CITY OF HOBART

# SUPPORTING INFORMATION

## SPECIAL COUNCIL MEETING

## OPEN PORTION OF THE MEETING

## TUESDAY, 27 JULY 2021
## AT 5:00 PM
## VENUE: COUNCIL CHAMBER, TOWN HALL

## TABLE OF CONTENTS

Planning: #180574

**Property**

100 PINNACLE ROAD MOUNT WELLINGTON TAS 7054

**People**

Applicant
*
Mount Wellington Cableway Company Pty Limited, by their
agent, Ireneinc Planning & Urban Design

49 Tasma Street
NORTH HOBART TAS 7000
62349281
planning@ireneinc.com.au

Owner
*
Hobart City Council

16 Elizabeth Street
HOBART TAS 7000
6238 2711
coh@hobartcity.com.au

Entered By
IRENEINC PLANNING AND URBAN DESIGN
49 TASMA STREET
NORTH HOBART TAS 7000
62349281
admin@ireneinc.com.au

**Use**

Other

**Details**

Have you obtained pre application advice?

- Yes

If YES please provide the pre application advice number eg PAE-17-xx

Are you applying for permitted visitor accommodation as defined by the State Government Visitor Accommodation Standards? Click on help information button for definition. If you are not the owner of the property you MUST include signed confirmation from the owner that they are aware of this application.
*

- No

Is the application for SIGNAGE ONLY? If yes, please enter $0 in the cost of development, and you must enter the number of signs under Other Details below.
*

- - No

If this application is related to an enforcement action please enter Enforcement Number

## Details

What is the current approved use of the land / building(s)?
*

open space and infrastructure

Please provide a full description of the proposed use or development (i.e. demolition and new dwelling, swimming pool and garage)
*

Development of cableway and associated infrastructure

Estimated cost of development
*

50000000.00

Existing floor area (m2) | Proposed floor area (m2) | Site area (m2)

## Carparking on Site

N/A

Total parking spaces | Existing parking spaces

Other (no selection chosen)

## Other Details

Does the application include signage?
*

No

How many signs, please enter 0 if there are none involved in this application?
*

0

**Tasmania Heritage Register**

Is this property on the Tasmanian Heritage Register?

- No

## Documents

### Required Documents

Title (Folio text and Plan and Schedule of Easements)
*

2 Combined Titles.pdf

Plans (proposed, existing)
*

3 architectural drawings_combined.pdf

### Supporting Documents

Concept Servicing Plan
8 MWCC_Site Servicing Report_ Feb 2019.pdf

Traffic Impact Assessment
16 MWCC_South Hobart Base Station_ Traffic Impact Assessment_May 2019.pdf

Planning Report
1 Planning Report_June 2019.pdf

Bushfire Management Plan
10 Bushfire Management Plan_and_Fire Protection Report.pdf

Flora and Fauna Report
9 Mt Wellington Cableway_NaturalValuesReport_NBES_20190605 (1).pdf

Longitudinal Profile
4 Longitudinal Profile_80ATW Mount Wellington_Aug 2018.pdf

| |
|---|
| Energy load & Storage<br>5 80-ATW Mount Wellington_ Oct 2018.pdf |
| Civil Drawings<br>6 MWCC Civil Drawings_13.0041_May 2019.pdf |
| Hydraulics Drawings<br>7 MWCC Hydraulics Drawings_Jan 2019.pdf |
| Geotechnical Study<br>11 Geotechnical Study Report_Oct 2018.pdf |
| MASTERPLAN<br>12 MWCC Masterplan 2019.jpg |
| Acoustic Assessments<br>13 Acoustic Report_Appendices_GM noise measurement report.pdf |
| Visual Impact Assessment<br>14 Visual Impact Assessment_and_Appendices_jan 2019.pdf |
| Visual Amenity Statement of Methodology<br>15 Visual Amenity_Statement of Methodology_Nov 2018.pdf |
| Construction Methodology<br>17 Construction Methodology_2018.pdf |


NEW LINK ROAD
Base
CONNECT TO EXISTING ROUNDABOUT
AERIAL TRAMWAY CORRIDOR EASEMENT
2592m total inclined length / 2142m centre span
Pinnacle
mwCC
MASTERPLAN


NOTE: ALL DETAIL SITE SURVEY INFORMATION REFERENCED IN THE FOLLOWING DRAWINGS HAS BEEN PROVIDED BY LEARY & COX LAND & ENGINEERING SURVEYORS

| DRAWING No. | DESCRIPTION |
|---|---|
| 1780_DA00 | SITE PLAN & DRAWING SCHEDULE |
| 1780_DA01 | LEVEL 0 - LOADING - FLOOR PLAN |
| 1780_DA02 | LEVEL 1 - STAFF - FLOOR PLAN |
| 1780_DA03 | LEVEL 2 - PLATFORM - FLOOR PLAN |
| 1780_DA04 | ROOF PLAN |
| 1780_DA05 | ELEVATIONS |
| 1780_DA06 | SECTIONS |

**FLOOR AREAS APPROX (m²)**

| | |
|---|---|
| LEVEL 2 PLATFORM: | 625 |
| LEVEL 1 STAFF: | 342 |
| LEVEL 0 LOADING: | 447 |
| TOTAL | 1424m² |

1780_DA00

H+2 ARCHITECTURE

JAWS ARCHITECTS

DEVELOPMENT APPLICATION

Mt. Wellington Cable Car

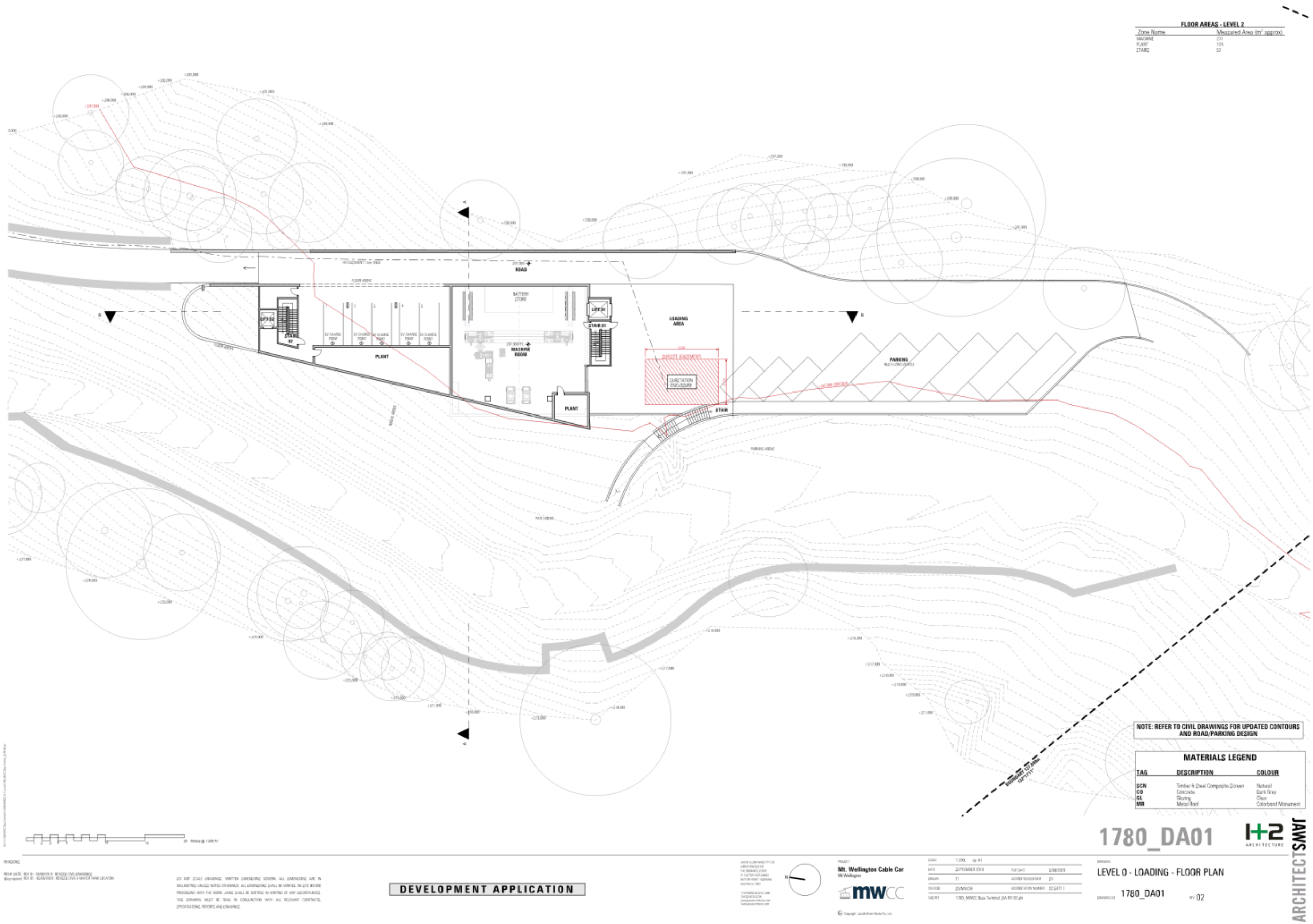
mwCC

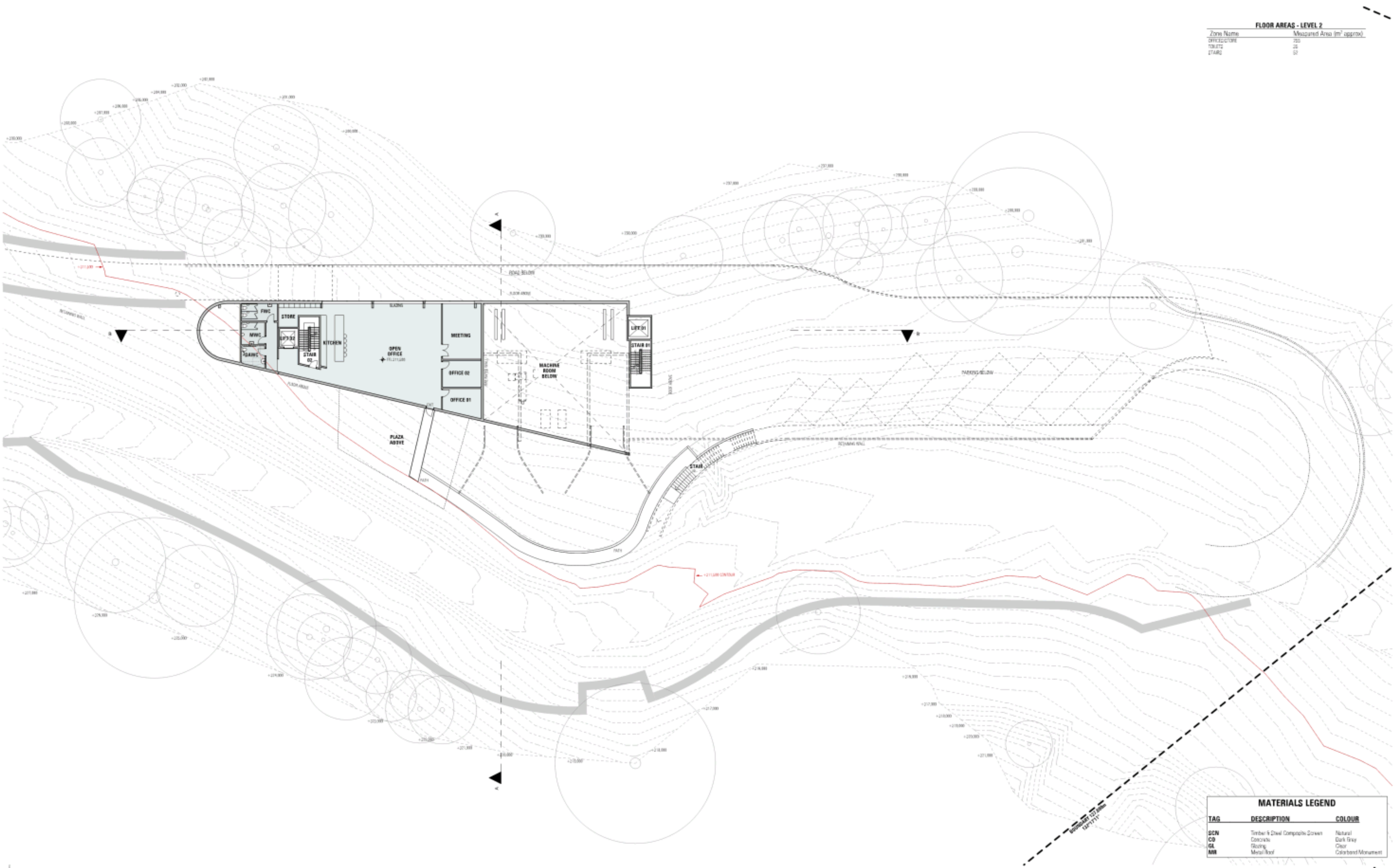
SITE PLAN & DRAWING SCHEDULE

1780_DA00

REV 02

# ATTACHMENT L






**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| SCN | Timber & Steel Composite Screen | Natural |
| CO | Concrete | Dark Grey |
| GL | Glazing | Clear |
| MR | Metal Roof | Colorbond Monument |

1780_DA02

I+2 ARCHITECTURE

JAWS ARCHITECTS

DEVELOPMENT APPLICATION

PROJECT
**Mt. Wellington Cable Car**
Mt Wellington

mwCC

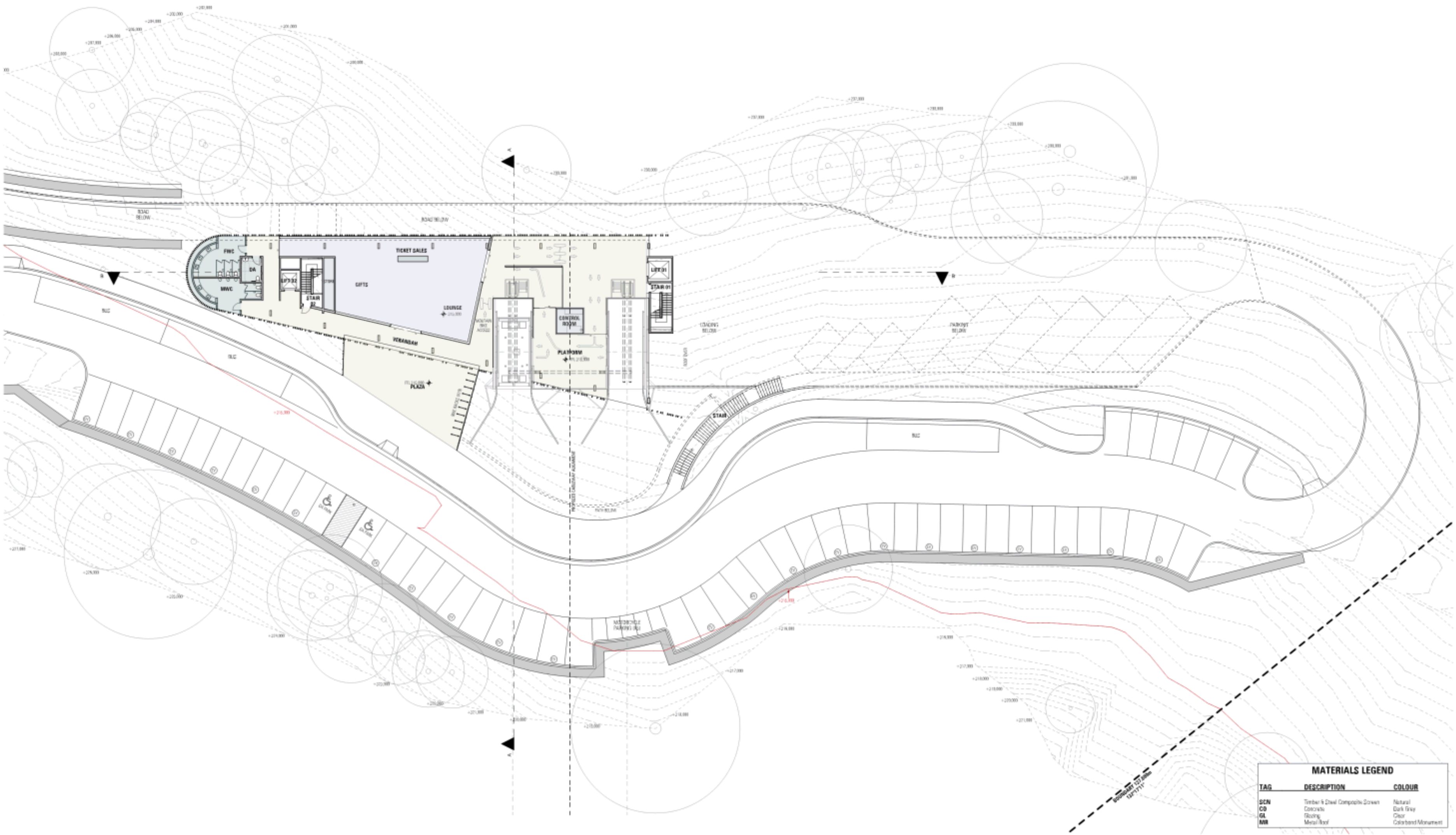
| | | | |
|---|---|---|---|
| SCALE | 1:200 @ A1 | | |
| DATE | SEPTEMBER 2018 | PLOT DATE | 5/08/2020 |
| DRAWN | TI | ACCREDITED DESIGNER | DV |
| CHECKED | DV/MW/DH | ACCREDITATION NUMBER | CC 6471 I |
| CAD REF | 1780_MWCC Base Terminal_DA R1 02.pln | | |

DRAWING
LEVEL 1 - STAFF - FLOOR PLAN

DRAWING NO 1780_DA02 REV 02

**FLOOR AREAS - LEVEL 2**

| Zone Name | Measured Area (m² approx) |
|---|---|
| VERANDAH/PLATFORM | 224 |
| LOUNGE/GIFTS/TICKET SALES | 137 |
| TOILETS | 58 |
| STORE | 3 |
| LIFTS/STAIRS | 52 |




**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| SCN | Timber & Steel Composite Screen | Natural |
| CO | Concrete | Dark Grey |
| GL | Glazing | Clear |
| MR | Metal Roof | Colorbond Monument |

**1780_DA03**

DEVELOPMENT APPLICATION

PROJECT: **Mt. Wellington Cable Car**, Mt Wellington

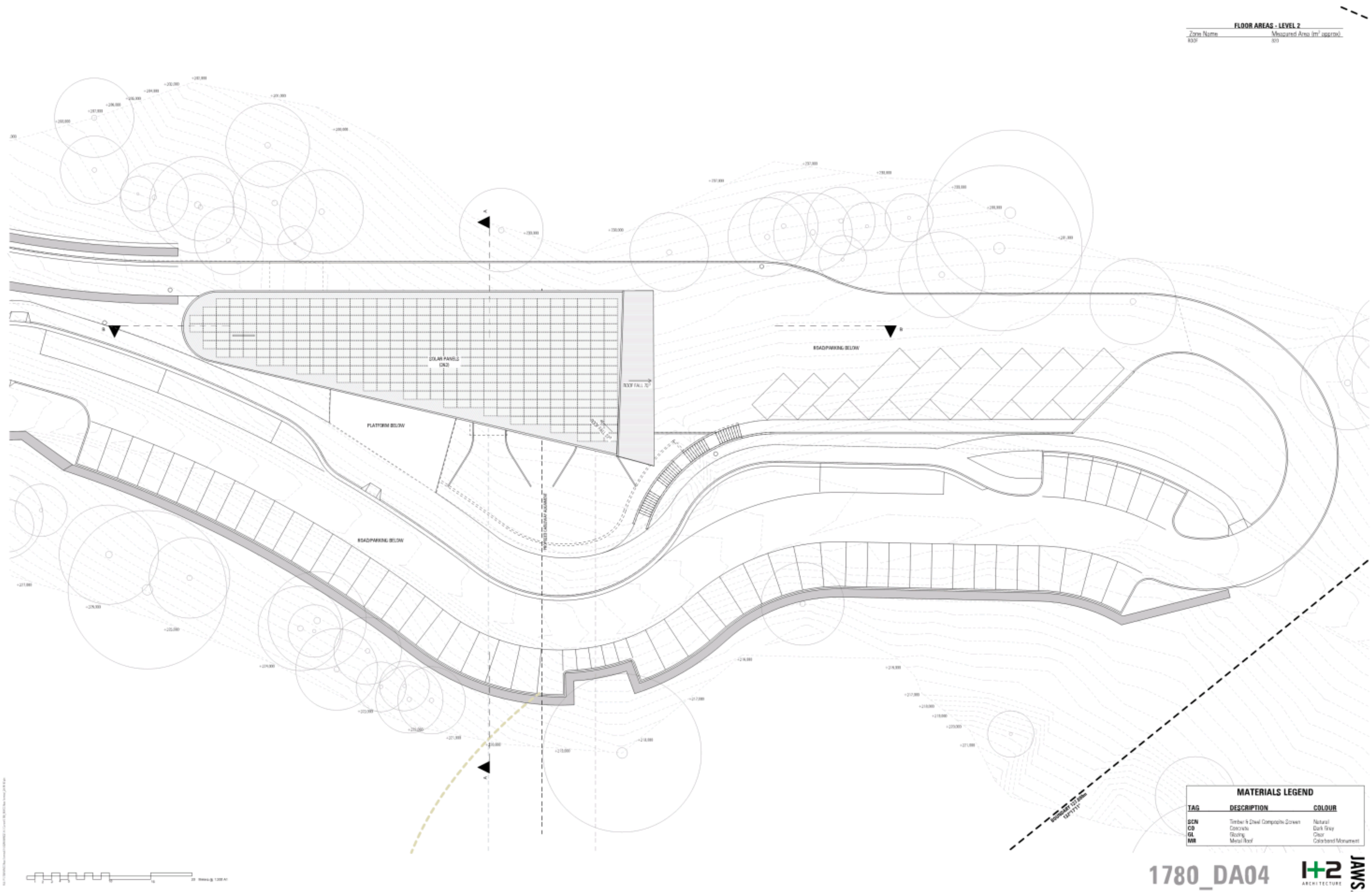
mwCC

DRAWING: LEVEL 2 - PLATFORM - FLOOR PLAN

DRAWING NO. 1780_DA03 REV 02

I+2 ARCHITECTURE

JAWS ARCHITECTS




## MATERIALS LEGEND

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| SCN | Timber & Steel Composite Screen | Natural |
| CO | Concrete | Dark Grey |
| GL | Glazing | Clear |
| MR | Metal Roof | Colorbond Monument |

1780_DA04

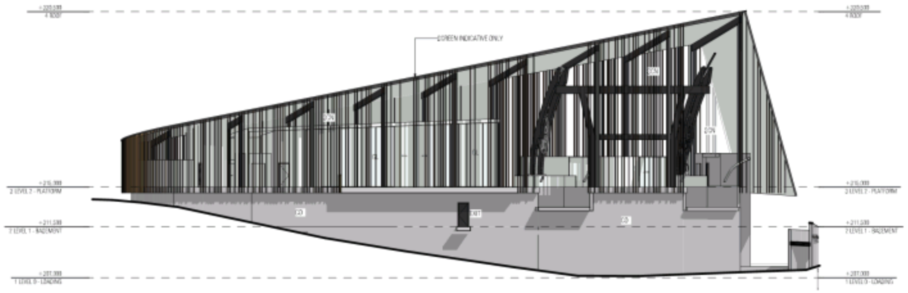
DEVELOPMENT APPLICATION

PROJECT
**Mt. Wellington Cable Car**
Mt Wellington

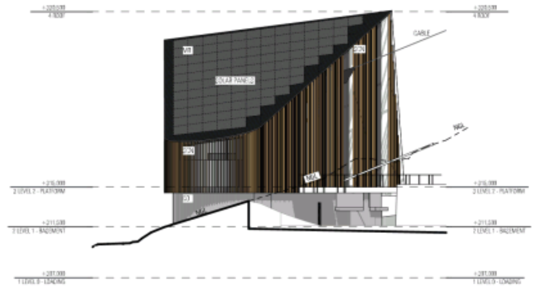
SCALE 1:200 @ A1
DATE SEPTEMBER 2019 PLOT DATE 5/08/2020
DRAWN TI
CHECKED ZV/MW/CH

DRAWING
ROOF PLAN
DRAWING NO 1780_DA04 REV 02

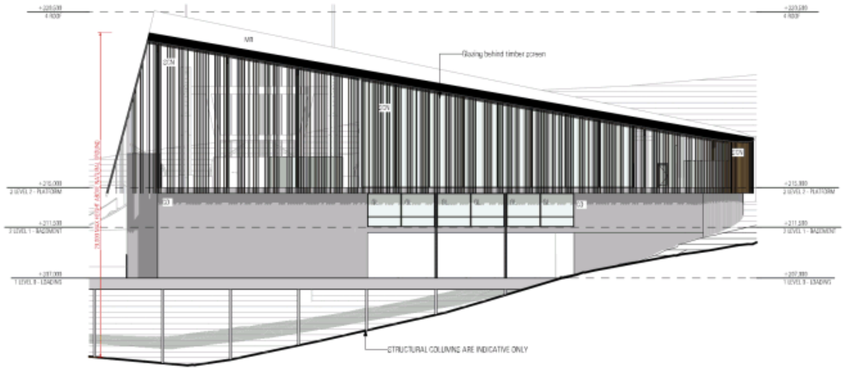
I+2 ARCHITECTURE
JAWS ARCHITECTS



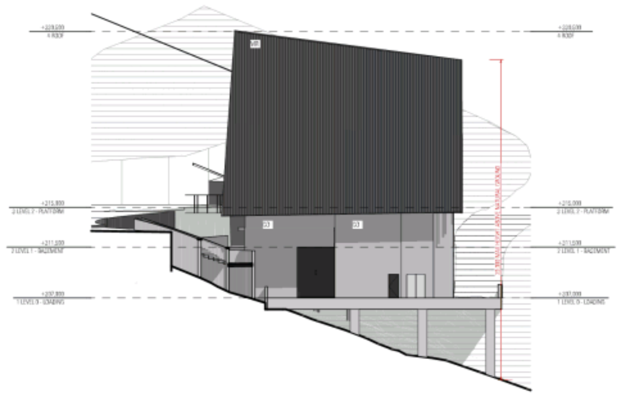

WEST ELEVATION - PROJECTED
Scale 1:200




NORTH ELEVATION - TRUE
Scale 1:200




EAST ELEVATION - TRUE
Scale 1:200



SOUTH ELEVATION - TRUE
Scale 1:200

**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| SCN | Timber & Steel Composite Screen | Natural |
| CO | Concrete | Dark Grey |
| GL | Glazing | Clear |
| MR | Metal Roof | Colorbond Monument |

DEVELOPMENT APPLICATION

1780_DA05

I+2 ARCHITECTURE

JAWS ARCHITECTS

PROJECT
**Mt. Wellington Cable Car**
Mt Wellington

mwCC

DATE SEPTEMBER 2019

DRAWING
ELEVATIONS

1780_DA05 REV 02

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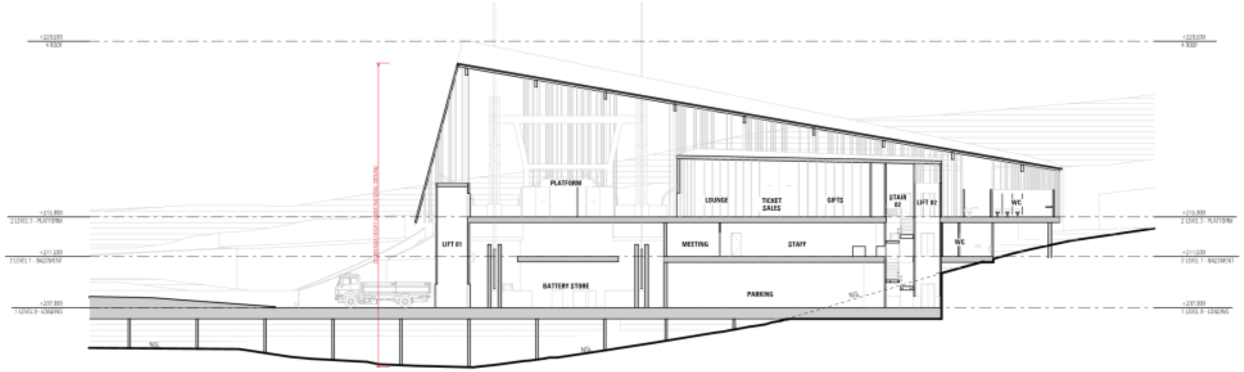
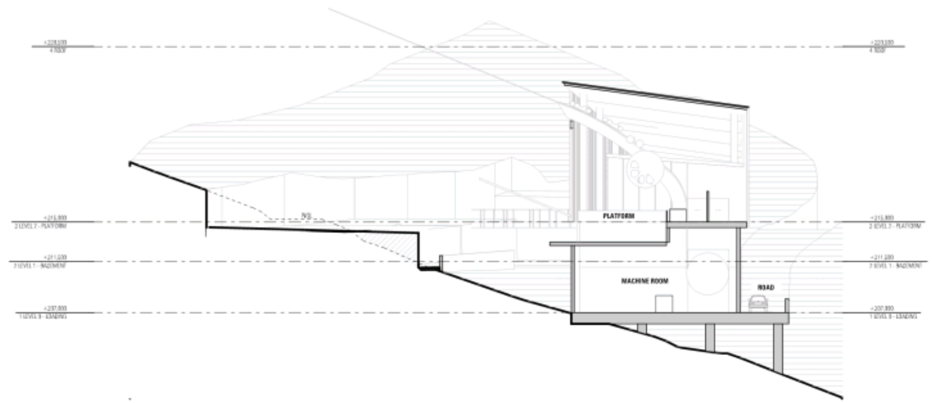



SECTION B
Scale 1:200




SECTION A
Scale 1:200

**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| SCN | Timber & Steel Composite Screen | Natural |
| CO | Concrete | Dark Grey |
| GL | Glazing | Clear |
| MR | Metal Roof | Colorbond Monument |

1780_DA06

I+2 ARCHITECTURE

JAWS ARCHITECTS

DEVELOPMENT APPLICATION

PROJECT
**Mt. Wellington Cable Car**
Mt Wellington

mwCC

DRAWING
SECTIONS

1780_DA06 REV 02


NOTE: ALL DETAIL SITE SURVEY INFORMATION REFERENCED IN THE FOLLOWING DRAWINGS HAS BEEN PROVIDED BY LEARY & COX LAND & ENGINEERING SURVEYORS AND NATIONAL SURVEY SOLUTIONS

NOTE: ALL PATHS SHOWN ARE INDICATIVE ONLY

| DRAWING No. | DESCRIPTION |
|---|---|
| 1782_DA101 | SITE PLAN & DRAWING SCHEDULE |
| 1782_DA201 | BASEMENT PLAN |
| 1782_DA202 | LEVEL 0 PLAN |
| 1782_DA203 | LEVEL 1 PLAN |
| 1782_DA204 | LEVEL 2 PLAN |
| 1782_DA205 | ROOF PLAN |
| 1782_DA301 | ELEVATIONS 01 |
| 1782_DA302 | ELEVATIONS 02 |
| 1782_DA401 | SECTIONS |

**TOTAL FLOOR AREAS ($m^2$)**

| | |
|---|---|
| BASEMENT: | [illegible] |
| LEVEL 0: | [illegible] |
| LEVEL 1: | [illegible] |
| LEVEL 2: | 1210 |
| ROOF: | 77 |
| TOTAL | [illegible] |

OUTDOOR (TRAFFICABLE ROOFS/OUTDOOR SEATING ETC.): [illegible]

1782_DA101

H+2 ARCHITECTURE

DEVELOPMENT APPLICATION

Mt. Wellington Cable Car

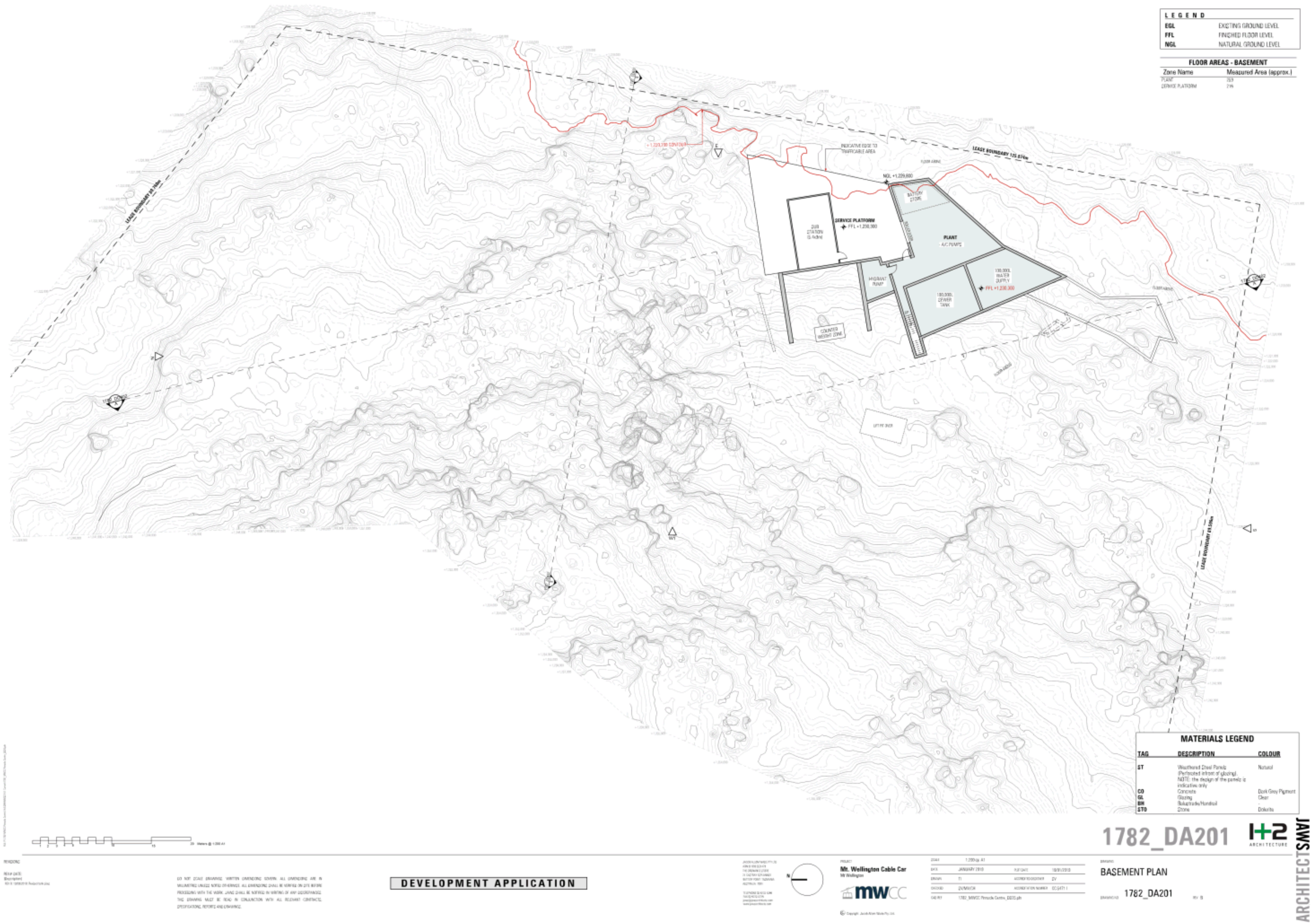
mwCC

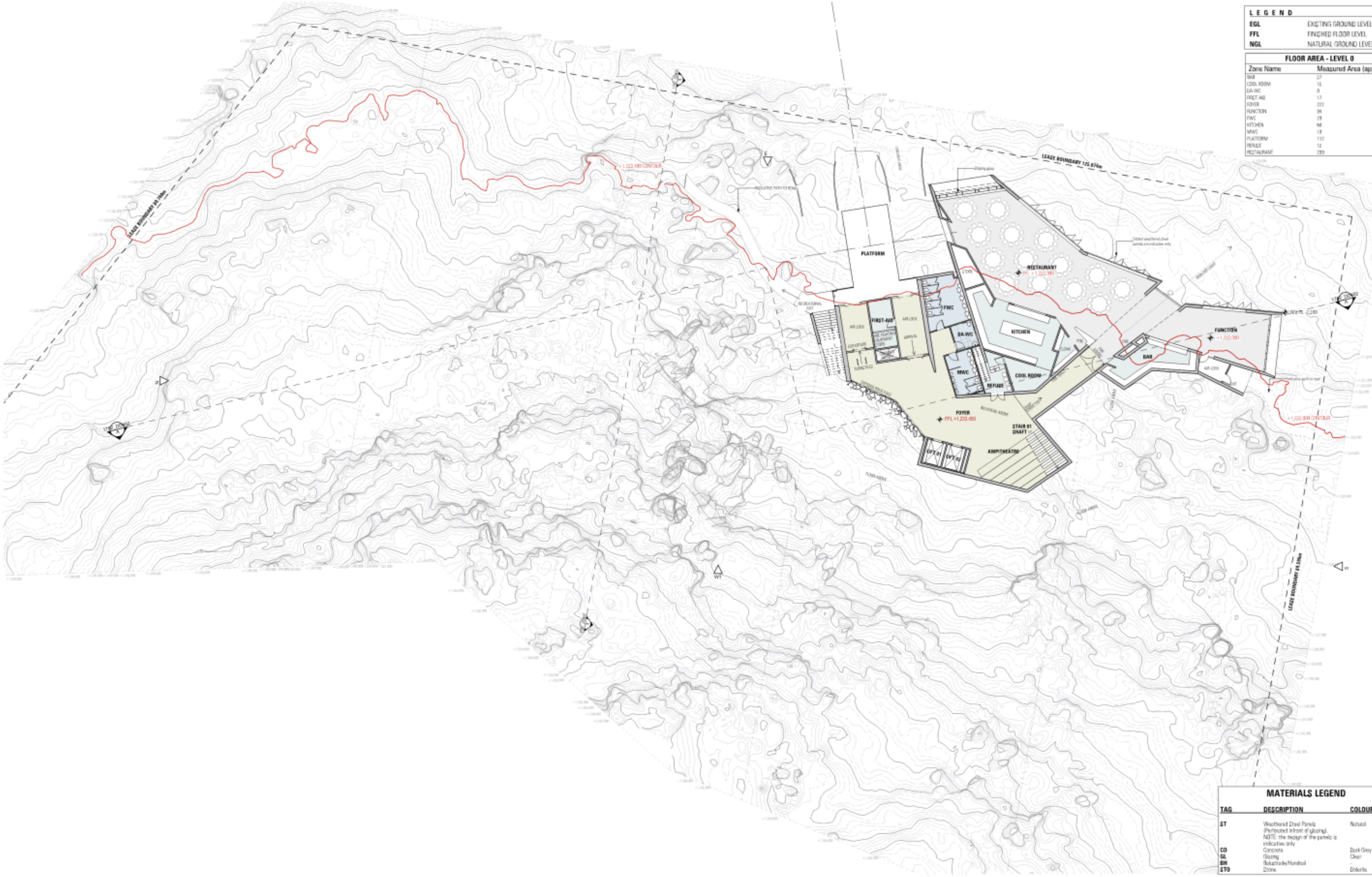
SITE PLAN & DRAWING SCHEDULE

1782_DA101

JAWS ARCHITECTS

**ATTACHMENT L**






| LEGEND | |
|---|---|
| EGL | EXISTING GROUND LEVEL |
| FFL | FINISHED FLOOR LEVEL |
| NGL | NATURAL GROUND LEVEL |

**FLOOR AREA - LEVEL 0**

| Zone Name | Measured Area (approx.) |
|---|---|
| BAR | 27 |
| COOL ROOM | 15 |
| DA-WC | 8 |
| FIRST-AID | 17 |
| FOYER | 222 |
| FUNCTION | 94 |
| FWC | 29 |
| KITCHEN | 48 |
| MWC | 19 |
| PLATFORM | 112 |
| REFUGE | 12 |
| RESTAURANT | 293 |

**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| ST | Weathered Steel Panels (Perforated infront of glazing). NOTE: the design of the panels is indicative only | Natural |
| CO | Concrete | Dark Grey Pigment |
| GL | Glazing | Clear |
| BH | Balustrade/Handrail | - |
| STO | Stone | Dolerite |

DEVELOPMENT APPLICATION

Mt. Wellington Cable Car

mwCC

1782_DA202

I+2 ARCHITECTURE

JAWS ARCHITECTS

LEVEL 0 PLAN

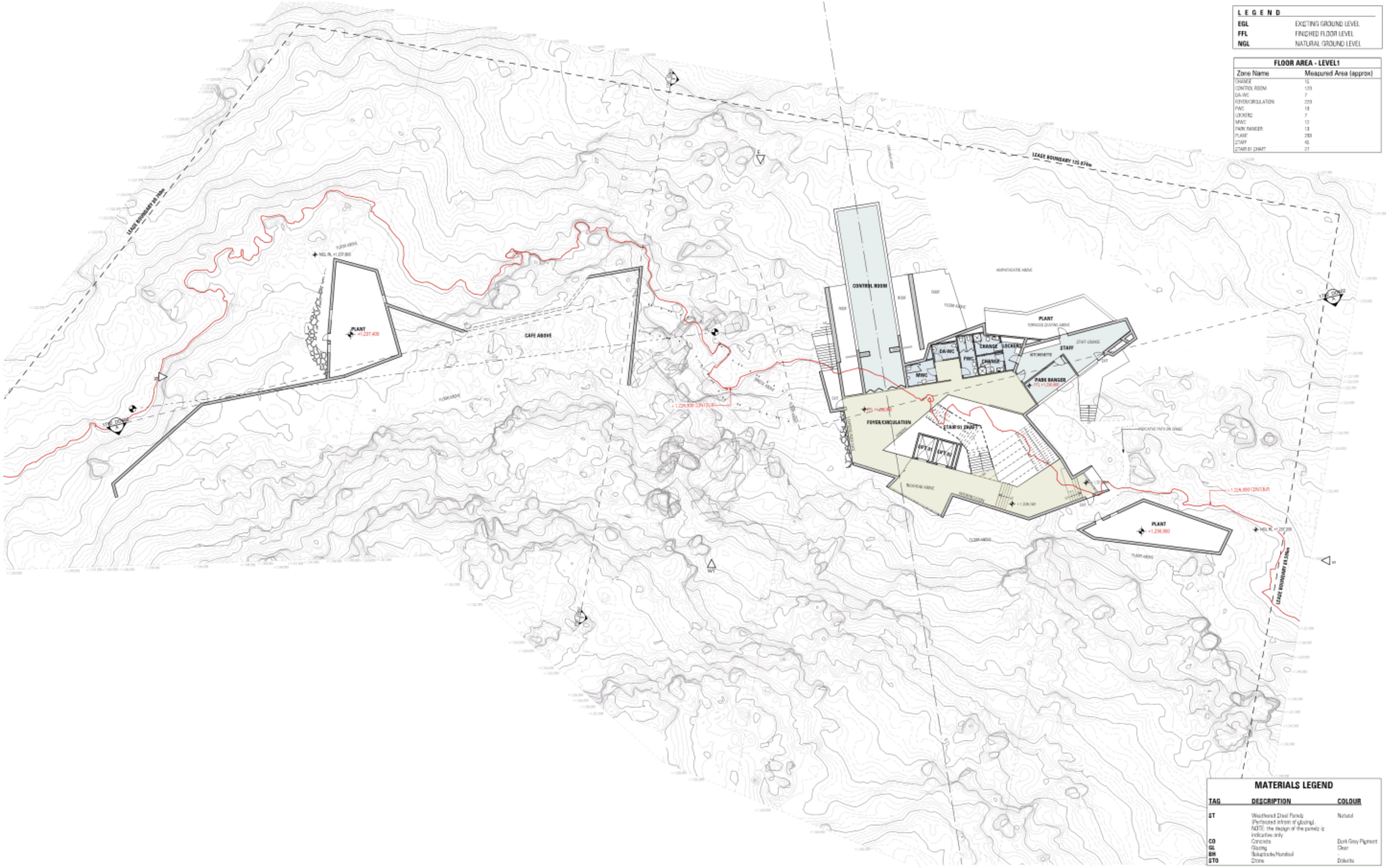
1782_DA202

# ATTACHMENT L

| L E G E N D | |
|---|---|
| **EGL** | EXISTING GROUND LEVEL |
| **FFL** | FINISHED FLOOR LEVEL |
| **NGL** | NATURAL GROUND LEVEL |

**FLOOR AREA - LEVEL1**

| Zone Name | Measured Area (approx) |
|---|---|
| CHANGE | 15 |
| CONTROL ROOM | 120 |
| DA-WC | 7 |
| FOYER/CIRCULATION | 220 |
| FWC | 18 |
| LOCKERS | 7 |
| MWC | 12 |
| PARK RANGER | 13 |
| PLANT | 283 |
| STAFF | 45 |
| STAIR 01 SHAFT | 27 |




**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| ST | Weathered Steel Panels (Perforated infront of glazing). NOTE: the design of the panels is indicative only | Natural |
| CO | Concrete | Dark Grey Pigment |
| GL | Glazing | Clear |
| BH | Balustrade/Handrail | - |
| STO | Stone | Dolerite |

1782_DA203

I+2 ARCHITECTURE

JAWS ARCHITECTS

DEVELOPMENT APPLICATION

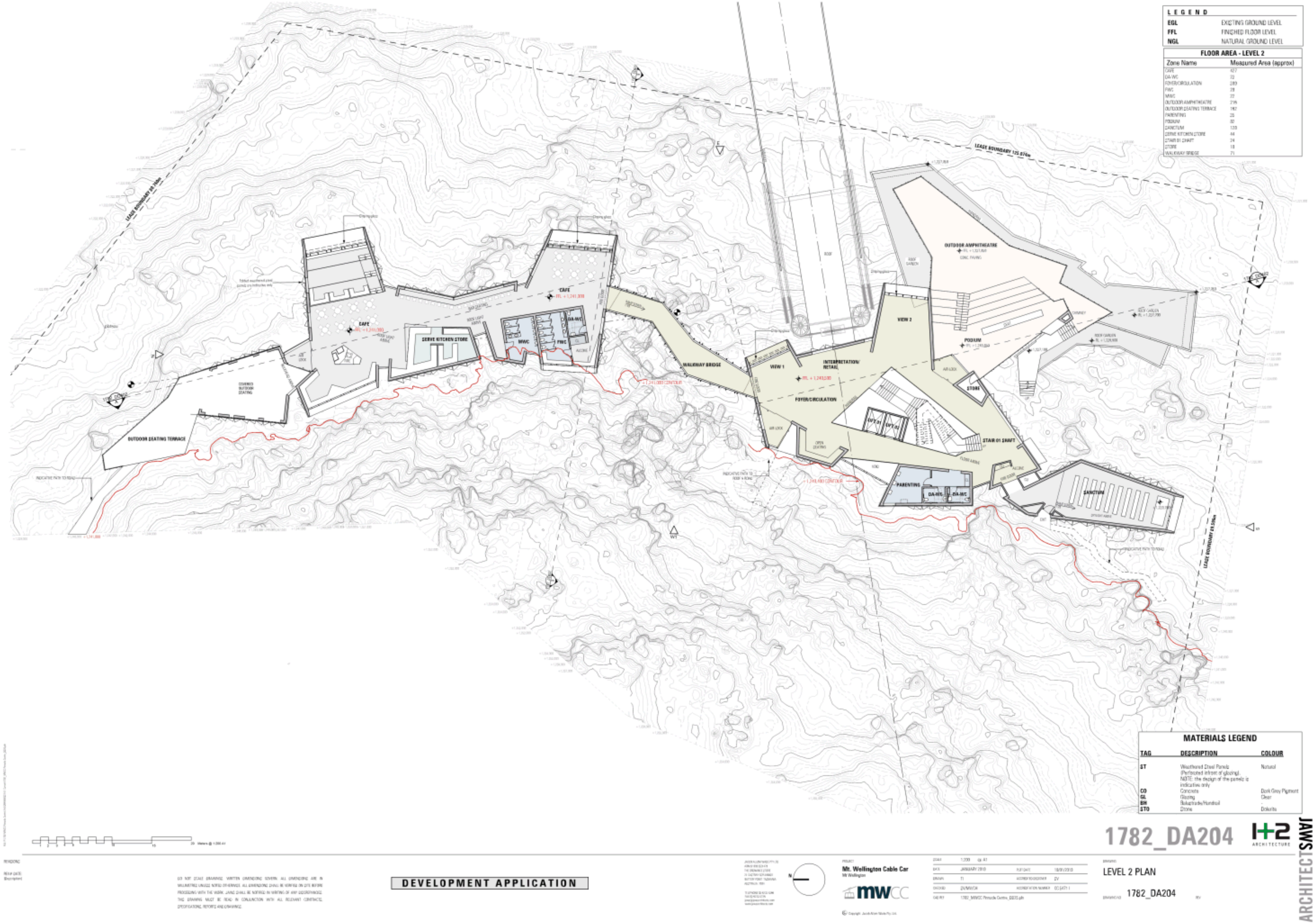
PROJECT
**Mt. Wellington Cable Car**
Mt Wellington

mwCC

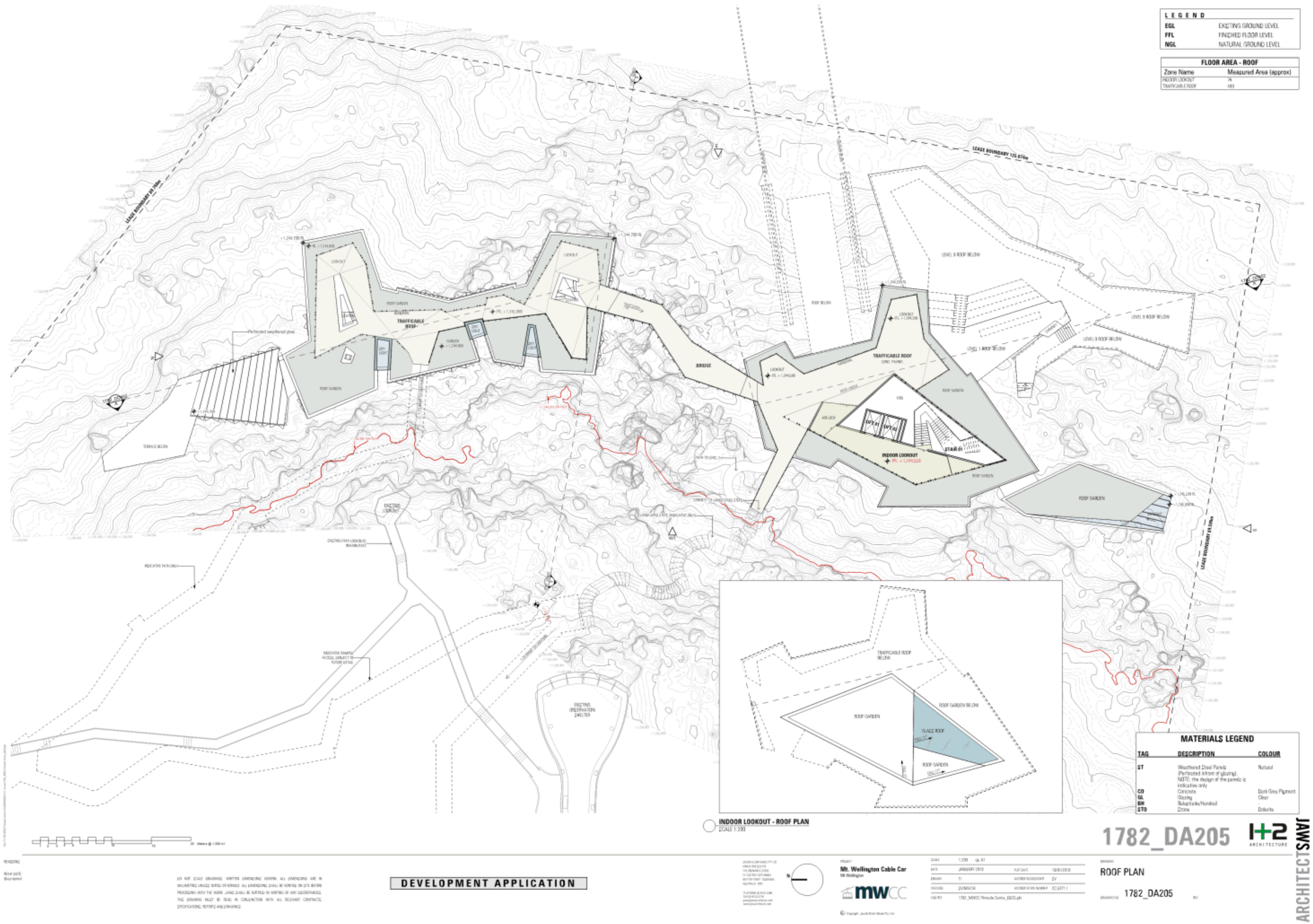
| | | | |
|---|---|---|---|
| SCALE | 1:200 @ A1 | | |
| DATE | JANUARY 2018 | PLOT DATE | 18/01/2018 |
| DRAWN | TI | ACCREDITED DESIGNER | DV |
| CHECKED | DV/MW/CH | ACCREDITATION NUMBER | CC 5471 I |
| CAD REF | 1782_MWCC Pinnacle Centre_DD25.pln | | |

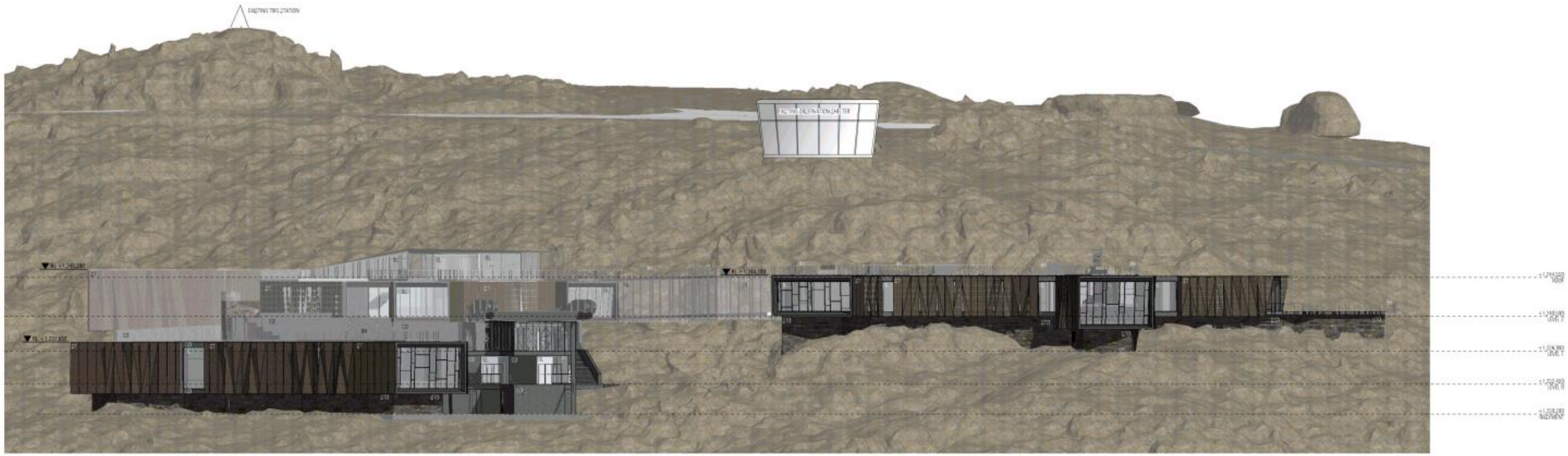
DRAWING
LEVEL 1 PLAN

DRAWING NO 1782_DA203 REV

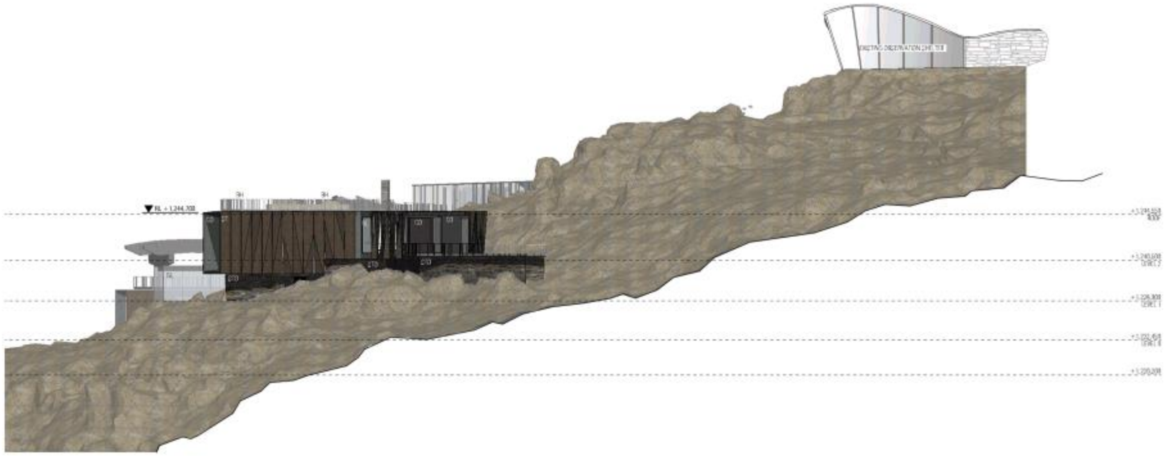

LEGEND
EGL EXISTING GROUND LEVEL
FFL FINISHED FLOOR LEVEL
NGL NATURAL GROUND LEVEL
FLOOR AREA - LEVEL 2
OUTDOOR SEATING TERRACE
CAFE
SERVE KITCHEN STORE
MWC
FWC
DA-WC
WALKWAY BRIDGE
VIEW 1
VIEW 2
INTERPRETATION/ RETAIL
FOYER/CIRCULATION
OUTDOOR AMPHITHEATRE
PODIUM
STORE
STAIR 01 SHAFT
PARENTING
SANCTUM
LEASE BOUNDARY
MATERIALS LEGEND
TAG DESCRIPTION COLOUR
1782_DA204
DEVELOPMENT APPLICATION
Mt. Wellington Cable Car
mwCC
LEVEL 2 PLAN
1782_DA204
JAWS ARCHITECTS
I+2 ARCHITECTURE

ATTACHMENT L





E EAST ELEVATION



N NORTH ELEVATION

**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| ST | Weathered Steel Panels (Perforated infront of glazing). NOTE: the design of the panels is indicative only | Natural |
| CO | Concrete | Dark Grey Pigment |
| GL | Glazing | Clear |
| BH | Balustrade/Handrail | - |
| STO | Stone | Dolerite |

**DEVELOPMENT APPLICATION**

**Mt. Wellington Cable Car**
Mt Wellington

1782_DA302

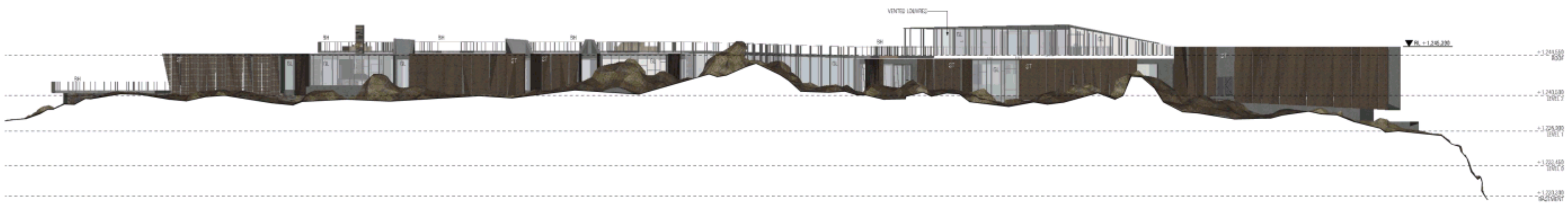
ELEVATIONS 02

1782_DA302

I+2 ARCHITECTURE

JAWS ARCHITECTS

S SOUTH ELEVATION



W WESTERN ELEVATION

**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| ST | Weathered Steel Panels (Perforated infront of glazing). NOTE: the design of the panels is indicative only | Natural |
| CO | Concrete | Dark Grey Pigment |
| GL | Glazing | Clear |
| BH | Balustrade/Handrail | - |
| STO | Stone | Dolerite |

1782_DA301

JAWS ARCHITECTS

DEVELOPMENT APPLICATION

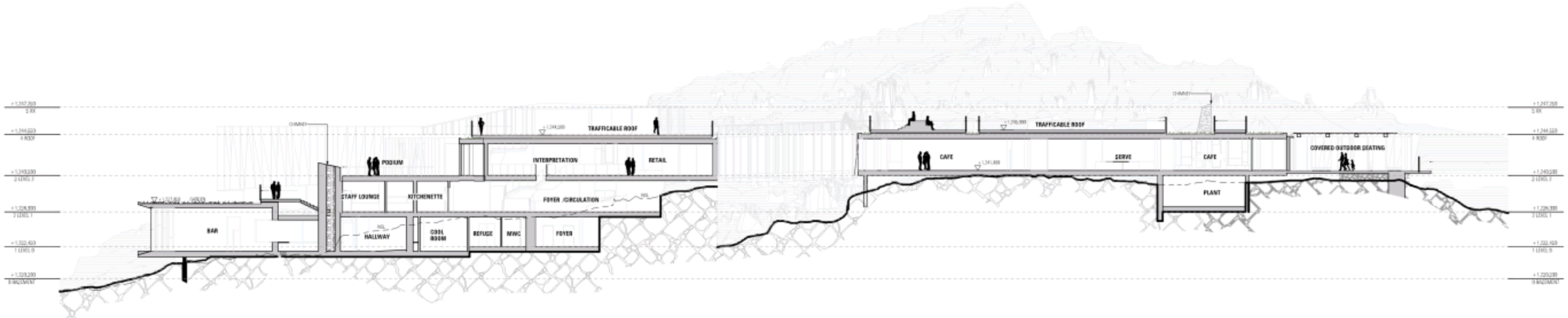
Mt. Wellington Cable Car
Mt Wellington

mwcc

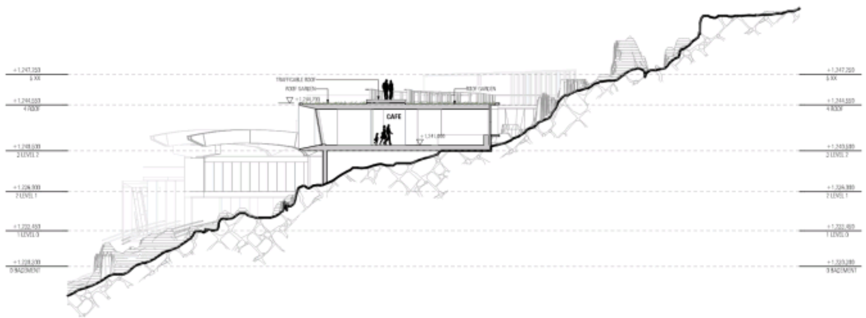
JANUARY 2018

ELEVATIONS 01

1782_DA301




A SECTION A-A
1:200




B SECTION B-B
1:200

**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| ST | Weathered Steel Panels (Perforated infront of glazing). NOTE: the design of the panels is indicative only | Natural |
| CO | Concrete | Dark Grey Pigment |
| GL | Glazing | Clear |
| BH | Balustrade/Handrail | - |
| STO | Stone | Dolerite |

1782_DA401

I+2 ARCHITECTURE

JAWS ARCHITECTS

DEVELOPMENT APPLICATION

PROJECT
**Mt. Wellington Cable Car**
Mt Wellington

mwCC

| | | | |
|---|---|---|---|
| SCALE | 1:200 @ A1 | | |
| DATE | JANUARY 2019 | PLOT DATE | 18/01/2019 |
| DRAWN | TI | ACCREDITED DESIGNER | DV |
| CHECKED | DV/MW/CH | ACCREDITATION NUMBER | CC 5471 I |
| CAD REF | 1782_MWCC Pinnacle Centre_DD25.pln | | |

DRAWING
SECTIONS

DRAWING NO 1782_DA401 REV

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# MOUNT WELLINGTON CABLE CAR DEVELOPMENT APPLICATION

ireneinc & smithstreetstudio
PLANNING & URBAN DESIGN

PLANNING TAS PTY LTD TRADING AS IRENEINC PLANNING & SMITH STREET STUDIO PLANNING & URBAN DESIGN ABN 78 114 905 074

# MOUNT WELLINGTON CABLE CAR

**Planning Assessment Report**

Last Updated- 18th May 2021

*V4 Incorporating responses to RFI*

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**Tel** (03) 6234 9281
**Fax** (03) 6231 4727
**Mob** 0418 346 283
**Email** planning@ireneinc.com.au

ireneinc PLANNING

# CONTENTS

# LIST OF FIGURES

# INTRODUCTION

# 1. SCOPE

Ireneinc Planning and Urban Design has been engaged by the Mount Wellington Cableway Company Pty Ltd (MWCC) to undertake an assessment of statutory planning requirements to accompany a submission for a development application. The application consists of infrastructure required to facilitate the operation of a cable car, including a terminal located at the pinnacle of kunanyi/Mount Wellington, three towers and a cableway between the towers, and a base terminal, car park and access road. Figure 1 illustrates the extent of the cable car infrastructure within Wellington Park.


**Figure 1: Masterplan showing the proposed cable car location (Source: MWCC October 2019)**

This report has been prepared in consultation with the following documentation, which constitutes the application submitted to Council.

## 1.1 DOCUMENTATION

### 1.1.1 CONSENTS

- Correspondence 'Mount Wellington Cable Car – Base Terminal – Road Access', TasNetworks, 21st September 2020

### 1.1.2 PLANS

- Base Station Architectural drawings; 1 + 2 Architecture and Jaws Architects, 5th August 2020 Rev 2
  - 1780_DA00, Site Plan and Drawing Schedule, Rev 2
  - 1780_DA01, Level 0 - Loading - Floor Plan, Rev 2
  - 1780_DA02, Level 1 – Staff – Floor Plan, Rev 2
  - 1780_DA03, Level 2 - Platform – Floor Plan, Rev 2
  - 1780_DA04, Roof Plan, Rev 2

- 1780_DA05 Elevations, Rev 2
- 1780_DA06, Sections, Rev 2
- 1780_DA07, Indicative Foundations Plan, Rev 01

- Pinnacle Centre Architectural drawings; 1 + 2 Architecture and Jaws Architects, 10 January 2019
  - 1782_DA101, Site Plan and Drawing Schedule
  - 1782_DA201, Basement Plan, Rev B
  - 1782_DA202, Level 0 Plan
  - 1782_DA203, Level 1 Plan
  - 1782_DA204, Level 2 Plan
  - 1782_DA205, Roof Plan
  - 1782_DA301, Elevations
  - 1782_DA302, Elevations 02
  - 1782_DA401, Sections
- Mt Wellington Cable Car- Road Engineering, Gandy and Roberts, Revision 6 04/08/2020
- Mt Wellington Cable Car Development Application Hydraulics Drawings; Gandy and Roberts Consulting Engineers, 3 January 2019
- MWCC Masterplan, MWCC 2019

### 1.1.3 Construction and Engineering Documentation

- Mt Wellington Cable Car Site Servicing Report for Planning Approval Submission, Revision 3, 27th of April 2020
- MWCC Development Application Construction Methodology; VOS Construction, 2 November 2018

### 1.1.4 Odour

- Technical Memo, Tarkarri Engineering, 10th September 2020
- Alex Mcleod, Curriculum Vitae
- EPA Correspondence, MWCC, 20th September 2019

### 1.1.5 Bushfire Documentation

- Draft Fire Protection Report Building Act Compliance Assessment (including Bushfire Hazard Management Plan) – Mount Wellington Cable Car; Castellan Consulting, Revision 8, 11$^{th}$ May 2021 including:

### 1.1.6 Natural Values Documentation

- Mt Wellington Cableway - Mt Wellington/ kunanyi Natural Values Impacts Assessment, North Barker Ecosystem Services, Version 7.7, 12th May 2021
- Mt Wellington Cableway- Collision Risk Report, North Barker Ecosystem Services, 16th March 2020
- Mount Wellington Cableway - Roadkill Risk Report and Draft Roadkill Mitigation Plan, North Barker Ecosystem Services, 16th April 2020
- Request for Further Information Clause 5a (b) – Biodiversity Matters, North Barker Ecosystem Services, 30th April 2020
- Response to Council Comments, North Barker Ecosystem Services, 15th July 2020
- Development Impact Assessment – Mount Wellington Cableway – Mount Wellington/kunanyi Element Tree Services, 8$^{th}$ May 2021

- Letter from Scenic World, Blue Mountains and Arthur's Seat, Mornington Peninsula regarding bird strikes
- MWCC letter to North Barker Ecosystem Services

### 1.1.7 Visual Impact Documentation

- Amended Mt Wellington Cable Car Visual Impact Assessment (Version D), Ethos Urban, 18th December 2019
- Photomontages (proposed, existing conditions and contrasting line colour), Another Perspective Drafting and Design
- View Shed Mapping 3D Photomontages, Another Perspective Drafting and Design, 2 January 2020
- Visual Amenity; Statement of Methodology Report, Stan Zaslavsky, 31st October 2018

### 1.1.8 Aboriginal Cultural Heritage Documentation

- Aboriginal Heritage Assessment Report of the proposed kunanyi/Mount Wellington Cable Car Footprint, Rev 1.0, 14th of May 2021, FHC

### 1.1.9 Geotechnical Documentation

- Geotechnical Study; Cardno (NSW/ACT) Pty Ltd, October 2018
- Supplementary Response to Hobart City Council Re Geotech Concerns, 19th October 2019
- MWCC GEO1 Review, SLR Consulting Australia Pty Ltd, 4th June 2020
- Dr Chris Meikle, Capability Statement, Cardno
- Garaventa Ltd 80-ATW Mount Wellington, 2018
- Garaventa Ltd Longitudinal Profile section, 800091740N500001 July 2018

### 1.1.10 Geoheritage Documentation

- Joe Giedle Curriculum Vitae, GE Consulting Engineers June 2020
- Proposed kunanyi/ Mt Wellington Cable Car, Hobart – Geomorphology Impact Assessment, GE Consulting Engineers, 17th June 2020

### 1.1.11 Acoustic Documentation:

- Mount Wellington Cable Car Project Acoustic Report Version 3, Pearu Terts, 27th July 2020
- Cable Car Gimmelwald – Mürren Noise Measurement Report (Garaventa AG), Akustiker SGA, 19th February 2007

### 1.1.12 Traffic Documentation

- Mount Wellington Cable Car, South Hobart Base Station, Traffic Impact Assessment; Midson Traffic Pty Ltd, May 2021
- Response to Council RFI; Midson Traffic, 23rd September 2019

### 1.1.13 Potentially Contaminated Land Documentation

- Preliminary Site Investigation – 30 McRobies Road, South Hobart – Proposed Mount Wellington Cable Car Access Road, Tasmania, Geo-Environmental Solutions, November 2019

### 1.1.14 Economic and Social Impact Documentation

- Community Benefits statement, MWCC, June 2020
- Mount Wellington Cable Car: Economic Impact, Saul Eslake, May 2016

### 1.1.15 Planning

- Revised Planning Report (Version 4), Ireneinc Planning & Urban Design, May 2021

- Planning letter response to RFI (October 2020), Ireneinc Planning and Urban Design, 13th May 2021
- Planning Letter in response to RFI (January 2020), Ireneinc Planning & Urban Design, 2nd October 2020
- Planning Letter in response to RFI (July 2019), Ireneinc Planning and Urban Design, 6th January 2020

# 2. PROPOSED USE AND DEVELOPMENT

This planning application has been prepared for the use and development of infrastructure to facilitate the operation of a cable car transport system, which is proposed to operate between the Base Station in McRobies Gully, South Hobart and the Pinnacle Centre on kunanyi/Mount Wellington. The proposal description is for use and development for partial demolition of existing observation shelter; construction of transport depot and distribution (cable car and associated infrastructure); tourist operation and food services and road.

The proposal consists of a number of components to the use/ development, which are outlined below.

## 2.1 BASE STATION

### 2.1.1 USE

The Base Station is classified as Transport Depot and Distribution use class under the Wellington Park Management Plan, and Tourist Operation under the Hobart Interim Planning Scheme 2015.

The proposed Base Station is a wedge-shaped building, which has adapted the functional requirements of the mechanical plant to operate the cable car, together with the natural topography of the land, resulting in a three-storey structure allowing at grade access to the upper level public access providing ticketing and waiting areas, gift shop and amenities.

The level below will house offices and staff areas, with the basement accommodating undercover parking and electric vehicle recharge points for 5 vehicles, and the cableway machinery room, service and battery store.

### 2.1.2 DESIGN & HEIGHT

The Base Station has been designed to minimise site disturbance. The building itself sits on steep terrain, with structural columns supporting the floor. A small portion of the northern end of the building (the narrow part of the triangular shape) will be excavated into the slope, with the remainder sitting on or above ground level.

The two lower levels of the building are finished in dark grey-pigmented concrete, giving the building a recessive appearance. The upper level (the public floor) is screened with natural timber slats, providing an open breeze through area and shelter for circulation and amenities, and an enclosed conditioned space (ticketing office). A skillion roof, sloping up east to west with the direction of the mountain face, will also accommodate solar panels.

At its maximum extent, the height of the Base Station from natural ground level is approximately 29m. This is measured from the eastern edge of the southern elevation and the height is due to the significant downward slope of the site in this location. From the new road access and parking area, the proposal will sit at a maximum height of 15.5m.

### 2.1.3 Vegetation disturbance

The Base Station will have an approximate floor area of 850m2 (excluding plant room, car parking and vehicle circulation areas), with a building footprint of approximately 635m2. The total disturbance footprint, which will be cleared of vegetation, including carpark and circulation and the bushfire hazard management area is approximately 0.9ha.

### 2.1.4 Construction Methodology

Precast panel walls will be poured in situ slabs. The upper-level structure is a steel frame with lightweight cladding also installed by mobile cranes and scissor lifts or similar. Normal sized components to be delivered by road to a location directly adjacent to the construction site. Mobile cranes will be utilised to erect the structure. Cableway infrastructure will be installed by mobile cranes. Temporary site sheds will be installed during construction and removed on completion. (Vos, 2018).

### 2.1.5 Servicing

There are currently no existing services to the site, meaning new infrastructure will need to be created. The Base Station will be serviced by a reticulated sewer system with the installation of a privately-owned sewer pump station on the site and construction of underground sewerage pipes following the alignment of the access road, connecting to the existing TasWater owned sewer main in McRobies Road. All sewerage generated from the Pinnacle Centre will be delivered to the Base Station by transportable tanks on the cable car during the hours of 4 and 6pm and emptied to the gravity fed drainage system within the building.

Water is to be delivered to the Base Station from the existing TasWater owned water main in McRobies Road. A privately owned transfer pump station located adjacent to the junction of the access road with McRobies Road is proposed to ensure sufficient pressure.

### 2.1.6 Vehicle Parking

Car Parking at the base station is provided on the basis that for most users this will be the origin and destination of the cable car journey. The carpark is designed to provide:

- 52 Car parking spaces, including 5 staff spaces and two disabled spaces*
- 6 minibus spaces*
- 3 bus/ coach parking spaces*
- 5 motorcycle parking spaces

- 20 bicycle parking spaces
- 3 car space lay off zones for drop off and pick up.

*These spaces include electric vehicle (EV) charging ports.

As detailed in drawing 1780_DA03 Rev 02 of the architectural base station set.

## 2.2 ACCESS ROAD

Access to the site is proposed by the construction of a new S4 class sealed rural road and will follow the alignment of existing 4WD or fire trails where possible.

The use of the road is ancillary to the use of the Base Station.

The road commences at the northern end of McRobies Road connecting to the existing roundabout and continues below the southern ridgeline that runs adjacent to the McRobies Waste Station, for a length of approximately 2.3km (Midson Traffic, 2021). It will join the Main Fire Trail and the High Voltage Transmission line easement at the eastern boundary of Wellington Park.

The roadway will be constructed to required municipal standards. The main fire trail will be reconnected by new sections wherever disturbance may occur, to ensure ongoing connectivity is maintained (Gandy & Roberts, 2020).

### 2.2.1 VEGETATION DISTURBANCE

The disturbance corridor along the access road alignment has been assessed as a maximum width of 20m, to accommodate benching where required, and has been calculated to have a disturbance footprint of 5.65ha. The alignment of the access road passes through two Threatened Vegetation Communities listed under the Nature Conservation Act 2002, (DGL) E. globulus forest and (DTO) E. tenuiramis forest on sediments (North Barker Ecosystem Services, 2021).

## 2.3 CABLEWAY/TOWERS

The proposed cableway will span a (horizontal) total of 2.4km from the Base Station to the Pinnacle Centre transporting two cabins, each with a maximum capacity of 80 persons (standing capacity based on weight) per cabin. Each of the cabins measure 6.9m x 3.9m.

The cable cars are secured by three cables, two track ropes for stability, and one haul rope for propulsion. The haul rope is controlled from the Base Station, obviating the need for any motor on the car itself. The two cars are counterbalanced and synchronised, resulting in one car ascending as the other descends.

The proposal involves a total of three towers to support the cable car along its route. These towers will be located in the following locations:

- Tower 1: approximately 180m to the west of the Base Station.
- Tower 2: approximately 100m further west from Tower 1.
- Tower 3: This tower will be located midway between the Organ Pipes and the proposed Pinnacle Centre, as shown in Figure 2 below, with an approximate distance from the escarpment of 70m. Tower 3 will be located in the Natural Zone, as specified under the WPMP.

The height of each of the towers is as follows:

| TOWER | HEIGHT (NATURAL GROUND LEVEL) | HEIGHT ABOVE TREE CANOPY |
|---|---|---|
| Tower 1 | 45m | 10m |
| Tower 2 | 55m | 15m |
| Tower 3 | 36m | N/A |

The building footprint of each tower is relatively small and required only to ensure adequate foundations. Minimal clearing will occur around each tower site.

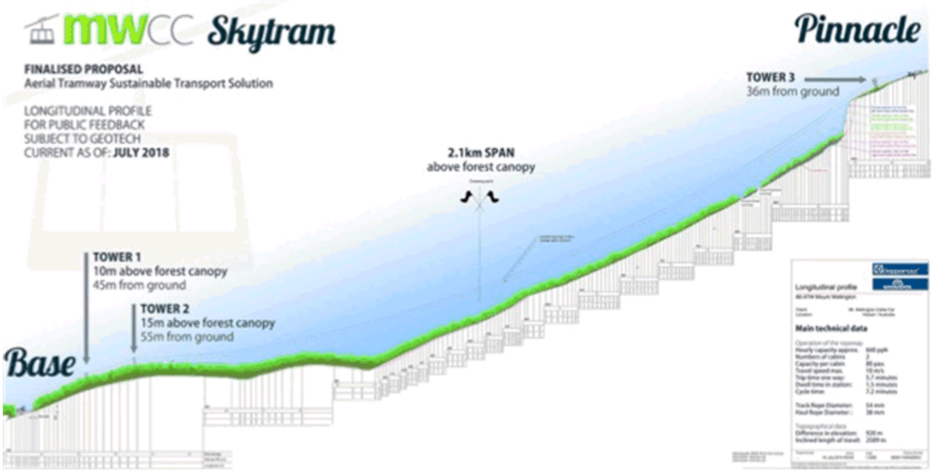


**Figure 2: Longitudinal section of cable way (Source: Garaventa Ltd. & Mount Wellington Cableway Company).**

### 2.3.1 Construction Methodology

The tower sites being remote from any roads will require excavation via small to medium excavator mostly helicoptered into site. Soil will need to be removed from site via helicopter if it is not re-used.

Concrete and reinforcement for tower footings will need to be pumped from the base station for the two lower sites and for the upper tower site pumped from the road location at the pinnacle.

The tower structures would be helicoptered in small to medium components, and the Cableway would be installed via helicopter.

A temporary walking access track is to be cleared between the base station, tower 1 and tower 2, (as indicated on 1780_DA00, Site Plan and Drawing Schedule, Rev A), which will be remediated following construction of the towers. (Vos, 2018)

The proposal will also require a temporary scaffold net for installation purposes to be erected over the existing TasNetworks electrical transmissions lines that run adjacent to Pinnacle Road, to facilitate the safe installation of the cableway. This will be removed immediately after construction, and any disturbance made good.

### 2.3.2 Vegetation disturbance

Selective clearance and pruning is required between the base station and Tower 1, until the cable car has sufficient height to clear the canopy. The "drop in" construction methodology of the towers will minimise the extent of clearance required to that of the pad footprint.

A 9m vertical clearance is required from the cable (at maximum sag), which may necessitate vegetation management between the Base Station to Tower 1, and some potential ongoing canopy trimming from tower 1 to 2 (Garaventa , 2018). For the remainder of the route, the cabins are well clear of the canopy and no clearance corridor is required.

The footprint of disturbance for each tower pad is expected to be a maximum of 10 x 10m, with disturbance required only for the four footings per tower. Full details of vegetation clearance and management will be provided prior to construction. No ongoing buffer is required, and vegetation can regrow following construction.

**Figure 3 Tower components installed by helicopter, with vegetation regrowth following construction. Source: (Vos, 2018)**

## 2.4 PINNACLE CENTRE

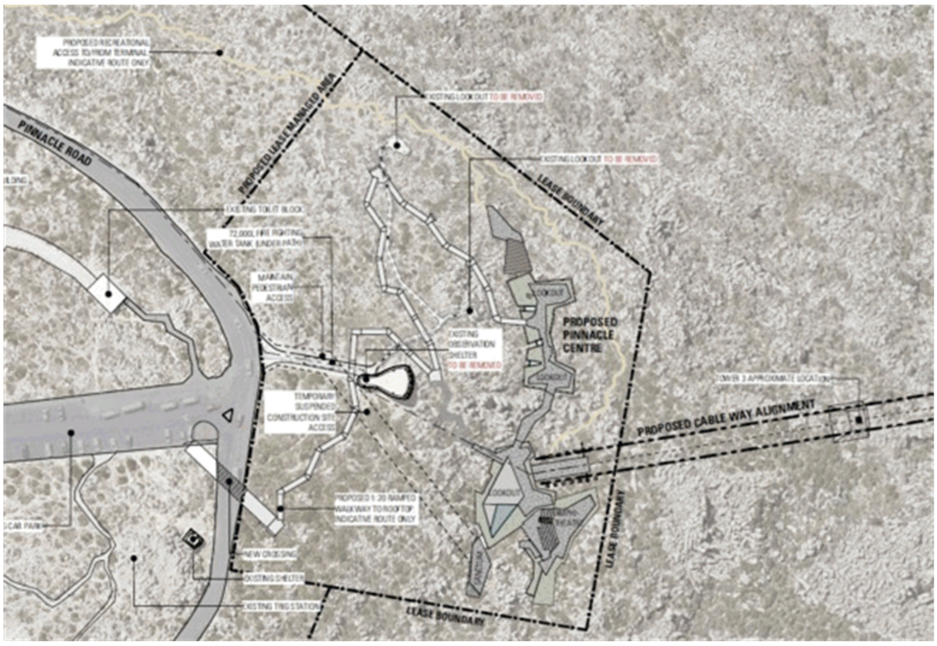


**Figure 4: Pinnacle Centre site plan (source: JAWS Architects)**

The proposed Pinnacle Centre is the destination facility for the cable car journey. The building provides the necessary infrastructure to allow passengers to alight from the ascending car, or board the descending car. It will offer public indoor and outdoor viewing facilities, interpretation, café, restaurant & function space, a quieter sanctum space, toilet & parenting facilities, first aid room, park ranger office and roof top viewing areas as well as associated staff facilities and service areas.

The Pinnacle Centre will be open to the public during the daytime, regardless of whether they are travelling on the cable car and will be accessible by ramp from the existing summit car park. The restaurant will be open during the evening, however, will only available to cable car ticket holders and will require a booking.

The building design for the proposed visitor centre and pinnacle station is fragmented in plan form, creating smaller components of building, which fold and nestle into shelves and pockets of the existing rocky terrain. The scale of cableway platform, plant and operations space is driven by technical requirements, with ancillary functions utilising residual space.

The lowest level of the building accommodates the service platform, plant room, and water and sewer tank. The second level provides turnstyles and boarding infrastructure, amenities, restaurant and function space. Level three accommodates control room (over the service platform), circulation space and staff amenities. The fourth level provides retail and interpretation, internal circulation and viewing space, and a sanctum, outdoor amphitheatre and walkway connecting to the northern wing. The northern wing houses café and outdoor seating. Each of the indoor viewing spaces is framed and directional, affording a variety of outlooks and views to each internal space. The roof area is trafficable in part, with the remainder covered by roof garden. Levels 3-5 are set back from the lower two levels, as the building steps up the slope.

The building siting and location has been determined by a number of factors:

The building is located within the designated area of the Mt Wellington Reserve Management Plan Pinnacle Specific Area.

The route of the cableway system, including platform locations and relative levels;

Proximity to the mountain pinnacle, to provide accessible shelter and facilities for visitors who access the mountain by car, whilst reducing visual impact by setting the building below the mountain crest, to minimise encroachments on the profile of the mountain when viewed from the city.

**Existing observation shelter**

As the proposed centre replicates the functions of the existing observation shelter, this application also includes the partial demolition of the existing facility, removing the glazing and easternmost roof portion. The remainder of the structure, including floor and stone walls will provide for an open shelter as an alternative viewing platform. The demolition of the roof form and glazing will substantially reduce the visual impact the structure currently has on the skyline.

### 2.4.1 USE

| USE | STATUS | USE CLASS | HOURS OF OPERATION |
|---|---|---|---|
| Bathroom facilities | D | Transport Depot | 8am - 10pm |
| Foyer/ Circulation | D | Transport Depot | 8am - 10pm |
| Retail | D | Transport Depot | Daylight hours |
| Plant | D | Transport Depot | as required |
| Control Room | D | Transport Depot | as required |
| Restaurant (for dining and functions) | D | Food Services | Daylight hours till 6pm; Evenings (for cable car ticket holders only) - close by 10pm |
| Bar | D | Food Services | As per restaurant |
| Café | D | Food Services | 8am - 5pm |
| Sanctum (a silent room for scenic views to the South Wellington ranges) | D | Tourist Operation | Daylight hours (unless exclusive events, as per function room) |

| | | | |
|---|---|---|---|
| Lookouts | D | Tourist Operation | Where accessible - all hours |
| Indoor Amphitheatre (indoor scenic viewing area) | D | Tourist Operation | Daylight hours |
| Outdoor Amphitheatre (Outdoor scenic viewing area) | D | Tourist Operation | Daylight hours |
| Interpretation | D/P | Tourist Operation | Daylight hours |
| Park ranger Offices | D | Natural and Cultural Management | As required |
| First aid facilities | D | Ancillary Transport depot or Natural and Cultural Management | As required |
| Staff facilitates | D | Ancillary | As required |

### 2.4.2 Floor Areas

The total building footprint is 1925.03m2. The total floor area of the Pinnacle Centre is 3147m2 (including service and plant room). Proposed floor areas of principle ancillary uses are as follows:

- Restaurant = 298.1m$^2$
- Café = 427.3m$^2$
- Bar = 37m$^2$

The proposal will also provide increased public space, which will include an outdoor amphitheatre, garden areas and public lookout, which will have the following approximate areas:

- Outdoor Amphitheatre = 216m$^2$
- Outdoor seating = 161.72m$^2$

### 2.4.3 Visitor numbers

The cable car development is anticipated to attract 470,979 customers per year, most of whom will utilise the facilities within the Pinnacle building. It is expected that visitors will visit more than one activity within the building during a trip. It is also acknowledged that visitors accessing the site via other methods such as by vehicle or mountain bike may also visit the Pinnacle building, therefore visitors to the Pinnacle building will likely be greater than the average customers per year.

The Traffic Impact Assessment determines that whilst the visitation to the summit will increase as a result of the development, the average vehicles per day using Pinnacle Road will reduce by 445 vehicles, from 730 to 285. The average people per vehicle has been observed onsite at 3.3 occupants. Therefore, a theoretical average of 343,283 people will visit the summit per annum via road, not accounting for road closures and other factors which will impact on reduced visitation.

An average of 814,262 people will visit the summit per year which averages to 2,231 people per day and many of whom will likely visit the Pinnacle Centre.

| ACTIVITIES | MAXIMUM CAPACITY AT ANY GIVEN TIME (PEOPLE) | CAPACITY PERCENTAGE | DISTRIBUTION OF AVERAGE PEOPLE PER DAY PER ACTIVITY (BASED ON CAPACITY PERCENTAGE) | AVERAGE PEOPLE PER HOUR (12 TRADING HOURS) |
|---|---|---|---|---|
| Café/retail | 443 | 43 | 959 | 80 |
| Restaurant/bar/function space | 434 | 42 | 937 | 78 |
| Viewing Areas/sanctum | 158 | 15 | 335 | 28 |
| Total | 1035 | 100 | 2231 | 186 |

Absolute Maximum visitors

Pinnacle Building Design

The building has been designed to accommodate a maximum daily limit of 10, 000 people.

Cable Car

The proposal consists of two cable car cabins which can accommodate (an absolute maximum) of up to 80 standing people per cabin. This is maximum theoretical capacity calculated on weight capacity and floor area. If operated at full speed the hourly system carrying capacity per cabin is 660 people with a 7.2minute cycle time (journey + loading time).

The proposed operation is a cycle time departing every 15 minutes, or 4 trips per hour. The proponent expects a likely average of 23 people per cabin per trip. The cabins operate in sync where one goes up whilst the other goes down. The maximum number of people proposed which could visit the Pinnacle via cable car with this operating mode is 320 people per hour.

The above data was provided by the cableway manufacturers, Doppelmayr Garaventa and the proponent, and the capacity of the building was determined by Lee Tyers Building Surveyors.

### 2.4.4 Proposed Operational Hours and Seasonal Visitor Variation

The expected operational hours are as follows, noting these are subject to the operational license and will likely to be between the hours of 8am and 10pm (noting these are not the explicit operational hours rather the timeframe operation will likely occur in):

- 9 hours per weekday in Winter
- 13 hours per weekend in the Winter
- 12 hours per weekday in Summer

- 14 hours per weekend in the Summer

The following table observes the absolute maximum visitors which could visit the pinnacle via the cable car based on the proposed scheduling of cable car trips and the maximum carrying capacity.

| HOURS OF OPERATION | MAXIMUM VISITORS VIA CABLE CAR PER DAY |
|---|---|
| 9 hours per weekday in Winter | 2, 880 |
| 13 hours per weekend in the Winter | 4, 160 |
| 12 hours per weekday in Summer | 3, 840 |
| 14 hours per weekend in the Summer | 4,480 |

### 2.4.5 DESIGN & HEIGHT

The Pinnacle Centre incorporates colours, materials and finishes consistent with the surrounding natural landscape elements, particularly the rock formations and colours and alpine vegetation. The colours and materials consist of weathered steel panels that will be placed in front of the glazing, with dark grey precast concrete panels.

This colour scheme is in-keeping with the dominant vegetation colours, that being dark greys and browns, interspersed with green vegetation. The outdoor amphitheatre and garden areas will provide additional colour to make existing vegetation surrounding the site.

Due to the nature of the topography, rising steeply from the edge of the Organ Pipes toward the summit and the siting of the Pinnacle Centre, the height will vary depending on each aspect of building and its relation to natural ground level. The maximum height of the Pinnacle Centre is taken from the eastern elevation, where the building will extend to a height of approximately 11.9m above NGL. Due to the changes in natural ground level, and the requirement for excavation works, all other aspects of the building fall at or below 11.9m in height.

### 2.4.6 INFRASTRUCTURE & SERVICING

TasNetworks electrical infrastructure will be extended from the existing high voltage infrastructure from the last existing power pole (located to the northern boundary of the pinnacle zone) to the Pinnacle Centre by underground trench following the existing road reservation, then continuing underground to the Pinnacle Centre from the existing observation shelter (refer site plan 1782_DD101)

Water is to be delivered to the Pinnacle Centre from the Base Station by a 1000l cube water tank within a cable car. At the Pinnacle, the water will be stored in a 75,000l water tank located in the basement of the building.

All sewerage and wastewater will be stored on site in a holding tank during operating hours and removed in transportable storage tanks to the Base Station. (Gandy & Roberts, 2020)

For water and wastewater, a design usage of 10L/person/day has been adopted. As illustrated in P4 Visitor Numbers of this report that average estimated numbers of visitors to the Pinnacle site is 2231 resulting in an estimated average of 22, 310 litres of water/wastewater. Each transportation tank can hold 5000 litres, resulting in an average of 5 trips and 1.25 hours of transportation. The cable car can carry a maximum of 4480 visitors during a weekend summer day, this would result up to 44,800 litres of wastewater/water resulting in 9 trips, equating to 2.25 hours of transportation. Waste transportation will generally occur between the hours of 4pm and 6pm, and in the event of higher than average visitation additional waste transfer can be accommodated into normal operating hours. It is noted that whilst the slower journey speed resulting in a 15m trip duration is used for transporting tourists, the cable car can operate at faster speed and shorter trip duration when used for servicing purposes. Goods loading and transportation is proposed between 8am and 9am.

### 2.4.7 Construction Methodology

Construction of the Pinnacle Centre will be undertaken in a manner, which minimises disturbance outside the building zone. A temporary ramp will be constructed from the existing observation shelter path to deliver material into and out of the site. This ramp will be of steel frame and timber sleepers or similar. This negates the need to build a road into the site avoiding degradation of the site outside of the building line and where the site has been previously untouched. Pedestrian access will be reaccommodated during construction.

The building structure is predominantly concrete, both in situ poured and precast. Precast components will be minimised to ensure delivery via the ramp system and a small tracked crane that can maintain its presence within the building site.

Other components of the building are lighter and smaller than the structure and include, cladding, framing, fitout materials and services plant. The excavation on the site is to be minimised and majority reused on site by local stonemasons to face the building's base perimeter, limiting material required to be removed via the ramp and roads (Vos, 2018).

# 3. THE SITE

The following figures describe the sites that form the proposal as well as the relevant zone and code requirement that relate the sites and the connections between the sites. The proposal involves a Base Station, Pinnacle Centre, connecting cableway and access road which fall within the provisions of the *Hobart Interim Planning Scheme 2015*, as well as the *Wellington Park Management Plan* (WPMP).

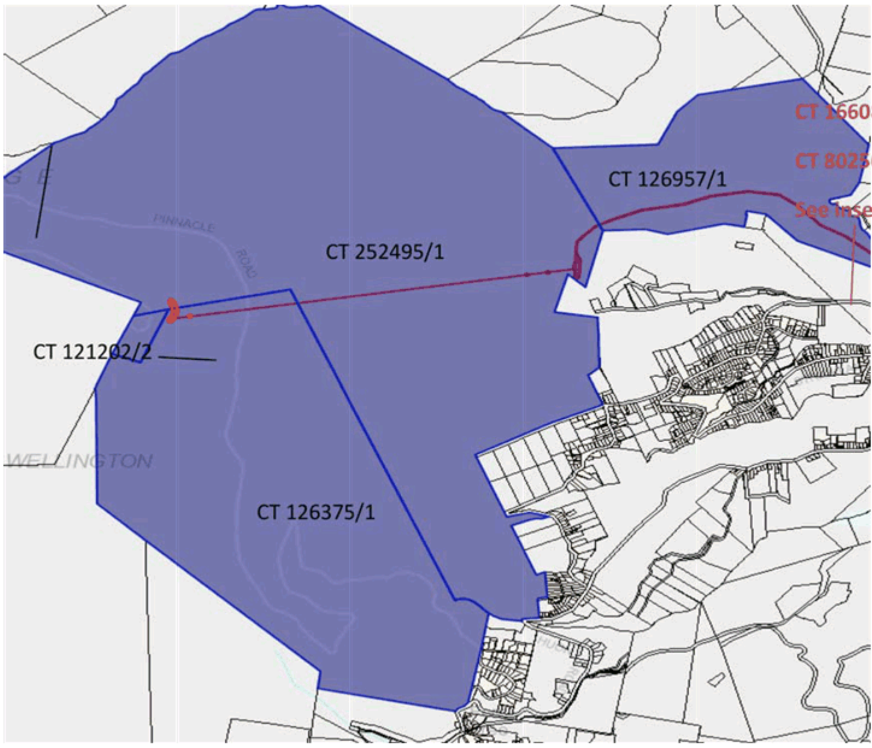


**Figure 5: Map showing Titles (Source: ListMap)**

## 3.1 TITLES & ADDRESS

| DEVELOPMENT | CERTIFICATE OF TITLE | ADDRESS |
|---|---|---|
| Base Station development | CT 252495/1 | 'WELLINGTON PARK' - 100 PINNACLE RD WELLINGTON PARK TAS 7054 |
| Towers 1 & 2 | CT 252495/1 | 'WELLINGTON PARK' - 100 PINNACLE RD WELLINGTON PARK TAS 7054 |
| Tower 3 | CT 126375/1 | 'WELLINGTON PARK' - 100 PINNACLE RD WELLINGTON PARK TAS 7054 |
| Pinnacle building development | CT 252495/1<br>CT 126375/1<br>CT 121202/2 (access only) | 'WELLINGTON PARK' - 100 PINNACLE RD WELLINGTON PARK TAS 7054 |
| Access Road | CT 252495/1<br>CT 80250/1<br>CT 166085/6<br>CT 126957/1 | 'HCC DISPOSAL AREA' - 30 MCROBIES RD SOUTH HOBART TAS 7004 |

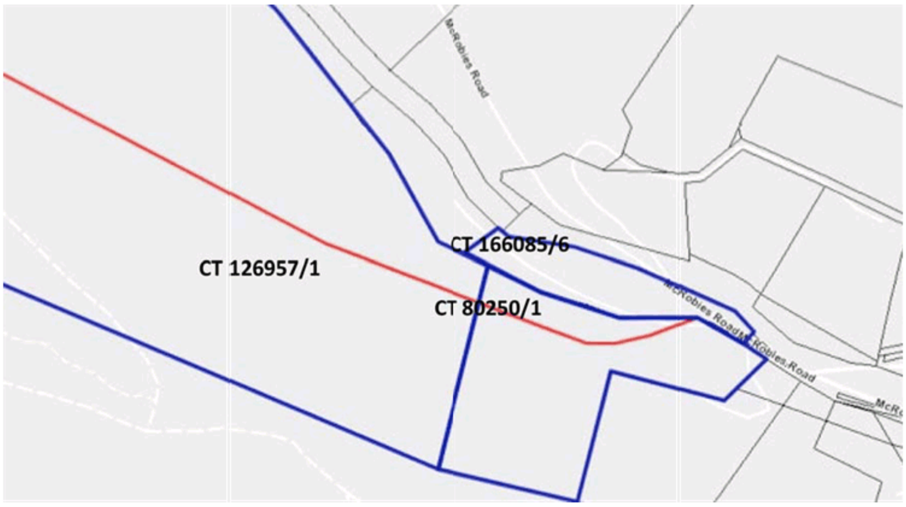


**Figure 6: Inset Map showing Titles for McRobies Road junction (Source: ListMap)**

## 3.2 DESCRIPTION: WELLINGTON PARK

Wellington Park is one of the largest areas of reserved land outside of the Tasmanian Wilderness World Heritage Area and is well known due to its close proximity to the surrounding urban and semi-rural environment. The proximity of the Park to Hobart presents unique opportunities for visitors and residents alike, to experience the natural and visual qualities that the Park has to offer.

The mountain is a significant landscape feature of Tasmania and is characterised by heavily vegetated slopes, ridges and open rocky landforms. The Organ Pipes and upper reaches of the mountain present the most striking visual features and form an integral part of Hobart's socio-cultural identity. During the early settlement years, Mount Wellington was extensively used for its natural resources including water, timber and stone, with timber being the most extensively used commodity (Centre for Tasmanian Historical Studies, 2006).

#### 3.2.1 USE

Existing uses within the Park include sporting and recreation activities such as rock climbing and mountain bike riding, as well as bushwalking, vehicular visitations, and, tourism and infrastructure services. A small commercial hub at the Springs provides refreshments and amenity facilities. Otherwise, the majority of use and development in the Park draws upon the intrinsic natural and cultural values that the Park provides.

#### 3.2.2 INFRASTRUCTURE & SERVICES

The Park serves as a key water catchment area for the greater Hobart area, providing a number of streams, creeks and tributaries that service the Waterworks Reserve and reservoirs. Public infrastructure and amenities within the Park are situated at The Springs and at the Pinnacle, where toilets, lookouts and other recreational support facilities are provided. Elsewhere within the Park, walking tracks and huts provide basic access and shelter.

#### 3.2.3 NATURAL AND CULTURAL VALUES

Wellington Park serves as a visual reference point for much of southeast Tasmania and the primary landmark of Greater Hobart. The natural features vary across the Park, with striking landforms, cultural (historic) history, diverse vegetation and climate contribute to the Parks' overall aesthetic characteristics. All use and development in the Park must be consistent with the values of the Park and those contained within the Wellington Park Management Plan. Adherence to these values ensures that use and development within the Park remains ancillary to the primary natural and cultural values that characterise the area.

The park is home to a high diversity of vegetation types, providing key habitat for a number of native fauna species. The Park supports over 500 native species, which represents about 30% of Tasmania's native flora. In addition, the Park supports over 80 endemic species with Mount Wellington being recognised as one of Tasmania's richest sites with regard to the number of endemic species, two of which are only found on Mt Wellington (Wellington Park Management Trust, Amended October 2015, p. 21).

#### 3.2.4 HAZARDS

The primary hazard across Wellington Park is the risk presented by bushfire. The steep topography of the Park and dense vegetation, coupled with hot weather, dry air and minimal humidity ensure that bushfire presents a clear and present danger to all use and development within the Park and wider Hobart area.

Bushfire risk in the Park is guided by the Wellington Park Fire Management Strategy (2006). Planned burns are also undertaken on a regular basis prior and during summer months to reduce fuel loads and to improve regrowth as many species rely on fire events for germination of seeds.

In addition to bushfire, landslip and soil erosion have also been identified as a significant hazards within Wellington Park.

## 3.3 DESCRIPTION: DEVELOPMENT SPECIFIC AREAS

### 3.3.1 BASE STATION

The lower slopes of Wellington Park support bike riding, walking and fire trails which zigzag through the Park, creating a myriad of connecting publicly accessible trails.

The proposed location of the Base Station is dominated by an existing fire trail, which runs south-to-west along the foothills of Wellington Park and is generally clear of native vegetation. The vegetation along the lower slopes varies and supports a wide variety of native flora but is generally dominated by eucalyptus globulus wet, dry forest and woodland (blue gum), along with eucalyptus obliqua forest (stringy bark) which is widespread along the foothills of the Mountain. These areas are predominately utilised for public recreation including walking and riding as well as orienteering and works undertaken by bush-care groups.

### 3.3.2 ACCESS ROAD

The access road route passes through similar vegetation and landscape elements as those contained within Wellington Park. Access to this area of bushland is restricted to bike riding, walking and other pedestrian activities, with vehicle access only provided through gated fire trails. This area is characterised by a ridgeline that separates the area and wider McRobies Gully from the surrounding South Hobart area, specifically Old Farm Road and the site of the proposed Base Station.

The area provides further multi-use trails that connect to the wider network of trails within Wellington Park and surrounding areas including Lenah Valley and West Hobart.

### 3.3.3 CABLEWAY/TOWERS

The location of Towers 1 and 2 are located in close proximity to the Base Station and are generally characterised by similar vegetation found across the lower and upper slopes of the Mountain, these being varieties of eucalyptus forest and woodland. Similarly, these areas are also in the vicinity of existing tracks and trails that run through the Park; however no existing trails are in the exact proximity of and or are impacted by the tower locations.

### 3.3.4 The Pinnacle

As identified in the accompanying Visual Impact Assessment (Ethos Urban, 2019, p. 5) the Pinnacle Area is distinctively separate from the rest of the Mountain in terms of landscape character and the extent of human development. The Pinnacle represents a developed area primarily for the purposes of tourism and industry, characterised by existing service infrastructure, including telecommunications facilities, which now arguably form part of the character of the Mt Wellington skyline and have become recognisable structures that form part of the skyline.

The area also provides for tourist related car parking, viewing shelter and boardwalk. The Pinnacle serves as a primary destination for tourists and locals, balancing between the provision of infrastructure to support tourism and the maintenance of the Parks' intrinsic natural values.

## STATUTORY FRAMEWORK

# 4. OVERVIEW

The proposal is largely located within Wellington Park, which is governed by the Wellington Park Management Plan (Wellington Park Management Trust, Amended October 2015), prepared by the Wellington Park Management Trust in accordance with the Wellington Park Act 1993. The Trust's primary role is to provide a co-operative and effective management and planning structure, and to ensure the protection and maintenance of the values for which the Park is reserved.

Any development in the Park is subject to both the Wellington Park Act 1993 and the Land Use Planning Approvals Act 1993; which consequently requires two approval processes. This means that the use and development of land within the Management Plan area is still subject to the relevant planning scheme provisions, however, where there is conflict between the underlying zoning (in this case Environmental Management Zone provisions of the Hobart Interim Planning Scheme 2015), and the provisions of the relevant zone under the Management Plan (Recreation zone, or Pinnacle SAP), the provisions of the Management Plan prevail.

The Wellington Park Management Plan applies to the area shown in yellow in Figure 7.

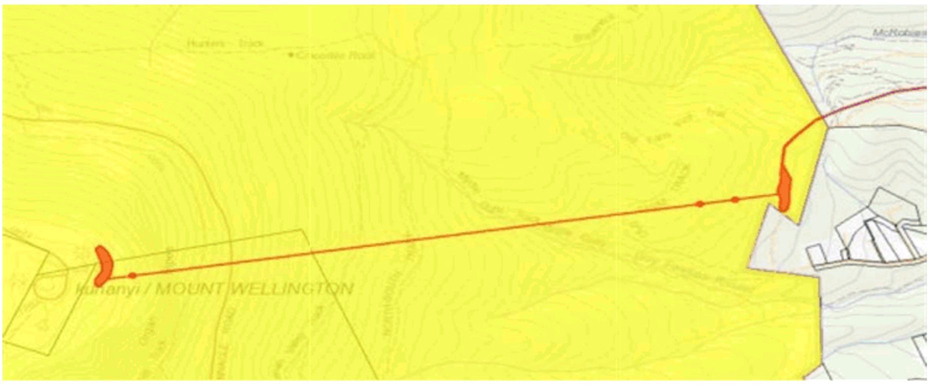


**Figure 7: Extent of Wellington Park shown in yellow (Source: LISTmap)**

The Management Plan identifies express values of the park, and seeks to ensure a balance which will enable the enhancement of visitor experiences in the park, along with protection of the ecological and cultural integrity of the park.

Specifically, the Management Plan identifies the recreational value of the Mountain, and the need to provide for and promote high quality tourism and recreational opportunities (Wellington Park Management Trust, Amended October 2015, 2.5.2 p. 25). These recreational activities should provide for the varying range of interests and abilities, from nature-based adventure experiences, to more passive observational opportunities, as well as catering to the range of physical mobility and capacity. Importantly, these activities should be provided without significantly degrading the experience of other users (Wellington Park Management Trust, Amended October 2015, 2.3.1 p. 19).

The use and development of a cable car has been identified as a sustainable transport solution (Wellington Park Management Trust, 2009) and anticipated in the Management Plan, and a range of standards are provided which are required to be met, to ensure that such a proposal can be constructed and operated without compromising cultural and ecological values, or significantly degrading the experience of other users. The plan also identifies a management objective for the Pinnacle Specific Area to consolidate and contain existing visitor facilities by enhancing or removing them (Wellington Park Management Trust, Amended October 2015, p. 41).

## 4.1 ZONES AND OVERLAYS

The following table provides an overview of the relevant zones and overlays as they apply to each part of the proposal. The table indicates the relevant zones as they apply within the WPMP and the HIPS 2015.

**Table 1 Application of Statutory Provisions (prevailing instrument shown in bold)**

| SITE | WELLINGTON PARK MANAGEMENT PLAN 2013 | HOBART INTERIM PLANNING SCHEME 2015 | |
|---|---|---|---|
| | ZONES (FIGURES 4 & 5) | ZONES (FIGURES 4 & 5) | OVERLAYS (FIGURE 5) |
| Site 1 (Base Station) | Recreation Zone | Environmental Management (blue) | • Biodiversity Protection Area (green stripe)<br>• Landslide Hazard Area low - medium |
| Towers 1 & 2 | Recreation Zone (light blue)<br><br>Natural Zone (light green) | Environmental Management | • Biodiversity Protection Area<br>• Landslide Hazard Area |
| Tower 3 | Natural Zone (light green) | Environmental Management | • Biodiversity Protection Area<br>• Landslide Hazard Area - low |

| | | | |
|---|---|---|---|
| Site 2 (Pinnacle) | Pinnacle Specific Area | Environmental Management (blue) | • Biodiversity Protection Area<br>• Landslide Hazard Area low - medium |
| Access Road | Access Road largely outside Wellington Park | Environmental Management (blue) Main Fire Trail upgrade<br>Utilities (yellow) - Connection to McRobies Road | • A portion of access road in Biodiversity Protection Area (High Priority Biodiversity Values) |

The western portion of the proposed access road from the Base Station will fall within the area administered by the Wellington Park Management Plan (WPMP). The remaining part of the proposed access road will be assessed in accordance with the provisions of the Hobart Interim Planning Scheme (HIPS), 2015.

The structure of this report provides assessment of the statutory provisions applying to use and development under the WPMP (from east to west) followed by that falling within the HIPS.

# WELLINGTON PARK MANAGEMENT PLAN

# 5. MANAGEMENT PLAN STRUCTURE

A reserve management plan means a management plan prepared under the *National Parks and Reserves Management Act 2002*, the *Wellington Park Act 1993*, or a plan of management prepared for an area reserved under the *Crown Lands Act 1976*.

The purpose of the Management Plan is as follows:

> *Wellington Park is reserved for the following purposes:*
>
> *a. The provision of recreational and tourism uses and opportunities consistent with the purposes specified in paragraphs (b) to (e);*
>
> *b. The preservation or protection of the fauna or flora contained in or on the land;*
>
> *c. The preservation or protection of the natural beauty of the land or of any features of the land of natural beauty or scenic interest;*
>
> *d. The preservation or protection of any features of the land being features of historical, Aboriginal, archaeological, scientific, architectural or geomorphological interest; and*
>
> *e. The protection of the water catchment values of the land.*

The Park is divided into a number of Management zones, as shown in Figure 8, and the application of these zones to each component of the proposal is outlined in Table 1.

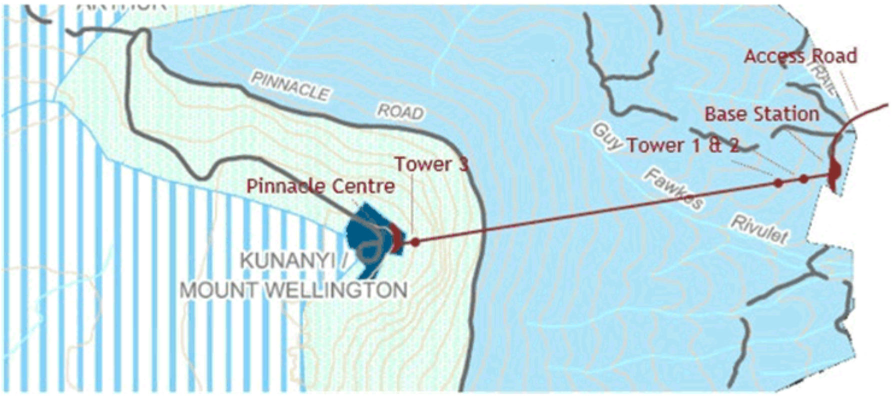


**Figure 8: Management Zones: Recreation Zone (light blue), Natural Zone (light green), Pinnacle Specific Area (dark blue) (Source: Wellington Park Management Plan Map 2a Management Zones).**

# 6. RECREATION ZONE

The portion of access road located within the Park, the Base Station, and Towers 1 and 2 are within the Recreation Zone. This zone has been identified as an area that provides for easy accessibility and relatively high use, nature-based tourism and recreation. Key zone values include significant aesthetic, cultural and recreational values; and areas with good public access and a concentration of a wide range of accessible tracks and trails, allowing for many recreational activities to occur (Wellington Park Management Trust, Amended October 2015, p. 29)

*The management objectives for the Recreation Zone are to:*

*Provide for relatively high levels of nature-based tourism and recreational day use and enjoyment of the area;*

*Preserve environmental and cultural features and values;*

*Provide education about, and promote, the values of the Park via high quality signs, interpretation and visitor activities;*

*Develop key visitor services and facilities in the Zone appropriate to the allowable level and type of use; and*

*Protect the scenic qualities of the Zone when viewed both from within the Zone and from outside the Park.*

## 6.1 USE

The Base Station forms part of the overall cableway system, which is identified and defined within the Pinnacle Specific Area Plan. Whilst the use of the Pinnacle station is assessed elsewhere, those components of the use which fall within the Recreation zone have been assessed pursuant to the Use Table 2 of the Management Plan (Wellington Park Management Trust, Amended October 2015). The following table has been adapted:

| PERMITTED | |
|---|---|
| Toilets | |
| Picnic/BBQ facilities | |
| Viewing Shelter/building | |
| Visitor Information/ interpretation panels | |
| Lookouts (open air) | |

| | |
|---|---|
| Recreation tracks and trails, and related structures | |
| **DISCRETIONARY** | |
| Food Services | Only if within the Mountain Bike Park overlay |
| Transport Depot and Distribution | Only for infrastructure associated with Potential Transport Modes |
| Vehicle Parking | Only in Conservation Area, Regional Reserve or Public Reserve under the Crown Lands Act 1976. |
| Utilities | |
| Fire trails (where consistent with Trust Endorsed Fire Management Strategy) | |
| **PROHIBITED** | |
| Tourist Operation | |
| Visitor Accommodation | |
| Camping | |
| Park management office | |

The Base Station falls under the definition of Transport Depot and Distribution, which is discretionary in the zone (extent of visitor/ tourist facility limited to ancillary).

*Transport Depot and Distribution*

*(Use of land for distributing goods or passengers); bus terminal, council depot, other Potential Transport Modes.*

A notation in the use table restricts this use class in the Recreation Zone to Potential Transport Modes only, which includes the following (as defined by the Pinnacle Specific Area Plan, WPMP P 170):

*Potential Transport Mode*

*Forms of public transport that have the potential to effectively move large numbers of people, but for which little or no infrastructure currently exists in the Park. It includes but is not limited to: shuttle buses, cable cars and aerial ropeways, funicular rail and cable rail systems.*

The Base Station functions primarily as the boarding and ticketing station for carriage on a cable car system. To the extent that other infrastructure is provided within the Base Station (amenities and gift store), it is clearly ancillary and intended to support the comfort and amenity of passengers.

The use and development of access road falls is considered ancillary to the Base Station, and therefore falls under the use class of Transport Depot and Distribution.

## 6.2 STANDARDS FOR USE AND DEVELOPMENT

### 6.2.1 Issue 2: Flora & Fauna Conservation, Geoconservation & Natural Processes

These provisions apply to the western portion of the access road, the Base Station and Towers 1 & 2.

| |
|---|
| ***Objective:*** *To conserve flora, fauna, geological and geomorphical values, and to protect natural processes.* |
| *A2.1 Native Vegetation*<br><br>*The proposal does not involve removal or damage to terrestrial or aquatic native vegetation which:*<br><br>*(a) is listed as significant in this Management Plan, or any planning strategy or Trust endorsed scientific assessment prepared in accordance with this Management Plan; or is a Threatened Vegetation Community under the Nature Conservation Act 2002.*<br><br>*(b) supports or forms habitat for any species of fauna listed in the Threatened Species Protection Act 1995 or the Environment Protection and Biodiversity Conservation Act 1999.*<br><br>*P2.1 Native Vegetation*<br><br>*Any adverse effects on terrestrial or aquatic native vegetation or habitat values must be avoided, or remedied to ensure no long term impact on vegetation values.* |
| Development Response - P2.1:<br><br>The Natural Values Impact Assessment has identified that some native vegetation supporting WGL, WOB, and DOB TASVEG forest communities will be impacted through local clearances. WOB and DOB communities are widespread and abundant, and the proportionate loss is small. WGL is not uncommon but considerably less extensive in area than WOB and DOB. There is however more than 94 ha in Wellington Park. Measures to protect retained vegetation from inadvertent damage during construction will minimise long term impact on vegetation values.<br><br>Whilst none of the vegetation communities identified in this footprint are listed as threatened under the NCA, the WPMP refers to significance being contributed to by poorly reserved plant communities, of which WGL has been identified. This community occupies the corridor between the Base Station and Tower 1, where some clearance will be required for the distance specified for the car to ascend the tree canopy.<br><br>In relation to habitat, vegetation along the corridor between the Base Station and Tower 2 includes some large hollow bearing trees that may provide nesting habitat for threatened fauna such as swift parrot and less likely masked owl (North Barker Ecosystem Services, 2021, p. 73). |

A number of conditions have been recommended, to ensure impact is avoided, mitigated or remediated. These are listed in the Table 7 of the Natural Values Impact Assessment and supplementary letter from North Barker (North Barker Ecosystem Services, 2021).

*A2.2 Threatened Species*

*The proposal does not impact upon any threatened species listed under the Threatened Species Protection Act 1995 or the Environmental Protection and Biodiversity Conservation Act 1999.*

*P2.2 Threatened Species*

*Any adverse affects on nationally or state listed rare, threatened or endangered species, communities or habitats must be avoided or remedied to ensure no long term impact on vegetation values.*

Development Response - A2.2:

No threatened flora species have been recorded and the likelihood of any occurring is considered low.

*A2.3 Geoheritage*

*The proposal does not impact upon any sites which are listed as significant in this Management Plan or in a Trust endorsed scientific assessment, or listed on the Tasmanian Geoconservation Database.*

*P2.3 Geoheritage*

*Any adverse impacts on any geoheritage values must be avoided, remedied or mitigated.*

Development Response -

The Geoheritage listing identifies the Wellington Range high altitude periglacial terrain which has not been affected by glacial processes as a landform that has scientific value and the Organ Pipes Columnar Jointing. Other specific features within 1000m of the search criteria include the Lost World Boulder Caves, Sphinx Rock, The Rolling Stone, Dead Island Area Marsh and String Bogs, but are not located within the proposed development corridor. The Base Station, Access Road and Towers 1 and 2 are not in proximity to, and do not impact on these sites or values. However, the base station is within proximity to Rankin Falls (Myrtle Gully). The proposal may impact on the Falls site due to increased visitation to the area and therefore the performance criteria must be addressed. This would be an indirect and uncontrolled effect of the proposal, and as the Falls is outside of the lease boundaries, the management of visitation to the Falls would come within the purview of the Wellington Park Management Trust. Visitation is currently uncontrolled. To the extent possible, the proponent will avoid promoting access to this specific site unless advised otherwise by the Trust.

### 6.2.2 ISSUE 3: WATER QUALITY AND FLOW

***Objective: To conserve water quality and quantity.***

*A3.1 Water quality*

*(a) Waste Water, including grey water, must be connected to reticulated or on-site waste treatment system approved by the Planning Authority; and*

*(b) Stormwater must be drained to a detention basin, artificial wetland or infiltration area, or reused within the site, without causing erosion or pollution of existing surface or ground waters or other values of the Park.*

*P3.1 Water quality*

*Waste water including grey water, stormwater, or other contaminants must not prejudice the achievement of the water quality objectives for surface or ground waters established under the State Policy on Water Quality Management 1997 or the water quality objectives of this Management Plan…*

Development Response

All sewerage created onsite, including that from the Pinnacle Centre will be collected into a 1000l cube container, and returned to the Base Station. The cube will be emptied into a reticulated waste treatment system, connecting to the Taswater reticulated sewer system in McRobies Rd. The Site Servicing Report considers this to meet acceptable solution A3.1. (Gandy & Roberts, 2020, p. 12).

*Stormwater produced at the site will be in part collected from roof runoff to a 25,000l storage tank in the basement for toilet flushing. The remainder of the stormwater which is not collected for use, will be delivered to existing natural water courses via a network of swales and piped systems designed to mimic existing water runoff (Gandy & Roberts, 2020, p. 10). Stormwater will be designed to meet standards to ensure that development should not result in erosion, siltation, degradation of water quality of any watercourse spring or recharge basin or increase in landslip or erosion hazard potential.*

*A3.2 Water Bodies, Wetlands and Watercourses*

*No land clearing, excavation, filling or other development must occur:*

*-within a water body, wetland or watercourse; or*

*-within a buffer area, as specified in accordance with this Management Plan, of a water body, wetland or watercourse, except for the purpose of maintaining a water supply for fire fighting purposes, or vehicle access to that water supply in accordance with a Fire Management Strategy prepared in accordance with this Management Plan. And*

*The use or development involves no extraction of water from any water body, wetland or watercourse except for use in fire fighting or carrying out planned burns in accordance with a fire management strategy prepares in accordance with this Management Plan.*

*P3.2 Water Bodies, Wetlands and Watercourses*

*Use and development must be designed and carried out to ensure that any adverse effects on natural drainage, flow regimes, erosion and sedimentation to and within any water body, wetland or watercourse will be avoided, or remedied to ensure no long term impact on any water body, wetland or watercourse.*

Development Response

Base Station & Towers:

The proposed Base Station is not located in proximity to any identified water bodies or wetlands and the nearest watercourse is Guy Fawkes Rivulet which is located approximately 440m to the south. Therefore, it is considered that associated construction activities will not result in any impacts on such areas. There are also no waterways identified under the water and waterways overlay which forms part of the *Hobart Interim Planning Scheme*, within proximity of the site.

The proposal does not require extraction of water from any waterbodies for the purpose of firefighting, as large on-site water tanks for firefighting purposes are provided (Gandy & Roberts, 2020, p. 10).

The towers within the Recreation Zone will have a minimal footprint and the nearest watercourse is Guy Fawkes Rivulet, which is located approximately 430m to the south. The Construction Management Plan should include provisions to ensure that no adverse effects occur on drainage systems resulting from erosion or sedimentation to Guy Fawkes Rivulet, or any other water body.

Access Road:

The construction of the access road will require works on the uphill slope of an unnamed waterbody in McRobies Gully. Best practise construction methodology can ensure erosion and sedimentation control is maintained during construction, and should be specified in the Construction Management Plan (referred to above).

*A3.3 Drinking Water Catchment Zones*

*TasWater has advised that the use of development will have no negative impact upon drinking water quality and quantity.*

*P3.3 Drinking Water Catchment Zones*

*All use and development is in accordance with the objectives and permitted activities of the Drinking Water Catchment Zone, and is in accordance with a water quality risk assessment prepared by a suitably qualified person.*

Development Response

There is no development proposed within the drinking water catchments as identified in Map 5 (Wellington Park Management Trust, Amended October 2015, p. 99).

### 6.2.3 Issue 4: Cultural Heritage Values

***Objective:*** *To protect sites or areas of cultural value and significance.*

*A4.1 Aboriginal Cultural Heritage*

*The proposal does not involve an Aboriginal relic as defined under the Aboriginal Relics Act 1975, or Aboriginal heritage site or precinct identified with this Management Plan.*

*P4.1 Aboriginal Cultural Heritage*

*Any impacts on any heritage precincts or sites of Aboriginal value must be avoided, mitigated or remedied so that no long term loss of Aboriginal cultural heritage values occurs.*

*Any works shall conform with any relevant standards and guidelines prepared by Aboriginal Heritage Tasmania and comply with the Aboriginal Relics Act 1975.*

Development Response

A report has been prepared title 'Aboriginal Heritage Assessment Report (AHAR) of the proposed kunanyi/Mount Wellington Cable Car Footprint' by Dr. Nicolas Grguric of Frontier Heritage Consulting Pty Ltd.

- Accompanying this report is Dr. Grguric's CV which details his qualifications to undertake this work. Furthermore, he is listed on Aboriginal Heritage Tasmania's (AHT) website under the Register of Consulting Archaeologists.
- A consulting archaeologist is considered an Aboriginal heritage practitioner as defined by the Aboriginal Heritage Standards and Procedures 2018 and therefore Dr. Grguric is qualified to carry out an AHAR.
- The field survey which forms part of the AHAR has found no aboriginal heritage including sites as defined by the Act within the development area. Therefore A4.1 of the above request is satisfied. Dr Grguric's advice is no further management is required.
- The AHAR report also includes information regarding the history of the site and area, and the onsite survey. An aboriginal heritage property search was undertaken in 2018, and the consultant has also sought a new search to check for any updates to the register.

*A4.2 Historic Cultural Heritage*

*The proposal does not involve a place: listed on the Tasmanian Heritage Register under the Historic Cultural Heritage Act 1995; or listed in a Heritage Code of a Planning Scheme.*

*P4.2 Historic Cultural Heritage*

All works shall conform with any relevant standards and guidelines produced by Heritage Tasmania to ensure that any adverse effects on historic cultural values and any heritage precincts or sites will be avoided, mitigated or remedied, and to ensure no long term loss of historic cultural values must be in accordance with any relevant Trust endorsed conservation policies and prescriptions, and with the Burra Charter (Australia ICOMOS, 1999).

The reconstruction or presentation of elements of historic heritage fabric must be carried out in accordance with a Trust endorsed conservation policy or plan.

*Note: 'Reconstruction' is appropriate only where a place is incomplete through damage or alteration, and only where there is sufficient evidence to reproduce an earlier state of the fabric (Burra Charter Australia ICOMOS, 1999).*

Development Response

The proposal does not involve a place listed on the Tasmanian Heritage Register and is not listed in the Heritage Code of the Planning Scheme.

### 6.2.4 Issue 5: Landscape, visual quality and amenity

***Objective:*** *To protect and enhance the landscape and visual quality of Wellington Park.*

*A5.1 Visual Sensitivity*

*Buildings and structure (other than park furniture or park signage) are not located within areas identified as of High or Moderate Visual Sensitivity shown in Map 4 of this Management Plan.*

*P5.1 Visual Sensitivity*

*Buildings and structure (other than Park furniture or replacement of an existing building or structure of the same size and location) in prominent locations visible from within or outside of the Park, or identified as of High or Moderate Visual Sensitivity in Map 4 of this Management Plan, must be designed and sited to minimise or remedy any loss of visual values or impacts on the visual character of the affected area.*

*Note: Satisfaction of this Performance Criteria may include a Visual Impact Analysis, prepared by a suitably qualified person, demonstrating how the building or structure can be designed and located to harmonise with the site.*

Development Response

The Base Station is located in an area which is identified as Moderate Visual Sensitivity under the WPMP. The is therefore required to meet the performance criteria P5.1.

Base Station:

Although the Base Station is identified within an area of Moderate Sensitivity in Map 4 of the WPMP, the accompanying Visual Impact Assessment has indicated that the Base Station is not sited in a visually prominent location and would generally be screened from view by existing vegetation, and is therefore not considered to be a prominent position visible from within or outside the Park. (Ethos Urban, 2019, p. 80)

Towers 1 & 2:

Towers 1 and 2 are also not located in visually prominent locations and are generally screened from view, and the accompanying cables are visually recessive.

Access Road

The access road has been designed to follow existing 4WD fire trails where practical (ensuring even fall for wastewater infrastructure which will be located within the access road easement) and is located below the nearest ridgeline and will only be visible from the McRobies Waste Disposal site. Existing vegetation along the ridgeline will also serve to screen the access road, ensuring minimal visual impacts. (Ethos Urban, 2019)

*A5.2 Building Design and Light Effects*

*The maximum building height is 3.5m and any building is not more than one storey, and is designed in accordance with the requirements of the relevant Management Zone and this Management Plan, and the Trust's Design and Infrastructure Manual where relevant. Associated services, access and parking must not be prominent.*

*External lighting must assist orientation only and will be focused towards the ground.*

*P5.2 Building Design and Light Effects*

Development must be designed to harmonise with the visual landscape and natural qualities of the site in terms of appearance, scale and proportions and follow the Trust's Design and Infrastructure Manual where relevant.

*Lighting and reflection must be managed to avoid adverse impacts on natural and cultural values.*

Development Response

The proposed building exceeds 3.5m in height and is more than one storey, and therefore does not meet the acceptable solution A5.2.

Base Station:

The proposed Base Station has been designed in accordance with the Wellington Park Design and Infrastructure Manual 2006. Materials and finishes have been chosen from a simple palette to allow the building to not appear visually prominent in the setting. Glazing is limited to the ticket office, set back behind timber screening, minimising reflectance. The timber screening surrounds the building including the platform and circulation spaces. Reflectance is therefore unlikely.

### 6.2.5 Issue 6: Noise

***Objective**: To provide for the quiet enjoyment of natural and cultural values, and acoustic amenity of the Park*

*A6.1 Noise*

*Noise from point sources must not exceed 50 dB(A) at any point within 50m of the source.*

*P6.1 Noise*

*Activities which could have an adverse effect on the quiet enjoyment of natural and cultural values must be avoided or remedied to prevent any loss of acoustic amenity in the Park.*

Development Response

The section of cable car infrastructure most likely to contribute to noise is the drive. It is proposed that this will be housed in the machine room below the cable car platform and will be encased in concrete which will significantly reduce any noise emissions. The cable system is driven by a motor at the Base Station, restricting any potential noise source to that one location.

The acoustic assessment has been conducted and drafted as a result of the specific drafting of the relevant provisions of the Wellington Park Management Plan (WPMP) which states "Noise from point sources must not exceed 50 dB(A) at any point source within 50 m of the source". It does not specify if this is vertical or horizontal distance from the point source or is it to be measured 50 m along the ground with the point source being represented as a dot on a plan.

To set a criteria implies that the criteria is directly and quickly verifiable. To measure 50 dB(A) at a height of 55 m may prove difficult since at that height we might be measuring wind passing the microphone or the noise generated by Karman vortices on the scaffold pipes or ladders rungs. Noise as a pollutant travels fast and usually leave no trace, nor does the WPMP indicate the metric to be used. Is 50 dB(A) measured as an Leq or L90 or L max and over what period the measurement is to be carried out

The assessment includes an assessment of noise 50 m from the point source, both in the horizontal direction and the vertical direction as well as an assessment based on 50 m from the tower at ground level. An assessment 50 m along the ground is in our opinion the most practical method of verification as it involves only a tripod and a sound level meter, and the results relate to the aural experience of the park visitors in the soundscape (Pearu Terts, 2020).

The following summarizes the findings:

| POINT SOURCE | LMAX (DB(A)) WITHIN 50M OF POINT SOURCE |
|---|---|
| Base Station front facade - cable car movement leaving | 59.8 |
| Pinnacle Station | Up to 59.8 |
| Cable Car moving across 35m tower (top hemisphere - horizontal and vertical) | 53.7 |
| Cable Car moving across 35m tower (bottom hemisphere – vertical (i.e. ground)) | 54.6 |

As demonstrated above, the noise emission is more than the acceptable solution and therefore the performance criteria must be addressed. As stated in the acoustic report, 50 dB(A) is a stringent requirement, and likely to be exceeded when people talk or animals and insects communicate. The existing average maximum noise level in the park is 62.6 dB(A) with a standard deviation of 7.7 dB(A); therefore, the maximum noise emissions from the cable car point sources are within the existing maximum noise levels experienced in the park's noise climate (Pearu Terts, 2020).

Noise emission from the cable car is unlikely to be intrusive or cause adverse effect on the enjoyment of the natural sounds, cultural values and acoustic amenity of the park.

### 6.2.6 Issue 7: Public access, infrastructure and safety

***Objective:*** *To ensure an adequate and appropriate level of access, infrastructure and safety for use and development of Wellington Park.*

*A7.1 Road Access*

*The design capacity and construction of any public road or access is in accordance with Australian Roads Standards (Austroads) appropriate to a public road in a mountain environment.*

*And*

*Road speed controls or other measures are utilised in order minimise road kill.*

*And*

*The design and maintenance of any fire trail meets the standards required by a Bushfire Management Strategy prepared in accordance with this Management Plan.*

*P7.1 Road Access*

*Where use and development involves a new or upgraded road or access, or increased use of an existing road or access, appropriate measures must be put in place, in consultation with the relevant road authority, to ensure that the free movement and safety of traffic, people and wildlife will be protected.*

Development Response

The new access road will be constructed as an S4 class sealed rural road and is designed to follow existing 4WD fire trails where practical (Midson Traffic, 2021).

The proposed access road is intended to have a design speed limit of 60km/h which is considered to be appropriate within this context. The TIA considers the proposal to comply with performance criteria P7.1.

Additionally, the proposed cable car provides an alternate access to the pinnacle to members of the public, as an alternative to walking or motor vehicles. The use of existing fire trails and tracks will be maintained throughout the access road alignment and car park, through traffic calming measures, and reconstruction where new works interrupt existing track alignment.

*A7.2 Pedestrian Access*

*Use or development does not interfere with (existing or potential) formal public pedestrian access within or into the park.*

*P7.2 Pedestrian Access*

*Existing formal public pedestrian access within the park must be maintained and enhanced except where public safety or protection of natural cultural would be at risk.*

Development Response

Use and development does not interfere with formal pedestrian access within or into the Park. The proposed upgrading of existing trails within proximity to the Base Station will ensure that pedestrian access to the Park will be maintained and enhanced. The proposal is considered to meet acceptable solution A7.2.

*A7.3 Recreation Track Construction*

*There is no Acceptable Solution for this element*

*P7.3 Recreation Track Construction*

*Recreation tracks must be constructed, located and maintained in accordance with any policies, objectives and standards contained in this Management Plan and in a Recreation Strategy* *prepared in accordance with this Management Plan (or, in the absence of a Recreation Strategy, a Walking Track Strategy or Bike Strategy endorsed by the Trust).*

Development Response

No new recreational trails are proposed as part of this application. Where existing trails are interrupted, they will be reconstructed or made good (MWCC, 2019).

### 6.2.7 ISSUE 8: NATURAL HAZARDS

***Objective:*** *Areas subject to natural hazards will be managed to protect life, property and land, and to minimise the need for remedial or engineering works and long term impacts on the Park's values.*

*A8.1 Hazard Avoidance and Mitigation*

*Buildings and structures, other than walking tracks constructed in accordance with a walking track strategy, do not involve cut and fill of more than 1m and must not be located within a buffer area, specified in accordance with this Management Plan, of a water body, wetland or watercourse.*

*And*

*The proposed use or development is accompanied by a geotechnical report from a suitably qualified person stating that there is an acceptable risk of instability.*

*P8.1 Hazard Avoidance and Mitigation*

*In areas where there is a risk of flooding or land instability, all buildings and structures, other than walking tracks constructed in accordance with a walking track strategy, must be sited, designed and constructed to, as minimum requirements, take account of future climate change and flood hazard potential, and to assess and mitigate risk in accordance with a hazard risk analysis as set out in the current Australian Geomechanics Society landslide risk management concepts and guidelines and Australian Standard AS1726.*

Development Response

The development will involve cut and fill of more than 1m and therefore is required to meet the Performance Criteria P8.1.

A hazard risk analysis, using the procedure based on the *Practice Note Guidelines for Landslide Risk Management (AGS 2007)* found that the risk of rock fall at both the Base Station site and Towers 1 & 2 are considered low, the risk of a large deep seated slide is considered low and debris and/or shallow slides are also considered to present a low potential hazard. (Cardno, 2018, p. 22)

Any level of risk can be address through appropriate design and engineering methods however, given that the risk is low to moderate without mitigation, there should be limited concern about risk (Cardno, 2019).

*A8.2 Bushfire*

*Development of new or modified buildings must be in accordance with sections E1.6.3, E1.6.4 & E1.6.5 of Planning Directive No 5 (Bush Fire Prone Areas Code)*

*P8.2 Bushfire*

*There are no Performance Criteria for this issue.*

Development Response

In the case of bushfire, this is realized and regulated in the specific standard (Issue 8: Natural Hazards) which requires compliance with Planning Direction No 5. Since the WMMP was established, a revised version of the planning directive has been enforced. According to the Wellington Park Act Section 23 (5):

*If a provision of the management plan is inconsistent with a provision of a planning directive issued under section 13 of the Land Use Planning and Approvals Act 1993 , the latter provision prevails.*

Legal opinion has verified that Planning Directive 5.1 supersedes PD 5.0 for the purpose of this assessment, as per S23(5) of the Wellington Park Act 1993.

PD 5.1 only applies if the use is a hazardous or vulnerable use as defined by the Bushfire Prone Areas Code or if subdivision is proposed. Neither of those two are triggered by this proposal, so consequently PD5.1 is not applicable, and a bushfire assessment is not pertinent to the application in relation to Issue 8.

However, a bushfire assessment forms part of this planning application which presents measures to mitigate and manage bushfire in relation to the proposed development. For the purposes of the planning application, it is necessary to have some degree of confidence in these outcomes to the extent that the required vegetation management or clearance is known and assessed in terms of the park values. Therefore, the bushfire assessment is relevant in so far as that it informs the Natural Values Impact Assessment, which responds to Issue 2 of the WPMP or the Biodiversity Code of the Hobart Interim Planning Scheme.

# 7. NATURAL ZONE

Tower 3 is located within the Natural Zone. The Natural Zone includes areas of substantially undeveloped landscape, which includes forested areas and some alpine areas. The zone encompasses the lower part of the Pinnacle and extends east to the Pinnacle Road.

The management objectives for the Natural Zone are to:

- Preserve the Zone in an undisturbed condition, except for necessary disturbance associated with approved use and development;
- Protect water quality;
- Protect plans and animal species and communities;
- Protect geodiversity;
- Protect cultural features and values;
- Protect the scenic qualities of the Zone when viewed both from within the Zone and from outside the Park;
- Develop visitor services and facilities in a few, limited occasions in the Zone appropriate to the permitted level and type of use; and
- Compatible with the above objectives, provide a variety of environmentally low impact, low density, non-intrusive visitor opportunities in a natural setting.

## 7.1 USE

Tower 3 is ancillary to the primary use under Transport Depot and Distribution, which is defined under the WPMP as follows:

> *Potential Transport Mode*
>
> *Forms of public transport that have the potential to effectively move large numbers of people, but for which little or no infrastructure currently exists in the Park. It includes but is not limited to: shuttle buses, cable cars and aerial ropeways, funicular rail and cable rail systems.*

Transport Depot and Distribution is discretionary in the zone.

## 7.2 STANDARDS FOR USE AND DEVELOPMENT

Note: this table does not apply in The Springs or Pinnacle Specific Areas.

### 7.2.1 ISSUE 2: FLORA & FAUNA CONSERVATION, GEOCONSERVATION & NATURAL PROCESSES

***Objective:** To conserve flora, fauna, geological and geomorphical values, and to protect natural processes.*

*A2.1 Native Vegetation*

*The proposal does not involve removal or damage to terrestrial or aquatic native vegetation which:*

*(a) is listed as significant in this Management Plan, or any planning strategy or Trust endorsed scientific assessment prepared in accordance with this Management Plan; or is a Threatened Vegetation Community under the Nature Conservation Act 2002.*

*(b) supports or forms habitat for any species of fauna listed in the Threatened Species Protection Act 1995 or the Environment Protection and Biodiversity Conservation Act 1999.*

P2.1 Native Vegetation

*Any adverse affects on terrestrial or aquatic native vegetation or habitat values must be avoided, or remedied to ensure no long term impact on vegetation values.*

Development Response:

A2.1 Native Vegetation

HHE is the impacted vegetation community. This is not listed as significant in the Management Plan and there are no Trust endorsed scientific assessments that deal with flora and fauna. HHE is not listed as threatened under the NCA. The term "significant vegetation" is not defined in the WPMP although the plan makes reference to sensitive vegetation in the alpine area. The Park Activity Assessment form (Appendix 3C of the WPMP) makes reference to "natural values" including "vegetation that is known to have a slow recovery rate after disturbance". HHE being an alpine community would fall into this category.

Rocky habitats at both the Temporary Installation Net and Tower 3 provide potential habitat for the silky snail (rare TSPA).

P2.1. Native Vegetation.

Some native vegetation supporting Eastern Alpine Heathland (HHE) TASVEG community (100m$^2$)will be lost to the development. This community is widespread with nearly 350 ha mapped in Wellington Park, so the proportionate loss is small (even taking into account the 0.42 impacted by the proposal in the Pinnacle zone). Management of the surrounding vegetation outside the immediate footprint should be controlled and prescribed in any approval conditions to ensure that there will be no peripheral impacts (North Barker Ecosystem Services, 2021, p. 65)

*A2.2 Threatened Species*

*The proposal does not impact upon any threatened species listed under the Threatened Species Protection Act 1995 or the Environmental Protection and Biodiversity Conservation Act 1999.*

*P2.2 Threatened Species*

*Any adverse affects on nationally or state listed rare, threatened or endangered species, communities or habitats must be avoided or remedied to ensure no long term impact on vegetation values.*

Development Response:

A2.2 Threatened Species.

One threatened flora species, montane ivy leaf violet Viola curtisiae, is present close to the Tower Site and one threatened fauna, the silky snail, may be impacted upon.

P2.2 Threatened Species.

The adverse impact on montane ivy leaf violet Viola curtisiae (listed rare in TSPA) may be avoided with careful siting of the tower infrastructure. However, the loss will not have an adverse long-term impact upon the species. The species has recently been found to be widespread across the Wellington Range. Reanalysis of the novel data may justify a case for having the species delisted as threatened from the TSPA.

Impact to the silky snail is not known. The localised impacts when considered against the extensive habitat availability suggest that it would not be significant (North Barker Ecosystem Services, 2021, p. 65)

*A2.3 Geoheritage*

*The proposal does not impact upon any sites which are listed as significant in this Management Plan or in a Trust endorsed scientific assessment, or listed on the Tasmanian Geoconservation Database.*

*P2.3 Geoheritage*

*Any adverse impacts on any geoheritage values must be avoided, remedied or mitigated.*

Development Response:

Tower 3 is within proximity of several features of geoconservation significance which are listed both under the Tasmanian Geoconservation Database and identified as a feature of Geoconservation Significance under the Management Plan, being: *1. Dolerite – Sandstone intrusive contact exposure*; *10. The Organ Pipes Cliff including Alberts Tomb & Jonstons Knob*; and Pinnacle Volcanic Plug, Pinnacle Nivation Hollow and Pinnacle Rock Fall. The following assessment is based on Geomorphology Impact Assessment by GE Consulting Engineers, June 2020 (GE Consulting Engineers, 2020)

The proposal is considered to have no impact on the following sites:

- Pinnacle Nivation Hollow
- Pinnacle Rock Fall
- Pinnacle Road Sandstone Dolerite Contact
- Pinnacle Volcanic Plug

The proposal is considered to have some impact on the geoheritage values:

- The Organ Pipes Cliff

The impact relates to the visual aesthetic of the Organ Pipes in relation to the proximity of the proposed development to the geoheritage site. The impact is considered negligible to minor and is considered offset by the provision of new viewing points from the Cable Car as it traverses the Mountain. There will be no physical or groundwater and none to imperceptible impact associated with construction.

- Wellington Range Periglacial Terrain

The impacts relate to the visual aesthetic which is considered negligible to minor; and the impacts related to physical, groundwater and construction is negligible to minor. No adverse impacts are anticipated.

### 7.2.2 Issue 3: Water quality and flow

| ***Objective**: To conserve water quality and quantity.* |
|---|
| *A3.1 Water quality*<br>*(a) Waste Water, including grey water, must be connected to reticulated or on-site waste treatment system approved by the Planning Authority; and*<br>*(b) Stormwater must be drained to a detention basin, artificial wetland or infiltration area, or reused within the site, without causing erosion or pollution of existing surface or ground waters or other values of the Park.*<br><br>*P3.1 Water quality*<br>Waste water including grey water, stormwater, or other contaminants must not prejudice the achievement of the water quality objectives for surface or ground waters established under the State Policy on Water Quality Management 1997 or the water quality objectives of this Management Plan. |
| Development Response |

Tower 3 does not generate wastewater, therefore this provision does not apply.

*A3.2 Water Bodies, Wetlands and Watercourses*

*No land clearing, excavation, filling or other development must occur:*

*-within a water body, wetland or watercourse; or*

*-within a buffer area, as specified in accordance with this Management Plan, of a water body, wetland or watercourse, except for the purpose of maintaining a water supply for fire fighting purposes, or vehicle access to that water supply in accordance with a Fire Management Strategy prepared in accordance with this Management Plan. And*

*The use or development involves no extraction of water from any water body, wetland or watercourse except for use in fire fighting or carrying out planned burns in accordance with a fire management strategy prepares in accordance with this Management Plan.*

*P3.2 Water Bodies, Wetlands and Watercourses*

*Use and development must be designed and carried out to ensure that any adverse effects on natural drainage, flow regimes, erosion and sedimentation to and within any water body, wetland or watercourse will be avoided, or remedied to ensure no long term impact on any water body, wetland or watercourse.*

Development Response

No clearing or development will occur within;

(a) a water body, wetland or watercourse;

(b) a buffer area; as part of the proposed development for Tower 3.

The proposal therefore meets the acceptable solution A3.2

*A3.3 Drinking Water Catchment Zones*

*TasWater has advised that the use of development will have no negative impact upon drinking water quality and quantity.*

*P3.3 Drinking Water Catchment Zones*

All use and development is in accordance with the objectives and permitted activities of the Drinking Water Catchment Zone, and is in accordance with a water quality risk assessment prepared by a suitably qualified person.

Development Response

Tower 3 is not located within the drinking water catchments as identified in Map 5 (Wellington Park Management Trust, Amended October 2015, p. 99).

### 7.2.3 ISSUE 4: CULTURAL HERITAGE VALUES

***Objective**: To protect sites or areas of cultural value and significance.*

*A4.1 Aboriginal Cultural Heritage*

*The proposal does not involve an Aboriginal relic as defined under the Aboriginal Relics Act 1975, or Aboriginal heritage site or precinct identified with this Management Plan.*

*P4.1* Aboriginal Cultural Heritage

Any impacts on any heritage precincts or sites of Aboriginal value must be avoided, mitigated or remedied so that no long term loss of Aboriginal cultural heritage values occurs.

*Any works shall conform with any relevant standards and guidelines prepared by Aboriginal Heritage Tasmania and comply with the Aboriginal Relics Act 1975.*

Development Response

A report has been prepared title 'Aboriginal Heritage Assessment Report (AHAR) of the proposed kunanyi/Mount Wellington Cable Car Footprint' by Dr. Nicolas Grguric of Frontier Heritage Consulting Pty Ltd.

- Accompanying this report is Dr. Grguric's CV which details his qualifications to undertake this work. Furthermore, he is listed on Aboriginal Heritage Tasmania's (AHT) website under the Register of Consulting Archaeologists.
- A consulting archaeologist is considered an Aboriginal heritage practitioner as defined by the Aboriginal Heritage Standards and Procedures 2018 and therefore Dr. Grguric is qualified to carry out an AHAR.
- The field survey which forms part of the AHAR has found no aboriginal heritage including sites as defined by the Act within the development area. Therefore A4.1 of the above request is satisfied. Dr Grguric's advice is no further management is required.
- The AHAR report also includes information regarding the history of the site and area, and the onsite survey. An aboriginal heritage property search was undertaken in 2018, and the consultant has also sought a new search to check for any updates to the register.

*A4.2 Historic Cultural Heritage*

*The proposal does not involve a place: listed on the Tasmanian Heritage Register under the Historic Cultural Heritage Act 1995; or listed in a Heritage Code of a Planning Scheme.*

*P4.2 Historic Cultural Heritage*

All works shall conform with any relevant standards and guidelines produced by Heritage Tasmania to ensure that any adverse effects on historic cultural values and any heritage precincts or sites will be avoided, mitigated or remedied, and to ensure no long term loss of historic cultural values must be in accordance with any relevant Trust endorsed conservation policies and prescriptions, and with the Burra Charter (Australia ICOMOS, 1999).

The reconstruction or presentation of elements of historic heritage fabric must be carried out in accordance with a Trust endorsed conservation policy or plan.

*Note: 'Reconstruction' is appropriate only where a place is incomplete through damage or alteration, and only where there is sufficient evidence to reproduce an earlier state of the fabric (Burra Charter Australia ICOMOS, 1999).*

Development Response

The proposal does not involve a place listed on the Tasmanian Heritage Register and is not listed in the Heritage Code of the Planning Scheme.

### 7.2.4 Issue 5: Landscape, visual quality and amenity

***Objective:** To protect and enhance the landscape and visual quality of Wellington Park.*

***A5.1** Visual Sensitivity*

*Buildings and structure (other than park furniture or park signage) are not located within areas identified as of High or Moderate Visual Sensitivity shown in Map 4 of this Management Plan.*

***P5.1** Visual Sensitivity*

Buildings and structure (other than Park furniture or replacement of an existing building or structure of the same size and location) in prominent locations visible from within or outside of the Park, or identified as of High or Moderate Visual Sensitivity in Map 4 of this Management Plan, must be designed and sited to minimise or remedy any loss of visual values or impacts on the visual character of the affected area.

*Note: Satisfaction of this Performance Criteria may include a Visual Impact Analysis, prepared by a suitably qualified person, demonstrating how the building or structure can be designed and located to harmonise with the site.*

Development Response

Tower 3 is located in a visually prominent location, identified as High Sensitivity in the WPMP. The proposal therefore must meet the performance criteria.

The siting and design of Tower 3 was determined by engineering requirements and was considered a preferable option to the construction of two slightly smaller towers in much closer proximity to the edge of Organ Pipes and the other much closer to the Pinnacle Centre. The chosen location sits below the skyline from the majority of viewpoints around the Greater Hobart area.

The Tower has been designed as a tubular steel open lattice construction, rather than a solid concrete form to appear as visually recessive as possible, minimising visual impact and interruption of the skyline.

The accompanying VIA provides assessment against the relevant provisions of the WPMP and finds that Tower 3 has been designed effectively to ensure minimal impacts within the visually sensitive areas. The VIA concludes that the interruptions to the skyline caused by Tower 3 is located in the context of the existing towers of the summit, and as such does not change the character of this area, merely the extent of this character. (Ethos Urban, 2019, p. 81)

***A5.2** Building Design and Light Effects*

*The maximum building height is 3.5m and any building is not more than one storey, and is designed in accordance with the requirements of the relevant Management Zone and this Management Plan, and the Trust's Design and Infrastructure Manual where relevant. Associated services, access and parking must not be prominent.*

*External lighting must assist orientation only and will be focused towards the ground.*

***P5.2** Building Design and Light Effects*

Development must be designed to harmonise with the visual landscape and natural qualities of the site in terms of appearance, scale and proportions and follow the Trust's Design and Infrastructure Manual where relevant.

*Lighting and reflection must be managed to avoid adverse impacts on natural and cultural values.*

Development Response

The proposed tower structure exceeds 3.5m in height and are more than one storey, and therefore do not meet the acceptable solution A5.2.

The accompanying VIA finds that Tower 3 has been designed to consider the Trust's Design and Infrastructure Manual and have been designed to ensure minimal impact in regards to reflectance and lighting.

### 7.2.5 Issue 6: Noise

***Objective:** To provide for the quiet enjoyment of natural and cultural values, and acoustic amenity of the Park*

*A6.1 Noise*

*Noise from point sources must not exceed 50 dB(A) at any point within 50m of the source.*

*P6.1 Noise*

*Activities which could have an adverse effect on the quiet enjoyment of natural and cultural values must be avoided or remedied to prevent any loss of acoustic amenity in the Park.*

Development Response

The section of cable car infrastructure most likely to contribute to noise is the drive. It is proposed that this will be housed in the machine room below the cable car platform and will be encased in concrete which will significantly reduce any noise emissions. The cable system is driven by a motor at the Base Station, restricting any potential noise source to that one location.

The acoustic assessment has been conducted and drafted as a result of the specific drafting of the relevant provisions of the Wellington Park Management Plan (WPMP) which states "Noise from point sources must not exceed 50 dB(A) at any point source within 50 m of the source". It does not specify if this is vertical or horizontal distance from the point source or is it to be measured 50 m along the ground with the point source being represented as a dot on a plan.

To set a criteria implies that the criteria is directly and quickly verifiable. To measure 50 dB(A) at a height of 55 m may prove difficult since at that height we might be measuring wind passing the microphone or the noise generated by Karman vortices on the scaffold pipes or ladders rungs. Noise as a pollutant travels fast and usually leave no trace. Nor does the WPMP indicate the metric to be used. Is 50 dB(A) measured as an Leq or L90 or L max. and over what period is the measurement to be carried out (Pearu Terts, 2020)

The assessment includes an assessment of noise 50 m from the point source, both in the horizontal direction and the vertical direction as well as an assessment based on 50 m from the tower at ground level. An assessment 50 m along the ground is in our opinion the most practical method of verification as it involves only a tripod and a sound level meter, and the results relate to the aural experience of the park visitors in the soundscape (Pearu Terts, 2020).

The following summarizes the findings:

| POINT SOURCE | LMAX (DB(A)) WITHIN 50M OF POINT SOURCE |
|---|---|
| Base Station front facade – cable car movement leaving | 59.8 |
| Pinnacle Station | Up to 59.8 |
| Cable Car moving across 35m tower (top hemisphere - horizontal and vertical) | 53.7 |
| Cable Car moving across 35m tower (bottom hemisphere – vertical (i.e. ground)) | 54.6 |

As demonstrated above, the noise emission is more than the acceptable solution and therefore the performance criteria must be addressed. As stated in the acoustic report, 50 dB(A) is a stringent requirement, and likely to be exceeded when people talk or animals and insects communicate. The existing average maximum noise level in the park is 62.6 dB(A) with a standard deviation of 7.7 dB(A); therefore, the maximum noise emissions from the cable car point sources are within the existing maximum noise levels experienced in the park's noise climate (Pearu Terts, 2020).

Noise emission from the cable car is unlikely to be intrusive or cause adverse effect on the enjoyment of the natural sounds, cultural values and acoustic amenity of the park

### 7.2.6 Issue 7: Public access, infrastructure and safety

***Objective:*** *To ensure an adequate and appropriate level of access, infrastructure and safety for use and development of Wellington Park.*

***A7.1*** *Road Access*

*The design capacity and construction of any public road or access in accordance with Australian Roads Standards (Austroads) appropriate to a public road in a mountain environment.*

*And*

*Road speed controls or other measures are utilised in order minimise road kill.*

*And*

*The design and maintenance of any fire trail meets the standards required by a Bushfire Management Strategy prepared in accordance with this Management Plan.*

***P7.1*** *Road Access*

*Where use and development involves a new or upgraded road or access, or increased use of an existing road or access, appropriate measures must be put in place, in consultation with the relevant road authority, to ensure that the free movement and safety of traffic, people and wildlife will be protected.*

Development Response

This clause does not apply as the only works within the Natural Zone is for the construction of Tower 3. This does not require any modifications to the existing road access to the Pinnacle.

***A7.2*** *Pedestrian Access*

*Use or development does not interfere with (existing or potential) formal public pedestrian access within or into the park.*

***P7.2*** *Pedestrian Access*

*Existing formal public pedestrian access within the park must be maintained and enhanced except where public safety or protection of natural cultural would be at risk.*

Development Response

Use and development does not interfere with formal pedestrian access within or into the park.

***A7.3** Recreation Track Construction*

*There is no Acceptable Solution for this element*

***P7.3** Recreation Track Construction*

*Recreation tracks must be constructed, located and maintained in accordance with any policies, objectives and standards contained in this Management Plan and in a Recreation Strategy prepared in accordance with this Management Plan (or, in the absence of a Recreation Strategy, a Walking Track Strategy or Bike Strategy endorsed by the Trust).*

Development Response

Construction of recreation tracks is not currently proposed.

### 7.2.7 Issue 8: Natural Hazards

***Objective:** Areas subject to natural hazards will be managed to protect life, property and land, and to minimise the need for remedial or engineering works and long term impacts on the Park's values.*

***A8.1** Hazard Avoidance and Mitigation*

*Buildings and structures, other than walking tracks constructed in accordance with a walking track strategy, do not involve cut and fill of more than 1m and must not be located within a buffer area, specified in accordance with this Management Plan, of a water body, wetland or watercourse.*

*And*

*The proposed use or development is accompanied by a geotechnical report from a suitably qualified person stating that there is an acceptable risk of instability.*

***P8.1** Hazard Avoidance and Mitigation*

*In areas where there is a risk of flooding or land instability, all buildings and structures, other than walking tracks constructed in accordance with a walking track strategy, must be sited, designed and constructed to, as minimum requirements, take account of future climate change and flood hazard potential, and to assess and mitigate risk in accordance with a hazard risk analysis as set out in the current Australian Geomechanics Society landslide risk management concepts and guidelines and Australian Standard AS1726.*

Development Response

Cut and fill associated with the construction of Tower 3 will not exceed 1m. The proposed development application is accompanied by a Geotechnical Study by Cardno and additional information by SLR which found that rock fall at both the Main Site and Towers 3 presents a moderate geotechnical hazard risk, whilst the risk of debris flow, boulder creep or large deep seated slide is considered low (Cardno, 2018) (SLR, 2020)

It is recommended by that removal/scaling of boulders within the footprint of Tower 3 should occur to remove any loose blocks, and the foundations of the tower to be placed directly on in-situ in very high strength rock and to be anchored accordingly (Cardno, 2018, p. 26).

*A8.2 Bushfire*

*Development of new or modified buildings must be in accordance with sections E1.6.3, E1.6.4 & E1.6.5 of Planning Directive No 5 (Bush Fire Prone Areas Code)*

*P8.2 Bushfire*

*There are no Performance Criteria for this issue.*

Development Response

In the case of bushfire, this is realized and regulated in the specific standard (Issue 8: Natural Hazards) which requires compliance with Planning Direction No 5. Since the WMMP was established, a revised version of the planning directive has been enforced. According to the Wellington Park Act Section 23 (5):

If a provision of the management plan is inconsistent with a provision of a planning directive issued under section 13 of the Land Use Planning and Approvals Act 1993 , the latter provision prevails.

Legal opinion has verified that Planning Directive 5.1 supersedes PD 5.0 for the purpose of this assessment, as per S23(5) of the Wellington Park Act 1993.

PD 5.1 only applies if the use is a hazardous or vulnerable use as defined by the Bushfire Prone Areas Code or if subdivision is proposed. Neither of those two are triggered by this proposal, so consequently PD5.1 is not applicable and a bushfire assessment is not pertinent to the application in relation to Issue 8.

However, a bushfire assessment forms part of this planning application which presents measures to mitigate and manage bushfire in relation to the proposed development. For the purposes of the planning application, it is necessary to have some degree of confidence in these outcomes to the extent that the required vegetation management or clearance is known and assessed in terms of the park values. Therefore, the bushfire assessment is relevant in so far as that it informs the Natural Values Impact Assessment, which responds to Issue 2 of the WPMP or the Biodiversity Code of the Hobart Interim Planning Scheme.

# 8. THE PINNACLE SPECIFIC AREA

The Pinnacle Centre is located within the Pinnacle Specific Area, as detailed under section 2.1.1 and shown in Figure 5 below:


**Figure 9: Extent of the Pinnacle Specific Area (source: WPMP)**

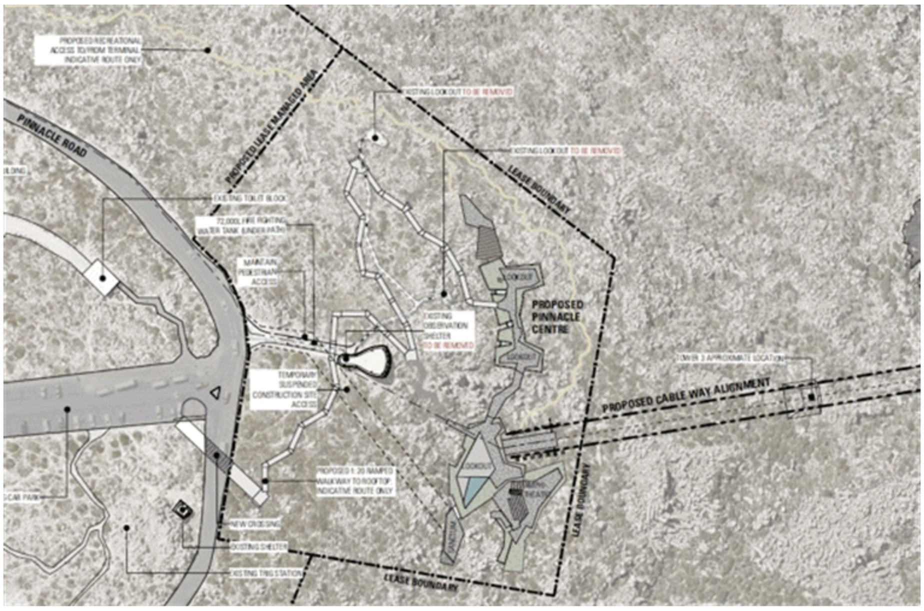


**Figure 10: Pinnacle Station site plan (source: JAWS Architects)**

The Pinnacle Specific Area is a major visitor and communications site and has a long history of visitor use. As per section 3.3.2 of the WPMP, the management objectives for the Pinnacle Specific Area are as follows:

The management objectives for the Pinnacle Specific Area are to:

- Provide for a range of day-use tourism and recreational opportunities based on sightseeing, scenic tourism and appreciation of alpine environment;
- Develop visitor services and facilities in the area appropriate to the allowable level and type of use;
- Consolidate and contain existing visitor facilities by enhancing or removing them;
- Protect environmental and cultural features and values;
- Protect the scenic qualities of the area when viewed both from within and from outside the Park and, except for existing or already approved communications facilities, minimise skyline intrusions when the Zone is viewed from municipalities surrounding the Park; and
- Provide for and manage communications facilities consistent with the above objectives.

## 8.1 USE

The following table has been adapted from the WPMP and modified to illustrate the use and development permitted (P), Discretionary (D) and Prohibited (X), within the Pinnacle Specific Area:

| | |
|---|---|
| **PERMITTED** | |
| Park seating | |
| Visitor Information/ interpretation panels | |
| **DISCRETIONARY** | |
| Tourist Operation | Only for visitor centre, interpretation centre, viewing shelter and ancillary uses to the provision of these including limited associated retail. |
| Food Services | |
| Transport Depot and Distribution | Only for bus terminal, council depot, or a Potential Transport Mode |
| Vehicle Parking | Only if single storey |
| Utilities | Only for telecommunications, electricity generation, transmitting power, transport networks, collecting, treating, transmitting, storing, distributing or disposing of water, sewerage or sullage. |
| Storage | Only for park management purposes |
| Toilets | |
| Park Management office | |
| Picnic/BBQ facilities | Only for picnic shelter |
| Viewing shelter/building | |
| Lookouts (open air) | |
| Recreation tracks and trails, and related structures | |
| **PROHIBITED** | |
| Visitor Accommodation | |
| Camping | |

The use of the Pinnacle Centre is primarily that of a Transport Depot and Distribution use group, under the specific use of Potential Transport Modes:

*Potential Transport Mode*

*Forms of public transport that have the potential to effectively move large numbers of people, but for which little or no infrastructure currently exists in the Park. It includes but is not limited to: shuttle buses, cable cars and aerial ropeways, funicular rail and cable rail systems.*

It is considered that the proposal is consistent with the definition provided in the WPMP, and is listed as a discretionary use.

However, as the Pinnacle Centre is open to members of the public, notwithstanding their intentions to ride the cable car, and offers a range of services including viewing shelter and interpretation centre, food services and limited retail.

Whilst the primary function of the Pinnacle Building is to receive and process travellers of the cable car, whether or not the remaining uses are ancillary to the primary use or standalone uses relies on a question of the degree to which they would and could function independently of the primary use. The following table ascribes more detailed breakdown of the potential nature of proposed uses for the components of the Pinnacle Building.

Pinnacle Building Uses

| USE | STATUS | USE CLASS | HOURS OF OPERATION |
|---|---|---|---|
| Bathroom facilities | D | Transport Depot | 8am - 10pm |
| Foyer/ Circulation | D | Transport Depot | 8am - 10pm |
| Retail | D | Transport Depot | Daylight hours |
| Plant | D | Transport Depot | as required |
| Control Room | D | Transport Depot | as required |
| Restaurant (for dining and functions) | D | Food Services | Daylight hours till 6pm; Evenings (for cable car ticket holders only) - close by 10pm |
| Bar | D | Food Services | As per restaurant |
| Café | D | Food Services | 8am - 5pm |
| Sanctum<br>(a silent room for scenic views to the South Wellington ranges) | D | Tourist Operation | Daylight hours (unless exclusive events, as per function room) |
| Lookouts | D | Tourist Operation | Where accessible - all hours |
| Indoor Amphitheatre<br>(indoor scenic viewing area) | D | Tourist Operation | Daylight hours |

| | | | |
|---|---|---|---|
| Outdoor Amphitheatre (Outdoor scenic viewing area) | D | Tourist Operation | Daylight hours |
| Interpretation | D/P | Tourist Operation | Daylight hours |
| Park ranger Offices | D | Natural and Cultural Management | As required |
| First aid facilities | D | Ancillary Transport depot or Natural and Cultural Management | As required |
| Staff facilitates | D | Ancillary | As required |

The key uses are defined by the WPMP as follows:

Tourist Operation: (use of land specifically to attract tourists): only for visitor centre, interpretation centre, viewing shelter and ancillary uses to the provision of these including limited associated retail.

Food Services: (use of land for preparing or selling food or drink for consumption on or off the premises): café, restaurant and take away food premises. (WPMP The Pinnacle Specific Area Plan P155)

Unlike the structure of interim planning schemes, the table of uses in the SAP does not default unlisted uses as otherwise prohibited. S2.5.1 of the PSAP states that use (and development) has (P), (D) and (X) use status designated to the selected uses in the use table. Only two uses are designated a prohibited use status with the Pinnacle Specific Area, which is camping and visitor accommodation. As none of the uses proposed are camping or visitor accommodation, the proposed uses are not prohibited.

The function room is effectively made up of the restaurant and bar area that can be booked for private functions if required and will operate the same hours as the restaurant. The amended TIA accounts for both vehicle and cable car visitation to the Pinnacle Zone. The Pinnacle Centre will be open to the public during the daytime (8am to dusk), regardless of whether they are travelling on the cable car and will be accessible by ramp from the existing summit car park. The restaurant and associated uses as identified in the table above, will be available after 6pm but only to those who have booked and are cable car ticket holders. The final cable car will leave the Pinnacle centre at 9.30pm and arrive at the Base Station at 9.45pm.

## 8.2 STANDARDS FOR USE AND DEVELOPMENT

### 8.2.1 Issue 2: Flora and Fauna Conservation, Geoconservation and Natural Processes

***Objective:*** *To conserve flora, fauna, geological and geomorphical values, and to protect natural processes.*

*A2.1 - Native Vegetation*

*The proposal does not impact upon terrestrial or aquatic native vegetation which:*

*(a) is listed as significant in this Management Plan, or any planning strategy or Trust endorsed scientific assessment prepared in accordance with this Management Plan; or is a Threatened Vegetation Community under the Nature Conservation Act 2002.*

*(b) supports, or forms habitat for any species of fauna listed in the Threatened Species Protection Act 1995 or the Environment Protection and Biodiversity Conservation Act 1999.*

P2.1 - Native Vegetation

Any adverse affects on terrestrial or aquatic native vegetation or habitat values must be avoided, or remedied to ensure no long term impact on vegetation values.

Development Response:

(a) The vegetation community present at the proposed pinnacle site is Eastern alpine heathland HHE which is not listed as significant in the Management Plan, or under the *NCA*, and there are no Trust endorsed scientific assessments that deal with flora and fauna. The term "significant vegetation" is not defined in the WPMP although the plan makes reference to sensitive vegetation in the alpine area. The Park Activity Assessment form makes reference to "natural values" including "vegetation that is known to have a slow recovery rate after disturbance". HHE being an alpine community would fall into this category.

(b) Rocky habitats within the Pinnacle may provide potential habitat for the silky snail. (North Barker Ecosystem Services, 2021).

P1.2

Some native vegetation supporting Eastern Alpine Heathland (HHE) TASVEG community (0.42ha) will be impacted by the development. The SAP area is dominated by this vegetation community and approximately 6 percent of the community within the SAP area will be impacted. North Barker writes:

*Given the SAP covers this area of heath and is specifically in place to regulate vegetation clearance for developments, the intent of the SAP is not to preclude any loss of vegetation with its boundaries but to ensure there is "no long-term impact on vegetation values". Management of the surrounding vegetation outside the immediate footprint should be controlled and prescribed in any approval conditions to ensure that there will be no peripheral impacts* (North Barker Ecosystem Services, 2021, p. 77)

*A2.2 Threatened Species*

*The proposal does not impact upon any threatened species listed under the Threatened Species Protection Act 1995 or the Environmental Protection and Biodiversity Conservation Act 1999.*

*P2.2 Threatened Species*

Any adverse effects on nationally or State listed rare, threatened or endangered species, communities or habitats must be avoided or remedied to ensure no long term impact on vegetation values.

Development Response:

One threatened species *Viola curtisiae* is present at the pinnacle site and can be expected to be impacted by the proposed development and one threatened fauna, the silky snail

The Natural Values Assessment indicates that the impact on Viola curtisiae cannot be entirely avoided by the proposed development. The loss will not have an adverse long-term impact upon the species. This is because the species has, only this year, been found to be widespread across the Wellington Range. Reanalysis of the novel data may justify a case for having the species delisted as threatened from the TSPA.

Impact to the silky snail is not known. The localised impacts when considered against the extensive habitat availability suggest that it would not be significant. (North Barker Ecosystem Services, 2021, p. 79)

The proposal is considered to comply with the performance criteria P2.2.

*A2.3 Geoheritage*

*The proposal does not impact upon any geoheritage sites listed as significant in this Management Plan or in a scientific assessment endorsed by a Trust, or listed on the Tasmanian Geoconservation Database.*

*P2.3 Geoheritage*

Any adverse impacts on any geoheritage values must be avoided or remedied to ensure no long term impact on geoheritage values.

Development Response:

P2.3 The geoheritage listing identifies the Wellington Range high altitude periglacial terrain which have not been affected by glacial processes as a landform that has scientific value and the Organ Pipes Columnar Jointing. Other specific features within 1000m of the search criteria include the Lost World Boulder Caves, Sphinx Rock, The Rolling Stone, Dead Island Area Marsh and String Bogs, but are not located within the proposed development corridor.

The Management Plan also identifies two features of Geoconservation Significance within proximity of the proposed Pinnacle Centre development site, as follows; *1. Dolerite - Sandstone intrusive contact exposure* and *10. The Organ Pipes Cliff including Alberts Tomb & Jonstons Knob*.

The following assessment is based on Geomorphology Impact Assessment by GE Consulting Engineers, June 2020 (GE Consulting Engineers, 2020)

The proposal is considered to have no impact on the following sites:

Pinnacle Nivation Hollow

Pinnacle Rock Fall

Pinnacle Road Sandstone Dolerite Contact

Pinnacle Volcanic Plug

The proposal is considered to have some impact on the geoheritage values:

The Organ Pipes Cliff

The impact relates to the visual aesthetic of the Organ Pipes in relation to the proximity of the proposed development to the geoheritage site. The impact is considered negligible to minor and is considered offset by the provision of new viewing points from the Cable Car as it traverses the Mountain. There will be no physical or groundwater and none to imperceptible impact associated with construction.

Wellington Range Periglacial Terrain

The impacts relate to the visual aesthetic which is considered negligible to minor; and the impacts related to physical, groundwater and construction is negligible to minor. No adverse impacts are anticipated.

### 8.2.2 Issue 3: Cultural Heritage

***Objective**: To protect sites or areas of cultural value and significance.*

*A3.1 Aboriginal Cultural Heritage*

*The proposal does not involve an Aboriginal relic as defined under the Aboriginal Relics Act 1975, or Aboriginal heritage site or precinct identified with this Management Plan.*

P3.1 Aboriginal Cultural Heritage

Any impacts on any heritage precincts or sites of Aboriginal value must be avoided, mitigated or remedied so that no long term loss of Aboriginal cultural heritage values occurs.

*Any works shall conform with any relevant standards and guidelines prepared by Aboriginal Heritage Tasmania and comply with the Aboriginal Relics Act 1975.*

Development Response:

A report has been prepared title 'Aboriginal Heritage Assessment Report (AHAR) of the proposed kunanyi/Mount Wellington Cable Car Footprint' by Dr. Nicolas Grguric of Frontier Heritage Consulting Pty Ltd.

Accompanying this report is Dr. Grguric's CV which details his qualifications to undertake this work. Furthermore, he is listed on Aboriginal Heritage Tasmania's (AHT) website under the Register of Consulting Archaeologists.

A consulting archaeologist is considered an Aboriginal heritage practitioner as defined by the Aboriginal Heritage Standards and Procedures 2018 and therefore Dr. Grguric is qualified to carry out an AHAR.

The field survey which forms part of the AHAR has found no aboriginal heritage including sites as defined by the Act within the development area. Therefore A4.1 of the above request is satisfied. Dr Grguric's advice is no further management is required.

The AHAR report also includes information regarding the history of the site and area, and the onsite survey. An aboriginal heritage property search was undertaken in 2018, and the consultant has also sought a new search to check for any updates to the register.

*A4.2 Historic Heritage*

*The proposal does not involve a place: listed on the Tasmanian Heritage Register under the Historic Cultural Heritage Act 1995; or listed in a Heritage Code of a Planning Scheme.*

*P4.2 Historic Heritage*

*Adverse impacts on all identified and assessed significant historic cultural heritage values must be avoided, or mitigated so that no long term loss of historic cultural heritage occurs.*

All development and use must be in accordance with the management objectives and policy in any Trust approved cultural heritage conservation policy, and conform with any relevant standards and guidelines produced by Heritage Tasmania and the Burra Charter (Australia ICOMOS, 1999).

*Note: Achieving this can occur through the submission of a Heritage Assessment and Management Plan, identifying the potential impacts and the measures to be taken to ensure the conservation of the heritage values, to meet any existing conservation policy approved by the Trust.*

Development Response:

The proposal does not involve a place listed on the Tasmanian Heritage Register and is not listed in the Heritage Code of the Planning Scheme.

### 8.2.3 Issue 4: Water quality

***Objective**: To conserve water quality.*

*A4.1 Waste Water*

*Waste Water, including grey water, must be connected to reticulated or on-site waste treatment system approved by the Planning Authority; and*

*Stormwater will be drained to a detention basin, artificial wetland or infiltration area, or reused within the site, without causing erosion or pollution of existing surface or ground waters or other values of the Park.*

*P4.1 Waste Water*

Waste water including grey water, stormwater, or other contaminants must not prejudice the achievement of the water quality objectives for surface or ground waters established under the State Policy on Water Quality Management 1997 or the water quality objectives of this Management Plan.

Development Response:

There are no reticulated sewer services in the Park.

Sewerage will be created on site, however this sewerage will be delivered to a 100,000 litre holding tank located at the basement level of the Pinnacle Centre.

The sewerage will then be transported outside to the Base Station via transport tanks which will be fixed to the base of the cable cars. Each tank will have a capacity of 4000 litres and will be emptied into a reticulated waste treatment system, connecting to the TasWater reticulated sewer system in McRobies Rd. The Site Servicing Report considers this to meet acceptable solution A4.1. (Gandy & Roberts, 2020, p. 7).

Stormwater produced at the site will be in part collected from roof runoff to a 25,000l storage tank in the basement for toilet flushing. The remainder of the stormwater which is not collected for use, will be delivered to existing natural water courses via a network of swales and piped systems designed to mimic existing water runoff (Gandy & Roberts, 2020, p. 10). Stormwater will be designed to meet standards to ensure that development should not result in erosion, siltation, degradation of water quality of any watercourse spring or recharge basin, or increase in landslip or erosion hazard potential.

*A4.2 Water Bodies, Wetlands and Watercourses*

*No land clearing, excavation, filling or other development must occur:*

*(a) Within a watercourse a water body, wetland; or*

*(b) within a buffer area, as specified in accordance with this Management Plan, of a water body, wetland or watercourse, except for the purpose of maintaining a water supply for fire fighting purposes, or vehicle access to that water supply in accordance with a Fire Management Strategy prepared in accordance with this Management Plan.*

*The use or development involves no extraction of water from any water body, wetland or watercourse except for use in fire fighting or carrying out planned burns in accordance with a fire management strategy prepares in accordance with this Management Plan.*

*The use or development has the approval of TasWater that it will have no negative impact upon drinking water quality.*

*P4.2 Water Bodies, Wetlands and Watercourses*

*Use and development must be designed and carried out to ensure that any adverse effects on natural drainage, flow regimes, erosion and sedimentation to and within any water body, wetland or watercourse will be avoided, or remedied to ensure no long term impact on any water body, wetland or watercourse.*

Development Response:

No land clearing excavation, filling or other development will occur within;

(a) a watercourse, a water body or wetland;

(b) a buffer area as specified in accordance with the Management Plan.

Water used for fire fighting will be collected and stored in underground tanks on site. Potable drinking water for handwashing and kitchen use will be transported to the Pinnacle Centre via the cable car, after hours and stored in a tank at basement level. (Gandy & Roberts, 2020, p. 10)

### 8.2.4 Issue 5: Landscape, visual quality and amenity

***Objective:** To protect and enhance the landscape and visual quality of Wellington Park.*

*A5.1 Visual Sensitivity*

*The proposal does not involve a building or structure, apart from Park furniture or Park signs.*

*P5.1 Visual Sensitivity*

Buildings and structure (other than park furniture or replacement of an existing building or structure of the same size and location) in prominent locations visible from within or outside of the Park, or identified as of High or Moderate Visual Sensitivity in Map 4 of this Management Plan, must be designed and sited to minimise or remedy any loss of visual values or adverse impacts on the visual character of the affected area.

*Note: Satisfaction of this Performance Criteria may include a Visual Impact Analysis, prepared by a suitably qualified person, demonstrating how the building or structure can be designed and located to harmonise with the site.*

Development Response:

The proposal involves a building and therefore does not meet the acceptable solution A5.1 and is required to meet the performance criteria P5.1.

The location of the proposed Pinnacle Centre is within a high visual management sensitivity area, as shown in Map 4 of the WPMP. The Visual Impact Assessment (VIA) finds that the proposal will not be perceived in its entirety from any singular vantage point. The impact of the built form and scale of the Pinnacle Centre is dependent upon the vantage points in which it is viewed. The report indicates that the scale of the Pinnacle Centre, when viewed from locations along the Hobart waterfront, Kingston, Salamanca and Rosny lookout will be low.

Design

The proposed Pinnacle Centre has been designed and sited to respond to the steep vertical change in topography by providing tiers to limit the requirement for excavation works. This is reinforced by providing a broken façade form that responds to the nature of the rocky slope.

Materials and finishes can also add to the overall visual impact of a development, particularly in sensitive areas such as the pinnacle. The VIA indicates that the proposal utilises materials and finishes that are in accordance with the Wellington Park Design and Infrastructure Manual 2006. It is considered that the design of the building, coupled with the materials and finishes, is consistent with its setting and does not appear as visually dominant.

Demolition

The partial demolition of the existing observation shelter is significant for two reasons; the first being that the observation shelter is an important visual feature associated with the mountain's visual character; secondly, the existing structure extends above the skyline and removing this feature will effectively reduce the existing visual impact on the skyline. The proposed Pinnacle Centre is located below the skyline and is designed to respect the topography. It is an objective of the WPMP to consolidate or remove visitor facilities.

Viewpoints

A number of viewpoints have been identified within the VIA, these points are as follows:

- Hobart Waterfront
- Summit to City
- South Hobart
- Kingston
- Glenorchy
- Salamanca Place

- Old Springs Hotel
- Tranmere
- Rosny Park Lookout
- Huon Road

The viewpoints provided by Another Perspective, and analysis in the Visual Impact Assessment has determined that the visual impact is low to moderate from all viewpoints. The moderate impact is associated with Summit to City, South Hobart, Glenorchy, Huon Road and Old Springs Hotel. This impact is considered reasonable, given the high sensitivity of these locations and lack of screening opportunities or further mitigation opportunities. Furthermore, the distance between the viewpoint and the pinnacle reduces any impact on the view to the summit. This is reinforced by the proposed partial removal of the existing observation shelter on the summit. It is noted in the accompanying report that weather and lighting, particularly during the early mornings are likely to increase or decrease the perceived change to the landscape in this location.

As per the attached VIA and this report, it is considered that the Pinnacle Centre complies with P5.1 (Ethos Urban, 2019).

### 8.2.5 Issue 6: Environmental Hazards - (a) Regolith

*Objectives:*

*(i) To ensure that the subject land is capable of supporting proposed developments and use.*

*(ii) To ensure that any development does not cause instability or erosion on the site, or on land outside the development site.*

*A6.1 Regolith*

*Development is on a slope less than 6 degrees.*

*P6.1 Regolith*

Any development on slopes 6 degrees or greater must be supported by geotechnical land instability report which:

- Is based on investigations which comply with the minimum requirements of Australian Standard 'Geotechnical Site Investigations" AS1726-1993;
- Addresses all potential hazards;
- Classifies the site in accordance with the relevant Australian Standard for the class of building being proposed;

- Makes recommendations for the type and design of drainage methods and structures, and building/structure foundations; and

*Concludes by providing an opinion on the level of risk, whether the site is capable of supporting the proposed development or the development is likely to cause instability on land outside the development site.*

Development Response:

Development is located on slopes greater than 6 degrees and therefore must be assessed against the performance criteria.

A hazard risk assessment completed by Cardno found that rock fall at both the Pinnacle Centre presents a moderate geotechnical hazard, whilst the risk of debris flow, boulder creep or large deep seated slide is considered low (Cardno, 2018) (SLR, 2020). A detailed analysis is provided in the report prepared by Cardo and the MWCC GEO1 Review by SLR.

Some minor rocks falls during the construction stage could be likely and should be managed appropriately. Any loose or hazardous boulders within the development site should be appropriately relocated and rock fall barriers may need to be considered to eliminate the risk of a boulder impacting the building.

It has been recommended that an intrusive geotechnical investigation be conducted before detailed design of footings is completed. A methodology for these investigations has been provided in MWCC GEO1 Review by SLR.

Based on experience with similar site investigations, Cardno indicate that a preliminary site classification of CLASS A ('Most sand and rock sites with little or no ground movement from moisture changes') is achievable for the proposed development site (Cardno, 2018, p. 26). If appropriate engineering and design and hillside construction practice is adopted, the proposed development is unlikely to contribute to instability on land outside of the development site (SLR, 2020).

### 8.2.6 Issue 7: Infrastructure Provision - (a) Roads

*Objectives:*

*(i) To ensure that adequate access is provided to the Pinnacle and that the appropriate facilities for vehicle circulation are provided within the Pinnacle Specific Area.*

*(ii) To ensure that all roads are constructed to an adequate standard.*

*(iii) To ensure that the construction, maintenance and repair of roads do not result in environmental damage.*

*A7.1 New Roads*

*Any new road to be constructed within the Pinnacle Specific Area is to provide access to an approved development.*

P7.1 New Roads

Any new road not required to provide access to an approved development is to be constructed for purposed which support the intent and objectives of this Plan.

Development Response:

No new roads will be constructed within the Pinnacle Specific Area, therefore this provision does not apply.

*A7.2 Road Capacity*

*No new development is to be carried out at the Pinnacle which would result in a requirement to upgrade the capacity of Pinnacle road (between the park Boundary and the Pinnacle).*

*P7.2 Road Capacity*

*Where development is shown to result in the upgrade of access roads to the Pinnacle, the proponent will avoid or minimise any adverse impacts upon existing road access, and public use and safety. A developer contribution towards the upgrade of those roads may be required.*

Development Response:

The proposed use and development generates vehicular activity at the Base Station, but by virtue of the primary use as an alternative form of transport, the cable car itself will not generate additional traffic movement. The tourist operation component of the use will cater to those travelling to the site by cable car primarily, as well as existing visitors to the pinnacle arriving by other means. As such, the Traffic Impact Assessment (TIA) concludes that the proposal will reduce the number of vehicular trips on Mt Wellington access roads, and as such will not result in a requirement to upgrade the capacity of Pinnacle Road (Midson Traffic, 2021, p. 26). Acceptable solution A7.2 has therefore been met.

*A7.3 Environmental Impacts*

*Works associated with any road construction, repair or maintenance do not require:*

*(a) removal of vegetation;*

*(b) disposal of runoff into any watercourse, bog or recharge basin; or*

*(c) The use of pesticides or herbicides for control of environmental weeds.*

*P7.3 Environmental Impacts*

*Where works associated with any road construction, repair or maintenance require the removal of vegetation, result in runoff into any hydrological feature identified in this Management Plan,* *or create visual intrusion, an environmental management plan must be prepared setting out how it is proposed to avoid or mitigate environmental effects.*

Development Response:

There will be no additional works associated with road construction required as part of the proposed development therefore this provision does not apply.

*A7.4 Road Construction*

*All roads are to be constructed to Australian Roads as published by Austroads.*

*P7.4 Road Construction*

*All roads and car parking areas are constructed to an adequate standard which provides for the safe and efficient movement of all users.*

Development Response:

No road construction will occur within the Pinnacle Specific Area and therefore this provision does not apply.

*A7.5 Car Parking Construction*

*Car parking facilities are to be constructed to Australian Standard "Parking Facilities" AS2890 for off street parking for cars and commercial vehicles.*

*P7.5 Car Parking Construction*

*All roads and car parking areas are constructed to an adequate standard which provides for the safe and efficient movement of all users.*

Development Response:

No new car parking facilities will be constructed within the Pinnacle Specific Area and therefore this provision does not apply.

### 8.2.7 Issue 7: Infrastructure Provision - (b) Water

***Objective****: To ensure that adequate high quality drinking water supplies are available to all users of the Pinnacle.*

***A7.6*** *The use and development does not require a supply of drinking water.*

***P7.6*** *The collection and storage of rain water in tanks is allowed provided that storage facilities meet all other requirements of this Management Plan.*

*Any required water treatment is to meet all other requirement of this Management Plan.*

Development Response:

The proposal will require a supply of drinking water and therefore must be assessed against the performance criteria P7.6.

Drinking water will be transported from the Base Station to the Pinnacle Centre via the cable car between 8am and 9am. The drinking water will be transported to the pinnacle via a 1000 litre cube style water container which will be designed to be wheeled onto the cable car. Water which has been transported to the pinnacle will be stored in a 75 000 litre tank at basement level.

Rainwater will be collected by a 25 000 litre tank at basement level which will be used for flushing of toilets (Gandy & Roberts, 2020).

### 8.2.8 Issue 7: Infrastructure Provision – (c) Sewerage

***Objective:*** *To ensure that facilities provided for the treatment and disposal of sewerage are sufficient to meet the needs of the development and do not result in the loss of water quality or cause environmental harm.*

*A7.7*

*The use and development does not require sewerage facilities.*

*P7.7*

*Sewerage facilities must be designed, performed and be managed to:*

*(a) deliver an appropriate level of protection for human health and the environment;*

*(b) minimise odour nuisance to acceptable levels;*

*(c) minimise noise nuisance to acceptable levels;*

*(d) not rely on the soils for absorption of any contaminated wastes; and*

*(e) Not cause landslip or erosion on the development site or other lands.*

Development Response:

Sewerage will be created on site, will be delivered to a 100,000 litre holding tank located at the basement level of the Pinnacle Centre.

The sewerage will then be transported to the Base Station via transport tanks which will be fixed to the base of the cable cars. Each tank will have a capacity of 5000 litres.

Average estimated numbers of visitors to the Pinnacle site is 2231 resulting in an estimated average of 22, 310 litres of water/wastewater. Each transportation tank can hold 5000 litres, resulting in an average of 5 trips and 1.25 hours of transportation. The cable car can carry a maximum of 4480 visitors during a weekend summer day, this would result up to 44,800 litres of wastewater/water resulting in 9 trips, equating to 2.25 hours of transportation. Waste transportation will generally occur between the hours of 4pm and 6pm, and in the event of higher than average visitation additional waste transfer can be accommodated into normal operating hours. It is noted that whilst the slower journey speed resulting in a 15m trip duration is used for transporting tourists, the cable car can operate at faster speed and shorter trip duration when used for servicing purposes. Goods loading and transportation is proposed between 8am and 9am.

Sewerage facilities will be designed to meet the performance criteria P7.7 (Gandy & Roberts, 2020).

### 8.2.9 Issue 7: Infrastructure Provision – (d) Stormwater

***Objective:*** *To ensure that stormwater runoff does not result in the loss of water quality or cause environmental harm.*

*A7.8*

*The design and construction of stormwater systems is to comply with Australian Standard 3500.3.2:2003, and does not drain into the Drinking Water Catchment Zone.*

*P7.8*

*Development and use is not to result in:*

*(a) erosion;*

*(b) siltation;*

*(c) degradation of water quality of any watercourse spring or recharge basin; or*

*(d) Any increase in landslip or erosion hazard potential.*

Development Response:

Stormwater produced at the site will be in part collected from roof runoff to a 25,000l storage tank in the basement for toilet flushing. The remainder of the stormwater, which is not collected for use, will be delivered to existing natural water courses via a network of swales and piped systems designed to mimic existing water runoff. The stormwater will be designed to meet standards to ensure that development should not result in erosion, siltation, degradation of water quality of any watercourse spring or recharge basin, or increase in landslip or erosion hazard potential (Gandy & Roberts, 2020, p. 10).

### 8.2.10 Issue 8: Car Parking and Access – (a) Car Parking Provision

***Objective:*** *To provide sufficient conveniently located and accessible parking for people utilising or servicing a use or development.*

*A8.1*

*The use and development does not require car parking.*

*P8.1*

*Car parking is to be provided to meet the needs of a development, and is determined by taking into account:*

*(a) the nature, number and size of vehicles associated with the proposed use and development;*

*(b) the location and nature of other uses or developments in the vicinity;*

*(c) the effect of hazards identified in the site or other site constraints in reducing parking opportunities;*

*(d) the possibility for sharing spaces with other developments; and*

*(e) the car parking needs of people likely to utilise the particular use or development.*

Development Response:

The Use and Development within the Pinnacle Area does not require additional car parking and therefore the acceptable solution is met.

### 8.2.11 Issue 8: Car Parking and Access – (b) Car Park and Access design

***Objective:*** *To ensure that car parking spaces are designed and located to meet the needs for on-site parking, access and manoeuvring of vehicles.*

*A8.2*

*Design and construction of car parking spaces and access facilities is in accordance with Australian Standard AS2890 – Part 1 Car Parking Facilities and Part 2 Commercial Vehicles as appropriate;*

*Where the development provides facilities for the public, one car parking space for every 20 provided is designed for use by persons with disabilities in accordance with Australian Standard "Design for Access & Mobility" AS 1428; and*

*Car parks are to be signed in accordance with the Wellington Park Sign Manual unless a variation is required to comply with a specific Australia Standard relating to traffic and parking regulatory signs.*

*P8.2*

*Vehicle parking facilities are to be designed and located conveniently, safely and efficiently service the needs of user, including pedestrians, cyclists and vehicles;*

*Vehicle parking facilities are to be designed and located to enable efficient use of car spaces and access ways and manoeuvrability for vehicles between the Pinnacle Road and the development served by the car park;*

*Parking facilities (including access ways or structures associated with the provision of car parking) are not to cause visual intrusion and methods to reduce the visual intrusion of parking and access facilities are to be specified;*

*Parking and access areas are to be appropriately located and designed to protect sites of cultural or heritage significance;*

*And*

*Access ways to a road are to be located so that vehicles entering or leaving the land are clearly visible to traffic on the road and vice versa.*

Development Response:

No additional vehicle parking will be constructed as part of the proposed Pinnacle Centre and therefore this provision does not apply.

### 8.2.12 Issue 9: Building Design – (a) Building Height

***Objective**: To ensure that buildings do not cause visual intrusion due to excessive height.*

*A9.1 Building Design*

*The maximum building height is 3.5m and any building is not more than 1 storey.*

*P9.1 Building Design*

*For any building greater than 3.5m in height it must be shown that the building will not visually intrude into the landscape in relation to:*

*(a) Local natural and environmental features;*

*(b) Views from neither the Pinnacle or elsewhere in the Park,*

*And*

*(c) Views from settled areas of Hobart and suburbs through the preparation of a Visual Impact Analysis conducted by a suitably qualified person.*

*Any building design must give consideration to the Wellington Park Infrastructure and Design Guidelines.*

Development Response:

The building is higher than 3.5m and therefore is required to meet performance criteria P9.1.

With regard to P9.1 (a) The Pinnacle Centre has been designed to ensure minimal impacts on existing geological and environmental features of the mountain. The fragmented façade design is designed to reduce the perceived visual bulk, and to integrate elements of the building like fingers into the landscape setting.

The Pinnacle Centre is sited below the skyline, which in part increases the technical height of the building, as the steeper topography drops away below the building, but also reducing the visual and landscape impact by placing the building where it will only be viewed against the much larger scale of the landscape as backdrop, rather than in silhouette and individually prominent against the skyline. The partial demolition of the existing observation shelter will further reduce the visible intrusion on the skyline by removing the higher portion of roof which is currently conspicuously visible from the city.

(b) As detailed in the accompanying VIA and in the response to Issue 5, a number of prominent view lines have been considered (Ethos Urban, 2019).

(c) for a detailed analysis of visual impacts, please refer to the attached VIA. An analysis has been provided to address a number of key view lines to the pinnacle from within Hobart, Glenorchy, Kingston and the Eastern Shore.

The proposal satisfies the performance criteria.

### 8.2.13 Issue 9: Building Design – (b) Building size

***Objective:*** *To ensure that buildings are of a size and dimension that fits in with the overall nature of low key development of the Pinnacle.*

*A9.2 Building Size*

*Maximum floor area of any building is 100m$^2$.*

*P9.2 Building Size*

Any proposal for a building of more than 100m$^2$ in floor area is to show that the building will not:

(a) Cause visual intrusion

(b) Require infrastructure that cannot be provided in accordance with the infrastructure provision standards, or

*(c) Be a dominant element in the landscape through the preparation of a Visual Impact Analysis conducted by a suitably qualified person.*

Development Response:

The building floor area exceeds 100m2 and therefore must address the performance criteria.

P9.2 (a) The following has been extracted from the VIA:

*In siting the Pinnacle Centre key views were considered to inform a building envelope that minimised intrusion to the skyline and views of and from the summit. This Visual Impact Assessment finds that the visual impact caused by the proposal is reasonable given the* *sensitivity of viewpoints and lack of available mitigation measures. Regardless the Pinnacle Centre will not be a dominant element in the landscape, barely discernible from the majority of views, and when perceptible has been designed to ensure that it references the surrounding forms and patterns of the landscape and is read amongst the context of surrounding infrastructural elements (Ethos Urban, 2019).*

(b) The proposal will not require additional servicing infrastructure (water, or sewerage) (Gandy & Roberts, 2020). Electrical infrastructure will require the extension of existing TasNetworks high voltage infrastructure from the last existing power pole (located to the northern boundary of the Pinnacle Zone) to the Pinnacle Centre by underground trench following the existing road reservation, then continuing underground to the Pinnacle Centre from the existing observation shelter (refer site plan 1782_DA101), in accordance with the infrastructure provision standards.

(c) The accompanying VIA indicates that the Pinnacle Centre does not introduce a new character on the Mountain and that the built form references existing patterns and forms on the Mountain summit and is not intruding into this landscape (Ethos Urban, 2019).

The proposal is therefore considered to meet the performance criteria P9.2

### 8.2.14 Issue 9: Building Design – (c) Appearance and Lighting

*Objectives:*

*(i) To ensure that all buildings are of a high architectural design standard.*

*(ii) To ensure that buildings blend with the local environment and do not cause visual intrusion.*

*(iii) To ensure lighting minimises impact on the local environment.*

*A9.3 Appearance and Lighting*

*The colour of external walls and roofs visible from off the site is to have a light reflectance value of less than 10%.*

*Roofs are to be clad with materials in non-reflective, muted natural colours and dark tones.*

*External lighting assists orientation only and is focused towards the ground.*

*P9.3 Appearance and Lighting*

The design of buildings and structures is to take into account the unique qualities of the pinnacle area while using innovative and high quality architectural solutions.

The colour and materials of external surfaces are to blend with the local environment and the dominant colours of adjoining areas of the Park.

Lighting and reflection must be managed to avoid adverse impacts on natural and cultural values.

Development Response:

The colour, texture and form of the facades have been designed to settle in a harmonious relationship with the natural colours and hues of the mountains landscape. The superstructure of the building is dark grey pigmented concrete, clad in a veil of weathered steel panels, partially folded and partially perforated where there is glazing behind. The panels will age and patina in time and allow light to penetrate to the windows and concrete behind creating variation in texture and colour. The folding of the panels fragments the light and shadow on each façade and reduces the length of straight wall sections adding complexity and variation to the facades. The design of the panels as shown on the drawings is indicative only and subject to detailed design development.

Materials & colours have been selected to have a low light reflectance and are muted natural colours and dark tones. The foundation walls, where exposed, are to be clad in stone reused from excavations on site, to visually connect the building form with its surroundings. Where ventilation is required in plant rooms weathered mesh screens shall be installed.

To reduce the potential for early morning reflection of sunlight to the city and towards Kingborough & Glenorchy, windows are either tilted forwards or located behind the perforated panels. The design has allowed for the inclusion of recessed external blinds or anti-reflective glass should this be required. Glazing will be designed to minimise reflectance, in compliance with the WPMP requirements including, if required, use of non-reflective glass or similar measures.

At night, to prevent glare associated with ceiling mounted light fixtures, it is proposed to use low intensity up-lights and wall mounted fittings facing away from windows and openings in the public areas. Lower levels of internal light will assist with viewing out of the building of an evening and at night, while being appropriate to evening dining experiences. Rooms requiring higher lighting levels such as kitchens and bathrooms are located internally, or facing immediately into the western mountainside, preventing visual intrusion.

External lighting will be sufficient to assist with orientation & access and will be focussed towards the ground (such as bollard lights).

### 8.2.15 Issue 10: Building Siting

***Objective:** To ensure that buildings are located in areas where they do not cause a reduction in the values associated with the Pinnacle.*

*A10.1*

*There is no Acceptable Solution for this element.*

*P10.1*

*Proposals for buildings facing on to or directly visible from the Pinnacle Road must show that there will be no diminution of values of the site either during the construction of the building or in its use and operation.*

*Buildings and structures (other than Park furniture or replacement of an existing building or structure of the same size and location) in prominent locations visible from within or outside of the Park, or in areas identified as of High or Moderate Visual Sensitivity in Map 4 of this Management Plan, must be designed and sited to avoid, remedy or mitigate any loss of visual values through the inclusion of a Visual Impact Analysis conducted by a suitably qualified person.*

Development Response:

The viewpoint from the summit has been addressed in the VIA, where it is concluded that the Pinnacle Centre will not significantly alter the existing character of the view from this area. The view from the Pinnacle is already characterised by existing infrastructure such as the observation shelter. The VIA finds that the proposal is sited and designed to minimise, avoid and mitigate impact on visual values to the greatest extent possible (Ethos Urban, 2019). The following response to P10.1 has been provided by Ethos Urban, which has found that the proposal satisfies the performance criteria:

P10.1: The proposed buildings do not face on to Pinnacle Road. A viewshed analysis has been undertaken to assess the theoretical zone of visibility of the Pinnacle Centre. This assessment indicates that the building will be potentially visible from Pinnacle Road at the summit carpark, and also where the road passes by The Springs. Assessment of photography from the 6 points (Figure 34-20) on Pinnacle Road demonstrates that roadside vegetation screens views to the summit and site of proposed buildings. From the remaining area of visibility at the summit, the visual impact assessment of Viewpoint 2 demonstrates that the proposal will not significantly alter the existing character of the view from this area of the summit as the current view features foreground tourism and road infrastructure similar to that proposed.

The findings of this visual impact analysis are that the proposal is sited and designed to minimise, avoid and mitigate impact on visual values to the greatest extent possible.

Diminution means a reduction in size, importance, or value. Throughout the report we have referred to the Significant Visual Elements of the mountain. We consider these to constitute the visual values of the site (i.e. the mountain). The likely impact of the Pinnacle Centre on these visual values is as follows:

- Skyline – the Pinnacle Centre will not result in a dominant break in the existing skyline silhouette

- Tree-line and change in texture – the proposal is located wholly above the tree line, and due to the form, materials and colours of the Pinnacle Centre, will not result in a readily perceptible change in texture
- Edge of settlement – the Pinnacle Centre is located remote from the dominant edge of settlement demarcated by the built up parts of Hobart and the mountain. It forms a cluster of human made elements at the summit of the mountain, and does not impact the other 'edge of settlement - views to wilderness areas to the south-west clearly visible form the summit of the mountain
- Variability (colour and 'mood') – the small scale of the Pinnacle Centre compared to the scale and complexity of the mountain will not result in any perceptible change in colour or 'mood'
- Scale (height, bulk, mass) – again, the small scale of the Pinnacle Centre compared to the scale of the mountain will not result in the diminution of this value
- Geological features – the Pinnacle Centre will be sited distant from the upper edge of the Organ Pipes, which is the dominant geological feature of the mountain, and will compared to the extent of the dolerite rock fields, will not result in a diminution of this geological feature.

In summary, it is considered that the Pinnacle Centre will not result in a diminution (as understood in terms of a reduction in size, importance, or value) of the visual values of the site.

With more specific regard to the Pinnacle itself, it is considered that the most important of these values is the skyline. As noted, the Pinnacle Centre will not result in a dominant break in the existing skyline silhouette. Furthermore, it is considered that the building is sited in an optimal location between the skyline and the edge of the Organ Pipes to not have a significant visual impact on either element (Ethos Urban, 2019, p. 83).

### 8.2.16 Issue 11: Noise

| |
|---|
| ***Objective:*** *To provide for the quiet enjoyment of natural and cultural values, and acoustic amenity of the Park.* |
| *A11.1*<br>*Noise from point sources must not exceed 50 dB(A) at any point within 50m of the source.*<br><br>*P11.1*<br>Noisy activities which could have an adverse effect on the quiet enjoyment of natural and cultural values must be avoided or remedied to prevent any loss of acoustic amenity in the Park. |
| Development Response: |

The section of cable car infrastructure most likely to contribute to noise is the drive. It is proposed that this will be housed in the machine room below the cable car platform and will be encased in concrete which will significantly reduce any noise emissions. The cable system is driven by a motor at the Base Station, restricting any potential noise source to that one location.

The acoustic assessment has been conducted and drafted as a result of the specific drafting of the relevant provisions of the Wellington Park Management Plan (WPMP) which states "Noise from point sources must not exceed 50 dB(A) at any point source within 50 m of the source". It does not specify if this is vertical or horizontal distance from the point source or is it to be measured 50 m along the ground with the point source being represented as a dot on a plan.

To set a criteria implies that the criteria is directly and quickly verifiable. To measure 50 dB(A) at a height of 55 m may prove difficult since at that height we might be measuring wind passing the microphone or the noise generated by Karman vortices on the scaffold pipes or ladders rungs. Noise as a pollutant travels fast and usually leave no trace, nor does the WPMP indicate the metric to be used. Is 50 dB(A) measured as an Leq or L90 or L max. and over what period is the measurement to be carried out (Pearu Terts, 2020)

The assessment includes an assessment of noise 50 m from the point source, both in the horizontal direction and the vertical direction as well as an assessment based on 50 m from the tower at ground level. An assessment 50 m along the ground is in our opinion the most practical method of verification as it involves only a tripod and a sound level meter, and the results relate to the aural experience of the park visitors in the soundscape (Pearu Terts, 2020).

The following summarizes the findings:

| POINT SOURCE | LMAX (DB(A)) WITHIN 50M OF POINT SOURCE |
|---|---|
| Base Station front facade – cable car movement leaving | 59.8 |
| Pinnacle Station | Up to 59.8 |
| Cable Car moving across 35m tower (top hemisphere - horizontal and vertical) | 53.7 |
| Cable Car moving across 35m tower (bottom hemisphere – vertical (i.e. ground)) | 54.6 |

As demonstrated above, the noise emission is more than the acceptable solution and therefore the performance criteria must be addressed. As stated in the acoustic report, 50 dB(A) is a stringent requirement, and likely to be exceeded when people talk or animals and insects communicate. The existing average maximum noise level in the park is 62.6 dB(A) with a standard deviation of 7.7 dB(A); therefore, the maximum noise emissions from the cable car point sources are within the existing maximum noise levels experienced in the park's noise climate (Pearu Terts, 2020).

Noise emission from the cable car is unlikely to be intrusive or cause adverse effect on the enjoyment of the natural sounds, cultural values and acoustic amenity of the park.

# HOBART INTERIM PLANNING SCHEME 2015

# 9. PLANNING SCHEME OPERATION

The following provisions of the *Hobart Interim Planning Scheme 2015* (HIPS) are relevant to consideration of the proposal. To the extent of any inconsistency with a standard or other requirement of the planning scheme, the provisions of the of the Wellington Park Management Plan (WPMP) prevail (s.23(4)(a) Wellington Park Act (Wellington Park Management Trust, Amended October 2015, p. 5).

## 9.1 ZONING

The underlying zoning under the Hobart Interim Planning Scheme (HIPS) is Environmental Management, which extends the full extent of proposed development, with the exception of the McRobies Road end of the proposed access road which is located within the Utilities Zone, as shown in figure 11.

**Figure 11: Zoning overview - Environmental Management (blue), Environmental Living (green), Utilities (yellow) Source: LISTmap**

# 10. ENVIRONMENTAL MANAGEMENT ZONE

## 10.1 ZONE PURPOSE

The purpose of the Environmental Management Zone is as follows:

*29.1.1.1 To provide for the protection, conservation and management of areas with significant ecological, scientific, cultural or aesthetic value, or with a significant likelihood of risk from a natural hazard.*

*29.1.1.2 To only allow for complementary use or development where consistent with any strategies for protection and management.*

*29.1.1.3 To facilitate passive recreational opportunities which are consistent with the protection of natural values in bushland and foreshore areas.*

*29.1.1.4 To recognise and protect highly significant natural values on private land.*

*29.1.1.5 To protect natural values in un-developed areas of the coast.*

There are no Local Area Objectives or Desired Future Character Statements for this zone. In relation to this proposal, the zone does provide for the protection, conservation and management of areas of significance, and with the integration of the WPMP, makes specific provisions for complementary use or development.

## 10.2 USE

| USE CLASS | QUALIFICATION |
|---|---|
| **NO PERMIT REQUIRED** | |
| Natural and cultural values management | |
| Passive recreation | |
| **PERMITTED** | |
| Community meeting and entertainment | Only if a reserve management plan applies |
| Educational and occasional care | Only if a reserve management plan applies |
| Emergency services | Only if a reserve management plan applies |
| Food services | Only if a reserve management plan applies |
| General retail and hire | Only if a reserve management plan applies |
| Pleasure boat facility | Only if a reserve management plan applies |

| | |
|---|---|
| Research and development | Only if a reserve management plan applies |
| Residential | Only if a reserve management plan applies |
| Sports and recreation | Only if a reserve management plan applies |
| Tourist operation | Only if a reserve management plan applies |
| Utilities | Only if a reserve management plan applies |
| Vehicle parking | Only if a reserve management plan applies |
| Visitor accommodation | Only if a reserve management plan applies |
| **DISCRETIONARY** | |
| Community meeting and entertainment | Except if permitted |
| Emergency services | Except if permitted |
| Extractive Industry | Only in Conservation Area, Regional Reserve or Public Reserve under the Crown Lands Act 1976. |
| Pleasure boat facility | Except if permitted |
| Port and shipping | Only if existing facility |
| Research and development | Except if permitted |
| Resource development | Only if for grazing of animals on native pasture or existing non-native pasture.<br>Only if marine farming shore facility or other facility dependant on a coastal location. |
| Resource processing | Only if dependent on a coastal location. |
| Sports and recreation | Except if permitted |
| Tourist operation | Except if permitted |
| Utilities | Except if permitted |
| Vehicle parking | |
| Visitor accommodation | Except if Permitted. |
| **PROHIBITED** | |
| All other uses | |

Reserve Management Plan is defined by the HIPS as (inter alia) "*a management plan prepared under the National Parks and Reserves Management Act 2002*". Tourist Operations and Food Services are designated as a permitted use within the zone, as a Reserve Management Plan applies.

Tourist operation is defined as:

> *use of land specifically to attract tourists, other than for accommodation. Examples include a theme park, visitors centre, wildlife park and zoo. Hobart Interim Planning Scheme 2015 - Administration*

Food Services is defined as:

*use of land for preparing or selling food or drink for consumption on or off the premises. Examples include a cafe, restaurant and take-away food premises. Hobart Interim Planning Scheme 2015 - Administration*

Transport Depot and Distribution is Prohibited in the Environmental Management Zone under the *Hobart Interim Planning Scheme*. This is contrary to the *Wellington Park Management Plan* and as such the provisions of the Plan prevail over the Scheme.

For the purposes of the assessment under the *Hobart Interim Planning Scheme 2015* and where the Management Plan does not prevail, the base station is classed as Tourist Operation and the access road is considered ancillary to the base station.

## 10.3 USE STANDARDS

Clause 29.3.1 outlines the Use Standards for Reserved Land, with the objective to provide for use consistent with any strategies for the protection and management of reserved land. The Acceptable Solutions rely heavily on the use of applicable reserve management plans.

### 10.3.1 CLAUSE 29.3.1 USE STANDARDS FOR RESERVED LAND

| ***Objective:*** *To provide for use consistent with any strategies for the protection and management of reserved land.* |
|---|
| ***A1*** *- Use is undertaken in accordance with a reserve management plan.*<br><br>**P1** - Use must satisfy all of the following:<br>(a) be complementary to the use of the reserved land;<br>(b) be consistent with any applicable objectives for management of reserved land provided by the National Parks and Reserves Management Act 2002;<br>*(c) not have an unreasonable impact upon the amenity of the surrounding area through commercial vehicle movements, noise, lighting or other emissions that are unreasonable in their timing, duration or extent.* |

Development Response

Use is undertaken in accordance with the Reserve Management Plan (Wellington Park Management Plan) as demonstrated in section 2.2, 2.3, 2.4 and 2.5 of this report and therefore meets Acceptable Solution A1.

Notwithstanding this, insofar as there are any inconsistencies, the provisions of the WPMP prevail.

## 10.4 DEVELOPMENT STANDARDS

### 10.4.1 CLAUSE 29.4.1 BUILDING HEIGHT

| |
|---|
| ***Objective**: To ensure that building height contributes positively to the landscape and does not result in unreasonable impact on residential amenity of adjoining land.* |
| ***A1** Building height comply with any of the following:*<br>*(a) as prescribed in an applicable reserve management plan;*<br>*(b) be no more than 7.5m.*<br><br>**P1** Building height must satisfy all of the following:<br>(a) be consistent with any Desired Future Character Statements provided for the area or, if no such statements are provided, have regard to the landscape of the area;<br>(b) be sufficient to prevent unreasonable adverse impacts on residential amenity on adjoining lots by:<br>(i) overlooking and loss of privacy;<br>(ii) visual impact when viewed from adjoining lots, due to bulk and height;<br>*(c) be reasonably necessary due to the slope of the site or for the functional requirements of infrastructure.* |

Development Response:

The WPMP deals specifically with building height therefore should prevail over provisions of the Environmental Management Plan. Notwithstanding this, the following assessment is provided as a precautionary approach.

Pinnacle Centre:

The building height of the proposed Pinnacle Centre exceeds the Acceptable Solution of 7.5m as well as the Acceptable Solution under the WPMP. Therefore, the proposal is required to meet performance criteria P1.

P1

(a) No Desired Future Character Statements are provided for the zone, however the building has been designed to have regard to the landscape of the area. Following extensive site analysis it was concluded that the chosen location was the most appropriate site within or around the Pinnacle Zone featuring the series of natural depressions or pockets in the topography that can be utilised to reduce impact on the skyline, as well as protect the building and visitors from the prevailing westerly winds.

As detailed in the accompanying Visual Impact Assessment (VIA), the building height of the Pinnacle Centre is dictated by the steep topography that characterises the eastern slope of the pinnacle area. The building has been designed to ensure that each section is setback into the landscape, siting sections where possible within these natural depressions and pockets to provide a fragmented/stepped design that responds to the topography of the site, reducing the visible height of the building (Ethos Urban, 2019, p. 75)

(b) (i) The Pinnacle is located on its own title, with the adjacent lots also contained within the WPMP area. There are no residential uses on the adjacent lots.

(ii) There are no residential lots adjacent to the site, and the building is set below the ridgeline and therefore the buildings height and bulk will not cause visual impact to neighbouring amenity.

(c) the height of the building responds to the steep nature of the site and is required to reduce the need to undertake substantial earthworks. The infrastructure required to house the cable car cabin dictates the ultimate height of building and the extent of construction to the lower levels.

Base Station:

The building height of the proposed Base Station exceeds the Acceptable Solution of 7.5m as well as the Acceptable Solution under the WPMP. Therefore, the proposal is required to meet performance criteria P1.

No Desired Future Character Statements are provided for the zone, however the building has been designed to have regard to the landscape of the area. The VIA notes that the proposed siting is within a modified landscape, and similarly to the Pinnacle Centre the height is influenced and informed by the surrounding steep topography. The Base Station will also be screened by trees, mitigating any increased impact on the existing modified landscape character.

(b) (i) The Base Station is located approximately 200m from the nearest residential dwelling, and not within line of sight. There is no potential for overlooking or loss of privacy.

(ii) Given the topography, vegetation and physical distance between the base station and the buildings height and bulk will not cause visual impact to neighbouring amenity.

(c) The Base Station is single storey at the pedestrian entry level, which follows the alignment of the existing fire trail access. The back of house and mechanical plant is accommodated through the fall of the site, which drops away relatively steeply from the upper level entry. The height of the building is driven by the steep slope of the site, but also consequently allows for a smaller footprint and disturbance area. The infrastructure required to house the cable car cabin dictates the ultimate height of building and the extent of construction to the lower levels.

Towers:

Tower 1 is proposed at 45m, Tower 2 at 55m, and Tower 3 at 36m. As these exceed the Acceptable Solution under the WPMP and the Environmental Management zone, the proposal is required to meet the performance criteria P1.

No Desired Future Character Statements are provided for the zone. The towers however have been designed and located to minimise visual impact. The location and height of Tower 3 avoids the necessity for two towers (as the alternative) closer both to the Organ Pipes and the Pinnacle Centre.

Tower 1 & 2 are designed to minimal functional requirements, providing sufficient height to clear the tree canopy, and avoid easement clearance.

(b) (i) The towers are not habitable, therefore there is no potential for overlooking or loss of privacy. The two aerial cabins will contain people, and on the downhill traverse they will have distant views of houses, however these are at such distance that they exceed (in distance) existing views across valleys or from existing lookouts. The distant views are not considered to impact on privacy or overlooking.

(ii) The accompanying VIA identifies that whilst the cable car infrastructure is visible from some closer viewpoints, it will not result in unreasonable adverse impacts on residential amenity.

The height of the towers is necessitated due to the topography and vegetation of the site. The open lattice design of the towers adopts best practise in minimising visibility, and reducing potential visual impact.

### 10.4.2 Clause 29.4.2 Setback

| |
|---|
| ***Objective:*** *To maintain desirable characteristics of the landscape, protect amenity of adjoining lots, avoid land use conflict and fettering of use on nearby rural land and protect environmental values on adjoining land zoned Environmental Living and adjoining land in the World Heritage Area.* |
| ***A1*** *Building setback from frontage must comply with any of the following:*<br>*(a) as prescribed in an applicable reserve management plan;*<br>*(b) be no less than 30 m.*<br><br>**P1** Building setback from frontage must satisfy all of the following:<br>(a) be consistent with any Desired Future Character Statements provided for the area or, if no such statements are provided, have regard to the landscape;<br>(b) minimise adverse impact on the landscape as viewed from the road;<br>(c) be consistent with the prevailing setbacks of existing buildings on nearby lots;<br>*(d) minimise loss of native vegetation within the front setback where such vegetation makes a significant contribution to the landscape as viewed from the road.* |

Development Response:

The building is located more than 30m from a boundary which abuts a road, therefore the proposal is considered to meet the acceptable solution A1.

| |
|---|
| ***A2*** *Building setback from side and rear boundaries must comply with any of the following:*<br>*(a) as prescribed in an applicable reserve management plan;* |

*(b) be no less than 30m.*

**P2** Building setback from side and rear boundaries must satisfy all of the following:

(a) be consistent with any Desired Future Character Statements provided for the area or, if no such statements are provided, have regard to the landscape;

(b) be sufficient to prevent unreasonable adverse impacts on residential amenity on adjoining lots by:

(i) overlooking and loss of privacy;

*(ii) visual impact, when viewed from adjoining lots, through building bulk and massing.*

Development Response:

Base Station:

The building is setback from the side and rear boundaries more than 30m and therefore meets the Acceptable Solution A2.

Pinnacle Centre:

The building is setback from the side and rear boundaries more than 30m and therefore meets the Acceptable Solution A2.

***A3** Buildings and works must be setback from land zoned Environmental Living no less than 30 m*

Development Response:

All buildings and works are setback more than 30m from land zoned Environmental Living and therefore meets the Acceptable Solution A3.

### 10.4.3 CLAUSE 29.4.3 DESIGN

***Objective:** To ensure that the location and appearance of buildings and works minimises adverse impact on natural values and on the landscape.*

*A1*

*The location of buildings and works must comply with any of the following:*

*(a) be located on a site that does not require the clearing of native vegetation and is not on a skyline or ridgeline;*

*(b) be located within a building area, if provided on the title;*

*(c) be an addition or alteration to an existing building;*

*(d) as prescribed in an applicable reserve management plan.*

P1

The location of buildings and works must satisfy all of the following:

(a) be located in an area requiring the clearing of native vegetation only if:

(i) there are no sites clear of native vegetation and clear of other significant site constraints such as access difficulties or excessive slope;

(ii) the extent of clearing is the minimum necessary to provide for buildings, associated works and associated bushfire protection measures;

(iii) the location of clearing has the least environmental impact;

(b) be located on a skyline or ridgeline only if:

(i) there are no sites clear of native vegetation and clear of other significant site constraints such as access difficulties or excessive slope;

(ii) there is no significant impact on the rural landscape;

(iii) building height is minimised;

(iv) any screening vegetation is maintained.

*(c) be consistent with any Desired Future Character Statements provided for the area or, if no such statements are provided, have regard to the landscape.*

Development Response:

Access Road:

A1

(a) The location of the access road requires the clearing of native vegetation and therefore does not meet the acceptable solution A1.

P1

(a) (i) The location and alignment of the access road follows existing clearance of the fire trail as far as possible. Where it deviates, it is to achieve constant fall to enable sewerage infrastructure to flow. No alternative which avoids vegetation is available.

(ii) The alignment and design of the road proposed is the minimum necessary to provide for works. Final design has been considered in light of on ground surveys, and minimisation of disturbance where possible.

(iii) There is no alternative which links the McRobies Road junction and the Base Station site which can avoid high priority vegetation. Minor changes to the road alignment may be required following more micro siting surveys (North Barker Ecosystem Services, 2021, p. 68).

(b)The proposed development is not located on a skyline or ridgeline.

(c) There are no desired future character statements and the proposal has regard to the landscape as it has been designed and sited to reduce impacts on natural values and the landscape. Refer to the Visual Impact Assessment for analysis of landscape impacts.

Base Station:

A1

(a) The location of the site requires the clearing of native vegetation and therefore does not meet the acceptable solution A1.

P1

(a) (i) The proposed Base Station development is largely within an existing cleared fire break and been sited to take advantage of as much of the cleared section of the site as possible.

(ii) The clearance represents the minimum necessary to provide for buildings, associated works and associated bushfire protection measures. Consultation with the Tasmanian Fire Service has confirmed the bushfire protection measures and extent of necessary clearance.

(iii) The clearing is likely to avoid high conservation values (North Barker Ecosystem Services, 2021, p. 68)

(b) The proposed development is not located on a skyline or ridgeline.

(c) There are no desired future character statements and the proposal has regard to the landscape as it has been designed and sited to reduce impacts on natural values and the landscape.

Towers:

A1

(a) The location of the site requires the clearing of native vegetation and therefore does not meet the acceptable solution A1.

P1

(a) (i) There are no sites suitable for the location of the towers clear of native vegetation which are due to the necessary alignment of the cableway. The proposed route is the only alignment that allows for the minimum number of towers, thereby minimising vegetation clearance.

(ii) The extent of the clearing necessary for the construction of the towers is restricted to the four corner foundations. Once installed, vegetation will be allowed to grow back, as ongoing vegetation clearance is not required, beyond the first 9 metres of canopy maintenance from the Base Station to Tower 1.

(iii) The final location of Tower 2 may need to be adjusted to ensure that the largest habitat tree (2m blue gums) can be retained as recommended in the Natural Values Assessment. (North Barker Ecosystem Services, 2021, p. 68).

(b) "The interruptions to the skyline caused by the upper tower are located in the context of the existing towers of the summit, and as such are do not change the character of this area, merely the extent of this character. This does not cause a significant impact on the character of the landscape" (Ethos Urban, 2019, p. 78).

(c) There are no Desired Future Character Statements and the proposal has regard to the landscape as it has been designed and sited to reduce impacts on natural values and the landscape.

Pinnacle Centre:

A1

(a) The Pinnacle Centre is located below the ridgeline of the summit, and appears only on the skyline when viewed from directly below, or oblique views. However, the clearance of any native vegetation is inevitable, given that vegetation will not be retained for the footprint of the building. The WPMP anticipates a cable car and visitor facility and makes provision for the use and development. The proposal is located within the identified Pinnacle SAP boundaries, however insofar as the specific location of such a building is not identified in the SAP, it is difficult to categorically state that such proposal is as prescribed in the WPMP. Insofar as the Management Plan specifies provisions for the siting and design, they prevail over these provisions. However, the performance criteria is addressed in a cautionary approach.

P1

(a) (i) the proposed site for the Pinnacle Centre was selected as it represented the most minimal visual impact, with buildings located within the hollows in the topography, and clear of the skyline. There are no other sites clear of vegetation which would cater to the technical design requirements of the proposal.

(ii) The extent of clearance is to be minimised through construction management practises, including the prefabrication of components of the building offsite and dropped into location.

(iii) The location of the proposed Pinnacle Centre has the least environmental impact in relation to the technical requirements of the operation.

(b) The proposed Pinnacle Centre is not located on a ridgeline, and appears on the skyline only when viewed from directly below the site or from oblique views. The VIA has determined that the interruption to the skyline will not be perceptible to the human eye.

(i) There are no sites clear of native vegetation which would respond to the technical requirements for the cable car infrastructure.

(ii) The site cannot be considered rural landscape, and to this extent the more specific landscape values identified and addressed under the WPMP prevail. Notwithstanding this, the VIA concludes that "The interruptions to the skyline by the Pinnacle Centre are minimal and will not be perceptible to the human eye." (Ethos Urban, 2019, p. 78)

(iii) Building height and form is driven by functional requirements, and as such is minimised to that which is required.

(c) The siting of the building has regard to the landscape.

*A2*

*Exterior building surfaces must be coloured using colours with a light reflectance value not greater than 40 per cent.*

P2

*Exterior building surfaces must avoid adverse impacts on the visual amenity of neighbouring land and detracting from the contribution the site makes to the landscape, views and vistas.*

Development response:

Base Station:

The exterior of the Base Station building façade will be constructed of dark coloured pigmented concrete. The building will be screened in natural timber screens and roof will be clad in dark grey Colourbond.

Pinnacle Centre:

*The superstructure of the building is dark grey-pigmented concrete and glazing will be screened by perforated weathered steel panels.*

**A3** The combined gross floor area of buildings must be no more than:

300 m2.

**P3** The combined gross floor area of buildings must satisfy all of the following:

(a) there is no unreasonable impact on natural values;

(b) there is no unreasonable impact on the landscape;

(c) buildings are consistent with the domestic scale of dwellings on the site or in close visual proximity;

(d) be consistent with any Desired Future Character Statements provided for the area;

Development response:

The acceptable solution permits a gross floor area of 300m$^2$ and the WPMP permits a gross floor area of 100m$^2$. The proposed development exceeds this and therefore the performance criteria must be responded to:

P3 a) The proposed Base Station building is located within an existing cleared fire break, and has been located to minimise vegetation clearance and impact on natural values. The Pinnacle Centre similarly seeks to minimise the extent of clearance of vegetation through construction management practices, careful design and siting of the building to sit within hollows in the topography.

b) The Base Station is not located on a skyline or ridgeline, and is visible only from very limited viewpoints. The proposed Pinnacle Centre is not located on a ridgeline, and appears on the skyline only when viewed from directly below the site or from oblique views. The VIA has determined that neither building will result in unreasonable impact on the landscape values.

c) The Pinnacle Centre is not located in close visual proximity to any dwellings. The Base Station is located over 200m from the nearest dwelling, and not visible from this dwelling due to topography and vegetation. The buildings are therefore not considered to be within close visual proximity of dwellings.

d) No Desired Future Character Statements are provided for this zone.

**A4** Fill and excavation must comply with all of the following:

(a) height of fill and depth of excavation is no more than 1 m from natural ground level, except where required for building foundations;

(b) extent is limited to the area required for the construction of buildings and vehicular access.

**P4** Fill and excavation must satisfy all of the following:

(a) there is no unreasonable impact on natural values;

(b) does not detract from the landscape character of the area;

(c) does not unreasonably impact upon the privacy of adjoining properties;

(d) does not affect land stability on the lot or adjoining land.

The height of fill and depth of excavation is more than 1m from natural ground level for the access road, Base Station and Pinnacle Centre, however the excavation for the Pinnacle Centre and Base Station are as required for building foundations. The access road will involve cuttings which exceed 1m, but are not required for building foundations.

The extent of fill and excavation is limited to the area required for the construction of buildings and vehicular access.

The Base Station and Pinnacle Centre therefore comply with the acceptable solution A4, however the access road must be assessed under the performance criteria:

(a) The Natural Values Assessment has found that there is no alternative alignment linking the access road to the Base Station, however the alignment has been modified to avoid direct impact to potential threatened fauna habitat, and where possible local modifications and alignment will limit impacts on larger trees (North Barker Ecosystem Services, 2019, p. 60).

(b) The access road follows the gully facing McRobies Gully. The site is not readily visible, nor is it in a prominent location. The presence of a road itself is not uncharacteristic for the surrounding landscape, and views of the road would be largely screened by surrounding vegetation.

(c) The location of the proposed cuttings on the access road which exceed 1m from natural ground level are not in any proximity to neighbouring properties, and their presence does not exacerbate any issues of privacy.

(d) All cuttings are to be designed and stabilised to ensure ongoing stability of batters.

# 11. UTILITIES ZONE

A portion of the proposed access road falls within the Utilities Zone; therefore the provisions of the zone must be addressed.

Under clause 9.6 "Access Across Land In Another Zone" within the Special Provisions, the use status of the application is to be determined disregarding the use status of the access in the different zone. The road is considered ancillary to the Base Station which falls within the use class Tourist

Operation which is permitted in the Environmental Management Zone. According to Clause 9.6 the permitted use status prevails.

## 11.1 ZONE PURPOSE STATEMENTS

28.1.1 Zone Purpose Statements

*28.1.1.1 - To provide land for major utilities installations and corridors.*

*28.1.1.2 - To provide for other compatible uses where they do not adversely impact on the utility.*

*28.1.1.3 - To provide for the continued use of the McRobies Gully landfill site for recycling and waste disposal activities and the Cleary's Gates site for Council depot activities.*

*28.1.1.4 - To maintain an appropriate level of amenity for nearby residential and recreational areas without unreasonable restriction or constraint on the nature and hours of uses allowed in the Zone.*

*28.1.1.5 - To ensure that building design and form does not have an adverse impact on scenic values.*

The proposed access road is to be provided to ensure ample access to the Base Station and will not impact on the continued operation of the McRobies Gully landfill site. The access road is located below the nearest ridgeline to the south and will loosely follow an existing trail that runs along the southern boundary of the McRobies Gully landfill site.

The location and route of the access road will ensure minimal residential impacts.

## 11.2 USE STATUS

The proposed access road is considered ancillary to the use class Tourist Operation, which is a permitted use in the Environmental Management Zone and the access is therefore permitted under clause 9.6.

## 11.3 USE STANDARDS

### 11.3.1 CLAUSE 28.3.1 HOURS OF OPERATION

| |
|---|
| ***Objective:*** *To ensure that hours of operation do not have unreasonable impact on residential amenity on land within a residential zone.* |

| |
|---|
| ***A1*** *- Hours of operation of a use within 50 m of a residential zone must be within 7.00 am to 7.00 pm, except if:*<br>*(i) for office and administrative tasks;*<br>*or*<br>*(ii) a Utilities use.*<br>***P1*** *- Hours of operation of a use within 50 m of a residential zone must not have an unreasonable impact upon the residential amenity of land in a residential zone through commercial vehicle movements, noise or other emissions that are unreasonable in their timing, duration or extent.* |
| Development Response:<br>The use does not fall into an office and administrative task or with the Utilities use as the road is considered ancillary to the Base Station. Therefore, the performance criteria must be met.<br>Whilst the access road is not applying for a Utilities use status, the use is ancillary to the Utilities Use Class (transport network), and will be used for similar operational hours as the cable car operation. Commercial vehicles will be coaches and small trucks. Given this portion of the road services the McRobies Gully Waste Transfer Station, the addition of coaches and small truck movements are unlikely to have an unreasonable impact upon residential land. Commercial vehicle movements can be conditioned to comply with these hours of operation noted in clause 28.3.4 |

### 11.3.2 Clause 28.3.2 Noise

| |
|---|
| ***Objective:*** *To ensure that noise emissions do not cause environmental harm and do not have unreasonable impact on residential amenity on land within a residential zone.* |
| ***A1*** *- Noise emissions measured at the boundary of a residential zone must not exceed the following:*<br>*(a) 55 dB(A) (LAeq) between the hours of 7.00 am to 7.00 pm;*<br>*(b) 5dB(A) above the background (LA90) level or 40dB(A) (LAeq), whichever is the lower, between the hours of 7.00 pm to 7.00 am;*<br>*(c) 65dB(A) (LAmax) at any time.*<br>*Measurement of noise levels must be in accordance with the methods in the Tasmanian Noise Measurement Procedures Manual, issued by the Director of Environmental Management, including adjustment of noise levels for tonality and impulsiveness.*<br>*Noise levels are to be averaged over a 15 minute time interval.* |
| Development Response:<br>McRobies Road is utilised by heavy vehicles entering and exiting the McRobies Gully landfill site daily, and it is therefore unlikely that the new access road would result in any increase over |

existing noise levels. The only development proposed in proximity to the boundary of a residential zone is for the junction of the proposed access road with McRobies Rd roundabout.

### 11.3.3 CLAUSE 28.3.2 EXTERNAL LIGHTING - NOT APPLICABLE

***Objective**: To ensure that external lighting (not including street lighting) does not have unreasonable impact on residential amenity on land within a residential zone.*

Development Response:

The only external lighting within the Utilities Zone would be street lighting, therefore the provision does not apply.

### 11.3.4 CLAUSE 28.3.4 COMMERCIAL VEHICLE MOVEMENTS

***Objective**: To ensure that commercial vehicle movements not have unreasonable impact on residential amenity on land within a residential zone.*

*A1 - Commercial vehicle movements, (including loading and unloading and garbage removal) to or from a site within 50 m of a residential zone must be within the hours of:*

*(a) 7.00 am to 7.00 pm Mondays to Fridays inclusive;*

*(b) 9.00 am to 5.00 pm Saturdays;*

*(c) Nil Sundays and Public Holidays.*

Development Response

The junction of the access road with McRobies Road is within 20m of a residential zone. Commercial vehicle movements can be conditioned to comply with these hours of operation.

### 11.3.5 CLAUSE 28.3.5 DISCRETIONARY USE

***Objective**: To ensure that uses not directly associated with a utility do not compromise the use of that land for utility purposes.*

**A1**- No Acceptable Solution.

**P1** Discretionary use must not compromise or reduce the operational efficiency of an existing or intended utility having regard to all of the following:

(a) the compatibility of the utility and the proposed use;

(b) the location of the proposed use in relation to the utility;

(c) any required buffers or setbacks;

(d) access requirements.

Development Response:

According to Clause 9.6 Access Across Land In Another Zone

*9.6.1 If an application for use of land includes access that runs through a different zone to the land upon which the use is proposed to take place, the use status of the application is to be determined disregarding the use status of the access in the different zone.*

The use status is therefore permitted, and this standard does not apply.

## 11.4 DEVELOPMENT STANDARDS

As no building, outdoor storage or fencing is proposed within the Utilities Zone these standards do not apply.

## CODES


Figure 12: Overlays overview - Biodiversity Protection Area (green stripe), Landslip (red stripe)
Source: LISTmap

# 12. LANDSLIDE CODE

The purpose of this provision is to ensure that use and development is appropriately designed, located, serviced, constructed or managed to reduce to within tolerable limits the risk to human life and property and the cost to the community, caused by landslides.

The following response has been prepared by Cardno and should be read in conjunction with their report (Cardno, 2019)

> *The purpose of the E3 land code is to ensure that use and development subject to risk from land instability is appropriately located and that adequate measures are taken to protect human life and property; and ensure that use or development does not cause, or have the cumulative potential to cause an increased risk of land instability.*
>
> *Both E3.7.1 Buildings and Works, other than Minor Extension; and E3.7.3 Major Works require that buildings and works must satisfy all of the following:*
>
> *no part of the buildings and works is in a High Landslide Hazard Area;*
>
> *the landslide risk associated with the buildings and works is either:*
>
> *acceptable risk; or*
>
> *capable of feasible and effective treatment through hazard management measures, so as to be tolerable risk.*
>
> *The Landslide Planning Report Version 5 – 19 August 2013 describes the planning zone risk as the following (noting that planning risk does not equate to geotechnical risk):*

| | |
|---|---|
| Acceptable Band | A landslide is a rare event in this area based on current understanding of the hazard, but it may occur in some exceptional circumstances.<br><br>Development and use is not subject to landslide controls.<br><br>The **acceptable** band includes 66% of the land area of Tasmania, 91% of vacant parcels and 92% of residential buildings. |
| Low Band | This area has no known landslides, however it has been identified as being susceptible to landslide by Mineral Resources Tasmania (MRT).<br><br>While non-construction requirements are not necessary for most use and development, controls may be necessary to reduce the risks associated with vulnerable and hazardous uses or post-disaster and catastrophic risk-based use to ensure that risks are tolerable (as recommended by AGS 2007a).<br><br>The ***low*** band covers 19% of the land area of Tasmania, 6% of vacant parcels and 5% of residential buildings. |
| Medium Band | The area has known landslide features, or is within a landslide susceptibility zone, or has legislated controls to limit disturbance of adjacent unstable areas.<br><br>Planning controls are necessary for all use and development to ensure that risks are tolerable (as recommended by AGS 2007a). Any vulnerable or hazardous use will only be allowed in exceptional circumstances.<br><br>The ***medium*** band covers 15% of the land area of Tasmania, 3% of vacant parcels and 3% of residential buildings. |

*Overlaying the Access Road alignment on Tasmanian Mapping system 'the List' with the 'Landslide Planning Map - Hazard Bands 20131022' indicates that greater than 98% of the proposed access road alignment is with the 'Acceptable Band', with around 1% having minor coincidence with 'Low Band' and 1% having coincidence with 'Medium Band' designations of the "Landslide Planning Map - Hazard Bands 20131022. Only one 'Landslide Point' is listed (883) around 100m outside of the building envelope, which is a pre-1990 'soil slide' adjacent to a private property off McRobbies Road.*

*Due to low/med zoning a formal field-based assessment was not undertaken for the DA. As such the low to med areas will be investigated, assessed and managed as part of the detailed design process in accordance with the designation of risk in the 'Landslide Planning Map - Hazard Bands 20131022 and AGS standards, such that any risks will be engineered to be tolerable (i.e. Low Risk).*

*As per the designation of risk in the 'Landslide Planning Map - Hazard Bands 20131022: Moderate Risk May be tolerated in certain circumstances but requires investigation, assessment and implementation of treatment options to reduce the risk to low; whereby Low Risk is typically acceptable to regulators. Where treatment has been required to reduce the risk to this low, ongoing maintenance is required.*

*Based on observations in the Cardno report, of slope processes in the vicinity of the alignment, the proposed is 'capable of feasible and effective treatment through hazard management measures, to be tolerable risk'.*

*As per comments made for RFI items (a): (i) to (vi), the purpose of the design process is to assess risk elements (hazards) and determine mitigation measures (e.g. structural elements)* *to ultimately lower the risk to an acceptable residual level. As such, the road alignment is deemed feasible, due absence of 'High' and 'Medium to Active' hazard bands, whereby formal assessment of potential hazards should be deferred to the detailed design phase of the project, where if needed, they can be appropriately addressed by typical/common engineered solutions for access roads in this environment.*

## 12.1 USE OR DEVELOPMENT EXEMPT FROM THIS CODE

The following use or development is exempt from this Code:

*(c) buildings within a Low Landslide Hazard Area;*

*(d) minor extensions within the Medium Landslide Hazard Area;*

*(e) major extensions and new buildings with a gross floor area no more than 200 m² in the Medium Landslide Hazard Area;*

*(f) minor structures or outbuildings; and*

*(g) use or development of land for Extractive industry where a mining lease under the Mineral Resources Development Act 1995 is in force, excluding a hazardous use.*

The proposed Base Station and Tower 1 fall within low and medium landslide hazard areas, as identified by the mapping that forms part of the planning scheme. However, as per above, buildings within a low hazard area are exempt and new buildings within medium hazard areas are exempt provided the gross floor area of the development within the medium hazard area is no more than 200m².

The footprint of the proposed base station and car park is listed as a Low Landslide Hazard Risk area and therefore exempt (E3.4 (c) Landslide Code). This accords with the risk hazard identified by the Geotechnical Study (Cardno, 2018, p. 24).

A small area of Medium Landslide Hazard Risk is located to the west of the existing fire trail. This potentially overlaps with the location of Tower 1, however as Tower 1 is not a building with a floor area greater than 200m2, it too is exempt from the provisions of the Code.

The access road to the Base Station requires assessment under the Code. The use is not a hazardous use nor a vulnerable use and therefore the use standards do not apply. The development is considered major works with approximately 4.8 ha of disturbance. Clauses E3.7.1 Building and Works other than Minor Extensions and E3.7.3 Major Works.

### 12.1.1 CLAUSE E3.7.1 BUILDING AND WORKS, OTHER THAN MINOR EXTENSIONS

***Objective:*** *To ensure that landslide risk associated with buildings and works for buildings and works, other than minor extensions, in Landslide Hazard Areas, is:*

*(a) acceptable risk; or*

*(b) tolerable risk, having regard to the feasibility and effectiveness of measures required to manage the landslide hazard.*

**A1** - No Acceptable Solution

**P1** - Buildings and works must satisfy all of the following:

(a) no part of the buildings and works is in a High Landslide Hazard Area;

(b) the landslide risk associated with the buildings and works is either:

(i) acceptable risk; or

(ii) capable of feasible and effective treatment through hazard management measures, so as to be tolerable risk.

Development Response:

No part of the road is within a High Landslide Hazard Area;

The proposed road alignment is capable of feasible and effective treatment through hazard management measures, to be tolerable risk. Hazard management should be deferred to the detailed design phase, and would be subject to permit conditions related to final engineering design.

### 12.1.2 Clause E3.7.3 Major Works

***Objective:*** *To ensure that landslide risk associated with major works in Landslide Hazard Areas, is:*

*(a) acceptable risk; or*

*(b) tolerable risk, having regard to the feasibility and effectiveness of any measures required to manage the landslide hazard.*

**A1** - No Acceptable Solution

**P1** – Major Works must satisfy all of the following:

(a) no part of the buildings and works is in a High Landslide Hazard Area;

(b) the landslide risk associated with the buildings and works is either:

(i) acceptable risk; or

(ii) capable of feasible and effective treatment through hazard management measures, so as to be tolerable risk.

No part of the road is within a High Landslide Hazard Area;

As per the accompany letter from Cardno, the proposed road alignment is capable of feasible and effective treatment through hazard management measures, to be tolerable risk. Hazard management should be deferred to the detailed design phase, and would be subject to permit conditions related to final engineering design.

# 13. ROAD AND RAILWAY ASSETS CODE

## 13.1 APPLICATION

The code applies as per the following:

> *This Code applies to use or development of land:*
>
> *(a) that will require a new vehicle crossing, junction or level crossing; or*
>
> *(b) that intensifies the use of an existing access;...*

The most feasible access to the site is from McRobies Road, and it is expected this existing access will intensify as a result of the proposed development.

## 13.2 USE STANDARDS

### 13.2.1 CLAUSE E5.5.1 EXISTING ROAD ACCESSES AND JUNCTIONS

| **Objective:** *To ensure that the safety and efficiency of roads is not reduced by increased use of existing accesses and junctions.* |
|---|
| **A3** - The annual average daily traffic (AADT) of vehicle movements, to and from a site, using an existing access or junction, in an area subject to a speed limit of 60km/h or less, must not increase by more than 20% or 40 vehicle movements per day, whichever is the greater. |
| **P3** - Any increase in vehicle traffic at an existing access or junction in an area subject to a speed limit of 60km/h or less, must be safe and not unreasonably impact on the efficiency of the road, having regard to:<br>(a) the increase in traffic caused by the use;<br>(b) the nature of the traffic generated by the use;<br>(c) the nature and efficiency of the access or the junction;<br>(d) the nature and category of the road;<br>(e) the speed limit and traffic flow of the road;<br>(f) any alternative access to a road;<br>(g) the need for the use; |

(h) any traffic impact assessment; and

(i) any written advice received from the road authority.

Development Response

The development will generate an average of 611 vehicles per day, which exceeds the Acceptable Solution.

The Traffic Impact Assessment finds as follows:

*a. The increased traffic generation is estimated to be in the order of up to 611 vehicles per day. This equates to a peak increase of up to 109 vehicles per hour (occurring on weekends). This level of traffic generation can be absorbed in the surrounding road network without any significant loss of efficiency. Noting particularly that a roundabout has been installed at the junction with McRobies Road, thus providing an efficient traffic control device to cater for development traffic and existing refuse site traffic.*

*b. The traffic generated by the development will be tourist traffic. This is consistent with traffic in the surrounding road network (noting that other tourist attractions, such as the Female Factory*

*and Cascade Brewery, are located nearby).*

*c. The existing junction is a roundabout. Existing traffic flows at the roundabout are in the order of 130 vehicles per hour (two-way flow), with all traffic currently travelling to and from Council's*

*refuse site. The introduction of up to 109 vehicles per hour on the access road at the roundabout*

*will maintain a high level of service for the intersection with relatively balanced flows on all three legs of the roundabout.*

*d. McRobies Road is a minor collector road that plays an important role in access to Council's refuse site, as well as other key destinations (including the Female Factory, childcare centre, commercial sites and residential properties). The additional traffic generated by the development will not increase the traffic flow beyond its existing capacity.*

*e. The speed limit of McRobies Road is 50-km/h. The existing traffic volumes are estimated to be in the order of 1,300 vehicles per day near the junction. The speed and volume environment of McRobies Road is suitable for the increase in traffic generated by the proposed development*

*f. The only alternative access to the site is via Old Farm Road. This road is not considered suitable due to its geometry and narrow construction.*

*g. The need for the use has not been assessed in this report.*

*h. This report documents the findings of a traffic impact assessment.*

*i. No written advice has been received by the road authority (Council)*

It is considered that the proposal complies with P3.

## 13.3 DEVELOPMENT STANDARDS

### 13.3.1 Clause E5.6.2 Road accesses and junctions

***Objective:*** *To ensure that the safety and efficiency of roads is not reduced by the creation of new accesses and junctions.*

***A1*** *- No new access or junction to roads in an area subject to a speed limit of more than 60km/h.*

Development Response

*The new access to McRobies road is not within an area subject to a speed limit of more than 60km/hr, therefore A1 does not apply.*

***A2*** *- No more than one access providing both entry and exit, or two accesses providing separate entry and exit, to roads in an area subject to a speed limit of 60km/h or less.*

***P2*** *- For roads in an area subject to a speed limit of 60km/h or less, accesses and junctions must be safe and not unreasonably impact on the efficiency of the road, having regard to:*

*(a) the nature and frequency of the traffic generated by the use;*

*(b) the nature of the road;*

*(c) the speed limit and traffic flow of the road;*

*(d) any alternative access to a road;*

*(e) the need for the access or junction;*

*(f) any traffic impact assessment; and*

*(g) any written advice received from the road authority.*

Development Response

The new access road will connect with McRobies Road and will form one vehicular access providing both entry and exit. Therefore, the access road complies with A2.

### 13.3.2 Clause E5.6.4 Sight distance at accesses, junctions and level crossings

***Objective:*** *To ensure that accesses, junctions and level crossings provide sufficient sight distance between vehicles and between vehicles and trains to enable safe movement of traffic.*

***A1*** *- Sight distances at:*

*(a) an access or junction must comply with the Safe Intersection Sight Distance shown in Table E5.1; and*

...

***P1*** *- The design, layout and location of an access, junction or rail level crossing must provide adequate sight distances to ensure the safe movement of vehicles, having regard to:*

*(a) the nature and frequency of the traffic generated by the use;*

*(b) the frequency of use of the road or rail network;*

*(c) any alternative access;*

*(d) the need for the access, junction or level crossing;*

*(e) any traffic impact assessment;*

*(f) any measures to improve or maintain sight distance; and*

*(g) any written advice received from the road or rail authority.*

Development Response

The new access point to McRobies Road will adjoin an existing roundabout, and sight distance to the southeast along McRobies Road exceeds 80m. The sight distance to the northwest, into McRobies waste management area, is approximately 55m. Normally this would require the performance criteria to be addressed, however the accompanying Traffic Impact Assessment (TIA) draws attention to the fact that actual vehicle speeds along McRobies Road are lower than the signposted 50km/h speed limit. It is considered that this effectively reduces the required sight distance, however the scheme does not provide sight distances for vehicles speeds below 50km/h.

The accompanying TIA concludes that the sight distance at the round-about to the northwest is sufficient when the scheme requirements are interpolated back to an 85$^{th}$ percentile speed of 30km/h or less. In addition, where the proposed access road meets McRobies Road, the existing roundabout ensures low vehicle speeds and vehicles are only required to give-way to the right.

Therefore, it is considered that the access point to McRobies Road is sufficient to comply with A1.

# 14. PARKING AND ACCESS CODE

The purpose of this provision is to:

*(a) ensure safe and efficient access to the road network for all users, including drivers, passengers, pedestrians and cyclists;*

*(b) ensure enough parking is provided for a use or development to meet the reasonable requirements of users, including people with disabilities;*

*(c) ensure sufficient parking is provided on site to minimise on-street parking and maximise the efficiency of the road network;*

*(d) ensure parking areas are designed and located in conformity with recognised standards to enable safe, easy and efficient use and contribute to the creation of vibrant and liveable places;*

*(e) ensure access and parking areas are designed and located to be safe for users by minimising the potential for conflicts involving pedestrians, cyclists and vehicles; and by reducing opportunities for crime or anti-social behaviour;*

*(f) ensure that vehicle access and parking areas do not adversely impact on amenity, site characteristics or hazards;*

*(g) recognise the complementary use and benefit of public transport and non-motorised modes of transport such as bicycles and walking;*

*(h) provide for safe servicing of use or development by commercial vehicles.*

## 14.1 USE STANDARDS

### 14.1.1 CLAUSE E6.6.1 NUMBER OF CAR PARKING SPACES

***Objective:*** *To ensure that:*

*(a) there is enough car parking to meet the reasonable needs of all users of a use or development, taking into account the level of parking available on or outside of the land and the access afforded by other modes of transport.*

*(b) a use or development does not detract from the amenity of users or the locality by:*

*(i) preventing regular parking overspill;*

*(ii) minimising the impact of car parking on heritage and local character.*

***A1*** *- The number of on-site car parking spaces must be:*

*(a) no less than and no greater than the number specified in Table E6.1;*

*except if:*

*(i) the site is subject to a parking plan for the area adopted by Council, in which case parking provision (spaces or cash-in-lieu) must be in accordance with that plan;*

*(ii) the site is subject to clauses E6.6.5, E6.6.6, E6.6.7, E6.6.8, E6.6.9 or E6.6.10 of this planning scheme.*

***P1*** *- The number of on-site car parking spaces must be sufficient to meet the reasonable needs of users, having regard to all of the following:*

*(a) car parking demand;*

*(b) the availability of on-street and public car parking in the locality;*

*(c) the availability and frequency of public transport within a 400m walking distance of the site;*

*(d) the availability and likely use of other modes of transport;*

*(e) the availability and suitability of alternative arrangements for car parking provision;*

*(f) any reduction in car parking demand due to the sharing of car parking spaces by multiple uses, either because of variation of car parking demand over time or because of efficiencies gained from the consolidation of shared car parking spaces;*

*(g) any car parking deficiency or surplus associated with the existing use of the land;*

*(h) any credit which should be allowed for a car parking demand deemed to have been provided in association with a use which existed before the change of parking requirement, except in the case of substantial redevelopment of a site;*

*(i) the appropriateness of a financial contribution in lieu of parking towards the cost of parking facilities or other transport facilities, where such facilities exist or are planned in the vicinity;*

*(j) any verified prior payment of a financial contribution in lieu of parking for the land;*

*(k) any relevant parking plan for the area adopted by Council;*

*(l) the impact on the historic cultural heritage significance of the site if subject to the Local Heritage Code;*

*(m) whether the provision of the parking would result in the loss, directly or indirectly, of one or more significant trees listed in the Significant Trees Code.*

Development Response

As a form of alternative transport to the mountain, no new parking is proposed at the Pinnacle. Any expansion of the existing carpark would result in significant visual and environmental impacts, as well as encourage a higher number of vehicle movements along Pinnacle Road, which would reduce the safety and efficiency of the road.

Car parking for the development will be provided at the Base Station, where patrons purchase tickets and access the cableway.

The Base Station will provide 55 car parking spaces along with 7 mini bus parking spaces, 3 bus/coach parking spaces and a drop-off/pick-up area. These spaces will all be fitted with EV charging stations. For Transport Depot and Distribution Use, the scheme requires 3.5 spaces per 100m$^2$. The Base Station has a floor area of approximately 850m$^2$ (not including machine room) and therefore generates a requirement for 30 spaces. As the proposal provides 55 spaces, plus bus parking, the performance criteria must be addressed.

The responses to the performance criteria, outlined above, are as follows:

P1 (a) The accompanying TIA identifies that the car parking demand is expected to be higher than the numbers required by the scheme. It is anticipated that the peak number of vehicles arriving to the site and requiring a parking space will be approximately 42 per hour on weekends during winter and 55 per hour during summer. This number is based on arrivals only, and the total demand is estimated to be 109 vehicles per hour arriving and departing the site on weekends. The 55 spaces proposed accounts for the peak parking demand per hour and allows for 5 spaces for staff and 10 bus parking spaces.

(b) The car parking proposed exceeds the requirements and is considered adequate to cater for the needs of the development. Therefore, on-street and public car parking is not required.

(c) The site will not be directly serviced by public transport services, however bus services will be provided by tour operators to and from the site on a regular basis, with ample parking provided.

(d) It is possible that some customers will access the site via the existing trails located within the Wellington Park area. It is further noted that the developers intend to upgrade the trails in the area at a later date. Some pedestrian and cyclist trips may therefore be generated to and from the site.

(e) No alternate arrangements are required.

(f) – (m) n/a

It is considered that the parking provided is sufficient to meet the performance criteria P1.

### 14.1.2 Clause E6.6.2 Number of Accessible Car Parking Spaces for People with a Disability

| |
|---|
| ***Objective:*** *To ensure that a use or development provides sufficient accessible car parking for people with a disability.* |
| ***A1*** *- Car parking spaces provided for people with a disability must:*<br>*(a) Satisfy the relevant provisions of the Building Code of Australia;* |

*(b) be incorporated into the overall car park design;*

*(c) be located as close as practicable to the building entrance.*

***P1** - No Performance Criteria.*

Development Response

The Base Station has been determined as a Class 6 building under the BCA. Class 6 buildings require 1 space per 50 spaces. The proposal provides 2 disabled parking spaces within the parking area, complying with A1.

No new parking is provided at the Pinnacle Centre; therefore no disabled parking is required.

### 14.1.3 Clause E6.6.3 Number of Motorcycle Parking Spaces

***Objective:*** *To ensure enough motorcycle parking is provided to meet the needs of likely users of a use or development.*

***A1** - The number of on-site motorcycle parking spaces provided must be at a rate of 1 space to each 20 car parking spaces after the first 19 car parking spaces except if bulky goods sales, (rounded to the nearest whole number). Where an existing use or development is extended or intensified, the additional number of motorcycle parking spaces provided must be calculated on the amount of extension or intensification, provided the existing number of motorcycle parking spaces is not reduced.*

***P1** - The number of on-site motorcycle parking spaces must be sufficient to meet the needs of likely users having regard to all of the following, as appropriate:*

*(a) motorcycle parking demand;*

*(b) the availability of on-street and public motorcycle parking in the locality;*

*(c) the availability and likely use of other modes of transport;*

*(d) the availability and suitability of alternative arrangements for motorcycle parking provision.*

Development Response

The proposal would generate a requirement for 2 motorcycle spaces. Parking provided at the Base Station will include 5 motorcycle parking spaces, which exceeds the requirement under A1.

Therefore, the proposal complies with A1.

### 14.1.4 Clause E6.6.4 Number of Bicycle Parking Spaces

| |
|---|
| ***Objective:*** *To ensure enough bicycle parking is provided to meet the needs of likely users and by so doing to encourage cycling as a healthy and environmentally friendly mode of transport for commuter, shopping and recreational trips.* |
| ***A1*** *- The number of on-site bicycle parking spaces provided must be no less than the number specified in Table E6.2.* <br><br> ***P1*** *- The number of on-site bicycle parking spaces provided must have regard to all of the following:* <br> *(a) the nature of the use and its operations;* <br> *(b) the location of the use and its accessibility by cyclists;* <br> *(c) the balance of the potential need of both those working on a site and clients or other visitors coming to the site.* |

Development Response

The primary use of the site falls under the Transport Depot and Distribution use class, which does not generate a requirement for bicycle parking. However, 20 bicycle parking spaces have been provided, located immediately adjacent to the main entrance to the Base Station.

## 14.2 DEVELOPMENT STANDARDS

### 14.2.1 Clause E6.7.1 Number of Vehicular Accesses

| |
|---|
| *Objective:* <br> *To ensure that:* <br> *(a) safe and efficient access is provided to all road network users, including, but not limited to: drivers, passengers, pedestrians, and cyclists, by minimising:* <br> *(i) the number of vehicle access points; and* <br> *(ii) loss of on-street car parking spaces;* <br> *(b) vehicle access points do not unreasonably detract from the amenity of adjoining land uses;* <br> *(c) vehicle access points do not have a dominating impact on local streetscape and character.* |
| ***A1*** *- The number of vehicle access points provided for each road frontage must be no more than 1 or the existing number of vehicle access points, whichever is the greater.* |

Development Response:

One vehicle access point is provided via a junction at the northern end of McRobies Road and therefore the acceptable solution is met.

### 14.2.2 Clause E6.7.2 Design of Vehicular Accesses

| |
|---|
| ***Objective:*** *To ensure safe and efficient access for all users, including drivers, passengers, pedestrians and cyclists by locating, designing and constructing vehicle access points safely relative to the road network.* |
| ***A1*** *- The number of vehicle access points provided for each road frontage must be no more than 1 or the existing number of vehicle access points, whichever is the greater.*<br><br>***P1*** *- The number of vehicle access points for each road frontage must be minimised, having regard to all of the following:*<br>*(a) access points must be positioned to minimise the loss of on-street parking and provide, where possible, whole car parking spaces between access points;*<br>*(b) whether the additional access points can be provided without compromising any of the following:*<br>*(i) pedestrian safety, amenity and convenience;*<br>*(ii) traffic safety;*<br>*(iii) residential amenity on adjoining land;*<br>*(iv) streetscape;*<br>*(v) cultural heritage values if the site is subject to the Local Historic Heritage Code;*<br>*(vi) the enjoyment of any 'al fresco' dining or other outdoor activity in the vicinity.* |

The following has been extracted from the TIA page 30:

*In this case the access is a junction to an existing roundabout. The road has been designed in accordance with Institute of Public Works Engineering Australia (IPWEA)/ Local Government Association Tasmania (LGAT) Tasmanian Standard Drawings for rural roads. Low Speed Rural Roads are roads having many curves with radii less than 150 metres. Operating speeds on the curves generally vary from 50-70 km/h.*

*On the approach to the roundabout the road cross-section will consist of a 6-metre sealed carriageway (2x 3.0 metre lanes), 0.4 metre shoulder and 0.5 to 1.0 metre verge. These cross-section elements are in accordance with LGAT Standard Drawings: S4. The LGAT Standard Drawing standards have been adopted by local government in Tasmania as the basis for urban and rural road design. The LGAT requirements are summarised in Figure 24.*

*The slope at the connection with the roundabout (the vehicular access to the site) has a slope that conforms to the requirements of AS2890.2. The geometry accommodates the swept paths of the design vehicle (long rigid bus) and the sight distance complies with the requirements of AS2890.2 (noting that the sight distance complies with the high requirements of Austroads for a road junction).*

*The access therefore complies with the requirements of Acceptable Solution A1 of Clause E6.7.2 of the Planning Scheme.*

### 14.2.3 CLAUSE E6.7.4 ON-SITE TURNING

| |
|---|
| ***Objective:*** *To ensure safe, efficient and convenient access for all users, including drivers, passengers, pedestrians and cyclists, by generally requiring vehicles to enter and exit in a forward direction.* |
| ***A1*** *- On-site turning must be provided to enable vehicles to exit a site in a forward direction, except where the access complies with any of the following:*<br>*(a) it serves no more than two dwelling units;*<br>*(b) it meets a road carrying less than 6000 vehicles per day.* |

Development Response

The access road meets McRobies Road, which according to the accompanying TIA, does not carry more than 6000 vehicles per day. Therefore, although no on-site turning is required, the design of the access and parking areas will facilitate on-site turning, considering the provision of bus parking and service vehicles.

### 14.2.4 CLAUSE E6.7.5 LAYOUT OF PARKING AREAS

| |
|---|
| ***Objective:*** *To ensure that parking areas for cars (including assessable parking spaces), motorcycles and bicycles are located, designed and constructed to enable safe, easy and efficient use.* |
| ***A1*** *- The layout of car parking spaces, access aisles, circulation roadways and ramps must be designed and constructed to comply with section 2 "Design of Parking Modules, Circulation Roadways and Ramps" of AS/NZS 2890.1:2004 Parking Facilities Part 1: Off-street car parking and must have sufficient headroom to comply with clause 5.3 "Headroom" of the same Standard.* |

Development Response

As per the attached TIA, the proposed development provides parking that has been designed in accordance with AS2890.1, this complies with the requirements of acceptable solution A1.

### 14.2.5 CLAUSE E6.7.6 SURFACE TREATMENT OF PARKING AREAS

| |
|---|
| ***Objective:*** *To ensure that parking spaces and vehicle circulation roadways do not detract from the amenity of users, adjoining occupiers or the environment by preventing dust, mud and sediment transport.* |
| ***A1*** *- Parking spaces and vehicle circulation roadways must be in accordance with all of the following;*<br>*(a) paved or treated with a durable all-weather pavement where within 75m of a property boundary or a sealed roadway;*<br>*(b) drained to an approved stormwater system,* |

*unless the road from which access is provided to the property is unsealed.*

Development Response

As per the accompanying Concept Servicing Report and drawings, the access road and parking areas will be sealed appropriately and drained to on-site stormwater infrastructure, including swales and piped systems. Concept drawings have been provided; however, exact locations of these systems will be determined during detailed design. Overland flows from above the Base Station will be directed to cut-off drains and hard-piped through the development zone to be treated/dispersion swales and then redirected to the natural water course.

For further details refer to attached Civil Plans.

### 14.2.6 Clause E6.7.7 Lighting of Parking Areas

***Objective:*** *To ensure parking and vehicle circulation roadways and pedestrian paths used outside daylight hours are provided with lighting to a standard which:*

*(a) enables easy and efficient use;*

*(b) promotes the safety of users;*

*(c) minimises opportunities for crime or anti-social behaviour; and*

*(d) prevents unreasonable light overspill impacts.*

***A1*** *- Parking and vehicle circulation roadways and pedestrian paths serving 5 or more car parking spaces, used outside daylight hours, must be provided with lighting in accordance with clause 3.1 "Basis of Design" and clause 3.6 "Car Parks" in AS/NZS 1158.3.1:2005 Lighting for roads and public spaces Part 3.1: Pedestrian area (Category P) lighting.*

***P1*** *- Parking and vehicle circulation roadways and pedestrian paths used outside daylight hours must be provided with lighting to a standard which satisfies all of the following:*

*(a) enables easy and efficient use of the area;*

*(b) minimises potential for conflicts involving pedestrians, cyclists and vehicles;*

*(c) reduces opportunities for crime or anti-social behaviour by supporting passive surveillance and clear sight lines and treating the risk from concealment or entrapment points;*

*(d) prevents unreasonable impact on the amenity of adjoining users through light overspill;*

*(e) is appropriate to the hours of operation of the use.*

Development Response

Car park lighting will be provided in accordance with the relevant Australian Standard.

### 14.2.7 Clause E6.7.8 Landscaping of Parking Areas

| |
|---|
| ***Objective:*** *To ensure that large parking and circulation areas are landscaped to:*<br>*(a) relieve the visual impact on the streetscape of large expanses of hard surfaces;*<br>*(b) screen the boundary of car parking areas to soften the amenity impact on neighbouring properties;*<br>*(c) contribute to the creation of vibrant and liveable places;*<br>*(d) reduce opportunities for crime or anti-social behaviour by maintaining clear sightlines.* |
| ***A1*** *- Landscaping of parking and circulation areas must be provided where more than 5 car parking spaces are proposed. This landscaping must be no less than 5 percent of the area of the car park, except in the Central Business Zone where no landscaping is required.*<br><br>***P1*** *- Landscaping of parking and circulation areas accommodating more than 5 cars must satisfy all of the following:*<br>*(a) relieve the visual impact on the streetscape of large expanses of hard surfaces;*<br>*(b) soften the boundary of car parking areas to reduce the amenity impact on neighbouring properties and the streetscape;*<br>*(c) reduce opportunities for crime or anti-social behaviour by maintaining passive surveillance opportunities from nearby public spaces and buildings.* |

Development Response

Considering the narrow nature of the parking areas at the Base Station, landscaping has been provided along the eastern edge of the internal circulation road and is considered sufficient to comply with A1.

### 14.2.8 Clause E6.7.9 Design of Motorcycle Parking Areas

| |
|---|
| ***Objective:*** *To ensure that motorcycle parking areas are located, designed and constructed to enable safe, easy and efficient use.* |
| ***A1*** *- The design of motorcycle parking areas must comply with all of the following:*<br>*(a) be located, designed and constructed to comply with section 2.4.7 "Provision for Motorcycles" of AS/NZS 2890.1:2004 Parking Facilities Part 1: Off-street car parking;*<br>*(b) be located within 30 m of the main entrance to the building.* |

Development Response

With regard to A1(a), the proposal generates a requirement for 2 motorcycle spaces. However, 5 spaces have been provided and have been designed in accordance with Australian Standards.

The motorcycle spaces are located within 30m of the main entrance to the Base Station.

Therefore, the proposal complies with A1.

### 14.2.9 Clause E6.7.10 Design of Bicycle Parking Facilities

***Objective:*** *To encourage cycling as a healthy and environmentally friendly mode of transport for commuter, shopping and recreational trips by providing secure, accessible and convenient bicycle parking spaces.*

***A1*** *- The design of bicycle parking facilities must comply with all the following;*

*(a) be provided in accordance with the requirements of Table E6.2;*

*(b) be located within 30 m of the main entrance to the building.*

Development Response

There is no bicycle parking requirement for the Transport Depot and Distribution Use Class. However, considering the location of the Base Station, it is likely that the proposal will attract bicycle users; therefore 10 bicycle racks which provide space for 20 bicycles have been provided near the main entrance to the site.

***A2*** *- The design of bicycle parking spaces must be to the class specified in table 1.1 of AS2890.3-1993 Parking facilities Part 3: Bicycle parking facilities in compliance with section 2 "Design of Parking Facilities" and clauses 3.1 "Security" and 3.3 "Ease of Use" of the same Standard.*

Development Response

There is no bicycle parking requirement under the use therefore this provision does not apply.

### 14.2.10 Clause E6.7.11 Bicycle End of Trip Facilities

***Objective:*** *To ensure that cyclists are provided with adequate end of trip facilities.*

***A1*** *- For all new buildings where the use requires the provision of more than 5 bicycle parking spaces for employees under Table E6.2, 1 shower and change room facility must be provided, plus 1 additional shower for each 10 additional employee bicycle spaces thereafter.*

Development Response

Not applicable, the use does not generate a requirement for staff bicycle parking.

### 14.2.11 E6.7.13 Facilities for Commercial Vehicles

***Objective:*** *To ensure that facilities for commercial vehicles are provided on site, as appropriate.*

*A1 - Commercial vehicle facilities for loading, unloading or manoeuvring must be provided on-site in accordance with Australian Standard for Off-street Parking, Part 2: Commercial. Vehicle Facilities AS 2890.2:2002, unless:*

*(a) the delivery of all inward bound goods is by a single person from a vehicle parked in a dedicated loading zone within 50 m of the site;*

*(b) the use is not primarily dependent on outward delivery of goods from the site.*

Development Response

Although commercial vehicles will be servicing the site, as per A1 (b) the use is not primarily dependent on the outward delivery of goods therefore commercial vehicle facilities are not required.

### 14.2.12 E6.7.14 Access to a Road

***Objective:*** *To ensure that access to the road network is provided appropriately.*

***A1*** *- Access must be in accordance with the requirements of the road authority.*

Development Response

The Base Station will be accessed via a new access road which will provide access to McRobies Road. It is anticipated that this access road and access point are consistent with the requirements of the road authority.

# 15. STORMWATER MANAGEMENT CODE

*The purpose of this provision is to ensure that stormwater disposal is managed in a way that furthers the objectives of the State Stormwater Strategy.*

## 15.1 USE STANDARDS

There are no use standards in this code.

## 15.2 DEVELOPMENT STANDARDS

### 15.2.1 E7.7.1 STORMWATER DRAINAGE AND DISPOSAL

| |
|---|
| **Objective:** To ensure that stormwater quality and quantity is managed appropriately. |
| ***A1*** *- Stormwater from new impervious surfaces must be disposed of by gravity to public stormwater infrastructure.*<br><br>**P1** - Stormwater from new impervious surfaces must be managed by any of the following:<br>(a) disposed of on-site with soakage devices having regard to the suitability of the site, the system design and water sensitive urban design principles<br>(b) collected for re-use on the site;<br>*(c) disposed of to public stormwater infrastructure via a pump system which is designed, maintained and managed to minimise the risk of failure to the satisfaction of the Council.* |
| Development Response<br>Stormwater will not be disposed of by gravity to public stormwater infrastructure, as no infrastructure is present at the pinnacle site; therefore the performance criteria is required to be met. Stormwater is proposed to be disposed of in accordance with P1 a) into existing natural watercourses.<br>At the Base Station stormwater will be disposed of by directing to treated stormwater by way of proprietary treatment systems and vegetated swales to existing natural watercourses in accordance with P1 a). |

Stormwater will be disposed of from the access road via stormwater network following the alignment of the access road, with stormwater disposed of by gravity to public stormwater infrastructure in McRobies Road. The proposed road complies with the Acceptable Solution.

***A2*** *- A stormwater system for a new development must incorporate water sensitive urban design principles R1 for the treatment and disposal of stormwater if any of the following apply:*

*(a) the size of new impervious area is more than 600 m2;*

*(b) new car parking is provided for more than 6 cars;*

*(c) a subdivision is for more than 5 lots.*

***P2*** *- A stormwater system for a new development must incorporate a stormwater drainage system of a size and design sufficient to achieve the stormwater quality and quantity targets in accordance with the State Stormwater Strategy 2010, as detailed in Table E7.1 unless it is not feasible to do so.*

Development Response

As the Pinnacle Centre has a footprint greater than 600m, the development will incorporate water sensitive design urban design (WSUD) principles in accordance with A2. (Gandy & Roberts, 2020)

*A3*

*A minor stormwater drainage system must be designed to comply with all of the following:*

*(a) be able to accommodate a storm with an ARI of 20 years in the case of non-industrial zoned land and an ARI of 50 years in the case of industrial zoned land, when the land serviced by the system is fully developed;*

*(b) stormwater runoff will be no greater than pre-existing runoff or any increase can be accommodated within existing or upgraded public stormwater infrastructure.*

P3

*No Performance Criteria.*

Development Response

A stormwater response has been provided by Gandy and Roberts which addresses the performance criteria for the *Hobart Interim Planning Scheme, E7.7.1*. A minor stormwater system will be employed and designed to accommodate a storm event with an ARI of 20 years and onsite storm water detention is included as a part of the design as such runoff will be no greater than pre-existing runoff. The proposal complies with the Acceptable Solution.

| |
|---|
| *A4*<br>*A major stormwater drainage system must be designed to accommodate a storm with an ARI of 100 years.*<br><br>*P4*<br>*No Performance Criteria.* |
| Development Response<br>The stormwater from the proposal is not considered to a major system, therefore A4 does not apply. |

# 16. ELECTRICITY TRANSMISSION INFRASTRUCTURE PROTECTION CODE

This code applies to the development of a road within the electricity transmission corridor. No communication stations or substation facilities are identified on the planning scheme maps within the vicinity of the proposed development. The relevant development area as indicated in the below image is not within 65m of a substation, or 55m from a communication station nor is for a sensitive use. No subdivision is proposed.

**Figure 13: Marker indicating site of Base Station and blue polygon indicating land where road passes through Electricity Transmission Corridor (The List 2020)**

## 16.1 DEVELOPMENT STANDARDS

### 16.1.1 CLAUSE E8.7.1 DEVELOPMENT WITHIN THE ELECTRICITY TRANSMISSION CORRIDOR

***Objective:*** *To ensure that development is located appropriate distances from electricity transmission infrastructure to:*

*(a) ensure operational efficiencies, access and security of existing or future electricity transmission infrastructure;*

*(b) protect against a safety hazard associated with proximity to existing or future electricity transmission infrastructure*

***A1*** *- Development is not within:*

*(a) an inner protection area; or*

*(b) a registered electricity easement.*

***P1*** *- Development must be located an appropriate distance from electricity transmission infrastructure, having regard to all of the following:*

*(a) the need to ensure operational efficiencies of electricity transmission infrastructure;*

*(b) the provision of access and security to existing or future electricity transmission infrastructure;*

*(c) safety hazards associated with proximity to existing or future electricity transmission infrastructure;*

*(d) the requirements of the electricity transmission entity.*

The proposed road passes through the inner protection area and corridor and therefore cannot satisfy the acceptable solution.

The performance criteria must be addressed.

P1 – a)-d) The proposal will be for a road passing through the area. It will not affect the operation efficiencies of the transmission infrastructure as a result. The provision of a sealed road will allow better access to the corridor. TasNetworks has been consulted and a letter has been provided and works and development will be in accordance with the requirements from TasNetworks. The letter states the following:

*Therefore, in accordance with E8.5.1 and E8.7.1 of HIPS, TasNetworks advises that it has no objections to the proposed road works in these locations subject to the following requirements:*

*All works associated with road construction must be a minimum of 10m (horizontal) clearance from any part of a transmission line tower.*

*Overhead clearance required between roads and the lowest overhead conductors are to be:*

*A minimum of 6.7m under TL432 (the transmission line closest to the base terminal) when at a maximum operating temperature; and*

*A minimum of 5.5 metres under all other powerlines.*

*All works undertaken beneath the transmission lines must be carried out in accordance with the Power Systems Safety Rules (PSSR).*

Works and development in accordance with the requirements will mitigate any hazards associated with the development in corridor.

# 17. BIODIVERSITY CODE

## 17.1 DEVELOPMENT EXEMPT FROM THE CODE

The following relevant development is exempt from this code:

*(a) clearance and conversion or disturbance associated with a Level 2 Activity under the Environmental Management and Pollution Control Act 1994;*

*(g) works considered necessary by an agency or council to remedy an unacceptable risk to public or private safety or to mitigate or prevent environmental harm;*

*(j) works within 2 m of existing infrastructure including roads, tracks, footpaths, cycle paths, drains, sewers, pipelines and telecommunications facilities for the maintenance, repair, upgrading or replacement of such infrastructure;*

*(m) clearance and conversion or disturbance of an area no more than 100m2, from the commencement of this planning scheme, provided that none of the vegetation communities or ecological communities identified as being of 'high' or 'moderate' biodiversity value in Table E10.1 are affected;*

*(n) clearance and conversion or disturbance of previously cleared land, provided it can be demonstrated that the previous clearing occurred within the preceding 10 years and that none of the vegetation communities or ecological communities identified as being of 'high' or 'moderate' biodiversity value in Table E.10.1 are affected;*

## 17.2 USE STANDARDS

There are no use standards in this code.

## 17.3 DEVELOPMENT STANDARDS

### 17.3.1 E10.7.1 – Buildings and Works

| |
|---|
| ***Objective:*** *To ensure that development for buildings and works that involves clearance and conversion or disturbance within a Biodiversity Protection Area does not result in unnecessary or unacceptable loss of priority biodiversity values.* |
| ***A1*** *- Clearance and conversion or disturbance must comply with one of the following:*<br>*(a) be within a Building Area on a plan of subdivision approved under this planning scheme.*<br>*(b) the development is for a single dwelling on an existing lot within the Low Density Residential Zone, Rural Living Zone or Environmental Living Zone and:*<br>*(i) clearance and conversion or disturbance is confined to Low Priority Biodiversity Values;* |

*(ii) the area of clearance and conversion is no more than 3,000 m2;*

*(iii) the area of disturbance is no more than 3,000 m2;*

*(c) the development is other than for a single dwelling on an existing lot within the Low Density Residential Zone, Rural Living Zone or Environmental Living Zone and:*

*(i) clearance and conversion or disturbance is confined to Low Priority Biodiversity Values;*

*(ii) the area of clearance and conversion is no more than 1,000 m2;*

*(iii) the area of disturbance is no more than 1,000 m2;*

***P1*** *- Clearance and conversion or disturbance must satisfy the following:*

*(a) if low priority biodiversity values:*

*(i) development is designed and located to minimise impacts, having regard to constraints such as topography or land hazard and the particular requirements of the development;*

*(ii) impacts resulting from bushfire hazard management measures are minimised as far as reasonably practicable through siting and fire-resistant design of habitable buildings;*

*(b) if moderate priority biodiversity values:*

*(i) development is designed and located to minimise impacts, having regard to constraints such as topography or land hazard and the particular requirements of the development;*

*(ii) impacts resulting from bushfire hazard management measures are minimised as far as reasonably practicable through siting and fire-resistant design of habitable buildings;*

*(iii) remaining moderate priority biodiversity values on the site are retained and improved through implementation of current best practice mitigation strategies and ongoing management measures designed to protect the integrity of these values;*

*(c) if high priority biodiversity values:*

*(i) development is designed and located to minimise impacts, having regard to constraints such as topography or land hazard and the particular requirements of the development;*

*(ii) impacts resulting from bushfire hazard management measures are minimised as far as reasonably practicable through siting and fire-resistant design of habitable buildings;*

*(iii) remaining high priority biodiversity values on the site are retained and improved through implementation of current best practice mitigation strategies and ongoing management measures designed to protect the integrity of these values;*

*(iv) special circumstances exist;*

Development Response

| Development | Biodiversity Value Priority (North Barker Ecosystem Services, 2021, p. 70). |
|---|---|
| Access Road | High |
| Base Station | High |
| Pinnacle Centre & Tower 3 | Low |
| Towers 1 & 2 | Moderate |
| Temporary Net Installation | Low |

**High Priority - Base Station and Access Road**

The Biodiversity Code applies "to development involving clearance and conversion or disturbance of native vegetation within a Biodiversity Protection Area" (HIPS 2015). Biodiversity Protection Area is defined as:

*means the area to which this code applies, as shown on the planning scheme maps*

(HIPS 2015)

Access Road:

The natural values impact assessment has for the purpose of this application defined the 'disturbance footprint' in relation to the access road as the design footprint with a 5m buffer (North Barker p.51). No disturbance outside this corridor is anticipated. The disturbance footprint therefore equates to 5.67ha, however, only 3.08 of this area is within the mapped biodiversity overlay as shown on the planning scheme maps.

P1 (c)

(i) Road alignment has been modified to avoid denning habitat and to avoid large trees wherever possible. Local steepening of cuts and fills will limit impacts to nearby trees.

(ii) No fire hazard management is required through this section as the development is a road only.

(iii) A detailed environmental construction management plan can include specific measures to ensure any impacts are contained within the immediate footprint. Opportunities can be sought to improve the current standard of management to tackle existing threats such as weeds, which will potentially improve the condition of retained vegetation. Details of mitigation strategies have been provided in the accompanying Natural Values Impact Assessment (North Barker Ecosystem Services, 2021, pp. 71-72)

The Base Station

The disturbance area for the base station equates to the clearance of 0.53ha for the purposes of bushfire hazard management and the development footprint.

P1 c)

(i) The base station is within an existing firebreak, which minimises the biodiversity impact. The clearance is considered minor; however,

(ii) Potential habitat trees are required for removal in accordance with Bushfire Hazard Management plan accepted for the purposes of planning by the Tasmanian Fire Service (North Barker Ecosystem Services, 2021, p. 71). The hazard management plan has minimised extent of vegetation clearing necessary for fire hazard management. Requisite clearance impacts low priority vegetation only in terms of the community but includes high priority values in the form of potential habitat trees for threatened fauna (North Barker Ecosystem Services, 2021, p. 71).

(iii) A detailed Construction Environmental Management Plan can include specific measures to ensure any impacts are contained within the requisite direct impact footprint (including the BHMA). Mitigation options have been proposed to offset the loss of potential foraging habitat trees with replacement plantings, and loss of potential nesting cavities with artificial replacement (North Barker Ecosystem Services, 2021, p. 71).

P1 c) iv) Special Circumstances

(iv) Special circumstances are defined by the Hobart Interim Planning Scheme 2015 are defined as:

> *means particular circumstances associated with the proposed use or development that justify loss of high priority biodiversity values.*

Special circumstances are considered to exist if one or more of the following apply:

> *(a) the use or development will result in significant long term social or economic community benefits and there is no feasible alternative location;*
>
> *(b) ongoing management cannot ensure the survival of the high priority biodiversity values on the site and there is little potential for recruitment or for long term persistence;*
>
> *(c) the development is located on an existing lot within the Low Density Residential, Rural Living or Environmental Living Zone and is for a single dwelling and/or associated residential outbuildings or works; (HIPS 2015)*

Relevant to this proposal is a) and b) and the following provides a detailed response:

> *(a) the use or development will result in significant long term social or economic community benefits and there is no feasible alternative location;*

A copy of the Economic Impact Assessment by Saul Eslake has been provided. In addition, the Mount Wellington Cableway Company has prepared a Community Benefits Report which should be read in conjunction with the Economic Impact Assessment. The following responses summarises the community benefits based on the aforementioned reports and provides further analysis as to no feasible alternative location for the Access or Base station.

**Economic Community Benefits**

The proposal will provide for long term economic community benefits by:

- A projected net economic benefit between $79-99 Million dollars injected into the State's economy each year of operation. Tourism in Tasmania generated a net contribution of 3.6 billion to the State's economy in 2019-2020 . In perspective MONA which 2017-18 projected economic benefit was 134 Million dollars and Cruise Ship economic contribution of directly 34.5 Million in 2017-2018 .
- Construction is anticipated to directly generate 200 jobs: and operation 51 FTE jobs operating and maintaining the cable car.
- The parks visitation is anticipated to increase by 220,800 people by 2022 with the introduction of the Cable Car.
- Flow on effect for local industry including hospitality, visitor accommodation and transport, including an increase in nights spent in southern Tasmania generating a demand of an additional 1000 beds once the project is operational.
- Cost savings of up to $250, 000.00 per annum by the City of Hobart, normally spent to subsidise the Wellington Park Trust.
- 3.9 million in government tax revenues per annum generated from the proposal (inclusive of projected income Tax, GST equalisation revenue for Tasmania, PAYG and Payroll Tax)
- Income generated to the State Government and City of Hobart for the long-term lease of the site.
- By 2022/2023 the visitor economy is anticipated to return to pre-pandemic conditions. The construction will also generate jobs during post-pandemic recovery.

**Social Benefits**

The proposal will provide for long term social community benefits:

- The proposal will ensure that that the pinnacle amenities are accessible for all persons including upgrading the boardwalks to ensure wheeled craft access. Currently, the pinnacle is not accessible friendly.
- Projected 40 percent decrease in traffic along Pinnacle Road and Pillinger Drive. This will reduce the need to widen Pinnacle Road, in the event visitation continues to increase to the Pinnacle. The cable car will divert traffic from the existing route to the

new access road, which is closer to existing urban areas and infrastructure. As a result, the impact on residential amenity will decrease.

- The net decrease in traffic on the road will also reduce any runoff pollution into the water catchment.
- As more visitors are anticipated to arrive by cableway than roadway, estimates using the Federal Chamber of the Automotive Industry 4 suggest a significant reduction in the 1100 tonnes of carbon monoxide emitted within the Park per annum. The Cable Car will be electrically operated.
- Opportunity for safer access into the park for Mountain Bike Enthusiasts, as well as a more direct access to Mountain Bike trails. The proposed base station will offer mountain biking amenities and will act as a central hub amongst the trails. This is particularly relevant given the City of Hobart's mountain biking masterplan. The mountain biking industry contributed 67 million to the State's economy between July 2015-June 2019.
- The proposed road development includes services infrastructure such as potable and wastewater management that enables best-practice environmental visitor solutions within Wellington Park.

**Alternative Route Analysis - Access**

The road alignment was chosen based on several factors. Over the last several years leading up to May 2018, the proponent consulted with residential stakeholders in the surrounding area and it was determined that they would prefer the road to be located further away from residential development in order to avoid impacts to their bushland residential amenity.

The location of the access road is within underutilised land adjacent to the McRobies Gully Waste Management Centre and was selected as it offered minimal impacts on residential amenity. This route provided the shortest distance to the site from the existing urban road network with the most even grade to the development. North Barker have prepared a route analysis which analyses the biodiversity impacts of five routes which has been summarised in the below response.


Figure 14: Route Options (MWCC)

**Table 2: Options Analysis of alternative access roads to Base Station**

| ROUTE OPTION | ACCESS ROAD DISTANCE (KM) | TOTAL AREA OF VEGETATION IMPACTED (HA) | DISTANCE THROUGH RESIDENTIAL AREAS FROM MAIN ROADS (CASCADE/HUON/AUGUSTA ROAD) (KM) | DISTANCE FROM BROOKE STREET PIER BUS DEPOT (KM) |
|---|---|---|---|---|
| 1 | 2.35 | 5.75 | 0.579 | 4.5 |
| 2 | 0.41 | 1.08 | 2.07 | 6.3 |
| 3 | 3.36 | 8.42 | 1.36 | 5.5-6 |
| 3a | 3.67 | 9.03 | 1.36 | 5.5-6 |
| 4 | 1.34 | 3.4 | 1.9-2.57 | 6.8 |

**Option 1:**

This is the proposed route. It extends for 2.35km. It is accessed off McRobie's Road, via Cascade Road and the proposed road runs parallel to McRobie's Gully Waste Management Centre.

This road is equipped for larger non-residential traffic volumes and vehicles.

The road will largely not be visible from residential areas and requires the minimum amount of time traversing residential areas of any of the options.

It is in an area already characterised by the waste management use and development.

The proposed route is largely forested and will require 5.07ha of clearing.

The road alignment is located below a ridgeline and is orientated toward the waste transfer site resulting in minimal visual impact for residential or public areas.

**Option 2:**

Option 2 utilises the Old Farm Track and as a result is cleared land, with only 1.06ha requiring clearing.

This route is shortest of the options traversing 0.41km.

Old Farm Track is accessed via Old Farm Road, South Hobart which is characterised as a residential street. Old Farm Road in its current form the road has portions which are narrow and winding.

It would require significant upgrades to ensure the road compliant with Australian Standards, which may potentially result in a need for land acquisition to widen the road reservation.

Use of this access would likely have significant impacts on residential amenity.

**Option 3 and 3a:**

This route is accessed via Pottery Road in Lenah Valley. This would take approximately 20-25 minutes to access from Salamanca and would require northern access across the CBD. This is the longest route option.

Pottery Road and connecting street network is residential and is difficult to navigate. Accessing this route would prove difficult to a person not familiar with the area.

Pottery Road would require significant upgrades to ensure the road compliant with Australian Standards, which may potentially result in a need for land acquisition to widen the road reservation.

Use of this access would likely have significant impacts on residential amenity.

Option 3 and 3a are densely forested with a number of topographical constraints. It crosses several water ways. Option 2 requires 6.94 ha clearance and option 3a 7.55ha. 3a would use a portion of the main fire trail.

The road would likely be visible from Knock lofty Reserve, resulting in an increased visual impact from public land.

**Option 4:**

Accessed via Inglewood Road, this route traverses several residential streets to reach. Use of this access would likely have significant impacts on residential amenity.

These streets are not readily equipped for increased traffic and consist of many winding and narrow portions of road.

The route would utilise Main Fire Trail and as a result does not require as much clearance.

The alternative road alignments, whilst have in some cases a reduced impact on biodiversity values, they do have significant impact on the existing road network namely that the existing road network simply are not equipped to facilitate access to these route locations and traverse existing residential areas which will result in impact on residential amenity. The alternative routes, specifically option 3 and 3a have topographic constraints which are not conducive with desirable road conditions. Option 1 presents the better option in relation to the existing road network, legibility and wayfinding to site, better road engineering conditions and the less impact on residential amenity and the street network. An access road is necessary to facilitate the proposal.

**Towers 1 & 2:**

The Towers 1 & 2 are located in medium priority biodiversity value area (PC(b))

(i) It is impossible to avoid some impact, especially between Base Station and Tower 1. The use of two towers ensures that the cable car rises more steeply from the Base Station so reducing the extent of canopy pruning. The construction methodology of the towers will minimise disturbance, as they are to be 'dropped in' reducing the extent of clearance (Vos, 2018). Minor adjustment to Tower 2 may ensure largest habitat tree (E. obliqua with 2m DBH) can be retained.

(ii) No fire management required here.

(iii) All vegetation outside the site of impact can be retained and opportunity sought to improve through ongoing site management (North Barker Ecosystem Services, 2021, pp. 70-71)

**Pinnacle Centre & Tower 3:**

The Pinnacle Centre and Tower 3 are located in a low priority biodiversity value area (PC(a))

(i) Impossible to avoid some impact, however Tower 3 is to be 'dropped in' minimising the extent of clearance. The opportunity to utilise existing boardwalk to some extent, rather than constructing a new walkway would potentially reduce the footprint further although relative to main footprint the benefit is proportionately low.

(ii) The Bushfire Fire Report provides 1m vegetation to be cleared around the perimeter (North Barker Ecosystem Services, 2021, p. 71)

# 18. HISTORIC HERITAGE CODE

This code applies to development involving land defined in this code as any of the following:

*(a) a Heritage Place;*

*(b) a Heritage Precinct;*

*(c) a Cultural Landscape Precinct;*

*(d) a Place of Archaeological Potential.*

This code does not apply. The proposed site is not listed in the Tasmanian Heritage Register.

# 19. ON-SITE WASTEWATER MANAGEMENT CODE

## 19.1 USE STANDARDS

There are no use standards.

## 19.2 DEVELOPMENT STANDARDS

### 19.2.1 CLAUSE E23.8.1 - DEVELOPMENT STANDARDS FOR NON-RESIDENTIAL DEVELOPMENT

***Objective:*** *To ensure sustainable onsite wastewater management for non-residential development.*

***A1*** *- A land application area for non-residential development must comply with the following:*

*(a) if including bedrooms, (such as visitor accommodation), the size of the land application areas must comply with Table E.23.1;*

*(b) if other development, design flow rates must be no less than the rates provided in the following table:*

*Wastewater Fixture: Flow Design Allowance per person per day:*

*Closet Pan: 50L*

*Urinals 25L*

*Washbasin: 10L*

*Shower: 30L*

*Bath: 30L*

*Laundry: 30L*

***P1*** *- The land application area is of sufficient size to comply with the requirements of AS/NZ1547.*

Development Response

The clause refers specifically to land application areas. The Pinnacle Centre and Base Station are not suitable locations for land application areas; therefore sewerage from both locations will be managed as per the following:

Base Station

As per above, sewerage from the Pinnacle Centre and Base Station will be directed to on-site gravity system and pump station, which will direct sewerage to public infrastructure. Further details on the flow rate and sewer output are provided within the accompanying Site Servicing Report (Gandy & Roberts, 2020)

Pinnacle Station

Waste from the Pinnacle Centre will be directed to a holding tank located at the basement level of the building. The sewerage will then be transferred to tanks located on the underside of the Cable Cars and then be transported to the Base Station. The waste will then be directed to new on-site gravity sewer system and pump station, which will then direct waste to public sewer infrastructure. (Gandy & Roberts, 2020)

# CONCLUSION

## 20. RECOMMENDED CONDITIONS:

The following recommendations arise from the consultant's reports, and have been consolidated as recommended conditions:

1. Any disturbance to existing tracks is to be restored and repaired.

2. Temporary scaffold net required for the safe installation purposes of the cables is to be removed immediately after construction, and any disturbance made good.

3. Full details of vegetation clearance and management are to be provided prior to works commencing.

4. Stormwater disposal is to be designed to ensure that development should not result in erosion, siltation, degradation of water quality of any watercourse spring or recharge basin or increase in landslip or erosion hazard potential.

5. The construction management plan should include provisions to ensure that no adverse effects occur on drainage systems resulting from erosion or sedimentation to Guy Fawkes Rivulet, or any other water body.

6. An Aboriginal Heritage Assessment is to be undertaken prior to any works, including vegetation removal or top soil disturbance, to the satisfaction of the THC.

7. Removal/scaling of boulders within the footprint of Tower 3 should occur to remove any loose blocks and the foundations of the tower be placed directly on very high strength rock and to be anchored accordingly.

8. Any loose or hazardous boulders within the development site should be appropriately relocated and rock fall barriers considered, to eliminate the risk of boulder impact on habitable buildings. An intrusive geotechnical investigation should be conducted before detailed design of footings is completed.

9. The colour, texture and form of the facades are to have low light reflectance, foundation walls where exposed are to be clad in stone, windows tilted or screened to minimise sun reflectance, and lighting designed to minimise glare and light spillage.

10. The final location of Tower 2 is adjusted to ensure that the largest habitat trees (2m blue gums) are retained as recommended in the Natural Values Assessment.

11. Commercial vehicle movements to and from the site within 50m of a residential zone must be restricted to within the hours of 7am to 7pm, Monday to Friday, 9am to 5pm Saturdays, and nil on Sundays and public holidays.

12. Hazard management should be deferred to the detailed design phase and would be subject to permit conditions related to final engineering design.

## 21. BIBLIOGRAPHY

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ireneinc & smithstreetstudio
PLANNING & URBAN DESIGN

06 January 2020

Ben Ikin
Hobart City Council
Via portal

Dear Ben,

## 100 PINNACLE ROAD, MOUNT WELLINGTON &
## 30 MCROBIES ROAD, SOUTH HOBART, PLN-19-345

I am writing to respond to the request for additional information which was issued over four letters dating from 13th and 21st June and 1st and 3rd of July 2019 in relation to PLN-19-345. Accompanying this letter are the following documents:

- Amended Masterplan, Mount Wellington Cableway Company
- Desktop Assessment undertaken and Correspondence, Aboriginal Heritage Tasmania
- Amended Traffic Impact Assessment and Response Letter, Midson Traffic
- Revised access road plans, Gandy and Roberts
- Concept Servicing Report, Gandy and Roberts
- Letter from MWCC to EPA
- Roadkill Risk Report, North Barker
- Strike Risk Assessment, North Barker
- Natural Values Letter of Response, North Barker
- Development Impact Assessment and Addendum, Element Tree Services
- Mount Wellington Cable Car: Economic Impact, Saul Eslake
- Letter from Scenic World, Blue Mountains and Arthur's Seat, Mornington Peninsula regarding bird strikes
- MWCC letter to North Barker Ecosystems
- Preliminary Site Investigation, Geo-Environmental Solutions
- Acoustic Letter of Response, Pearu Terts
- Geotechnical Assessment and Geoconservation letter of Response, Cardno

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- Dr Chris Meikle, Capability Statement, Cardno
- An Amended Visual Impact Assessment, Ethos Urban
- View Shed Mapping, Another Perspective drafting and design
- Photomontages by Another Perspective
- Revised Planning Report, Ireneinc Planning & Urban Design

In addition, the following responses are provided to the questions raised in the RFI:

## PLANNING

### P1 USE CLASSIFICATION

> *An amended planning report which provides further detail on the proposed mix of uses within the Pinnacle Building and appropriate use classifications having regard to the allowable uses within The Pinnacle Specific Area Plan under the Wellington Park Management Plan 2015.*

As requested, a further breakdown of uses has been provided for the Pinnacle Building. Whilst the primary function of the Pinnacle Building is to receive and process travellers of the cable car, whether or not the remaining uses are ancillary to the primary use or standalone uses relies on a question of the degree to which they would and could function independently of the primary use. The following table ascribes more detailed breakdown of potential uses for the components of the Pinnacle Building.

*Pinnacle Building Uses*

| Use | Status | Use class |
|---|---|---|
| Bathroom facilities | D | Transport Depot |
| Foyer/ Circulation | D | Transport Depot |
| Retail | D | Transport Depot |
| Plant | D | Transport Depot |
| Control Room | D | Transport Depot |
| Restaurant | D | Food Services |
| Bar | D | Food Services |
| Café | D | Food Services |
| Sanctum<br>(a silent room for scenic views to the South Wellington ranges) | D | Tourist Operation |
| Function room | D | Tourist Operation |
| Lookouts | D | Tourist Operation |
| Indoor Amphitheatre<br>(indoor scenic viewing area) | D | Tourist Operation |
| Outdoor Amphitheatre<br>(Outdoor scenic viewing area) | D | Tourist Operation |
| Interpretation | D/P | Tourist Operation |
| Park ranger Offices | D | Natural and Cultural Management |

| | | |
|---|---|---|
| First aid facilities | D | Ancillary Transport depot or Natural and Cultural Management |
| Staff facilitates | D | Ancillary |

The key uses are defined by the WPMP as follows:

Tourist Operation: (use of land specifically to attract tourists): only for visitor centre, interpretation centre, viewing shelter and ancillary uses to the provision of these including limited associated retail.

Food Services: (use of land for preparing or selling food or drink for consumption on or off the premises): café, restaurant and take away food premises. (WPMP The Pinnacle Specific Area Plan P155)

Unlike the structure of interim planning schemes, the table of uses in the SAP does not default unlisted uses as otherwise prohibited. S1.5 of the PSAP states that use (and development) has (P), (D) and (X) use status designated to the selected uses in the use table. Only one use is designated a prohibited use status, which is camping. As the function centre does not fall within the definition of camping, it is not a prohibited use.

### P2 ABORIGINAL HERITAGE ASSESSMENT

> *A copy of the Aboriginal heritage desktop assessment undertaken by Aboriginal Heritage Tasmania demonstrating that there will be no Aboriginal heritage sites affected by the proposed development. The desktop assessment should include the spatial search parameters provided to Aboriginal Heritage Tasmania.*

A copy of the desktop assessment undertaken by Aboriginal Heritage Tasmania has been provided. No protected Aboriginal heritage sites are recorded in the development area. The provisions of the Aboriginal Heritage Act 1975 are independent of LUPAA, and do not rely on carriage of a development application. AHT has recommended a further aboriginal heritage assessment be conducted as part of the planning process and the proponent has undertaken to carry out this process independently of the planning process, and in accordance with Section 14 of the *Aboriginal Heritage Act 1975*.

### P4 VISITOR NUMBERS

> *An outline of the estimated average and total number of visitors for each use within the Pinnacle Building per year, each day and at any one time. This should include seating capacity for the restaurant, cafe and bar, carrying capacity of each cable car carriage/cabin and likely number of cable car trip with information on journey time between the base station and Pinnacle building.*

The cable car development is anticipated to attract 470,979 customers per year, most will utilise the facilities within the Pinnacle building. It is expected that visitors visit more than one activity within the building during a trip. It is also acknowledged that visitors accessing the site via other methods such as by vehicle or mountain bike may also visit the Pinnacle building, therefore visitors to the Pinnacle building will be greater than the average customers per year.

The Traffic Impact Assessment determines that whilst the visitation to the summit will increase as a result of the development, the average vehicles per day using Pinnacle Road will reduce by 445 vehicles, from 730 to 285. The average people per vehicle has been observed onsite at an average of 3.3 occupants.

Therefore, an average 343,283 people will visit the summit per annum via road, not accounting for road closures which will result in a reduced average.

An average of 814,262 people will visit the summit per year which averages to 2,231 people per day and many of whom will likely visit the Pinnacle Centre.

***Pinnacle Centre Activities***

| Activities | Maximum Capacity at any given time (people) | Capacity percentage | Distribution of average people per day per activity (based on capacity percentage) | Average people per hour (12 trading hours) |
|---|---|---|---|---|
| Café/retail | 443 | 43 | 959 | 80 |
| Restaurant/bar/function space | 434 | 42 | 937 | 78 |
| Viewing Areas/sanctum | 158 | 15 | 335 | 28 |
| **Total** | **1,035** | **100** | **2,231** | **186** |

## ABSOLUTE MAXIMUM VISITORS

*Pinnacle Building Design*

The building has been designed to accommodate a maximum daily limit of 10 000 people.

*Cable Car*

There are two cable car cabins which can accommodate up to 80 standing people per cabin. This is maximum capacity and is calculated on weight capacity and floor area. If operated at full speed the hourly system carrying capacity per cabin is 660 people with a 7.2 minute cycle time (journey + loading time), however the proposed operation is a cycle time departing every 15 minutes, or 4 trips per hour. The proponent expects a likely average of 23 people per cabin per trip. The cabins operate in sync where one goes up whilst the other goes down. The maximum number of people proposed which could visit the Pinnacle via cable car with this operating mode is 320 people per hour.

The above data was provided by the cableway manufacturers, Doppelmayr Garaventa and the proponent, and the capacity of the building was determined by Lee Tyers Building Surveyors.

*Proposed Operational Hours and Seasonal Visitor Variation*

As stated in the Planning Report prepared by Ireneinc Planning and Urban Design, the expected operational hours are as follows, noting these are subject to the operational license and will likely to be between the hours of 6am and 10pm:

- 9 hours per weekday in Winter
- 13 hours per weekend in the Winter
- 12 hours per weekday in Summer
- 14 hours per weekend in the Summer

The following table observes the absolute maximum visitors which could visit the pinnacle via the cable car based on the proposed scheduling of cable car trips and the maximum carrying capacity.

| Hours of Operation | Maximum Visitors via Cable Car per day |
|---|---|
| 9 hours per weekday in Winter | 2,880 |
| 13 hours per weekend in the Winter | 4,160 |
| 12 hours per weekday in Summer | 3,840 |
| 14 hours per weekend in the Summer | 4,480 |

### P5 DEMOLITION

*Clarification on whether the application includes the demolition of the existing observation shelter at the Pinnacle. The photomontages submitted with the application show its removal.*

The observation shelter is partially intended for demolition in order to restore the skyline visual impact and therefore bring the development into greater conformity with the Wellington Park Management Plan. The intended outcome for the existing footprint is to provide an outdoor viewing/gathering space.

The slab and stone retaining wall will be retained but reduced in height to approximately 1 metre. The structure remains accessible for as long as viable during the construction process to ensure adequate public shelter and visitor experience. Refer to page 16 of the Planning Report.

### P6 MOUNTAIN BIKE AND WALKING TRAILS

*Clarification that the new mountain bike (and walking) trails shown on the Masterplan (purple, red and orange lines) do not form part of the application.*

The proposed walking trails are currently considered a concept within the masterplan and do not form part of this application. An updated masterplan accompanies this letter.

### P7 EXISITNG TRAILS USERS

*Clarification on how existing trail users within the area of the base station will be provided with safe and appropriate connections through the development site.*

The Base Station and the surrounding accesses have been designed to be a shared zone with pedestrian priority. There will be a 10km speed limit in this area and only one-way traffic.

## TRAFFIC IMPACT ASSESSMENT

An amended Traffic Impact Assessment and letter of response by Midson Traffic has been provided.

### T1 TRAFFIC MOVEMENT OT THE PINNACLE

*An amended Traffic Impact Assessment that provides justification as to why uses within the Pinnacle Building, which will generally be open to the public, will not increase traffic movement to the Pinnacle and parking demand in the area. The current TIA assumes a reduction in traffic and parking on the basis that the uses in the Pinnacle Building will be accessed via the cable car only. Given that the Pinnacle Building will be accessible via an existing public road it would be reasonable to assume that some patrons will arrive by means other than the cable car.*

The introduction of the cable car will result in a net road traffic reduction, and the amended TIA accounts for both vehicle and cable car visitation to the Pinnacle Zone.

### T2 & T4 CASCADE AND MCROBIES ROAD

> *If they are not to be included, please provide an amended Traffic Impact Assessment which demonstrates that these works are not necessary for the proposal to demonstrate consistency with the Road and Railway Assets Code under the Hobart Interim Planning Scheme 2015. An amended suite of civil engineering drawings and master plan image which excludes these works should also be provided.*

The modifications of Cascade and McRobies Road do not form part of this application. An amended suite of civil engineering drawings and masterplan has been provided.

### T3 TRAFFIC COUNT DATA

The following responses are extracted from the letter provided form Midson Traffic.

> *a) how survey results were used to derive estimated number of passengers per vehicle as outlined in section 4.1.1;*

Surveys were undertaken at the Springs of all vehicles travelling towards the summit at various times in summer and winter months between 2014 and 2016. The surveys recorded the number of people per vehicle.

> *b) the basis for adopting a traffic distribution of 40% buses/coaches/tours and 60% private vehicles/taxis;*

The proportion of buses/ cars was based on comparable Australian operators, notably Scenic World and Sky Rail.

> *c) how the hourly multipliers in Table 2 were derived noting that the TIA indicated information from Scenic World and Table Mountain Aerial Cableway were used to derived figures;*

The hourly multipliers in Table 2 (relating to seasonal variation throughout the year) were obtained from Scenic World and Table Mountain Aerial Cableway patronage data and compared with the hourly traffic flow data on Pinnacle Road to provide a reasonable weighting of projected visitation through the course of an operating day.

> *d) whether there is adequate car parking at the base station based on that information and the visitor information requested in P4.*

The car parking was derived from first principles as outlined in Section 5.2.1 of the TIA. The parking was derived from the forecast peak demands and the duration of stay associated with the cableway. On this basis, the car parking provision is adequate.

### T5 ROUNDABOUT

> *Commentary within the Traffic Impact Assessment on the compliance of the proposed roundabout at the junction of the new access road with McRobies Road as shown in the Gandy and Roberts Drawing 13.0041 – CO35 Rev 1, with Austroads Guide to Road Design Part 4B: Roundabouts.*

The roundabout is an existing roundabout and its design has been assumed to comply with the requirements of Austroads Guide to Road Design.

### T6 TURNING PATHS

> *Turning path diagrams demonstrating that a bus can negotiate the proposed roundabout at the function of the new access road with McRobies Road as shown in the Gandy and Roberts Drawing 13.0041 – CO35 Rev 1.*

Vehicle swept paths have been provided in the accompanying TIA and civil drawings by Gandy and Roberts.

### T7 COMMERCIAL VEHICLES

> *Details of the type and size of commercial vehicles that will be using the access road and confirmation that the grade of the access road will comply with Clause E6.7.2 under the Hobart Interim Planning Scheme 2015.*

Please refer to page 29 of the accompanying TIA which has determined compliance with the Acceptable Solution A1 of E6.7.2 of the Hobart Interim Planning Scheme 2015.

## BUSHFIRE MANAGEMENT

The Bushfire Management response will be provided under a separate cover.

## BIODIVERSITY

The accompanying letter from North Barker provides a comprehensive response to B1-B5. Please refer to the letter.

### B3 ABORICULTURAL ASESSMENT

> *An arboriculture assessment undertaken by a suitably qualified arborists which outlines the condition and likely impact of all high conservation value trees within the development footprint. The assessment should identify trees that must be removed as well as trees which may require trimming or incur encroachment within their tree protection zone.*

High conservation trees have been identified in the Natural Values Assessment. An arboriculture assessment has been provided. It has determined the number of trees which will be affected by the development and recommended potential management strategies in order to reduce the impact during and post construction. Following this, some design changes were made and these are detailed in the Addendum to the report which accompany this letter.

### B5A E10.7.1 BUILDING AND WORKS

> *Further information to demonstrate compliance with subclause (c) under P1 of Clause E10.7.1 of the Hobart Interim Planning Scheme 2015, particularly in regard to the development component outside of the Wellington Park area and therefore subject to the Biodiversity Code.*
>
> *(a) a copy of the economic analysis prepared by Saul Eslake, referenced in the planning report that supports the argument that special circumstances exist;*
>
> *(b) justification that no feasible alternative locations for the access road existing, including an options analysis; and*
>
> *(c) an outline of what is considered to be the most appropriate mitigation strategy (including a potential offset) and ongoing management measures for remaining high priority biodiversity values.*

a) A copy of the *Mount Wellington Cable Car: Economic Impact* report by Saul Eslake has been provided.

b) The road alignment was chosen based on several factors. Over the last several years leading up to May 2018, the proponent consulted with residential stakeholders in the surrounding area and it was determined that they would prefer the road to be located further away from residential development in order to avoid impacts to their bushland residential amenity.

The location of the access road is within underutilised land adjacent to the McRobies Gully Waste Management Centre and was selected as it offered minimal impacts on residential amenity. This route provided the shortest distance to the site from the existing urban road network with the most even grade to the development; and it impacts the smallest and least dense area of bushland.


**Figure 1:** Potential road alignments (Source: The LIST 2019 (baseplan) and MWCC (annotations)

c) Please refer to North Barker's Response to RFI Biodiversity Matters letter which accompanies this letter. Specifically, section B4 and B5a which proposes appropriate mitigation strategies.

### B5B ROADKILL RISK REPORT

> *A roadkill risk report prepared by a suitably qualified person, analysing the roadkill risk, particularly to threatened fauna, presented by the proposal including risks along the new access road to the base station as well as Pinnacle Road with respect to potential change in evening/night traffic associated with the uses within the Pinnacle Building (including restaurant and bar) and construction impacts.*
>
> *This analysis should include a draft Roadkill Mitigation Plan confirming how roadkill risks will be mitigated and managed.*

A roadkill risk report accompanies this letter. The report assesses roadkill risk associated with the access road and Pinnacle Road and provides a mitigation plan for both areas.

### B6 BIRD COLLISION REPORT

> *A bird collision report prepared by a suitably qualified person, analysing the risk of bird collision with cables and other structures (including windows in buildings) as well as during construction, having regard to the intended use of helicopters.*
>
> *This bird collision report should specifically consider the likelihood of risk to threatened avifauna that are likely or are known to be present within the area.*

A Collision Risk Report has been provided by North Barker. Further information has also been provided which includes letters from Scenic World, Blue Mountains and Arthurs Seat Eagle, Victoria which both operate similar developments. Scenic World states that they have had no known incidences of bird strikes since the two operations began (1957 and 2000). Arthurs Seat employ several preventative measures such as maintaining habitat trees and mechanism to deter birds from perching on the cables such as small flags installed before each station.

## POTENTIALLY CONTAMINATED LAND

> *An environmental site assessment prepared by a suitably qualified person in accordance with Clause E2.3 of the Hobart Interim Planning Scheme 2015 that demonstrates compliance with P1 of Clause E2.6.2. 30 McRobies Road is a potentially contaminated site.*
>
> *Clause E2.6.2*
>
> *P1 Excavation does not adversely impact on health and the environment, having regard to:*
>
> *a) an environmental site assessment that demonstrates there is no evidence the land is contaminated; or*
>
> *b) a plan to manage contamination and associated risk to human health and the environment that includes:*
>
> *i) an environmental site assessment;*
>
> *ii) any specific remediation and protection measures required to be implemented before excavation commences; and*
>
> *iii) a statement that the excavation does not adversely impact on human health or the environment.*

A preliminary desktop assessment has found that there is a lack of historically contaminating activities that would impact the access road excavation and construction. However, the assessment has recommended soil testing prior to excavation. The assessment states that the likelihood of contaminants of potential concern impact human health or ecological receptors is unlikely.

## TASWATER

Please refer to Gandy and Roberts Site Servicing Report.

## ENVIRONMENTAL IMPACTS

> *EI1 Details on how the proposed sewer pump station will comply with the EPA Sewage Pumping Station Environmental Guidelines, specifically in relation impacts on receiving water values, proposed protection measures to be adopted and how any emergency overflow to the environment will be managed.*
>
> *EI2 An assessment prepared by a suitably qualified odour expect on the likelihood of odour generation for sewage holding tanks for the Pinnacle building with the appropriate odour control measures identified given that detention times for sewage will be up to 12 hours.*
>
> *EI3 Details on how risk of spillage will be managed during transfer of sewage to and from the cable car holding tanks.*

### EI1-EI3

Gandy and Roberts have provided an updated Site Servicing Report which includes the section 5 Sewer Transport Management. This highlights the proposed sewer pump station's compliance with the Sewage Pumping Station Guidelines 1999; potential risk mitigation strategies in the case of a spillage and odour management strategies.

Furthermore, the proponent has consulted with the EPA. Upon the EPAs recommendation the following response has been included in this letter. For water and wastewater, a design usage of 10L/person/day has been adopted. As illustrated in *P4 Visitor Numbers* of this report that average estimated numbers of visitors to the Pinnacle site is 2,231 resulting in an estimated average of 22,310 litres of water/wastewater. Each transportation tank can hold 5,000 litres, resulting in an average of 5 trips and 1.25 hours of transportation. The cable car can carry a maximum of 4,480 visitors during a weekend summer day, this would result up to 44,800 litres of wastewater/water resulting in 9 trips, equating to 2.25 hours of transportation. Waste transportation will generally occur between the hours of 4pm and 6pm, and in the event of higher than average visitation additional waste transfer can be accommodated into normal operating hours. It is noted that whilst the slower journey speed resulting in a 15m trip duration is used for transporting tourists, the cable car can operate at faster speed and shorter trip duration when used for servicing purposes. Goods loading and transportation is proposed between 8am and 9am.

## STORMWATER

### SW1 STORMWATER DRAINAGE

> *A3 - A minor stormwater drainage system must be designed to comply with all of the following:*
>
> *(a) be able to accommodate a storm with an ARI of 20 years in the case of non-industrial zoned land and an ARI of 50 years in the case of industrial zoned land, when the land serviced by the system is fully developed;*

*(b) stormwater runoff will be no greater than pre-existing runoff or any increase can be accommodated within existing or upgraded public stormwater infrastructure.*

A stormwater response has been provided by Gandy and Roberts which addresses the performance criteria for the *Hobart Interim Planning Scheme, E7.7.1*. A minor stormwater system will be employed and designed to accommodate a storm event with an ARI of 20 years and onsite storm water detention is included as a part of the design as such runoff will be no greater than pre-existing runoff. The proposal complies with the Acceptable Solution.

#### SW2 OIL INTERCEPTOR

*Clarification of whether any oil interceptor treatment will be provided for stormwater runoff from the car park at the base station.*

The site servicing report details stormwater disposal in section 4.2.4 Stormwater. It states a combination of proprietary treatment systems and vegetated swale will be used to treat stormwater in accordance with the *Hobart Interim Planning Scheme*.

### NOISE

*A revised Acoustic Report which:*

*a) provides reasoning for assessing the proposal as Leq as opposed o Lmax noise emissions against the requirements of the Wellington Park Management Plan 2013 (amended October 2015);*

*b) expected Leq and Lmax noise emissions from the proposal specifically at 50m. Please note that the Wellington Park Management Plan 2013 (amended October 2015) does not explicitly reference vertical or horizontal dimensions and the assumption made in the Acoustic Report prepared by Pearu Terts dated 27 May 2019 has provided the basis for increasing the assessment distance to greater than 50m.*

An acoustic report has been provided which provides the reasoning for Leq rather than Lmax noise emissions, and the expected noise emissions in Leq and Lmax.

### GEOTECHNICAL

#### GEO1

A letter from Cardno has been provided with qualified responses to the geotechnical and geoconservation requests for additional information.

#### GEO2 SUITABLY QUALIFIED PERSON

*Evidence that the assessment of impact upon sites of geoconservation significance contained at Section 7.4 of the Geotechnical Study prepared by Cardno and dated 11 January 2019 has been prepared by a suitably qualified geomorphologist.*

Dr Chris Miekle undertook the Geotechnical Study and his qualifications have been detailed in the capability statement provided.

### VISUAL IMPACT

#### VIA1 VISUAL CATCHEMENT ASSESSMENT

*A visual catchment assessment (VCA) of the wider area including all locations that have a line of sight to the proposed development including all proposed infrastructure. This would be an* *extended version of Figure 15: Pinnacle Centre Zone of Theoretical Visibility shown on p54 in the Visual Impact Assessment prepared by Urban Ethos and dated 24 January 2019*

A Visual Catchment Assessment (VCA) has been prepared by Ethos Urban. The basis of the VCA was formed on a viewshed analysis conducted by Another Perspective. This analysis considers the terrain and does not accommodate for built form or tree coverage. Ten locations have been selected for the Visual Catchment Assessment based on the information provided by the Viewshed Analysis.

### VIA2 PHOTOMONTAGES

*Based on the VCA identify further positions that would benefit from additional analysis in the form of accurate/verifiable Aligned Photomontage images that represent:*

*(a) Existing conditions;*

*(b) Proposed built form;*

*(c) Proposed built form and proposed landscape; and*

*(d) Proposed built form and proposed landscape with outline of proposed built form in contrasting stoke.*

Photomontages have been prepared by Another Perspective based on the locations identified in the Viewshed Analysis. As mentioned previously, ten locations have been selected. The photos have been in included in the VCA. Photos of the existing conditions, photomontages of the proposed development and landscape conditions, as well as the proposed built form in contrasting stroke have been provided in the View Shed Mapping by Another Perspective. The contrasting stroke analysis demonstrates the spatial placement of the proposed built form without consideration for topography, vegetation or existing built form.

### VIA3 AMENDED VISUAL IMPACT ASSESSMENT

An Amended Visual Impact Assessment (VIA) has been provided. This assessment is based on the photomontages provided by Another Perspective as requested in VIA2. Further analysis regarding colour, form, line, texture, scale and spatial characteristics have been provided in section 7.1 of the VIA.

The Visual Catchment Assessment has included the following locations which include the River Derwent, Eastern Shore and nearby locations within Wellington Park:

- Hobart Waterfront
- Summit to City
- South Hobart
- Kingston
- Glenorchy
- Salamanca Place
- Old Springs Hotel
- Tranmere
- Rosny Park Lookout
- Huon Road

The amended VIA provides further analysis of the Base Station where relevant. The performance criteria has been satisfied as articulated in the amended Planning Report and VIA. The assessment is based on the most recent architectural drawings.

Yours faithfully

Irene Duckett
Director
Planning Tas Pty Ltd

ireneinc
PLANNING & URBAN DESIGN

2nd October 2020

Neil Noye
Hobart City Council
Via portal

Dear Neil,

## 100 PINNACLE ROAD, MOUNT WELLINGTON &
## 30 MCROBIES ROAD, SOUTH HOBART, PLN-19-345

I am writing to respond to the request for additional information dating from 17th of January in relation to PLN-19-345. This information further clarifies responses to P1 and T3. We acknowledge that other further information relating to bushfire is still outstanding and will follow.

## PLANNING

### P1 USE CLASSIFICATION

> *An amended planning report which provides further detail on the proposed mix of uses within the Pinnacle Building and appropriate use classifications having regard to the allowable uses within The Pinnacle Specific Area Plan under the Wellington Park Management Plan 2015.*

As requested, a further breakdown of uses has been provided for the Pinnacle Building. Whilst the primary function of the Pinnacle Building is to receive and process travellers of the cable car, whether or not the remaining uses are ancillary to the primary use or standalone uses relies on a question of the degree to which they would and could function independently of the primary use. The following table ascribes more detailed breakdown of the potential nature of proposed uses for the components of the Pinnacle Building.

*Pinnacle Building Uses*

| Use | Status | Use class | Hours of operation |
|---|---|---|---|
| Bathroom facilities | D | Transport Depot | 8am – 10pm |
| Foyer/ Circulation | D | Transport Depot | 8am - 10pm |
| Retail | D | Transport Depot | Daylight hours |
| Plant | D | Transport Depot | as required |
| Control Room | D | Transport Depot | as required |
| Restaurant (for dining and functions) | D | Food Services | Daylight hours till 6pm; Evenings (for cable car |

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| | | | |
|---|---|---|---|
| | | | ticket holders only) - close by 10pm |
| Bar | D | Food Services | As per restaurant |
| Café | D | Food Services | 8am - 5pm |
| Sanctum<br>(a silent room for scenic views to the South Wellington ranges) | D | Tourist Operation | Daylight hours (unless exclusive events, as per function room) |
| Lookouts | D | Tourist Operation | Where accessible - all hours |
| Indoor Amphitheatre<br>(indoor scenic viewing area) | D | Tourist Operation | Daylight hours |
| Outdoor Amphitheatre<br>(Outdoor scenic viewing area) | D | Tourist Operation | Daylight hours |
| Interpretation | D/P | Tourist Operation | Daylight hours |
| Park ranger Offices | D | Natural and Cultural Management | As required |
| First aid facilities | D | Ancillary Transport depot or Natural and Cultural Management | As required |
| Staff facilitates | D | Ancillary | As required |

The key uses are defined by the WPMP as follows:

Tourist Operation: (use of land specifically to attract tourists): only for visitor centre, interpretation centre, viewing shelter and ancillary uses to the provision of these including limited associated retail.

Food Services: (use of land for preparing or selling food or drink for consumption on or off the premises): café, restaurant and take away food premises. (WPMP The Pinnacle Specific Area Plan P155)

Unlike the structure of interim planning schemes, the table of uses in the SAP does not default unlisted uses as otherwise prohibited. S2.5.1 of the PSAP states that use (and development) has (P), (D) and (X) use status designated to the selected uses in the use table. Only two uses are designated a prohibited use status with the Pinnacle Specific Area, which is camping and visitor accommodation. As none of the uses proposed are camping or visitor accommodation, the proposed uses are not prohibited.

**The function room is effectively made up of the restaurant and bar area that can be booked for private functions if required and will operate the same hours as the restaurant.** The amended TIA accounts for both vehicle and cable car visitation to the Pinnacle Zone. T**he Pinnacle Centre will be open to the public during the daytime (8am to dusk)**, regardless of whether they are travelling on the cable car and will be accessible by ramp from the existing summit car park. **The restaurant and associated uses as identified**

**in the table above, will be available after 6pm but only to those who have booked and are cable car ticket holders. The final cable car will leave the Pinnacle centre at 9.30pm and arrive at the Base Station at 9.45pm.**

*Proposed Operational Hours and Seasonal Visitor Variation*

Hours of operation of the Pinnacle Centre will fall within the range of 8am to 10pm as a maximum, with seasonal restrictions applying within this range:

- 9 hours per weekday in Winter
- 13 hours per weekend in the Winter
- 12 hours per weekday in Summer
- 14 hours per weekend in the Summer

## P2 ABORIGINAL HERITAGE

The following is Request P2, from the City of Hobart dated 13th of June 2019:

> *A copy of the Aboriginal heritage desktop assessment undertaken by Aboriginal Heritage Tasmania demonstrating that there will be no Aboriginal heritage sites affected by the proposed development. The desktop assessment should include the spatial search parameters provided to Aboriginal Heritage Tasmania.*

**In break down, the request is for:**

- **A copy of the Aboriginal heritage desktop assessment by Aboriginal Heritage Tasmania**
- **The spatial search parameters in which the proponent provided to AHT to conduct the assessment.**

**The following accompanies this letter:**

- **A copy of the desktop assessment undertaken by AHT**
- **The search parameters including:**
    - **Marked up map from the List**
    - **Drawing C010, Rev 2, Gandy and Roberts (Concept Road Alignment)**
    - **PDF 994907 1a M.G.A coordinates showing the development with contours and survey**
    - **PDF 994907 1b M.G.A coordinates showing development without contours and survey**
    - **The proposal description, Ireneinc**
    - **Correspondence between AHT and Ireneinc documenting the request for the desktop assessment**

**As these items have been provided, it is concluded that the request issued on the 13th of June 2019 has been satisfied.**

## T3 TRAFFIC COUNT DATA

The following responses are extracted from the letter provided form Midson Traffic and expanded on as indicated in bold.

a) *how survey results were used to derive estimated number of passengers per vehicle as outlined in section 4.1.1;*

**Manual headcount surveys were undertaken at the Springs of all vehicles travelling towards the summit at various times in summer and winter months between 2014 and 2016 by the proponent. The surveys recorded the number of people per vehicle in private vehicle, and the head counts per coaches were deduced from licenced minimum and maximum capacities of small coaches/shuttle buses. The findings were as follows:**

| | Maximum | Minimum | Average |
|---|---|---|---|
| Headcounts per coach vehicle visiting the mountain | 55 | 24 | 39.5 |
| Headcounts per FIT/Local Vehicle visiting the mountain | 3.4 | 3.2 | 3.3 |

**Traffic count data from 2009 and 2011 was provided to the proponent by Hobart City Council in 2014 and combined with the Tasmanian Visitor Surveys (2010-2019) to derive the visitation mix, and to verify manual traffic count data.**

b) *the basis for adopting a traffic distribution of 40% buses/coaches/tours and 60% private vehicles/taxis;*

The proportion of buses/ cars was based on comparable Australian operators, notably Scenic World and Sky Rail, and the cycle time of a shuttle service from the Hobart Waterfront to the base station during operating hours.

c) *how the hourly multipliers in Table 2 were derived noting that the TIA indicated information from Scenic World and Table Mountain Aerial Cableway were used to derived figures;*

The hourly multipliers in Table 2 (relating to seasonal variation throughout the year) were obtained from Scenic World and Table Mountain Aerial Cableway patronage data observed over the course of a decade of operation, and compared with the hourly traffic flow data on Pinnacle Road to provide a reasonable weighting of projected visitation through the course of an operating day.

d) *whether there is adequate car parking at the base station based on that information and the visitor information requested in P4.*

The car parking was derived from first principles as outlined in Section 5.2.1 of the TIA. The parking was derived from the forecast peak demands and the duration of stay associated with the cableway. On this basis, the car parking provision is adequate.

The number of daily trips associated with the cable car operations were separately derived and do not link of the existing number of trips.

BM5

**No hazardous chemicals will be stored on site. The backup generators will operate from a lithium battery for both the pinnacle and base station.**

EI2

**An Odour Assessment prepared by Dr. Alex Mcleod of Tarkarri Engineering Pty Ltd, along with Dr. Mcleod's Curriculum Vitae. The report finds that the odour nuisance is highly unlikely with the proposed controls in place.**

TASNETWORKS

**A letter from TasNetworks is provided which confirms TasNetworks has no objections to the proposed road works subject to conditions.**

Yours faithfully

Irene Duckett
Director
Planning Tas Pty Ltd

ireneinc
PLANNING & URBAN DESIGN

17th May 2021

Neil Noye
Hobart City Council
Via portal

Dear Neil,

## 100 PINNACLE ROAD, MOUNT WELLINGTON &

## 30 MCROBIES ROAD, SOUTH HOBART, PLN-19-345

I am writing to respond to the request for additional information dating from 2nd of October, 2020 in relation to PLN-19-345. We believe that the information below satisfies the request for further information.

### ABORIGINAL HERITAGE

The following request was issued in relation to aboriginal heritage.

*1. Evidence from a suitably qualified person that either:*

*(a) The development does not involve an Aboriginal heritage site as defined under the Aboriginal Heritage Act 1975; or*

*(b) Demonstrates that impacts on any Aboriginal heritage sites have been reasonably avoided, mitigated or remedied having regard to:*

> *i) The history of the surrounding area and known surveys of other nearby areas and any necessary prescriptions that set out mitigation or remediation measures; or*
>
> *ii) An on-site survey.*

A report has been prepared title 'Aboriginal Heritage Assessment Report (AHAR) of the proposed kunanyi/Mount Wellington Cable Car Footprint' by Dr. Nicolas Grguric of Frontier Heritage Consulting Pty Ltd.

- Accompanying this report is Dr. Grguric's CV which details his qualifications to undertake this work. Furthermore, he is listed on Aboriginal Heritage Tasmania's (AHT) website under the Register of Consulting Archaeologists.
- A consulting archaeologist is considered an Aboriginal heritage practitioner as defined by the Aboriginal Heritage Standards and Procedures 2018 and therefore Dr. Grguric is qualified to carry out an AHAR.
- The field survey which forms part of the AHAR found no aboriginal heritage including sites as defined by the Act within the development area. Therefore a) of the above request is satisfied. Dr Grguric's advice is no further management is required.


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- The AHAR report also includes information regarding the history of the site and area, and the onsite survey.
- An aboriginal heritage property search was undertaken in 2018, and again in 2021.

*2. Confirmation that the extent of vegetation clearance shown in the submitted plans and as assessed under the Natural Values Report prepared by North Barker and dated 6 August 2020 is sufficient for the purposes of bushfire management and that no additional vegetation clearance or development footprint will be required. This should be demonstrated through provision of an amended Fire Protection Report (or Bushfire Hazard Management Plan) with evidence that the Chief Fire Officer has or is likely to accept the proposed performance based approach.*

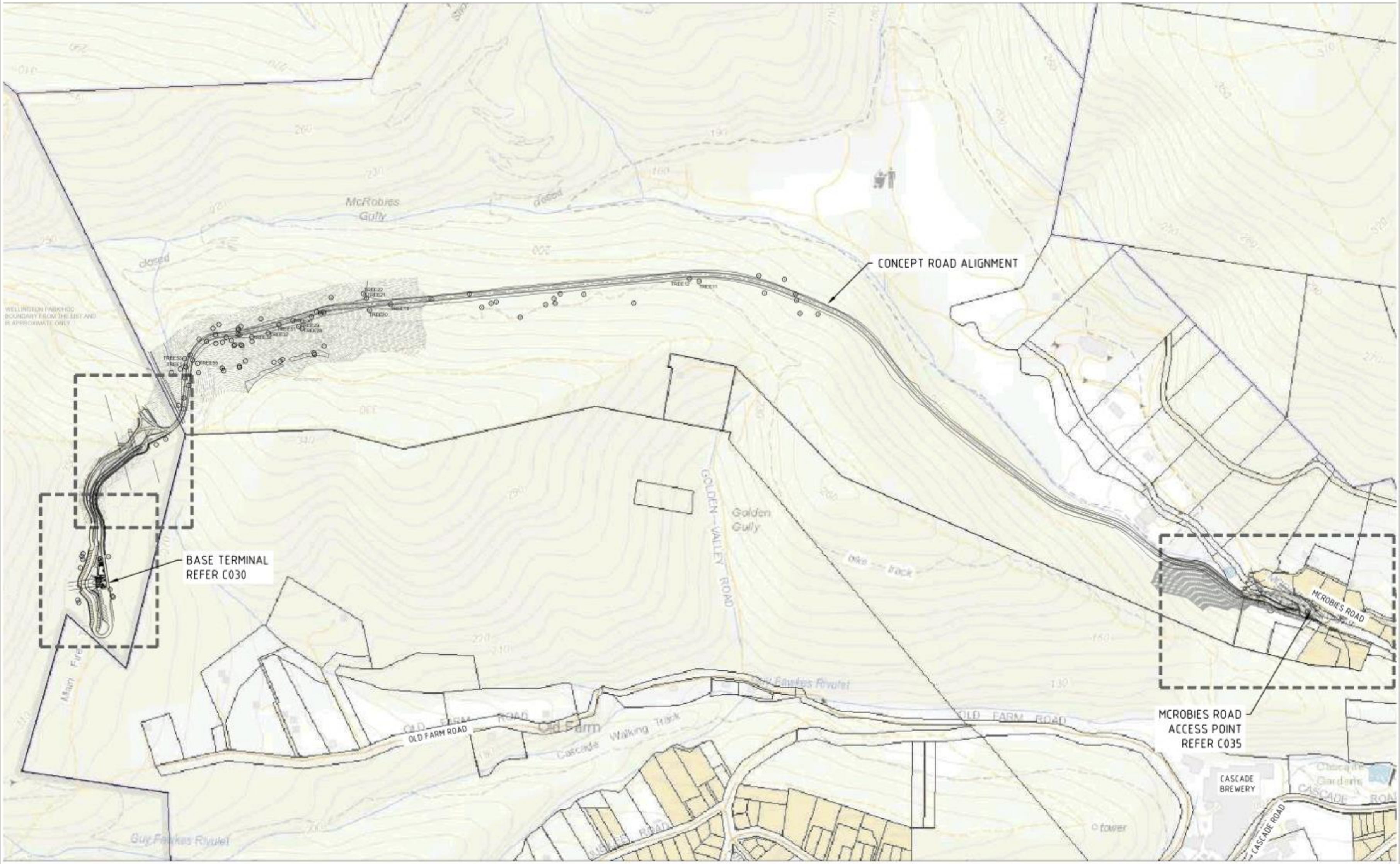
- Since the submission of the original Fire Protection Report and Bushfire Hazard Management Plan, the proponent has liaised with the Tasmanian Fire Service (TFS) to ensure the hazard management plans and report are acceptable.
- As a result, the Base Station will now have a hazard management area to BAL 29 and the Pinnacle will adopt a performance solution (1m hazard management around the permitter of the building).
- TFS have indicated the report and bushfire hazard management plans are acceptable and the formal response from the TFS will be provided to Council in accordance with request 2 of the RFI.
- The Natural Values Impacts Assessment has been updated where necessary and accompanies this letter. The revised Bushfire Hazard Management Area will impact on 0.37ha of WOB vegetation community.
- The extent of vegetation clearance is sufficient for bushfire purposes and no additional vegetation clearance or development footprint is required.

In accordance with the above responses, we believe the request for further information is now satisfied. The following documents accompany the RFI response and form part of the application:

- Draft Fire Protection Report Building Act Compliance Assessment, Mount Wellington Cable Car, Mount Wellington, Revision 8, 11th May 2021, Castellan Consulting
- Mt Wellington Cableway, Mt Wellington/ kunanyi, Natural Values Impacts Assessment, Rev 7.7, 12th of May 2021, North Barker Ecosystem Services
- Aboriginal Heritage Assessment Report of the proposed kunanyi/Mount Wellington Cable Car Footprint, Rev 1.0, 14th May 2021, FHC
- Planning Report, Rev 4, 17th May 2021, Ireneinc Planning and Urban Design

Yours faithfully

Irene Duckett FPIA, GAICD
Director
Planning Tas Pty Ltd

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| 1 | PLANNING APPROVAL | DV | 31.05.2019 | | | | |

GANDY AND ROBERTS
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MT WELLINGTON CABLE CAR
BASE TERMINAL
OVERALL PLAN
DRAWING TITLE
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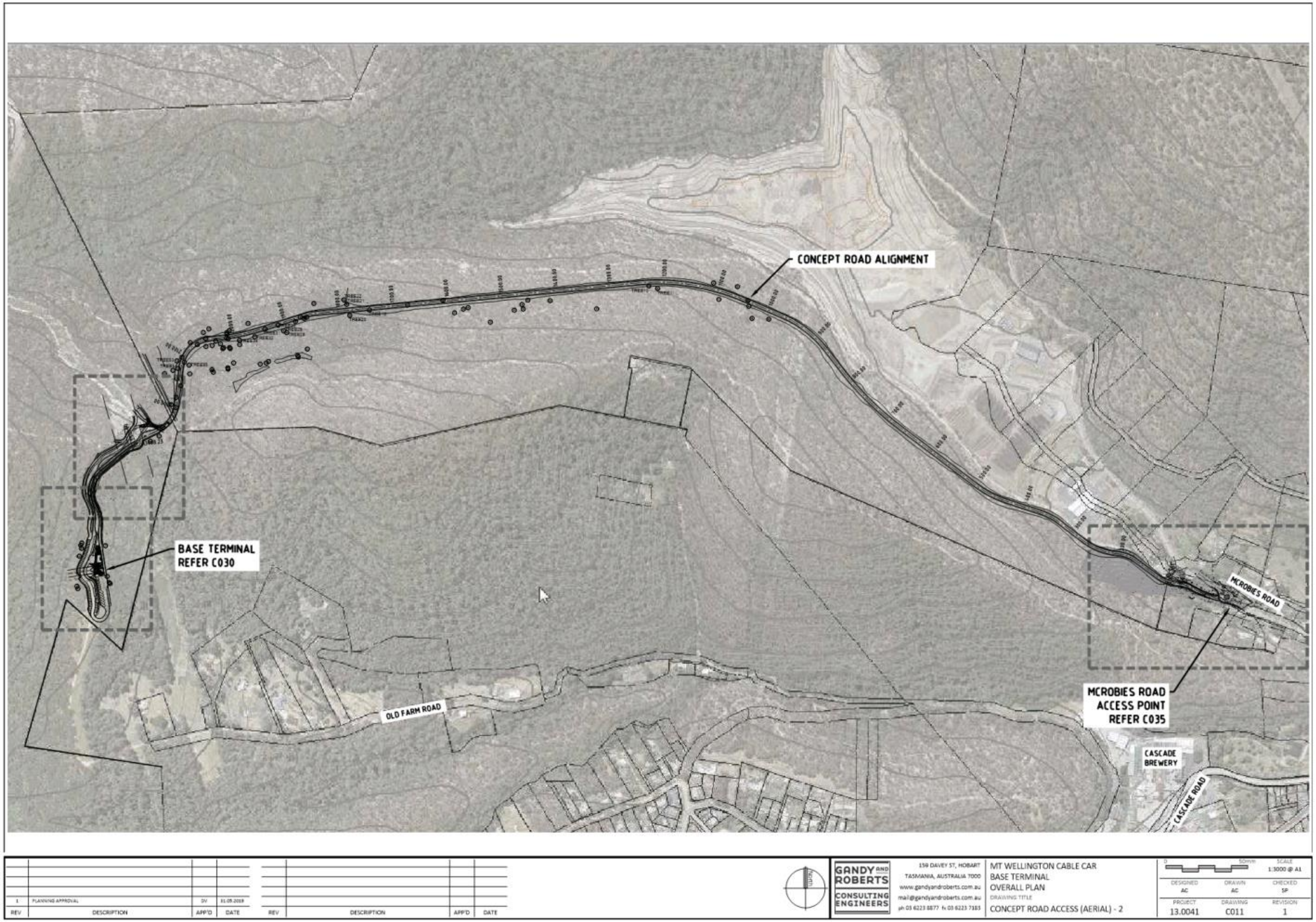
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MCROBIES ROAD
MCROBIES ROAD
ACCESS POINT
REFER C035
CASCADE
BREWERY
CASCADE ROAD
1 PLANNING APPROVAL
REV DESCRIPTION APP'D DATE
North
GANDY AND ROBERTS
CONSULTING ENGINEERS
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MT WELLINGTON CABLE CAR
BASE TERMINAL
OVERALL PLAN
DRAWING TITLE
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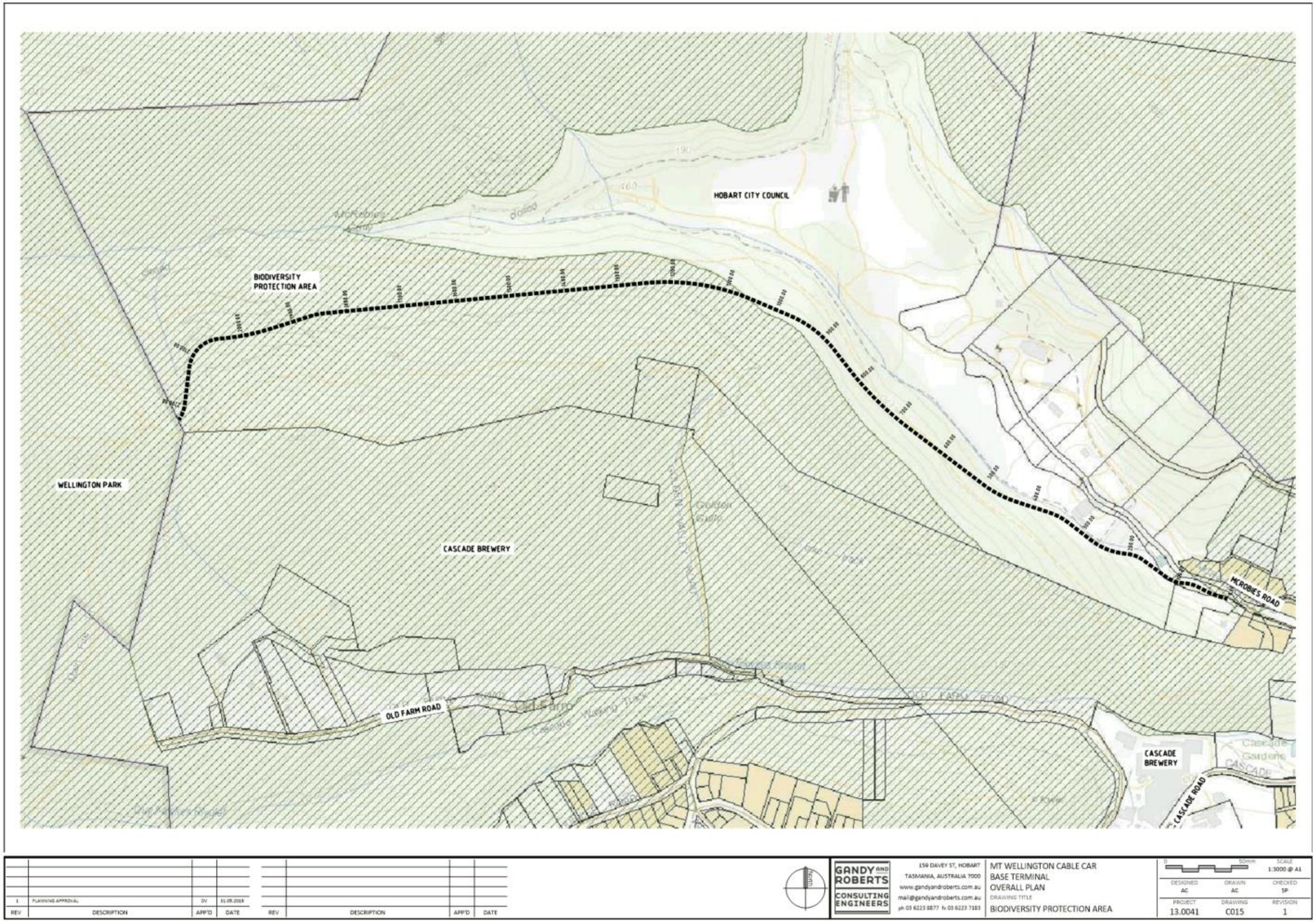
REVISION 1


HOBART CITY COUNCIL
BIODIVERSITY PROTECTION AREA
WELLINGTON PARK
CASCADE BREWERY
OLD FARM ROAD
MCROBIES ROAD
CASCADE BREWERY
CASCADE ROAD
1 PLANNING APPROVAL 01.05.2018
REV DESCRIPTION APP'D DATE
GANDY AND ROBERTS CONSULTING ENGINEERS
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MT WELLINGTON CABLE CAR
BASE TERMINAL
OVERALL PLAN
DRAWING TITLE
BIODIVERSITY PROTECTION AREA
SCALE 1:3000 @ A1
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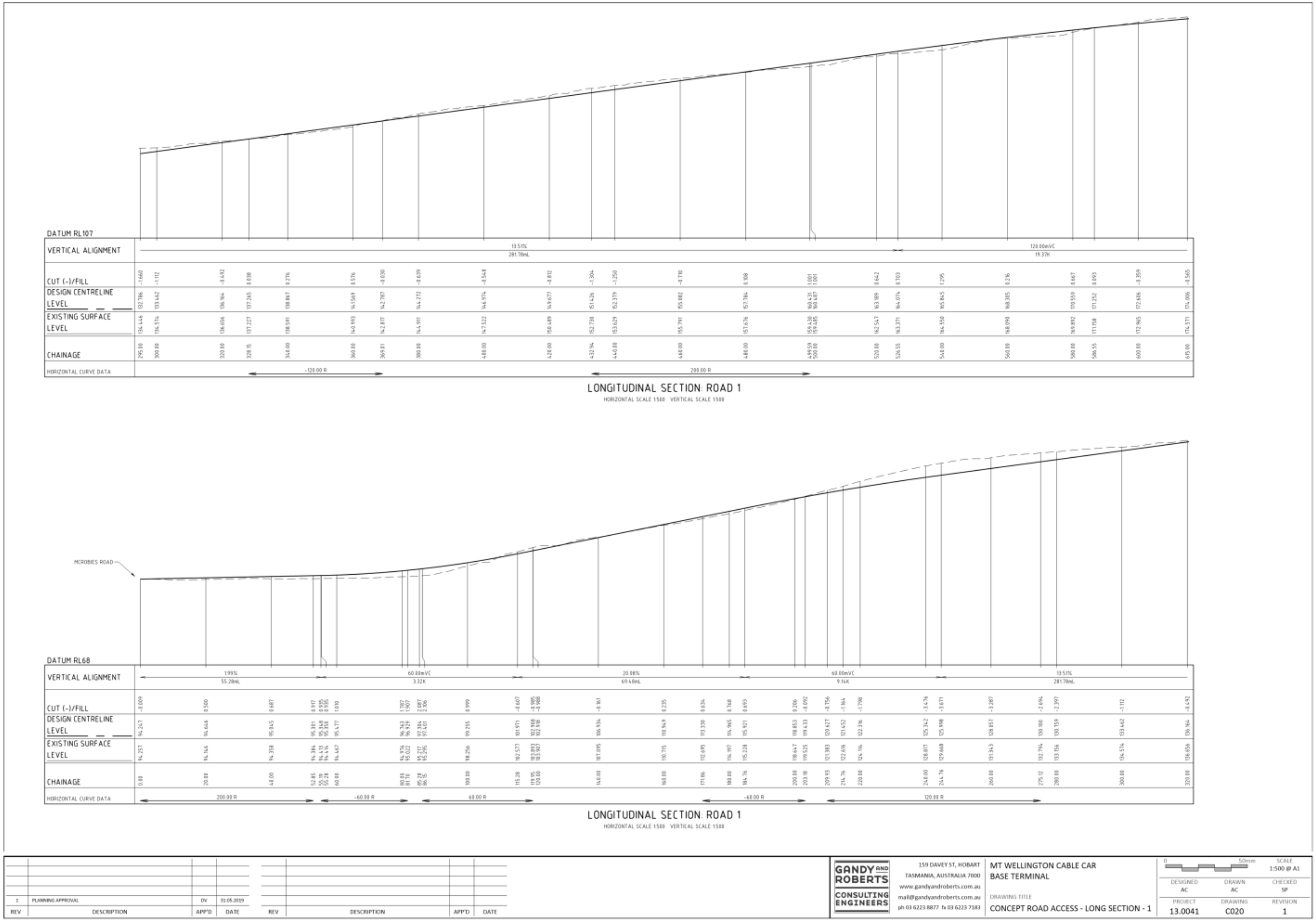
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MCROBIES ROAD
DATUM RL68
LONGITUDINAL SECTION: ROAD 1
1 PLANNING APPROVAL DV 31.05.2019
REV DESCRIPTION APP'D DATE
GANDY AND ROBERTS CONSULTING ENGINEERS
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MT WELLINGTON CABLE CAR
BASE TERMINAL
DRAWING TITLE
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SCALE 1:500 @ A1
DESIGNED AC
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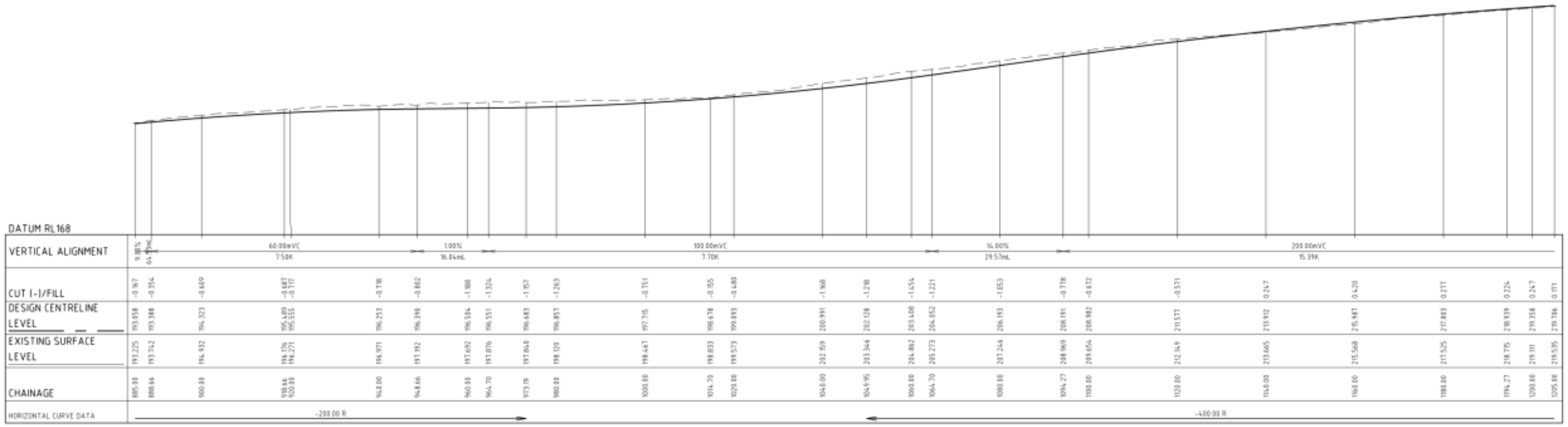


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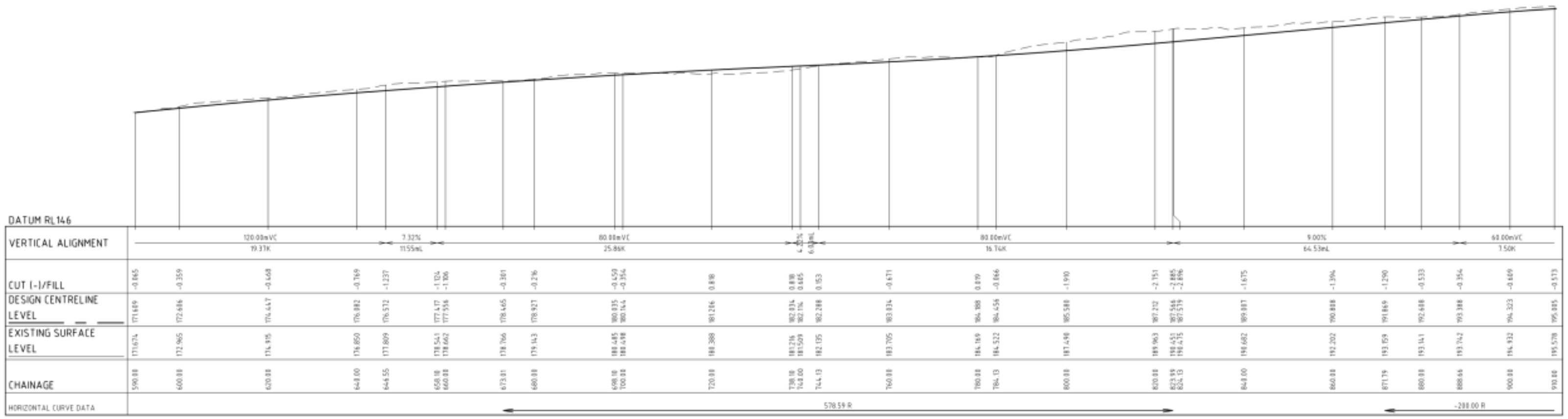


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|---|---|---|---|---|---|---|---|
| 1 | PLANNING APPROVAL | DV | 31.05.2019 | | | | |

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MT WELLINGTON CABLE CAR
BASE TERMINAL

DRAWING TITLE
CONCEPT ROAD ACCESS - LONG SECTION - 2

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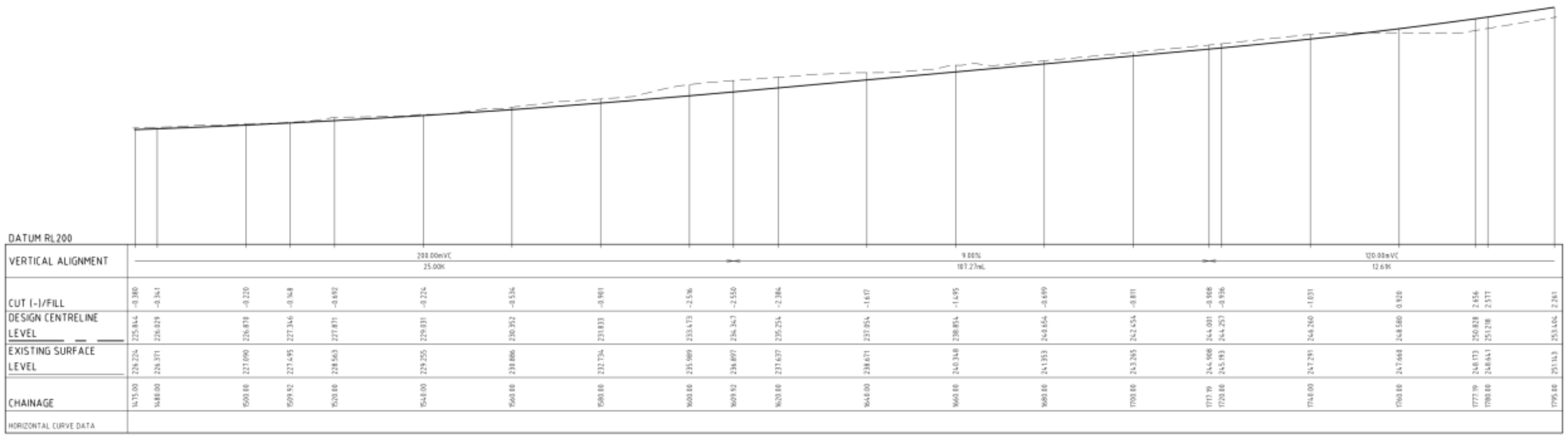


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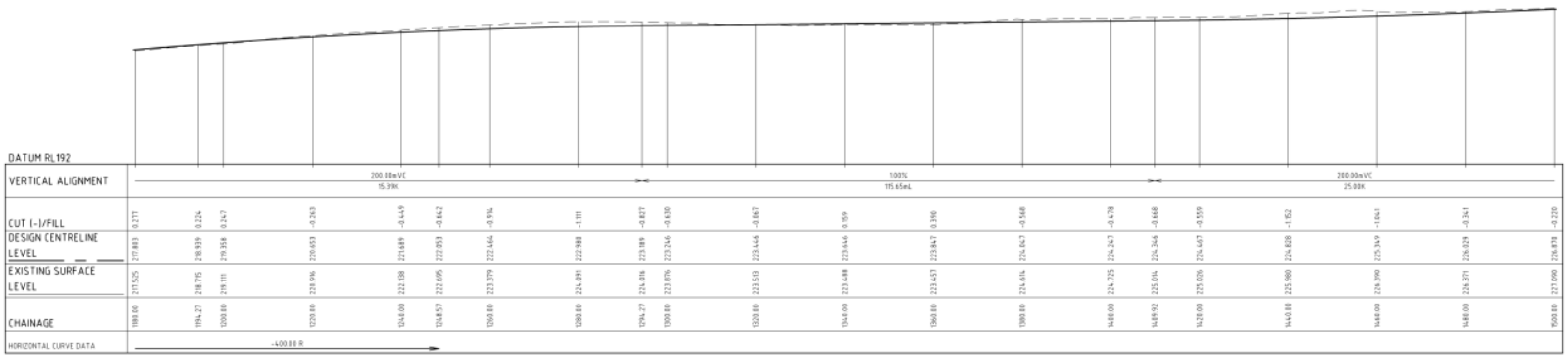


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| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 1 | PLANNING APPROVAL | DV | 31.05.2019 | | | | |

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MT WELLINGTON CABLE CAR
BASE TERMINAL

DRAWING TITLE
CONCEPT ROAD ACCESS - LONG SECTION - 3

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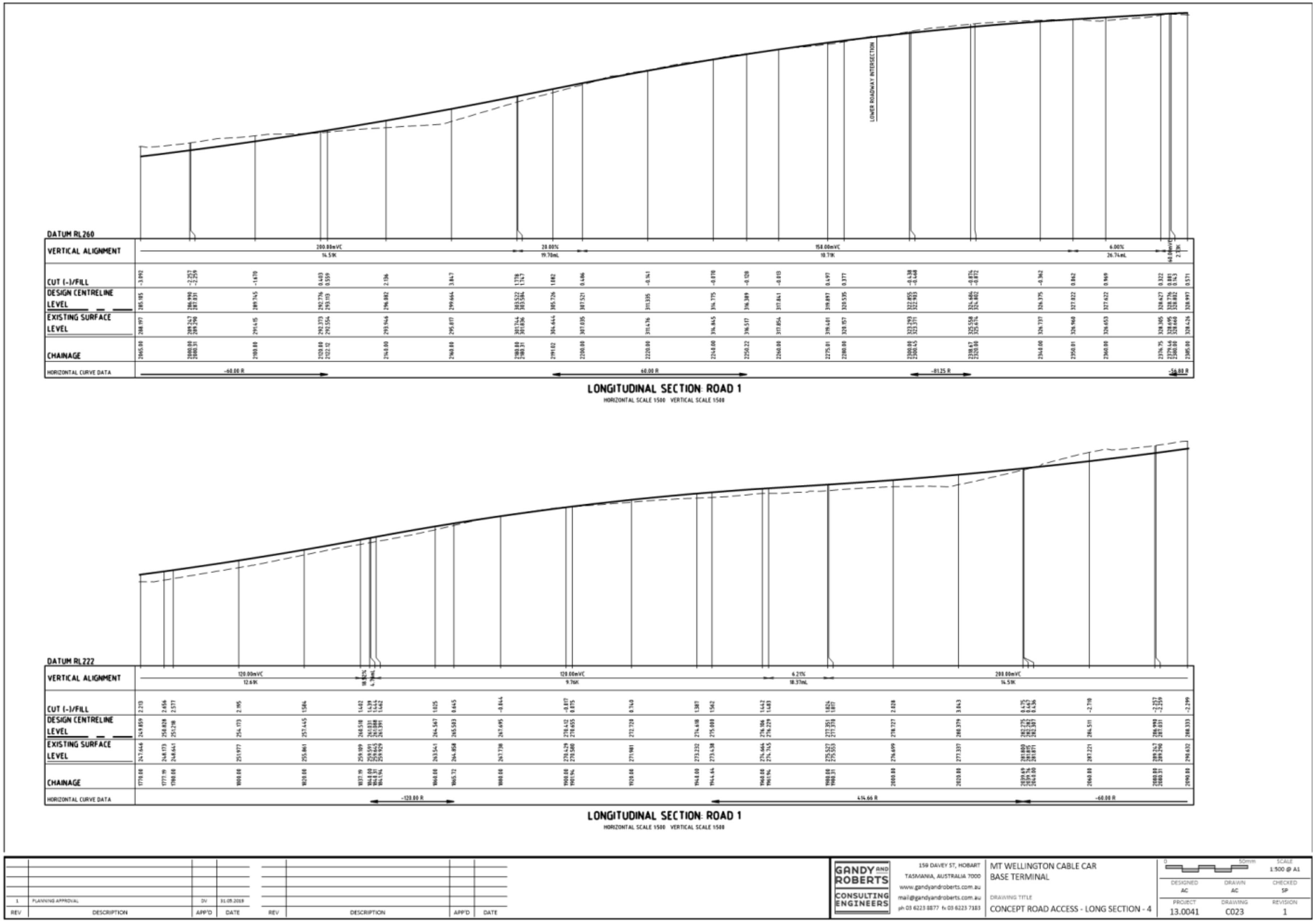
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HORIZONTAL SCALE 1:500 VERTICAL SCALE 1:500
1 PLANNING APPROVAL
REV DESCRIPTION APP'D DATE
GANDY AND ROBERTS CONSULTING ENGINEERS
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MT WELLINGTON CABLE CAR BASE TERMINAL
DRAWING TITLE
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CHECKED SP
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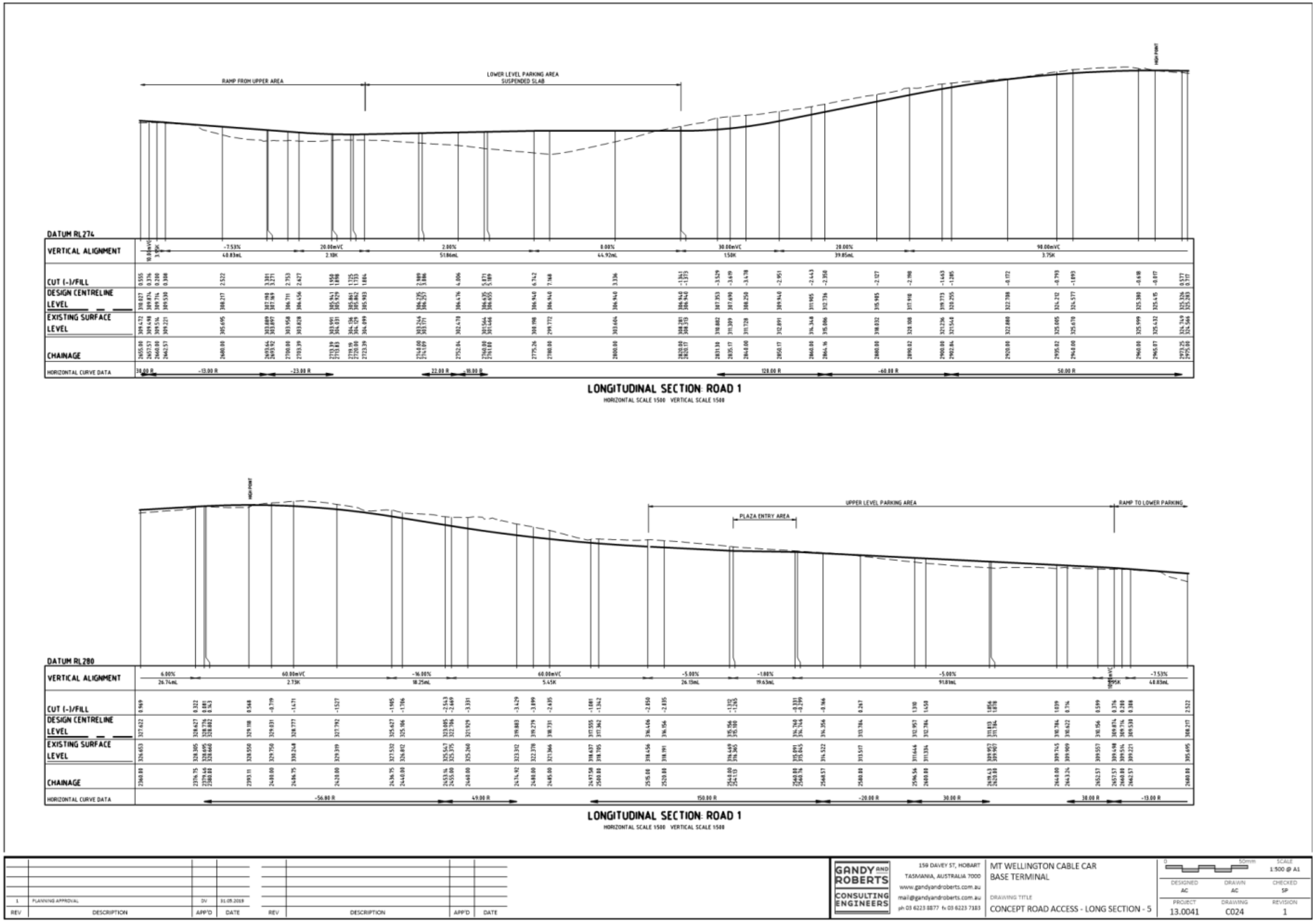
REVISION 1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LOWER LEVEL PARKING AREA
SUSPENDED SLAB
HIGH POINT
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PLAZA ENTRY AREA
RAMP TO LOWER PARKING
DATUM RL280
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HORIZONTAL SCALE 1:500 VERTICAL SCALE 1:500
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MT WELLINGTON CABLE CAR
BASE TERMINAL
DRAWING TITLE
CONCEPT ROAD ACCESS - LONG SECTION - 5
SCALE
1:500 @ A1
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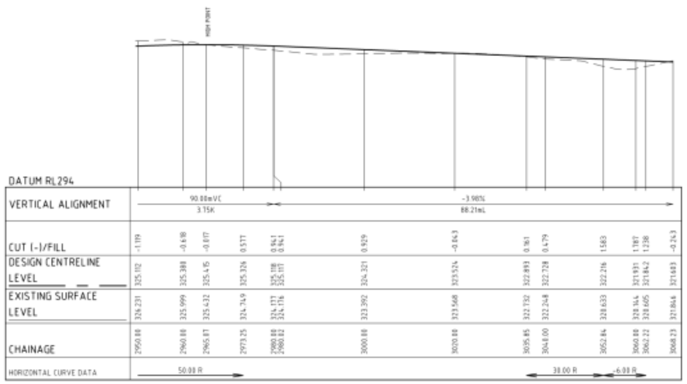


LONGITUDINAL SECTION: ROAD 1

HORIZONTAL SCALE 1:500 VERTICAL SCALE 1:500

| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 1 | PLANNING APPROVAL | DV | 31.05.2019 | | | | |

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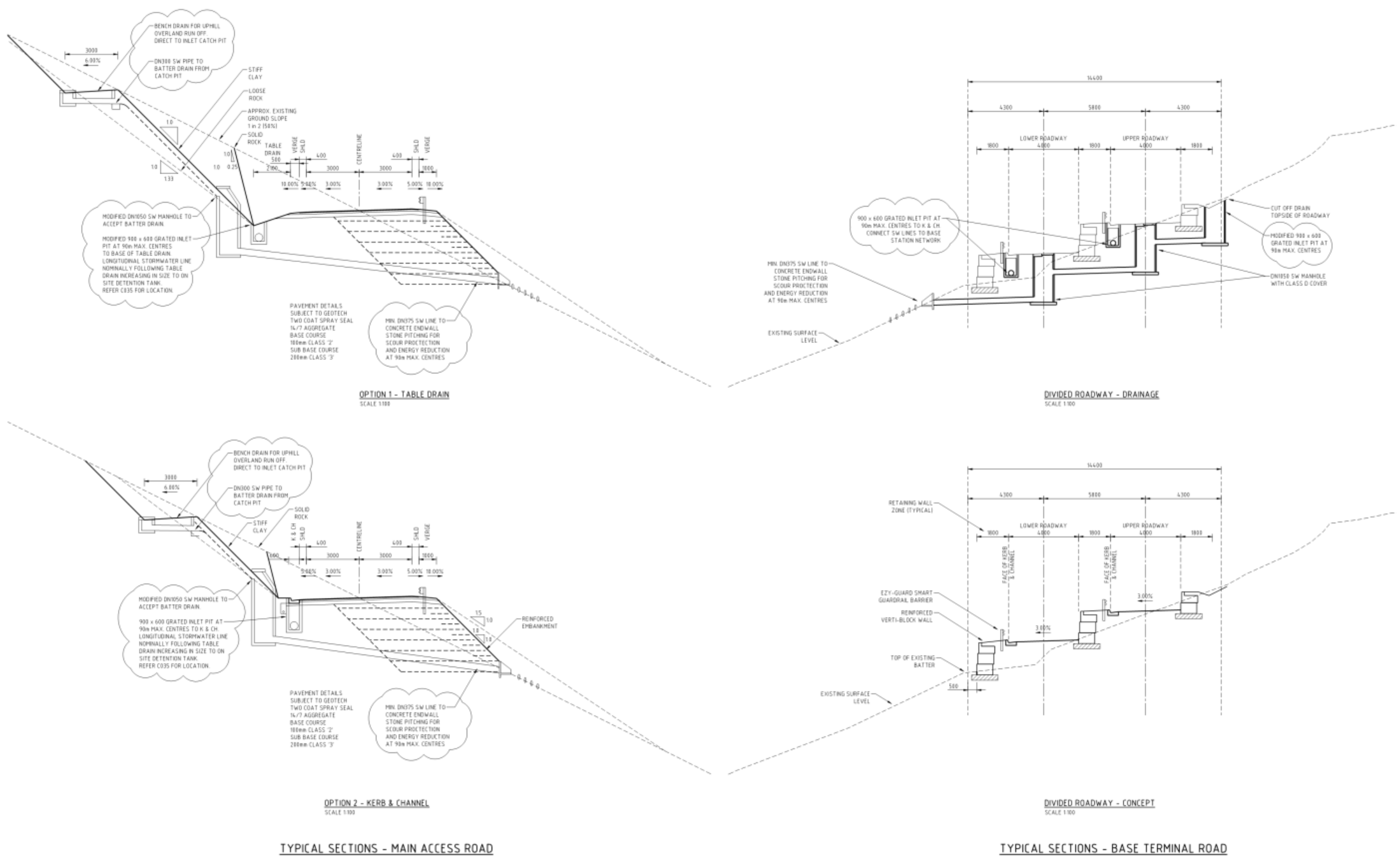
MT WELLINGTON CABLE CAR
BASE TERMINAL

DRAWING TITLE
CONCEPT ROAD ACCESS - LONG SECTION - 6

| 0 | 50mm | SCALE 1:500 @ A1 |
|---|---|---|
| DESIGNED AC | DRAWN AC | CHECKED SP |
| PROJECT 13.0041 | DRAWING C025 | REVISION 1 |




| REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|
| 2 | PLANNING APPROVAL | AC | 07.02.2020 |
| 1 | PLANNING APPROVAL | DV | 31.05.2019 |

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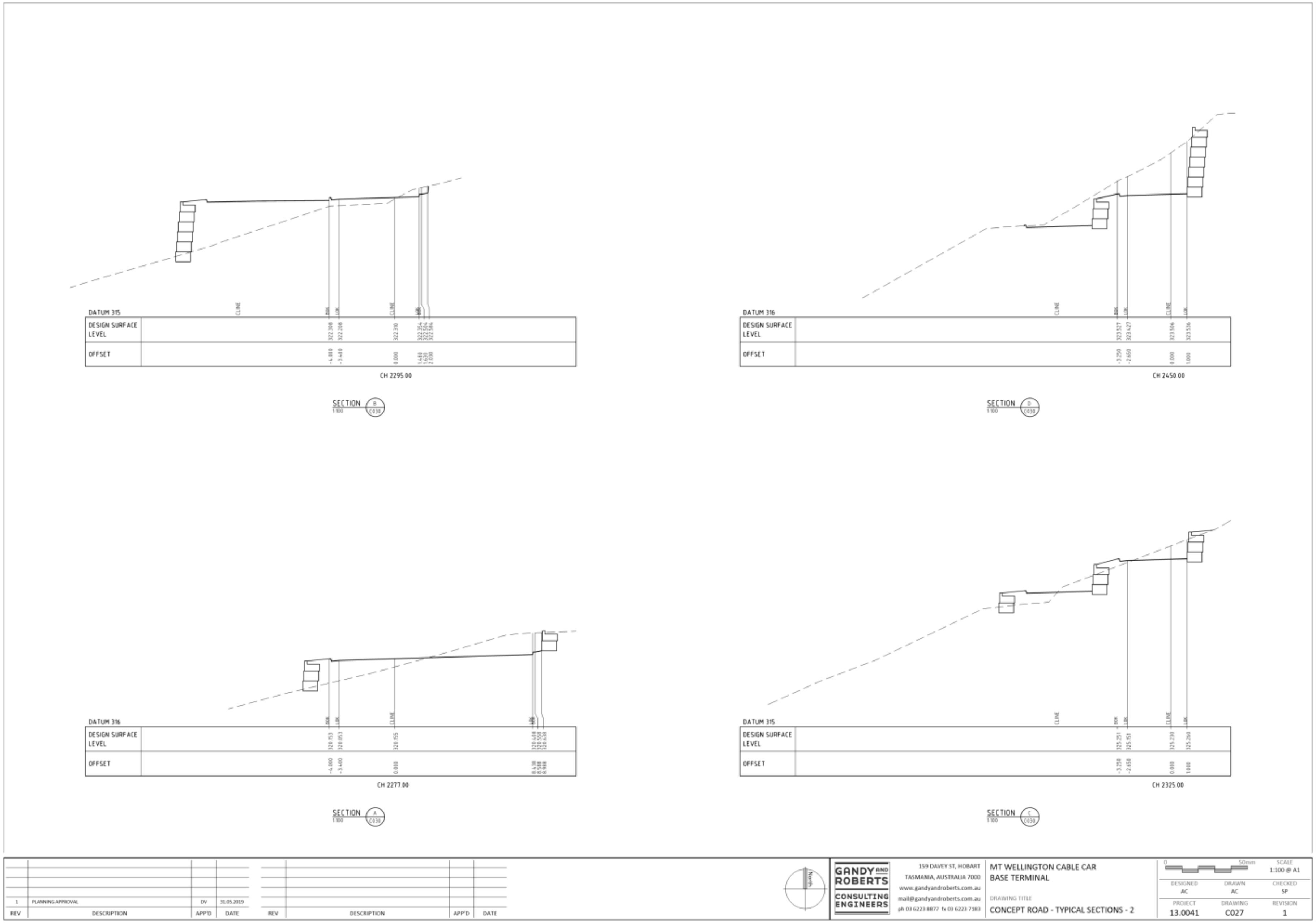
MT WELLINGTON CABLE CAR
BASE TERMINAL

DRAWING TITLE
CONCEPT ROAD - TYPICAL SECTIONS - 1

| SCALE | DESIGNED | DRAWN | CHECKED |
|---|---|---|---|
| 1:100 @ A1 | AC | AC | SP |

| PROJECT | DRAWING | REVISION |
|---|---|---|
| 13.0041 | C026 | 2 |


DATUM 315
DESIGN SURFACE LEVEL
OFFSET
CH 2295.00
SECTION B C030
1:100
DATUM 316
DESIGN SURFACE LEVEL
OFFSET
CH 2450.00
SECTION D C030
1:100
DATUM 316
DESIGN SURFACE LEVEL
OFFSET
CH 2277.00
SECTION A C030
1:100
DATUM 315
DESIGN SURFACE LEVEL
OFFSET
CH 2325.00
SECTION C C030
1:100
1 PLANNING APPROVAL DV 31.05.2019
REV DESCRIPTION APP'D DATE REV DESCRIPTION APP'D DATE
North
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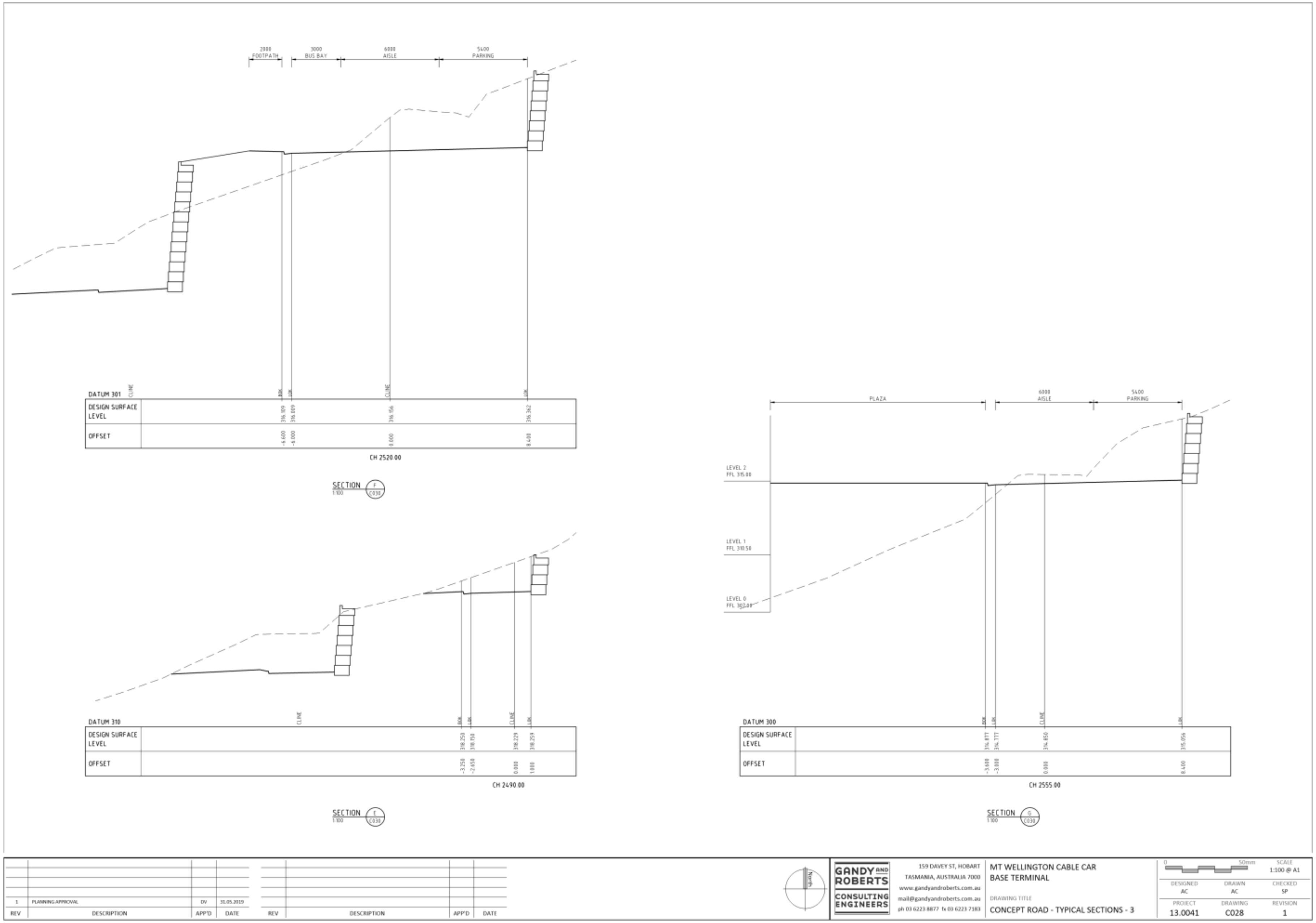
MT WELLINGTON CABLE CAR
BASE TERMINAL
DRAWING TITLE
CONCEPT ROAD - TYPICAL SECTIONS - 2
0 50mm
SCALE 1:100 @ A1
DESIGNED AC
DRAWN AC
CHECKED SP
PROJECT 13.0041
DRAWING C027
REVISION 1


FOOTPATH
BUS BAY
AISLE
PARKING
DATUM 301
DESIGN SURFACE LEVEL
OFFSET
CH 2520.00
SECTION F
DATUM 310
DESIGN SURFACE LEVEL
OFFSET
CH 2490.00
SECTION E
PLAZA
AISLE
PARKING
LEVEL 2
LEVEL 1
LEVEL 0
DATUM 300
DESIGN SURFACE LEVEL
OFFSET
CH 2555.00
SECTION G
PLANNING APPROVAL
REV
DESCRIPTION
APP'D
DATE
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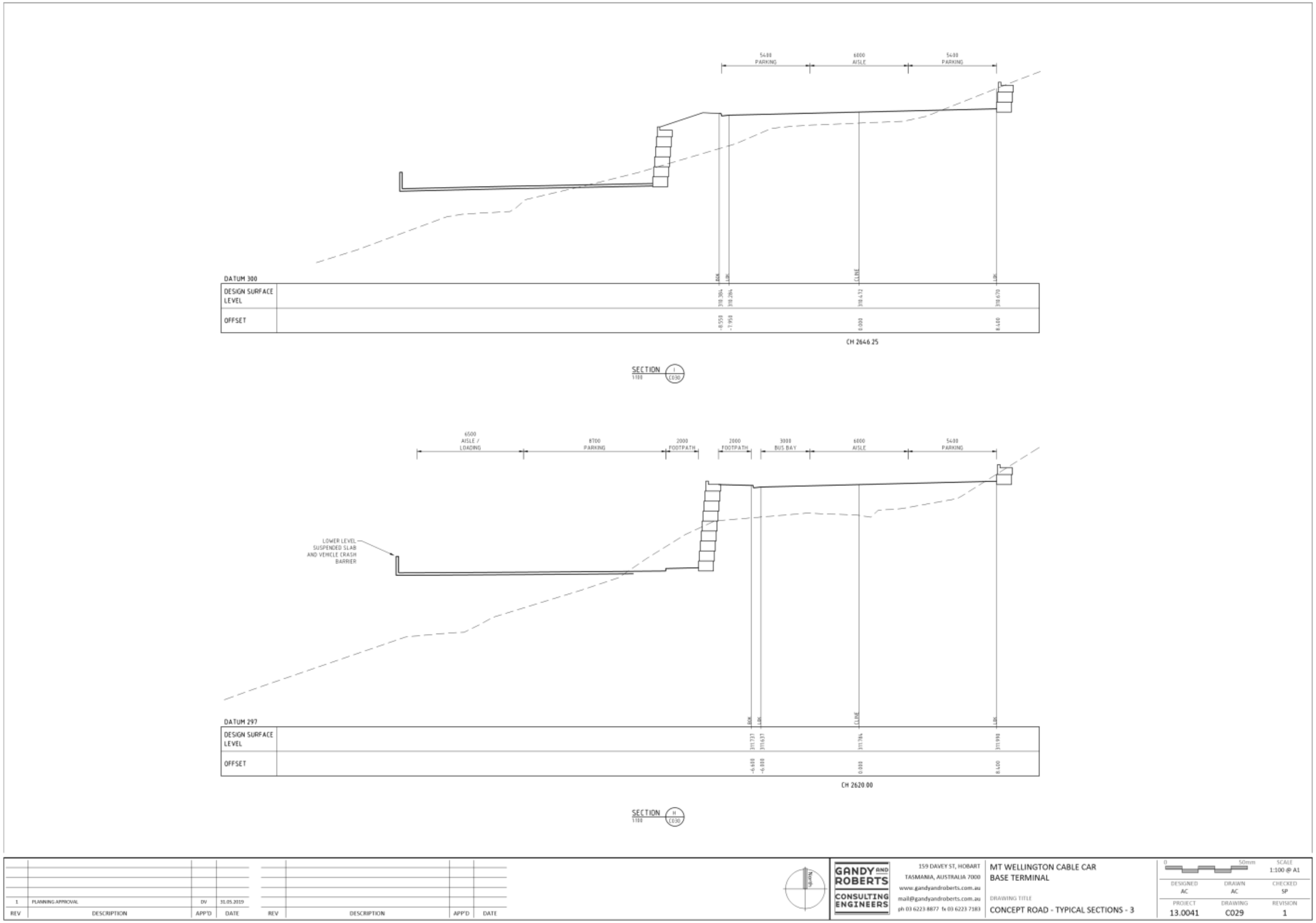
MT WELLINGTON CABLE CAR
BASE TERMINAL
DRAWING TITLE
CONCEPT ROAD - TYPICAL SECTIONS - 3
SCALE
1:100 @ A1
DESIGNED
DRAWN
CHECKED
PROJECT
DRAWING
REVISION
13.0041
C028
1


5400 PARKING
6000 AISLE
5400 PARKING
DATUM 300
DESIGN SURFACE LEVEL
OFFSET
310.384
310.284
310.472
310.670
-8.550
-7.950
0.000
8.400
CH 2646.25
SECTION I C030
1:100
6500 AISLE / LOADING
8700 PARKING
2000 FOOTPATH
2000 FOOTPATH
3000 BUS BAY
6000 AISLE
5400 PARKING
LOWER LEVEL SUSPENDED SLAB AND VEHICLE CRASH BARRIER
DATUM 297
DESIGN SURFACE LEVEL
OFFSET
CH 2620.00
SECTION H C030
1:100
1 PLANNING APPROVAL DV 31.05.2019
REV DESCRIPTION APP'D DATE
REV DESCRIPTION APP'D DATE
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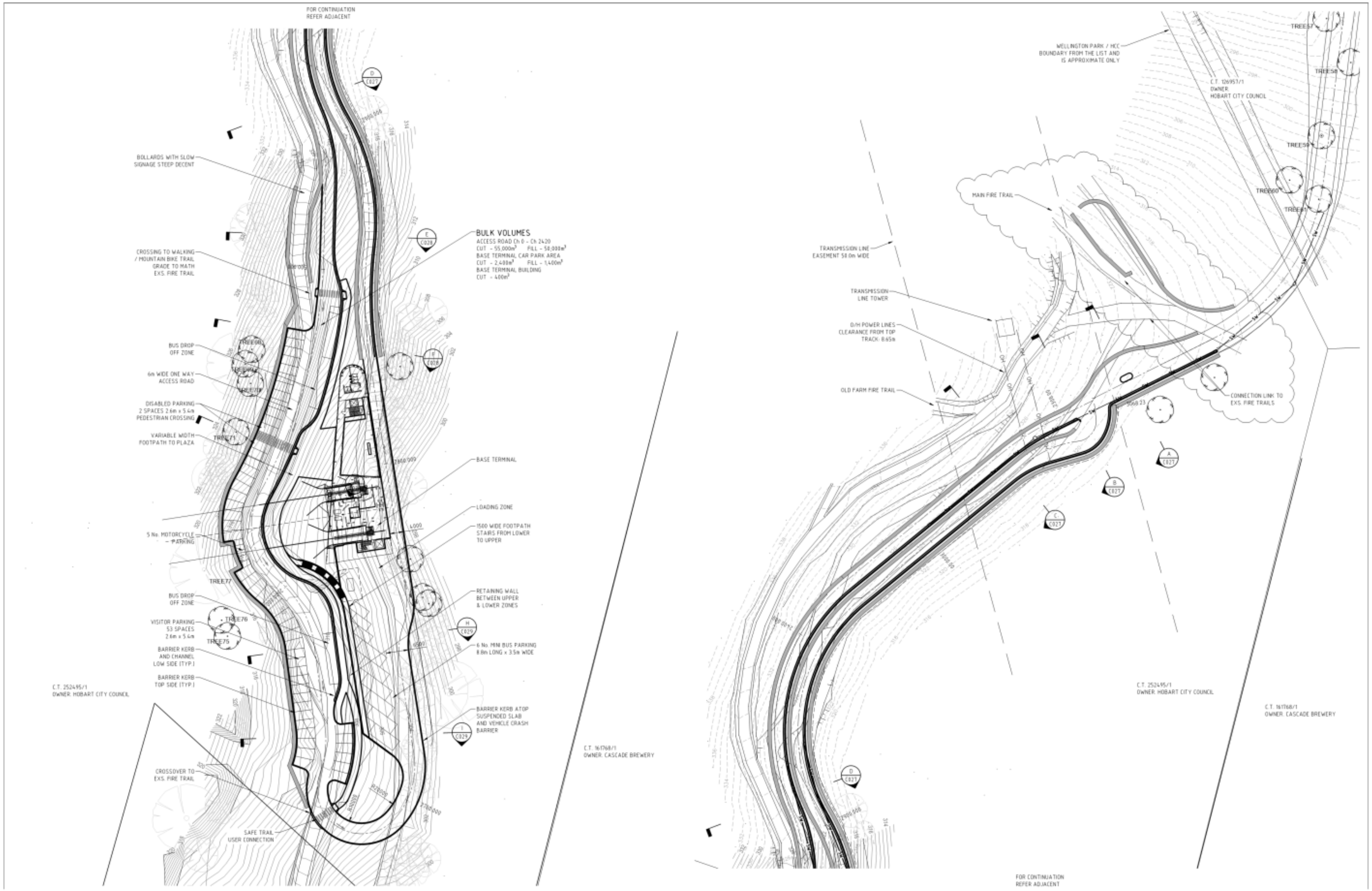
MT WELLINGTON CABLE CAR
BASE TERMINAL
DRAWING TITLE
CONCEPT ROAD - TYPICAL SECTIONS - 3
0 50mm
SCALE 1:100 @ A1
DESIGNED AC
DRAWN AC
CHECKED SP
PROJECT 13.0041
DRAWING C029
REVISION 1




| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 4 | PLANNING APPROVAL | DV | 04.08.2020 | | | | |
| 3 | PLANNING APPROVAL | AC | 16.07.2020 | | | | |
| 2 | PLANNING APPROVAL | AC | 06.09.2019 | | | | |
| 1 | PLANNING APPROVAL | DV | 31.05.2019 | | | | |

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MT WELLINGTON CABLE CAR
BASE TERMINAL

DRAWING TITLE
CONCEPT ROAD ACCESS

0 50mm
SCALE 1:500 @ A1

| DESIGNED | DRAWN | CHECKED |
|---|---|---|
| AC | AC | SP |
| **PROJECT** | **DRAWING** | **REVISION** |
| 13.0041 | C030 | 4 |


| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 2 | PLANNING APPROVAL | DV | 04.08.2020 | | | | |
| 1 | PLANNING APPROVAL | DV | 31.05.2019 | | | | |

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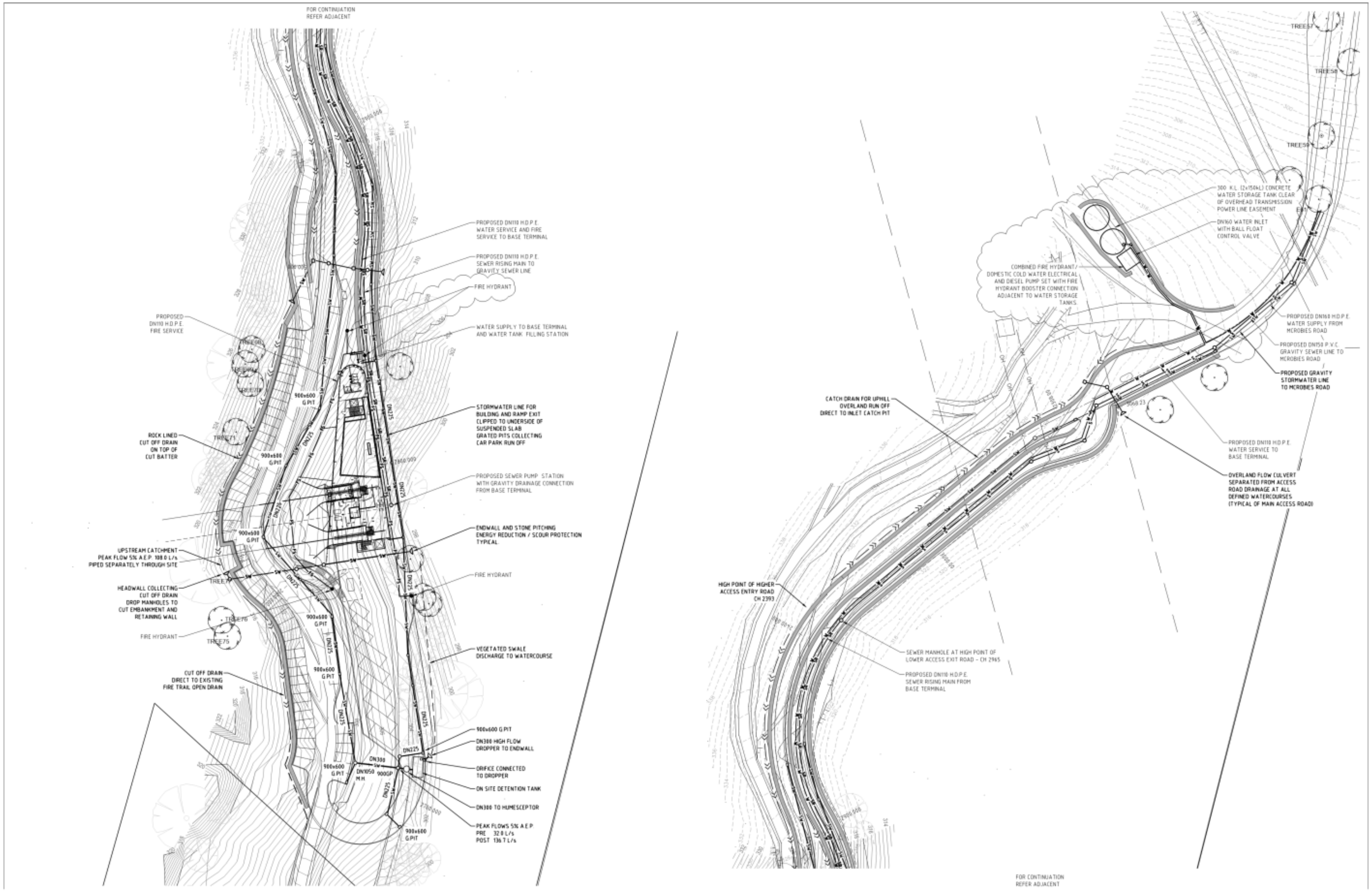
MT WELLINGTON CABLE CAR
BASE TERMINAL

DRAWING TITLE
CONCEPT ROAD ACCESS - TURNING PATHS

0 50mm

| SCALE | | |
|---|---|---|
| 1:500 @ A1 | | |
| DESIGNED | DRAWN | CHECKED |
| AC | AC | SP |
| PROJECT | DRAWING | REVISION |
| 13.0041 | C031 | 2 |




| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 4 | PLANNING APPROVAL | DV | 04.08.2020 | | | | |
| 3 | PLANNING APPROVAL | AC | 07.02.2020 | | | | |
| 2 | PLANNING APPROVAL | AC | 06.09.2019 | | | | |
| 1 | PLANNING APPROVAL | DV | 31.05.2019 | | | | |

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MT WELLINGTON CABLE CAR
BASE TERMINAL

DRAWING TITLE
CONCEPT SERVICES

SCALE 1:500 @ A1

| DESIGNED | DRAWN | CHECKED |
|---|---|---|
| AC | AC | SP |
| PROJECT | DRAWING | REVISION |
| 13.0041 | C032 | 4 |


| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 3 | PLANNING APPROVAL | AC | 07.02.2020 | | | | |
| 2 | PLANNING APPROVAL | AC | 06.09.2019 | | | | |
| 1 | PLANNING APPROVAL | DV | 31.05.2019 | | | | |

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MT WELLINGTON CABLE CAR
BASE TERMINAL
CONCEPT ROAD

DRAWING TITLE
ACCESS & SERVICE CONNECTIONS

0 50mm

| SCALE | | |
|---|---|---|
| 1:500 @ A1 | | |
| DESIGNED | DRAWN | CHECKED |
| AC | AC | SP |
| PROJECT | DRAWING | REVISION |
| 13.0041 | C035 | 3 |


LONG BUS (14.5m) SWEPT PATH
SCALE 1:500


SINGLE UNIT TRUCK / BUS (12.5m) SWEPT PATH
SCALE 1:500

| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 1 | PLANNING APPROVAL | DV | ? | | | | |

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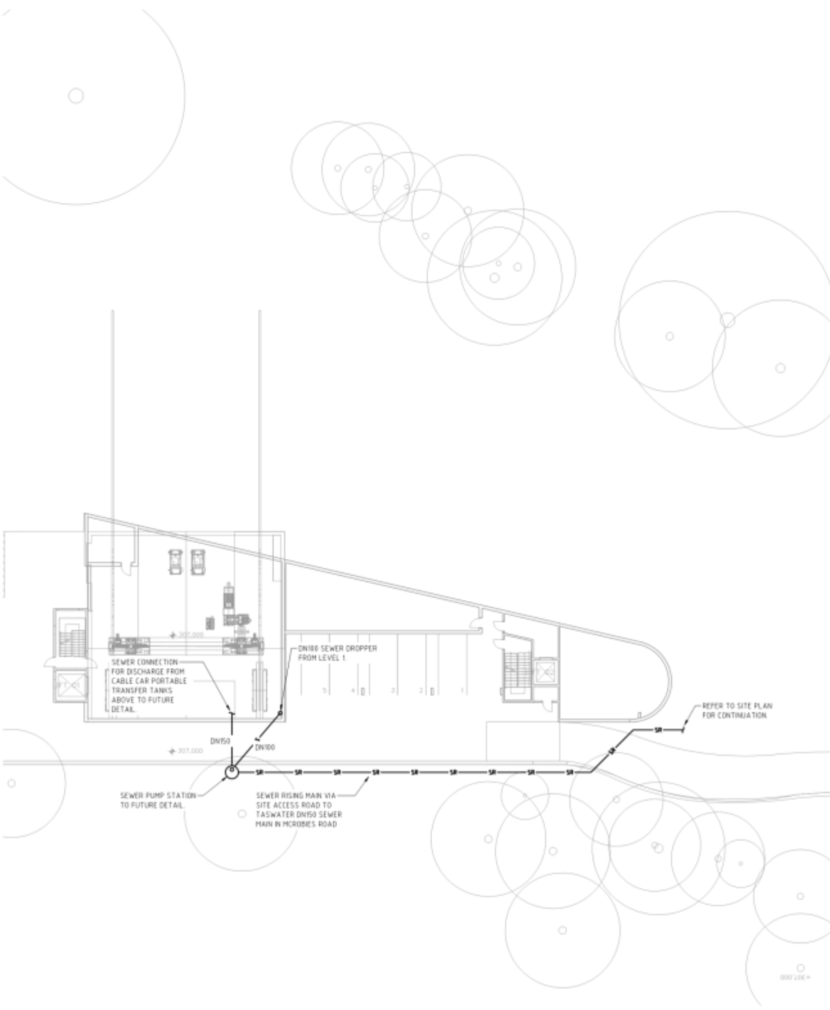
MT WELLINGTON CABLE CAR
BASE TERMINAL
CONCEPT ROAD

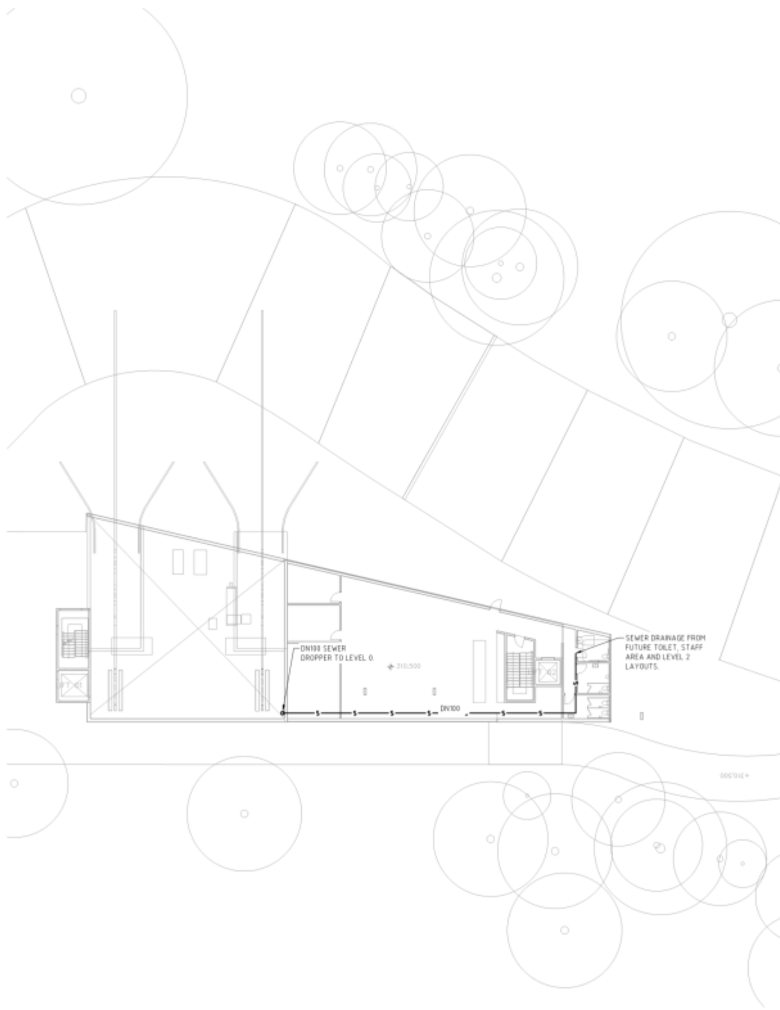
DRAWING TITLE
ACCESS TURNING PATHS

0 — 50mm

| SCALE | DESIGNED | DRAWN | CHECKED | PROJECT | DRAWING | REVISION |
|---|---|---|---|---|---|---|
| 1:500 @ A1 | AC | AC | SP | 13.0041 | C036 | 1 |




DRAINAGE - LEVEL 0
1:200




DRAINAGE - LEVEL 1
1:200

| REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|
| 1 | PLANNING APPROVAL | DV | 03.01.19 |

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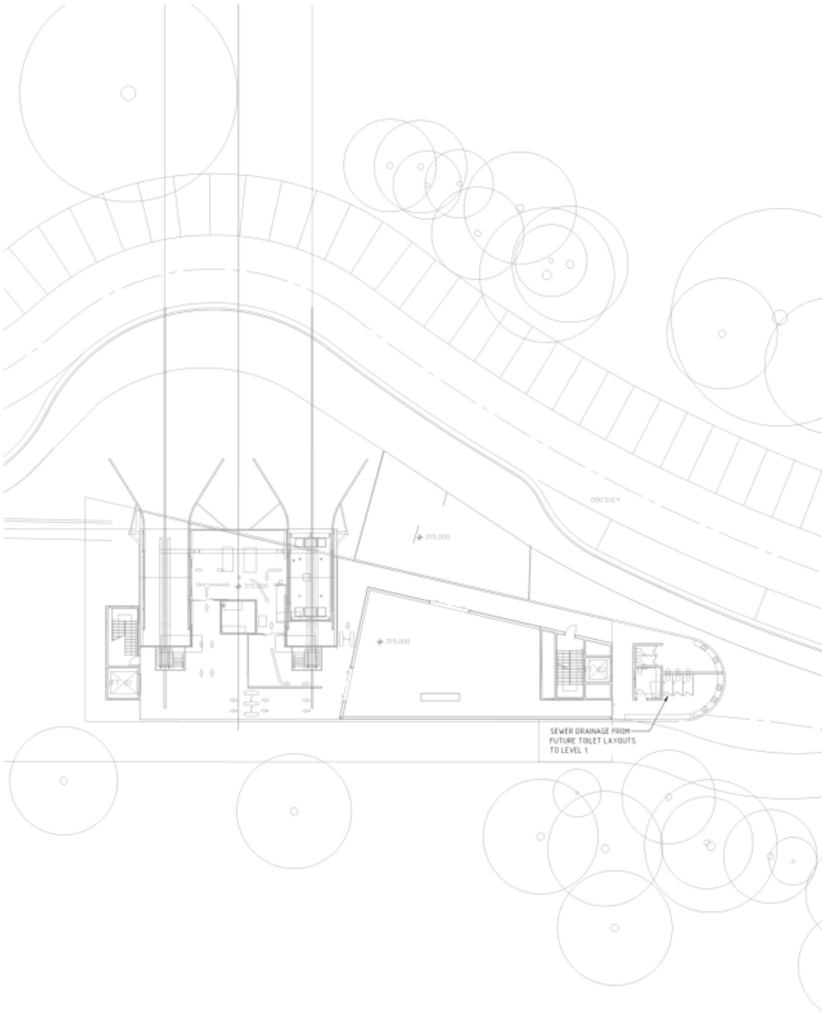
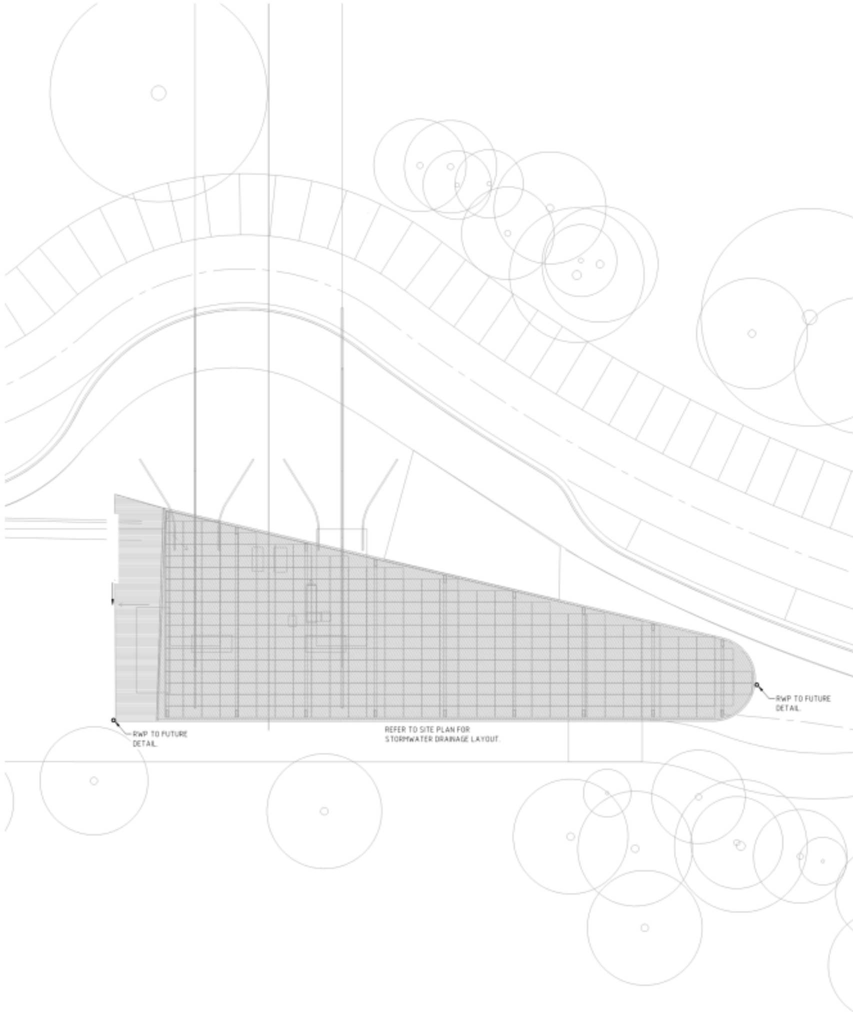
MT WELLINGTON CABLE CAR
MT WELLINGTON
BASE TERMINAL
DRAWING TITLE
LEVEL 0 & LEVEL 1 DRAINAGE

| SCALE | DESIGNED | DRAWN | CHECKED | PROJECT | DRAWING | REVISION |
|---|---|---|---|---|---|---|
| 1:200 @ A1 | DB | AK | DH | 13.0041 | B.T.01 | 1 |




DRAINAGE - LEVEL 2
1:200




DRAINAGE - ROOF
1:200

| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 1 | PLANNING APPROVAL | DV | 03.01.19 | | | | |

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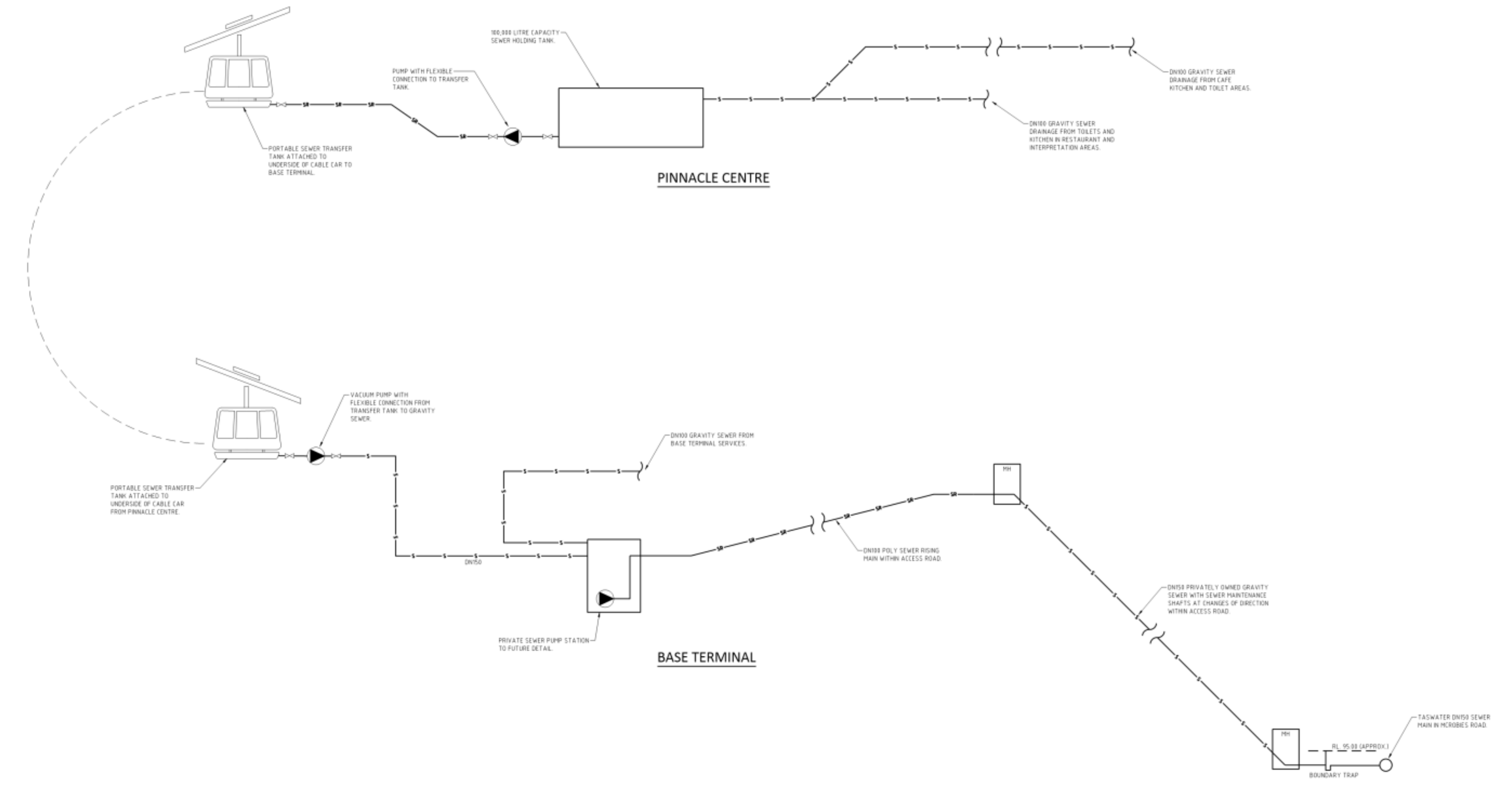
MT WELLINGTON CABLE CAR
MT WELLINGTON
BASE TERMINAL

DRAWING TITLE
LEVEL 2 & ROOF DRAINAGE

| 0 – 50mm | | SCALE 1:200 @ A1 |
|---|---|---|
| DESIGNED DB | DRAWN AK | CHECKED DH |
| PROJECT 13.0041 | DRAWING B.T.02 | REVISION 1 |




| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 1 | PLANNING APPROVAL | DV | 03.01.19 | | | | |

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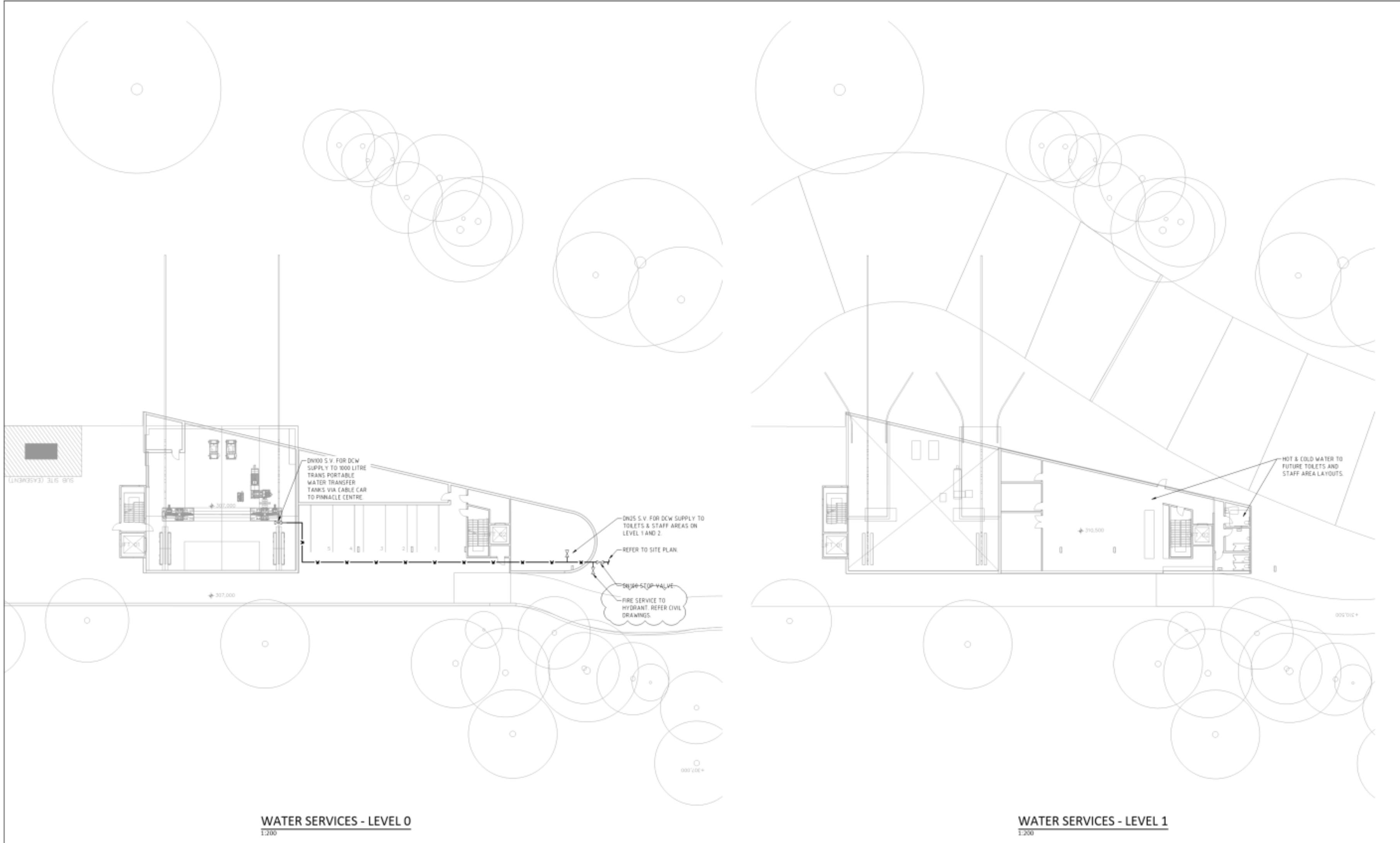
MT WELLINGTON CABLE CAR
MT WELLINGTON
BASE TERMINAL
DRAWING TITLE
SEWER DRAINAGE SCHEMATIC LAYOUT

0 50mm SCALE 1:200 @ A1

| DESIGNED | DRAWN | CHECKED |
|---|---|---|
| DB | AK | DH |
| PROJECT | DRAWING | REVISION |
| 13.0041 | B.T.03 | 1 |




| REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|
| 2 | PLANNING APPROVAL | DV | 03.08.20 |
| 1 | PLANNING APPROVAL | DV | 03.01.19 |

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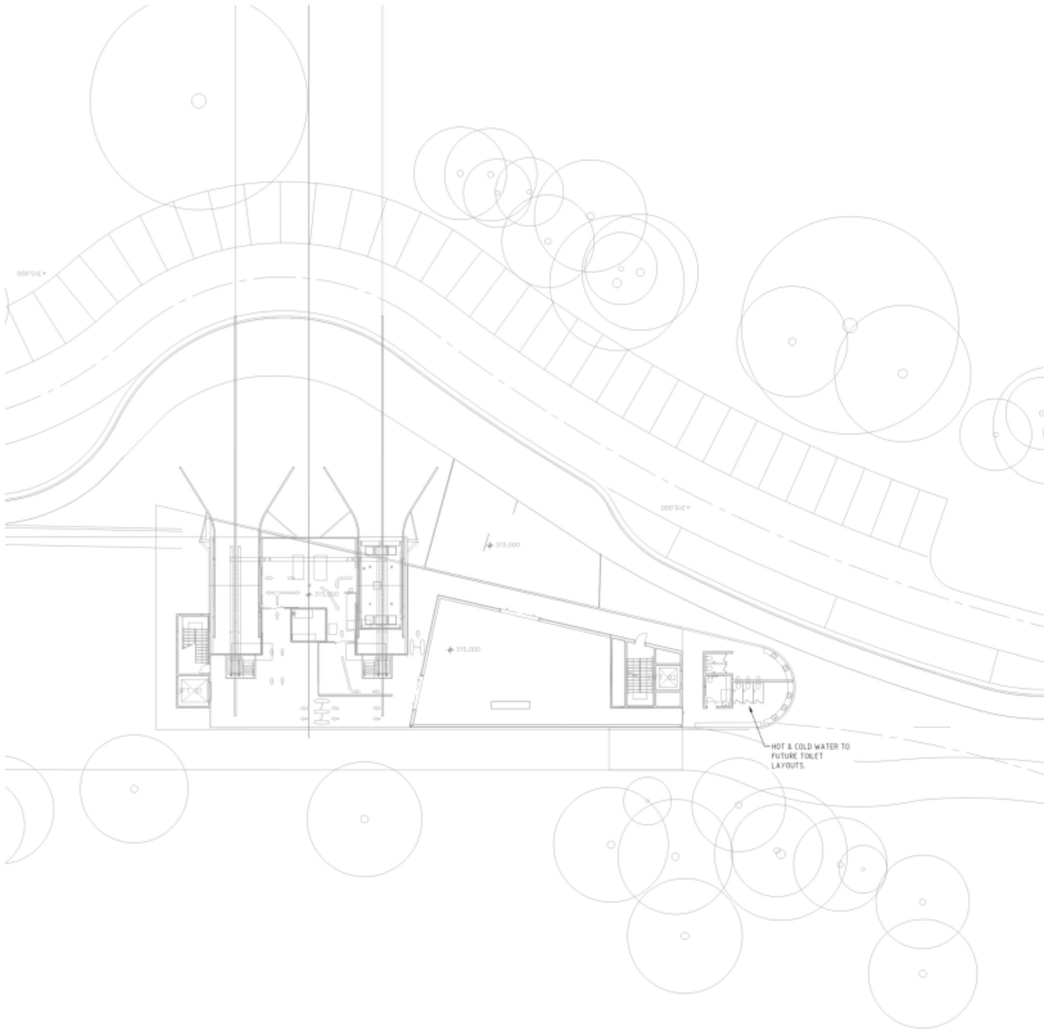
MT WELLINGTON CABLE CAR
MT WELLINGTON
BASE TERMINAL
DRAWING TITLE
LEVEL 0 & LEVEL 1 WATER SERVICES

| SCALE | DESIGNED | DRAWN | CHECKED | PROJECT | DRAWING | REVISION |
|---|---|---|---|---|---|---|
| 1:200 @ A1 | DB | AK | DH | 13.0041 | B.T.04 | 2 |




| REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|
| 2 | PLANNING APPROVAL | DV | 03.08.20 |
| 1 | PLANNING APPROVAL | DV | 03.01.19 |

| REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|

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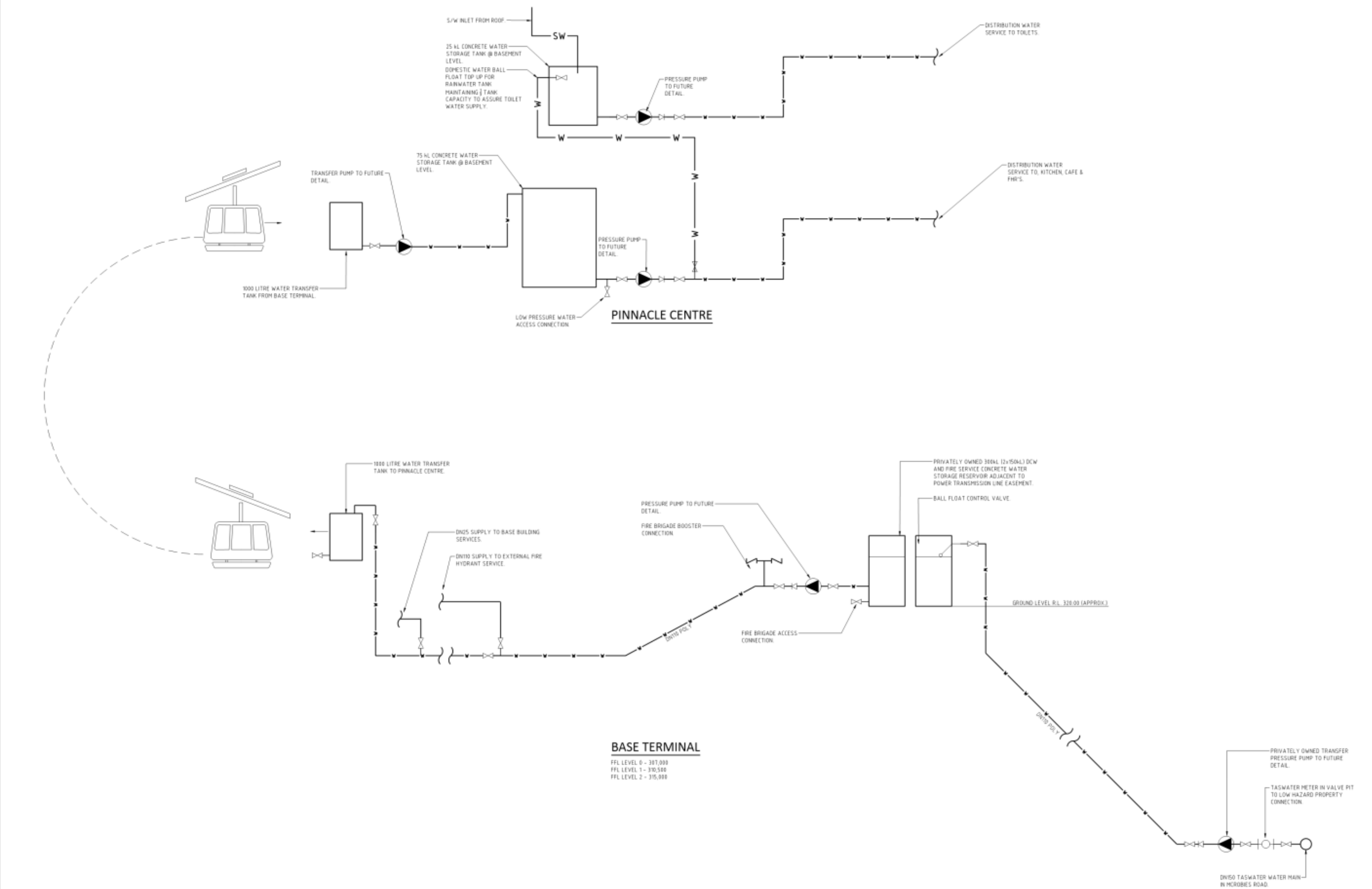
mail@gandyandroberts.com.au
ph 03 6223 8877 fx 03 6223 7183

MT WELLINGTON CABLE CAR
MT WELLINGTON
BASE TERMINAL

DRAWING TITLE
LEVEL 2 WATER SERVICES

0 50mm

| SCALE | | |
|---|---|---|
| 1:200 @ A1 | | |
| DESIGNED | DRAWN | CHECKED |
| DB | AK | DH |
| PROJECT | DRAWING | REVISION |
| 13.0041 | B.T.05 | 2 |




| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 1 | PLANNING APPROVAL | DV | 03.01.19 | | | | |

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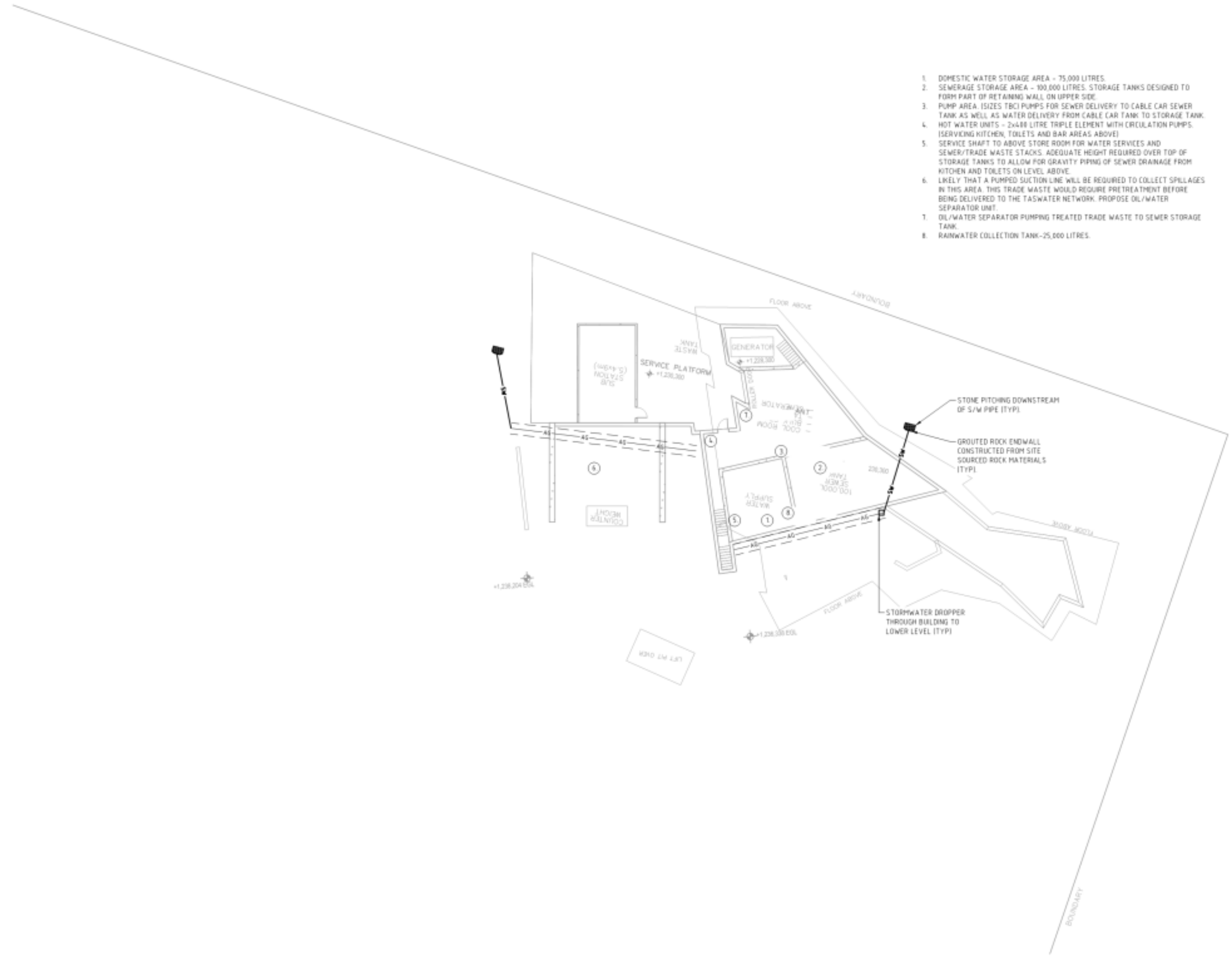
ph 03 6223 8877 fx 03 6223 7183

MT WELLINGTON CABLE CAR
MT WELLINGTON
BASE TERMINAL
DRAWING TITLE
WATER SERVICES SCHEMATIC LAYOUT

0 50mm

| SCALE | | |
|---|---|---|
| 1:200 @ A1 | | |
| DESIGNED | DRAWN | CHECKED |
| DB | AK | DH |
| PROJECT | DRAWING | REVISION |
| 13.0041 | B.T.06 | 1 |

1. DOMESTIC WATER STORAGE AREA – 75,000 LITRES.
2. SEWERAGE STORAGE AREA – 100,000 LITRES. STORAGE TANKS DESIGNED TO FORM PART OF RETAINING WALL ON UPPER SIDE.
3. PUMP AREA. (SIZES TBC) PUMPS FOR SEWER DELIVERY TO CABLE CAR SEWER TANK AS WELL AS WATER DELIVERY FROM CABLE CAR TANK TO STORAGE TANK.
4. HOT WATER UNITS – 2x400 LITRE TRIPLE ELEMENT WITH CIRCULATION PUMPS. (SERVICING KITCHEN, TOILETS AND BAR AREAS ABOVE)
5. SERVICE SHAFT TO ABOVE STORE ROOM FOR WATER SERVICES AND SEWER/TRADE WASTE STACKS. ADEQUATE HEIGHT REQUIRED OVER TOP OF STORAGE TANKS TO ALLOW FOR GRAVITY PIPING OF SEWER DRAINAGE FROM KITCHEN AND TOILETS ON LEVEL ABOVE.
6. LIKELY THAT A PUMPED SUCTION LINE WILL BE REQUIRED TO COLLECT SPILLAGES IN THIS AREA. THIS TRADE WASTE WOULD REQUIRE PRETREATMENT BEFORE BEING DELIVERED TO THE TASWATER NETWORK. PROPOSE OIL/WATER SEPARATOR UNIT.
7. OIL/WATER SEPARATOR PUMPING TREATED TRADE WASTE TO SEWER STORAGE TANK.
8. RAINWATER COLLECTION TANK–25,000 LITRES.




| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 1 | PLANNING APPROVAL | DV | 03.01.19 | | | | |

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MT WELLINGTON CABLE CAR
MT WELLINGTON
PINNACLE CENTRE
DRAWING TITLE
BASEMENT PLUMBING SERVICES

0 50mm

| SCALE | DESIGNED | DRAWN | CHECKED | PROJECT | DRAWING | REVISION |
|---|---|---|---|---|---|---|
| 1:200 @ A1 | DB | AK | DH | 13.0041 | P.C.01 | 1 |


| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 1 | PLANNING APPROVAL | DV | 03.01.19 | | | | |

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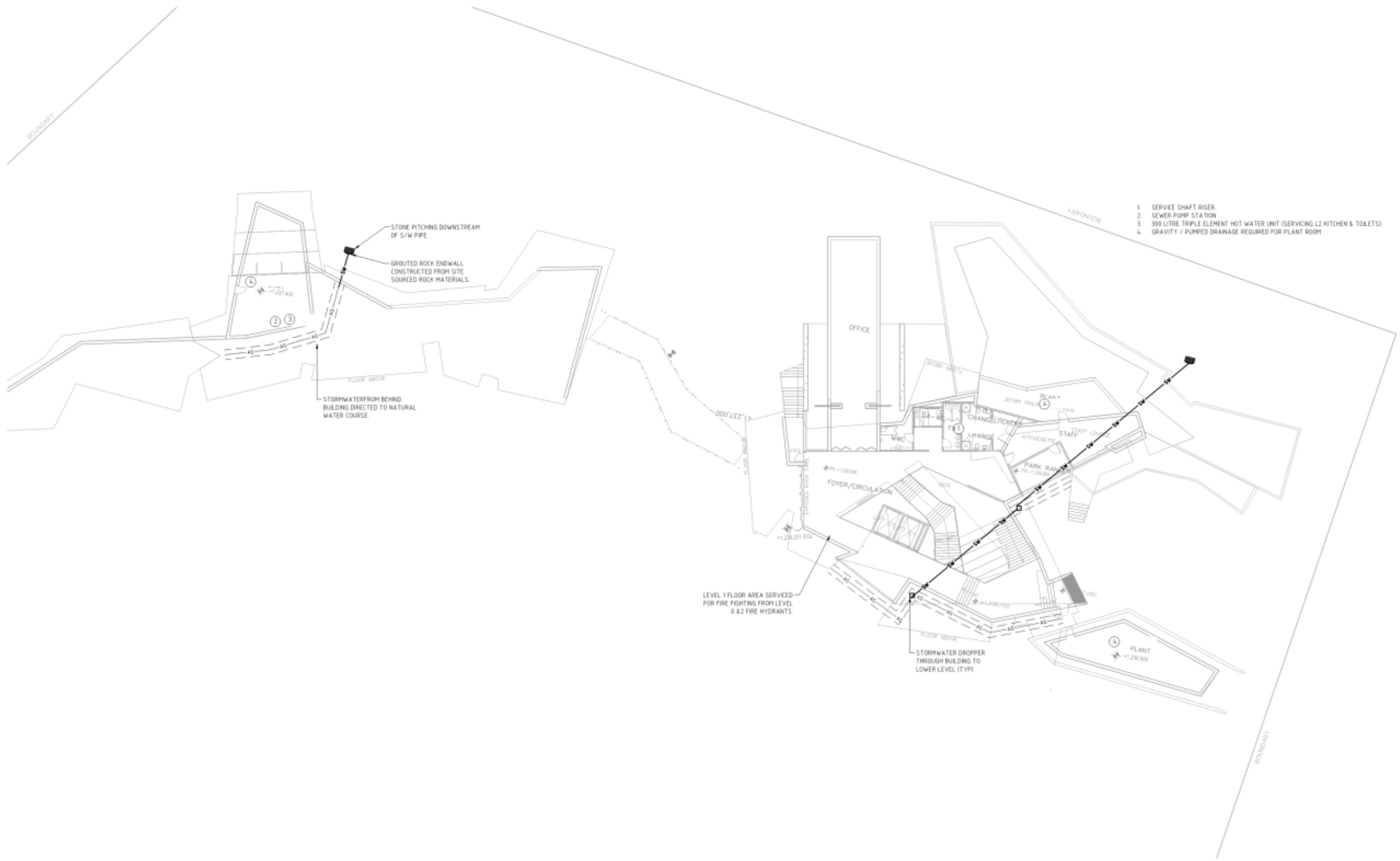
MT WELLINGTON CABLE CAR
MT WELLINGTON
PINNACLE CENTRE
DRAWING TITLE
LEVEL 0 PLUMBING SERVICES

0 50mm SCALE 1:200 @ A1

| DESIGNED | DRAWN | CHECKED |
|---|---|---|
| DB | AK | DH |
| PROJECT | DRAWING | REVISION |
| 13.0041 | P.C.02 | 1 |




| REV | DESCRIPTION | APP'D | DATE | REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|---|---|---|---|
| 1 | PLANNING APPROVAL | DV | 03.01.19 | | | | |

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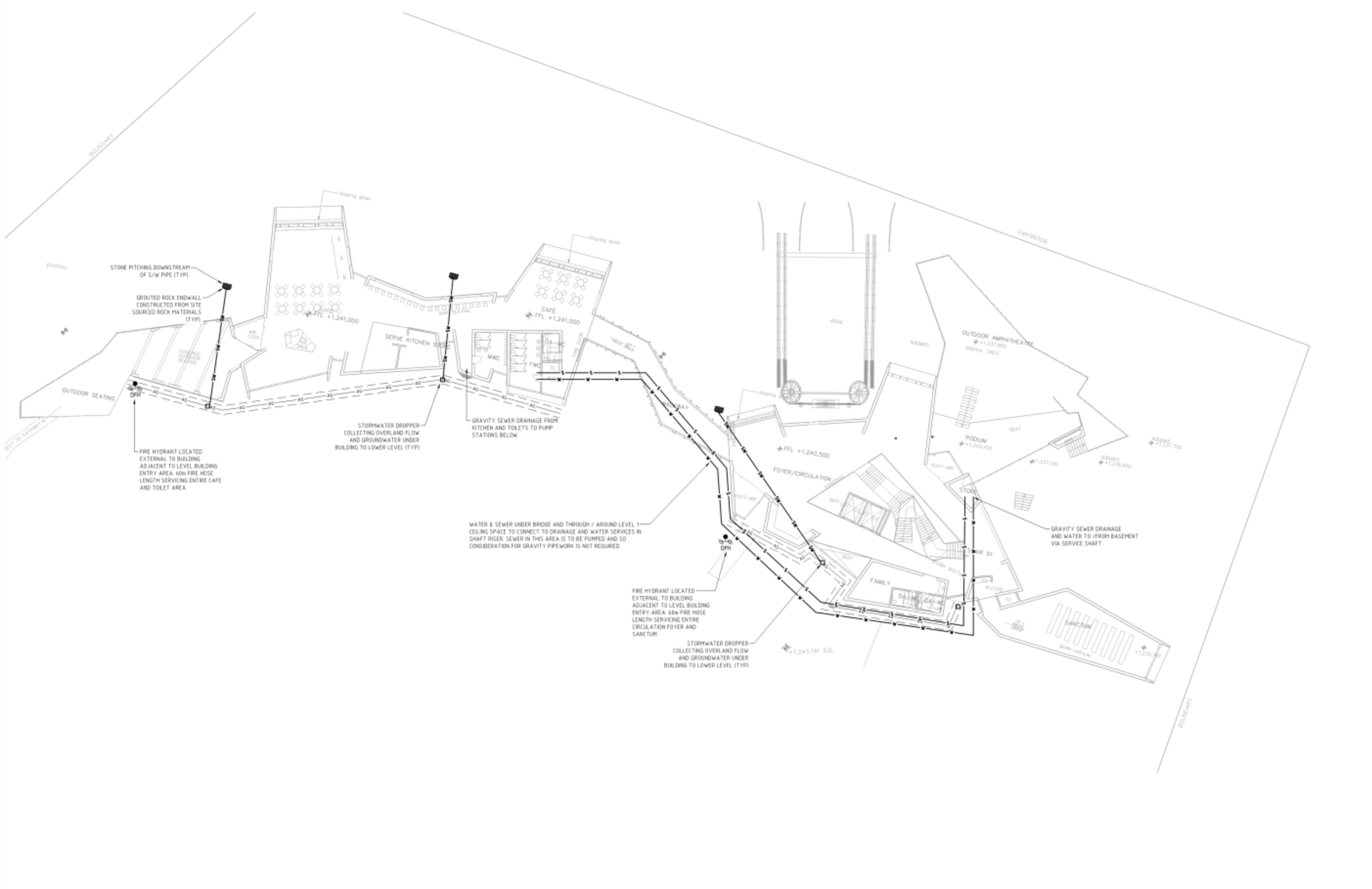
MT WELLINGTON CABLE CAR
MT WELLINGTON
PINNACLE CENTRE
DRAWING TITLE
LEVEL 1 PLUMBING SERVICES

0 50mm

| SCALE | | |
|---|---|---|
| 1:200 @ A1 | | |
| DESIGNED | DRAWN | CHECKED |
| DB | AK | DH |
| PROJECT | DRAWING | REVISION |
| 13.0041 | P.C.03 | 1 |




| REV | DESCRIPTION | APP'D | DATE |
|---|---|---|---|
| 1 | PLANNING APPROVAL | DV | 03.01.19 |

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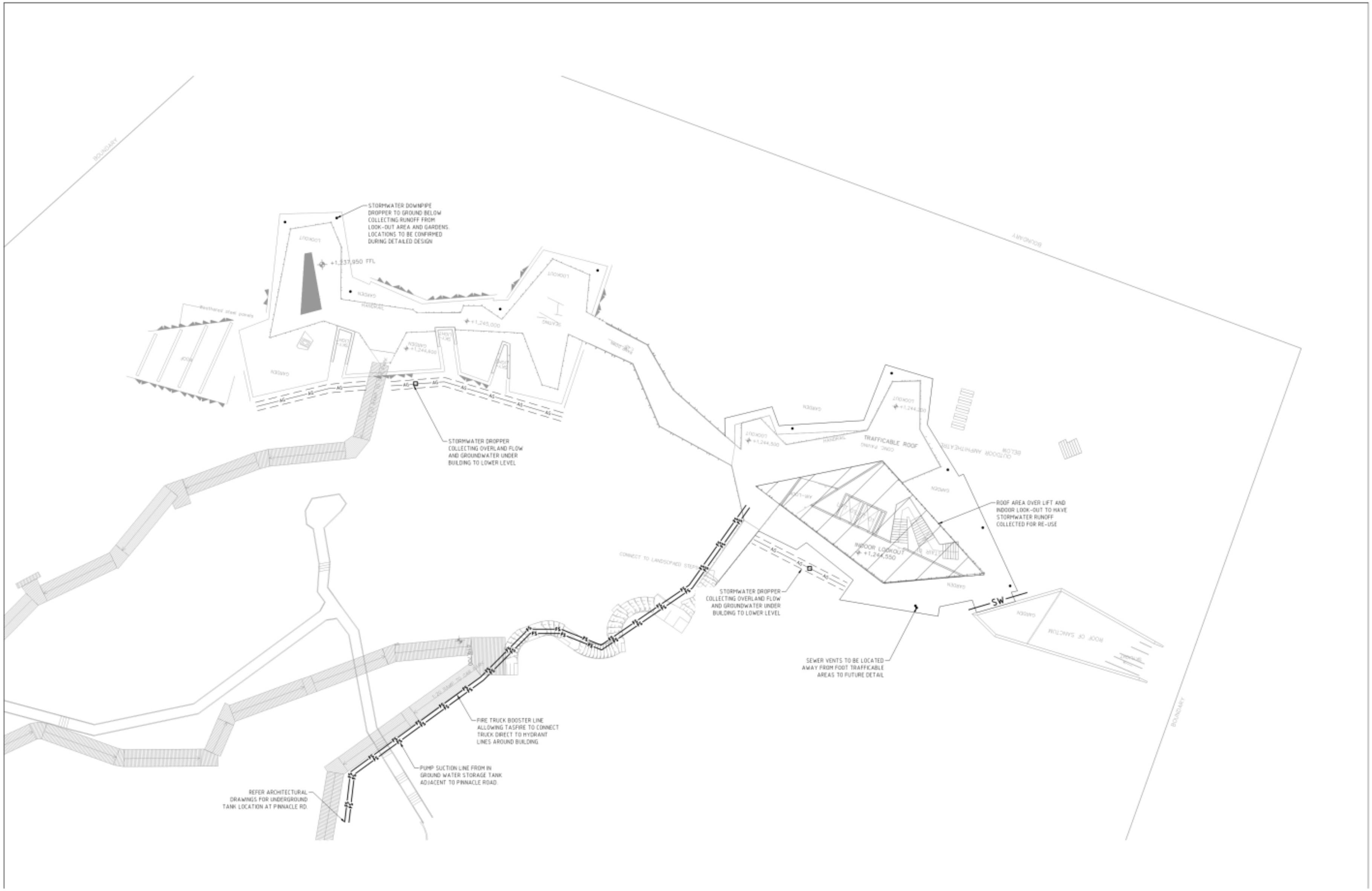
ph 03 6223 8877 fx 03 6223 7183

MT WELLINGTON CABLE CAR
MT WELLINGTON
PINNACLE CENTRE

DRAWING TITLE
LEVEL 2 PLUMBING SERVICES

| SCALE | DESIGNED | DRAWN | CHECKED | PROJECT | DRAWING | REVISION |
|---|---|---|---|---|---|---|
| 1:200 @ A1 | DB | AK | DH | 13.0041 | P.C.04 | 1 |

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| 1 | PLANNING APPROVAL | DV | 03.01.19 | | | | |

THIS DRAWING HAS NOT BEEN APPROVED FOR CONSTRUCTION

North

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MT WELLINGTON CABLE CAR
MT WELLINGTON
PINNACLE CENTRE
DRAWING TITLE
ROOF LEVEL PLUMBING SERVICES

| | | |
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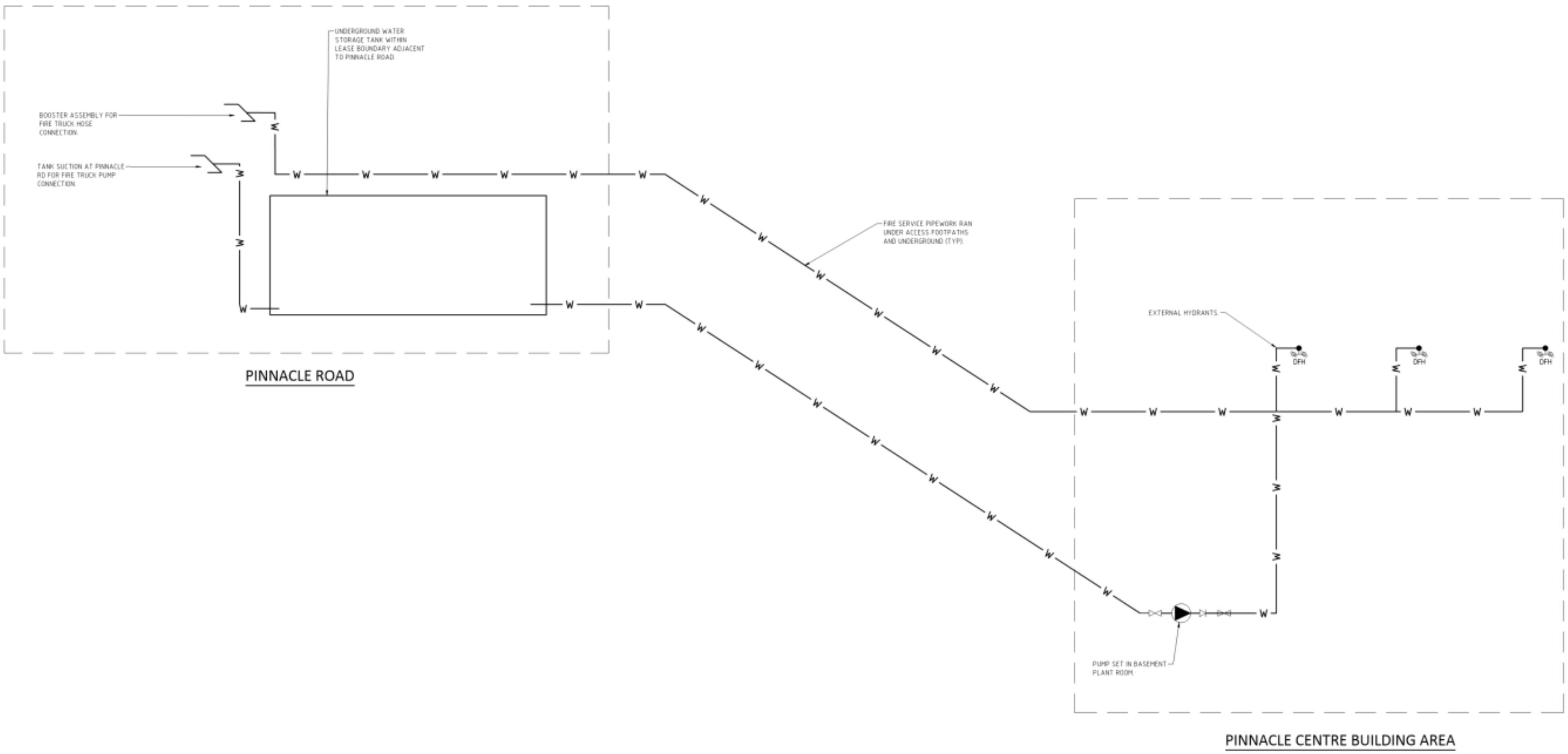
| PROJECT 13.0041 | DRAWING P.C.05 | REVISION 1 |

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MT WELLINGTON CABLE CAR
MT WELLINGTON
BASE TERMINAL

DRAWING TITLE
PINNACLE FIRE SYSTEM SCHEMATIC

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| PROJECT | DRAWING | REVISION |
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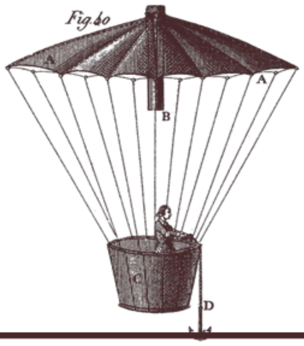

# Mt Wellington Cable Car

## Site Servicing Report for Planning Approval Submission

Mt Wellington Pinnacle and
McRobies Rd South Hobart

Revision 3, 27th April 2020.

Version control

| Revision | Description | Issue date | Issued by |
|---|---|---|---|
| 1 | Planning Approval | 06.02.19 | D.Hayers |
| 2 | Updated Submission Addressing HCC RFI | 18.12.19 | D.Hayers |
| 3 | Updated Submission Addressing HCC RFI | 27.04.20 | D.Hayers |

PROJECT NUMBER **13.0041**
REPORT AUTHOR **D.Hayers**
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# Table of Contents

# Table of Figures

# 1 Context

## 1.1 General

Gandy and Roberts Consulting Engineers have been engaged by the Mt Wellington Cable Car Company (MWCC) to provide concept servicing documentation for a proposed cable car to Mt Wellington. This report has been prepared as part of the Planning Application submission process and aims to discuss the methodology in which the sites sewer, water and stormwater infrastructure will be delivered to existing TasWater and City of Hobart owned infrastructure. This report shall be read in conjunction with Gandy and Roberts Consulting Engineers design drawings as well as other locality and servicing reports submitted by the proponent.

# 2 Design

The design is based on a maximum daily visitor number of 10,000 people per day during opening hours, in accordance with the advice received from the MWCC. Based on the intent to use water saving sanitary fixtures throughout the building space, a design usage of 10 Litres/person/day has been adopted for the design water and wastewater. This is in accordance with AS1547:2012 Table H4. On this basis, the design makes allowance for every visitor to the Pinnacle Centre making use of amenities and purchasing from café/restaurant.

Further consideration will be given during detailed design for the installation of vacuum sewer systems within buildings to further reduce water usage. This system will be designed in accordance with AS3500.2:2018.

# 3 Existing Site and Services

## 3.1 Locality and Existing Site Services

### 3.1.1 Pinnacle Centre

The Cable Car Pinnacle Building is to be located in front of the existing visitor lookout and Pinnacle Road at the summit of Mount Wellington, refer Figure 1 below. A number of new trails and access paths are to be provided, allowing pedestrian access to and from existing services at Pinnacle Road to the new Pinnacle Centre.

There are no existing services to this site, meaning that new infrastructure will need to be created for this development.

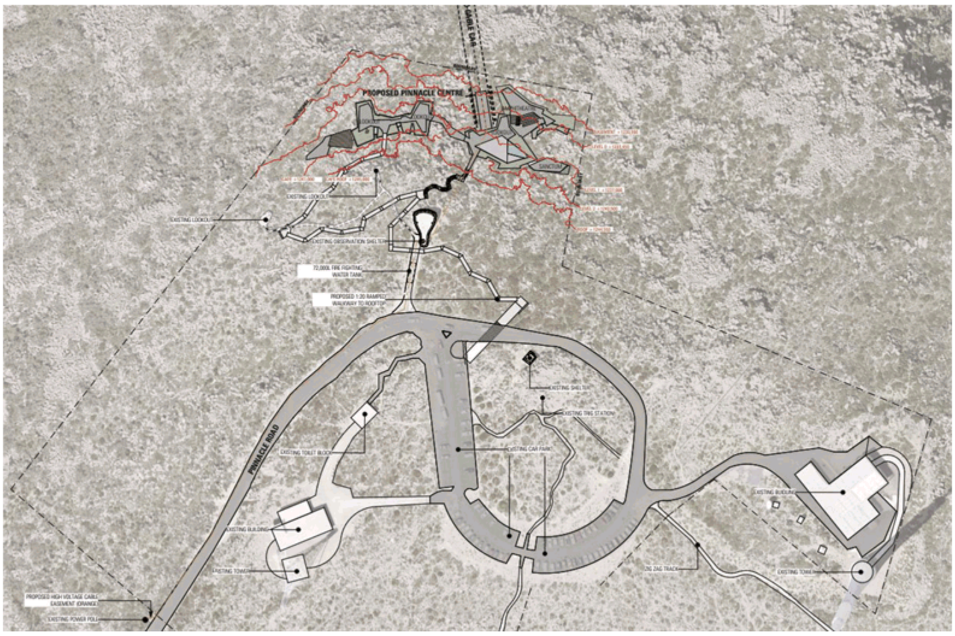

Figure 1: Pinnacle Centre Locality Plan

### 3.1.2 Base Terminal

The Cable Car's Base Terminal is to be located within the Wellington Park title. The proposed site is currently accessed via a fire trail off Old Farm Rd in South Hobart, refer Figure 2 below. As part of the new development, a new roadway from McRobies Road, South Hobart is proposed, using land owned by City of Hobart.

There are no existing services to this site, meaning that new infrastructure will need to be created for this development.


**Figure 2: Base Terminal Locality Plan**

# 4 Proposed New Site Services

## 4.1 Pinnacle Centre

Development within this zone of Wellington Park is to be in accordance with the Pinnacle Specific Area Plan of the Wellington Park Management Plan, as well as the Hobart Interim Planning Scheme 2015.

### 4.1.1 Sewer

All sewerage infrastructure created at the Pinnacle Centre will be delivered to a holding tank located at the basement level of the building (refer design plans). The majority of drainage to this tank will be via gravity drainage, with localised pumping where required. Sewage will be stored in this tank and then transported to the Base Terminal via the Cable Car. This will be completed by the Cable Car operator.

Transportation of wastewater to the Base Terminal will be with two custom designed transport tanks which will be fixed to the base of the Cable Car's, similar to that as shown in Figure 3 below. The MWCC crew will execute a number of runs as required to empty the storage tank at the Pinnacle Centre and deliver it to the Base Terminal. The estimated capacity of each tank will be 5,000 Litres based on the Cable Cars' maximum load rating.

**Figure 3: Wastewater Delivery Tank as used at Table Mountain Cable Car, Cape Town South Africa**

This process is in accordance with the Wellington Park Management Plan Pinnacle Area Specific Plan Issue 4-A4.1 Acceptable Solution and Issue 7-c Performance Criteria as wastewater will be delivered to a reticulated system.

Trade waste generated at the Pinnacle Centre is to be treated at source by a performance based solution in accordance with Taswater Trade Waste Guidelines. A deemed to satisfy solution cannot be achieved at this location due to there being no vehicle access path to the building, meaning direct pump out of settling tanks cannot be achieved. The performance solution will likely include a range of proprietary skimmer style units with capability to serve multiple areas of the site.

#### 4.1.2 Water

Most domestic water will be delivered to the Pinnacle Centre from the Base Terminal via the Cable Car operator. This will be completed through the delivery of 1000 Litre cube style water containers being wheeled onto the cable car throughout the day and night. Figure 4 shows a water cart used at another cable car site for delivery of drinking water.

Once at the Pinnacle Centre, water will be stored in a 75,000 Litre water storage tank located within the basement level of the building.

The remainder of the water required for use at the Pinnacle Centre will be collected from roof catchments and stored in tanks in the building's basement. Both water delivery methods are in accordance with Wellington Park Management Plan Pinnacle Area Specific Plan Issue 7-b Performance Criteria P7.6.

Figure 4: Drinking Water Delivery Tank as used at another Cable Car site

### 4.1.3 Fire Services

Reference should be made to the Fire Engineers and Building Surveyors Reports for Building Classifications for the Pinnacle Centre and the manner in which fire needs will be serviced.

The system comprises of an underground storage located near Pinnacle Road. From this tank, a suction line will be installed to a fire pump set located in the Pinnacle Centre Basement Level. This pump set will maintain pressure in the fire hydrant system proposed for the building perimeter.

At the Pinnacle Road tank, a pump suction and booster will also be installed, allowing TasFire to draw from the tank and pressurise the fire hydrant system in the event of pump failure. Fire Hydrants are proposed to be located external to the Pinnacle Centre Building, adjacent to main entry/exits. Internal Fire Hose Reels are also proposed as part of the Fire Solution, served from the domestic water supply.

Top-ups, as required to maintain a full water level within the underground storage tank will be a completed by the Cable Car operator.

### 4.1.4 Stormwater

Much of the stormwater collected at the site will be delivered to existing natural water courses via a networks of swales and piped systems. Locations of these are to be confirmed during detailed design to mimic existing water runoff from the mountain. In general, overland flows from upstream of the site will be collected via cut-off drains located at existing runoff paths and directed through the development zone back to the existing natural water course.

A section of roof area (approximate 190 $m^2$), has been allocated for the collection of rainwater. Collected rainwater will be delivered to a 25,000 Litre water storage tank in the basement, with the intention to reuse this water for toilet flushing. Refer to Hydraulic Drawing P.C.05 for details.

Both design options are in accordance with the Wellington Park Management Plan Pinnacle Area Specific Plan Issue 4-A4.1 Acceptable Solution and Issue 7-(d) A7.8. The design of the drainage system will be in accordance with AS3500.3.2:2003 and the development does not drain into the Drink Water Catchment Zone. Refer to Figure 5 below for drinking water catchment boundaries.

In regards to the Hobart Interim Planning Scheme 2015 Part E7.7.1 Stormwater Drainage and Disposal; stormwater from the Pinnacle Centre:

- Acceptable Solution A1 cannot be addressed as no gravity stormwater infrastructure is present at the site. As such, disposing of stormwater runoff to existing natural watercourses is proposed. This is to be conducted in accordance with Performance Criteria P1(a). As noted above, a section of roof has also been dedicated for re-use onsite. This is in accordance with Performance Criteria P1(b).
- As the Pinnacle Centre development is larger than 600 $m^2$, the development will incorporate water sensitive urban design (WSUD) principles in accordance with Acceptable Solution A2.
- In accordance with Acceptable Solution A3(a), minor stormwater drainage systems at the site are designed to accommodate a storm event with an ARI of 20 years.
- In accordance with Acceptable Solution A3(b), run-off generated at the Pinnacle Centre will be no greater than pre-existing. The pinnacle area can generally be described as a plateau with dolerite outcrops, small cliffs and large dolerite boulders across the entire area. As such the natural area can be considered impermeable and would result in runoff levels not dissimilar to a roofed area. Therefore, under the proposed development there will be no noticeable

increase in runoff and consequently no impact on any downstream public stormwater infrastructure. Performance Criteria A3(b) is therefore met.

- The site stormwater system is not considered a major system so Acceptable Solution A4 is not applicable.

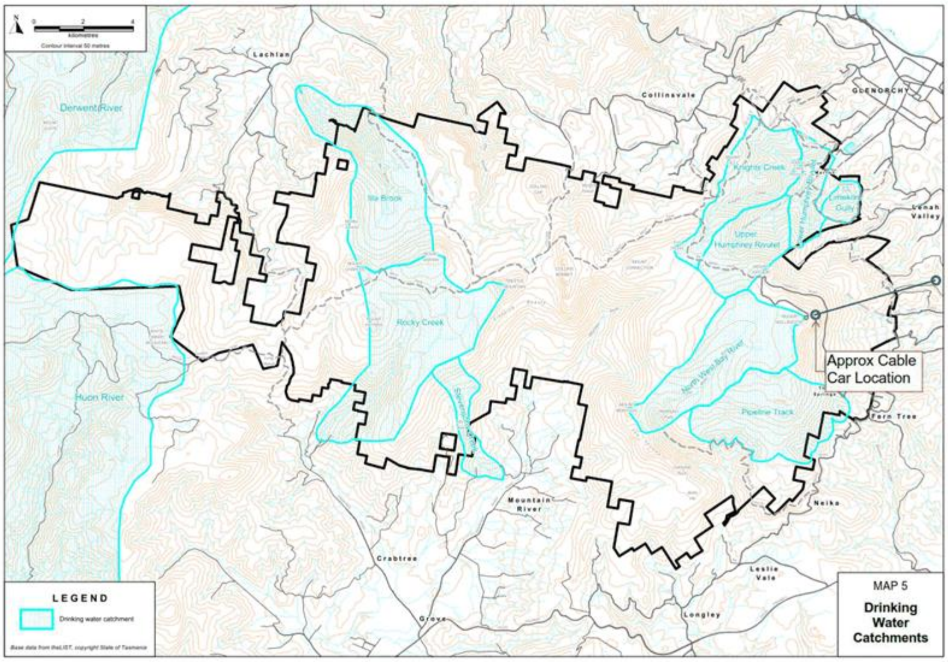


**Figure 5: Drinking Water Catchments as shown in the Wellington Park Management Plan**

## 4.2 Base Terminal

Development within this zone of Wellington Park is to be in accordance with the requirements of the Recreation Zone of the Wellington Park Management Plan, as well as the Hobart Interim Planning Scheme 2015.

### 4.2.1 Sewer

All sewage created at the Pinnacle Centre is to be delivered to the Base Terminal via the cableway tanks. Once at the Base Terminal, tanks will be emptied to the gravity drainage system within the building and will be delivered to a privately owned sewer pump station at the site. All sewerage from the building will also be drained via gravity to this pump station. Once delivered to the private sewer pump station, all waste will be removed from site and delivered to the Taswater reticulated sewer system in McRobies Road.

This design is in accordance with the Wellington Park Management Plan Recreation Zone Issue 3-A3.1 Acceptable Solution as wastewater will be delivered to a reticulated system.

The pump station will lift sewage along the alignment of the new roadway in a private rising main to a privately owned gravity drainage network located within the access road from McRobie's Road.
This drain will extend for the full length of the road before connecting into the existing DN150 Taswater owned sewer main within McRobies Road.

### 4.2.2 Water

Water is to be delivered to the Base Terminal from the existing DN150 Taswater owned water main within McRobies Road.

Due to the elevation level of the Base Terminal (approx. 315 m), no existing Taswater Infrastructure in the area has sufficient elevation head to guarantee a water supply to the site. This has been confirmed from preliminary design discussions held with TasWater on 23/2/18. During these discussions it was confirmed that the water supplies within Cascade Road area are served from the Hobart High Level Reservoir, elevation 255 m.

Accordingly, the installation of a privately owned transfer pump station located adjacent to McRobies Road at the new Access Road junction is proposed. A private lot water connection would deliver water to the transfer pump, with water then pumped to a privately owned reservoir close to the Base Terminal site. Two days of water storage would be required at the reservoir, with sufficient volume above to allow filling as the draw off occurs. Water level and flow will be controlled via a float valve installed within the reservoir. A total volume of 300,000 Litres is proposed, spread across two 150,000 Litre storage tanks. This allows for shutdown maintenance where required.

With a design usage of 100,000 Litres per day, pumps will be required to constantly top up reservoirs. A private lot metered water connection is proposed from the Taswater water main within McRobies Road. The location of the connection is to be adjacent to site access road. The water connection will extend to a minimum 6000 litre break tank, with private pumps delivering water to the Base Terminal connected to the break tank.

Physical break tank sizes will be confirmed during detailed design, but it is suggested that a 2.50 m High x 2.00 m Diameter Tank providing 500 mm above the operational level for fitment of floats and overflow pipework would be suitable to provide the minimum 6000 Litre break tank storage volume required.

From the reservoir, a combined water/fire system will then be pumped to the Base Terminal to a range of tank fill stations, sanitary fixtures and the firefighting system.

#### 4.2.3 Fire Services

Reference should be made to the Fire Engineers and Building Surveyors Reports for Building Classifications for the Base Terminal and the manners in which fire needs will be serviced.

The privately owned water storage reservoir (refer 4.2.2) will also serve as a firefighting solution. A combined domestic/fire pump set is proposed for installation adjacent to the reservoir. This pump set will serve the domestic needs of the building, whilst also maintaining pressure in the fire hydrant system proposed for around the building. A diesel back-up pump set and fire booster assembly will be required as part of this installation.

Fire hydrants are proposed to be located external to the Base Terminal Building, adjacent to the Level 2 main entry and also at the staff entry door at Level 0. These hydrants have sufficient coverage ability to service Level 1 without the need for an internal hydrant system.

#### 4.2.4 Stormwater

Stormwater collected at the site will be delivered to existing natural water courses via a networks of swales and piped systems as required. The exact location of these are to be confirmed during detailed design. In general, overland flows from upstream of the site will be collected via cut-off drains located at existing water courses and hard-piped through the development zone, back to the existing natural water course.

Base Terminal hardstand and roof areas will be collected via new private stormwater infrastructure and delivered to treatment/dispersion swales around the development zone. Refer to Gandy and Roberts Consulting Engineers Civil Drawings for details. This design option is in accordance with the Wellington Park Management Plan Recreation Area Issue 3-A3.1 Acceptable Solution.

In regards to the Hobart Interim Planning Scheme 2015 Part E7.7.1 Stormwater Drainage and Disposal; stormwater from the Base Terminal:

- Acceptable solution A1 cannot be addressed as no gravity stormwater infrastructure is present at the site. As such, disposing of stormwater runoff to existing natural watercourses is proposed and this is to be conducted in accordance with Performance Criteria P1(a).
- As the Base Terminal development and carpark is larger than 600 m² and provides for more than six cars. As such, the development will incorporate water sensitive urban design (WSUD) principles in accordance with Acceptable Solution A2. As shown in Gandy and Roberts Engineers drawing 13.0041 C032, it is proposed that a combination of proprietary treatment system and vegetated swale will be used to treat stormwater. The performance of the stormwater treatment system is to be in accordance with Hobart Interim Planning Scheme Table E7.1 requirements for reductions in Total Suspended Soilds, Total Nitrogen and Total Phosphorous.
- In accordance with Acceptable Solution A3(a), minor stormwater drainage systems at the site are designed to accommodate a 5% AEP storm event. In accordance with Acceptable Solution A3(b), onsite stormwater detention has been included as part of the design. As such, run-off

generated at the Pinnacle Centre will be no greater than pre-existing. Refer to Gandy and Roberts Engineers drawing 13.0041 C032-Rev 2 for details.

- The site stormwater system is not considered a major system so Acceptable Solution A4 is not applicable.

## 4.3 New Access Road from McRobies Road

This section addresses items SW1 of City of Hobart's (HCC) Request for Further Information (RFI) PLN-19-345, dated 3 July 2019 and updated on January 17th 2020.

As part of the proposed cable car development, a new access from McRobies Road in South Hobart to the Base Terminal site is proposed. The approximate alignment and typical sections for the proposed access road are presented in civil design drawings. It is proposed that the road will make use of an existing roundabout located at the entry to the McRobies Road Waste Transfer Station.

### 4.3.1 Stormwater

Stormwater runoff from the uphill side draining towards the new access road is proposed to be collected via a series of cut off drains prior to reaching the roadway, and will be delivered to existing natural water courses via a network of swales and piped systems.

Locations of these are to be confirmed during detailed design to replicate existing water runoff into McRobies Gully. In general, overland flows from upstream of the roadway will be collected via cut-off drains located at existing runoff paths and directed through the development zone back to existing natural depressions.

Runoff generated from the access road is proposed to be collected by a series of inlet pits along the road, with the total length of roadway draining to a single pit not to exceed 90 m. The piped stormwater network will follow the alignment of the access road, with inlet pit catchments dictating the required design capacity of the line.

Runoff from the road catchment will be directed to an underground detention tank located underneath the access road. The tank will be located directly upstream of the round-about intersection where the proposed access road connects to McRobies Road. Outflow from the detention tank will be controlled via an orifice so that discharge from the proposed development site is limited to less than or equal to the pre-development flow rate. Runoff from the access roadway downhill of the detention tank will be discharged directly to the receiving infrastructure without flow rate mitigation, and this volume has been taken into account in the design of the detention volume to ensure that the post-development flow rate to the council infrastructure does not exceed pre-development conditions.

Downstream of the detention, a proprietary stormwater treatment device will be provided to treat stormwater runoff from the site in accordance with Hobart Interim Planning Scheme Table E7.1 requirements for reductions in Total Suspended Solids, Total Nitrogen and Total Phosphorous.

In regards to the Hobart Interim Planning Scheme 2015 Part E7.7.1 Stormwater Drainage and Disposal;

- Acceptable solution A1 will be achieved via stormwater network following the alignment of the access road, with stormwater from the access road disposed of by gravity to the public stormwater infrastructure in McRobies Road.

- A proprietary stormwater treatment system will be installed downstream of the on-site detention, in order to treat the stormwater to achieve quality and quantity targets in accordance with the State Stormwater Strategy 2010, as detailed in Table E7.1, satisfying Performance Criteria P2.
- In accordance with Acceptable Solution A3(a), the minor stormwater drainage systems for the access road will be designed to accommodate a 5% AEP storm event. In accordance with Acceptable Solution A3(b), onsite stormwater detention will be included as part of the design, and stormwater discharge to the public infrastructure will be no greater than current levels.
- The site stormwater system is not considered a major system so Acceptable Solution A4 is not applicable. Local stormwater flow paths will be maintained in separation to the minor drainage system, providing no alteration to the pre-development runoff reporting to downstream catchments.

# 5 Sewage Transport and Management

This section addresses items E1-E3 of City of Hobart's (HCC) Request for Further Information (RFI) PLN-19-345, dated 3 July 2019 and updated on January 17th 2020.

In the first release of this report, assessment and sizing of the private sewer pump station was made in accordance with the Department of Primary Industries, Water and Environments *Sewage Pumping Station Guidelines 1999*. City of Hobart has requested confirmation that the Cable Cars sewer management system and pumping stations will meet the updated Environment Protection Authority (EPA) *Sewage Pumping Station Guidelines October 2019*.

## 5.1 Site Location Sensitivity

Section 4.2 of the updated *Sewage Pumping Station Guidelines 2019* discusses required approvals for sewage pumping stations. Section 4.2.1 details *Significant SPS Developments.* A significant SPS development is one that has:

- *an ultimate design ADWF above 12 L/s and a location sensitivity rating (see section 6.1) of High or*
- *Except for single user SPSs, a receiving water PEV of "pristine or nearly pristine ecosystems" or*
- *Any other mix of characteristics which significantly increases potential for environmental harm.*

The total Average Dry Weather Flow (ADWF) for the both the Pinnacle Centre and Base Terminal for the Cable Car Development is 0.217 L/s (see Section 7).

By definition, the cable car development is not a single user system, so consideration of the Protected Environment Values (PEV's) and receiving waters requires assessment. This has been considered through a risk assessment process in accordance with the *State Policy on Water Quality Management 1997.* Both the Pinnacle Centre and Base Terminal are considered part of the sewage transport and management system for the site and so risk ratings presented are the same for both sites.

| **Cable Car Sewage Transport and Management System Protected Environmental Values Risk Assessment** | |
|---|---|
| **Health Indicators** | |
| Overflow May Reach Habitable Area | YES. Due to the locality of the development, above existing residential and commercial land, there is a risk that overflows could reach habitable area. The risk of this occurring however is low based on management systems employed through the design that lower the risk of any overflows from the system. Overall risk rating: MEDIUM. |
| Overflow May Reach water used for aquaculture. | YES. Due to the locality of the development, above existing water courses that extend to the Derwent River, there is a risk that overflows could reach waterways used for aquaculture. The risk of this occurring however is low based on management systems employed through the design that lower the risk of any overflows from the system. Overall risk rating: MEDIUM. |
| **Protected Environmental Values** | |
| A:Protection of Aquatic Ecosystems | Existing estuaries and ecosystems below the development have been commercialised and developed in many ways. This inclusive of the brewery and waste transfer station downstream, whilst dam and retention basins are noted along the lower estuaries. Much of runoff from residential properties and roadways within the South Hobart area are piped to existing waterways, presenting a continual residual risk of damage to aquatic ecosystems from other pollutants.<br>Despite this, existing water ways and estuaries are of high value.<br>Overall risk rating: HIGH. |
| B: Recreational Water Quality and Aesthetics. | Downstream of the proposed development are a number of parks and recreational zones that are frequently daily by members of the public. Any pump station overflow has the ability to see primary and secondary contact, whilst providing an aesthetically unpleasing environment. Overall risk rating: HIGH. |
| C/D: Raw Water for Drinking Water Supplies | As presented in Section 4.1.4, the development is located outside of raw drinking water catchment areas. Overall risk rating: LOW. |
| E/F: Agricultural and Industrial Water Use and Supply | Downstream of the development there are little to no agricultural land use zones and so it is unlikely water is drawn from any water system for agricultural use. It is further believed that the brewery also do not draw any water from streams below the development. Overall risk rating: LOW. |

Due to the nature of the downstream environment, the default location sensitivity of 'High' has been applied to the sewage management system. The proposed pump station development has therefore been assessed as significant in nature. Recommended minimum overflow controls as presented in Table 6.4 of *Sewage Pumping Station Guidelines October 2019* for highly sensitive sites have been adopted for the sewage management system, these include:

- 8 hours of emergency storage within the Base Terminal wet well.
- Pressurised water supply for rapid clean-up of sewer spillage.
- Pump station will have a stand-by duty pump installed within wet well (2 pump system).
- An audible and visual alarm will be fitted to the station, to be activated at high level, prior to filling of the emergency storage.
- Visual signage with 24-Hour site contact detail to be provided adjacent to the wet well.
- Remote dial out telemetry, contacting multiple site operators to warn of activation of the high level alarm and overflow.
- Overflow structures designed to prevent discharge of solids to the environment and overflows at the Base Terminal SPS directed to the carpark area where kerb and channels will act as a bund, reducing the likelihood of any flows reaching the environment.

- The proposed Base Terminal has a stand-alone electrical supply from authority mains. Along with this, the site also has a grid connected solar system on the building's roof and a battery array which stores regenerated power from the cableway. Despite this and as a further assurance that no sewage overflow or spillage will occur; the Cable Car operator shall have a contract formed between them and an approved pumping contractor for site response in the event of an extended power outage. If this event occurred the contractor will be required to pump the wet-well and deliver sewage to the site's gravity system as required until the pump station is back online.
- A 3-monthly maintenance contract with an approved pumps and equipment supplier shall be formed by the Cable Car operators as to confirm adequate operation of the system and reduce the likelihood of breakdown/system failure.

## 5.2 Odour

### 5.2.1 Buffer Zone

The measured distance between the total sewage management system is much greater than 30 m at both the Pinnacle Centre and Base Terminal. The existing observation shelter at the Pinnacle is the closest public nature building across both sites, this located approximately 35 m from the proposed building and 70 m from the proposed sewage holding tank. As such, the odour risk under this criteria is LOW.

### 5.2.2 Topography

Given the low hazard rating of the buffer zone, vertical topography is also deemed as LOW hazard. The level height difference between top of pumping station venting system and other residences/public buildings or business floors is greater than 5 m for much of the sewage management system. The closest risk is that of the existing observation shelter, located approximately 26 m higher than the sewage holding tank at the Pinnacle Centre. Vents from the drainage system will extend to the highest level of the building and exhaust to atmosphere, these located with approximately 10 m of vertical separation to the floor the existing observation shelter.

### 5.2.3 Residence Times

Due to the nature in which sewage will be managed at the Pinnacle system, sewage may reside in the system for periods of more than 5 hours. As such, a HIGH odour classification has been confirmed for this site in accordance with Table 7.1 of the *Sewage Pumping Station Guidelines*. At the base station, residence times are much shorter, with sewage remaining in system for less than 2 hours. Despite this, the same level of odour treatment will be applied at both sites.

### 5.2.4 Trade Waste

Food and beverage will be sold at the Pinnacle Centre. Trade waste is to be treated at source effectively eliminating odour risks. Risk Rating: LOW.

### 5.2.5 Overall Risk Rating

Given the high residence time of sewage at the Pinnacle Centre, the overall risk rating to the site is deemed as HIGH. To reduce the risk of odour from both the Pinnacle Centre sewage storage tank and the Base Terminal wet well, at source treatment has been considered.

Vent stacks with carbon filter units will be connected to the storage tank/pump station outlet vent. These vent filters are commonly used by sewer utility providers as an effective option to significantly reduce odour from sewage pump station wet wells and manholes located within urban environments.

The Cable Car operator will be required to replace the filter cartridge annually to maintain a high level of odour treatment, this work to be completed as part of the pump station maintenance contract.

In addition to this, it is proposed that both the storage tank and wet well shall be fitted with an automatic well washer unit. The well washer units act to reduce odour generation and septicity inside the storage tanks; whilst also reduce corrosion and the number of confined space entries required for maintenance.

This odour treatment solution, is common with a MEDIUM risk category in accordance Table 7.2 of the *Sewage Pumping Station Guidelines*. The table published in the guidelines makes reference to HIGH hazard systems being; larger pump stations, environments with high risk of septicity and problematic trade waste contributions. Given the proposed development is not any of these cases and with the inclusions detailed above, the overall risk rating for the sewage management system shall be reduced to MEDIUM.

Further supporting this assessment is the fact the predominant wind directions on the mountain are from the West and North-West (see https://www.wellingtonpark.org.au/weather/), meaning vents will be directing flumes to the East and South East, away from the existing public car park and amenities atop the Pinnacle.

#### 5.2.6 Further Odour Management Operational Considerations.

As detailed above, operational management of the sewage system is key to achieving positive outcomes and managing potential problems generated by the system. Such operational tasks shall include:

- A maintenance contract between pumping contractor and Cable Car operator, providing for 24 hour response to spillage or system failure.
- A maintenance contract providing for quarterly checks and maintenance of the full sewage system, including changing filter cartridges annually or as required.
- Annual structural engineers check of sewage transport tank.
- Odour complaints register in which complaints are clearly monitored, recorded and acted upon as required.

## 5.3 Sewage Transport

Management of sewer flows and moving sewage from the Pinnacle Centre to the base station is a two stage process:

1. Pumping waste from the storage tank at the Pinnacle Centre, transportation of sewage from the mountain via the tramway and delivering sewage to the Base Station sewage pump station.
2. Delivery of sewage from the Base Terminals to the Taswater reticulated sewer system.

The two processes and design for each are independent and described in detail in sections 5.3.1 and 5.3.2 below:

### 5.3.1 Transportation of Sewage from the Pinnacle Centre to the Base Terminal

With an upper maximum sewage generation of 100,000 Litres at the Pinnacle Centre, sewage may be required to be transported throughout the day. It is proposed that under standard visitor number days that this will be managed between 4 and 6pm.

From the Pinnacle Centre sewage storage tank, variable speed pumps with a maximum flow rate of 10 L/s will fill the transportation tank. At the maximum flow rate, tank filling would take approximately eight minutes once pumping has commenced. Allowing time to make pump connections and disconnections, 15 minutes has been determined as an appropriate operational timeframe. Cable Car speeds can be increased to a 12 minute run time during the sewage movements. As such, the process of moving sewage from the Pinnacle Centre to the Base Terminal will require approximately 30 minutes.

At the Base Terminal, whilst the upper sewage tank is being filled; sewage is being emptied from the transport tanks into the base terminal pumped system which ultimately delivers sewage to the Taswater sewer network (refer 5.3.2). The same pumping rates and process has been considered for the emptying process.

The maximum volume of sewage is to be limited to 5,000 Litres, this is based on the maximum 6,400 kg load limit that the cableway can transport. With the concept tank and frame design weighing approximately 1,000 kg and safety factor allowance; 5000 Litres is the maximum volume. The density of sewage (721 kg/m$^3$) has been ignored, as pure water (1000 kg/m$^3$) has a higher density and so is the worst case scenario.

With the two-tank sewage system operating, there is the ability to transport 10,000 Litres in 30 minutes, equating to 40,000 Litres in the 2 hour period from 4pm to 6pm. This transport volume can cater for a visitor number of 4,000 people during a day period. As noted in Section 2 of this report, the design volume of sewage generated does not cater for water saving fixtures, which the Cable Car operator has committed to installing at the site.

Should the design maximum of 100,000 Litres be reached, this would require additional sewage movements to be completed for a longer period of time, under the same design principle as detailed above. Under this scenario, all sewage could be removed from the Pinnacle Centre in 5 hours of running, which could be completed as required throughout the day. This is to be managed by the Cable Car operator on these peak visitor days, with the sewage transport runs completed as required, independent of visitors on board the system. The empty sewage cart can be connected to the tram and transported to the Pinnacle Centre whilst members of the public board the tram; whilst the loaded sewage cart is transported to the Base Terminal, with no visitors aboard the tram. Both can then be disconnected and emptied/filled as required.

The Cable Car operator is able to effectively manage additional sewage runs through the light indicator system at the Pinnacle Centre. This system uses lighting signals to inform visitors if there is space available on the next tram returning to the Base Station. When a sewage run is being performed, the operators will simply set the signals to show that the next tram is full, alerting visitors to wait for the next tram (in 15 minutes time).

### 5.3.2 Delivery of sewage to the Taswater reticulated system.

All sewage being transported from the mountain, as well as that created from amenities in the Base Terminal will be piped to a sewage pump station located at the Base Terminal. During the main sewage transport period off the mountain (between 4pm and 6pm each night), 40,000 Litres is delivered to the sewage pumping station. If an additional sewage run was required directly after this period, it would arrive 30 minutes later, providing an effective 2.5 hour period in which pumps would be pumping sewage from the wet well. Over the 2.5 hour period, this equates to an average flow rate of 4.44 L/s.

Pumps will be sized to this flow rate and will pump sewage along the proposed access road to a suitable discharge point allowing for gravity drainage. This gravity drainage will then extend the length of the access road, where a new private lot sewer connection is proposed at McRobies Road.

Sizing of the wet-well for the sewage pump station at the Base Terminal will be confirmed during detailed building design. As detailed in Section 5.1 above, the system will be designed to cater for 8 hours of emergency storage should pump failure occur.

### 5.3.3 Spill Management

Transfer of sewage to and from the cable car transfer tanks will be managed by the Cable Car operators. Transfer tanks are proposed to have an approximate 5,000 Litre volume and so bunding/floor recesses will be required as to contain this total volume, should a spill or breakage occur within a pipeline during transfer at both the Pinnacle Centre and also at the Base Terminal.

Bunds shall have floors graded to a collection pit, allowing for wash down and clean-up should a spillage occur. Based on the floor areas of the machine room/loading bays at both the Pinnacle Centre and Base Terminal, a 50 mm high bund/floor recess will provide an adequate storage volume for tank spillage.

All pump equipment and connections to transfer tanks will be made via camlock sealed fittings and sewage pumps' shall be controlled to only operate when connections are made.

# 6 References

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# 7 Sewer and Water Flows

Equivalent Tenements (ET) loadings have been calculated for each of the Cable Car sites. Refer to Figure 6 below for calculations.

| 13.0041 Mt Wellington Cable Car | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TasWater ET's | | |
| **Sewer Fixture Unit Loadings** | **Basins** | **Urinal** | **Trough** | **WC** | **Sink** | **Shower** | **Codes on Level** | **ET Water** | **ET Sewer** |
| Pinnacle Centre Basement | 0 | 0 | 0 | 0 | 0 | 0 | - | 0.00 | 0.00 |
| Pinnacle Centre Level 0 | 9 | 4 | 0 | 8 | 4 | 0 | CF09/EF04/BE07/MP01 | 7.45 | 11.51 |
| Pinnacle Centre Level 1 | 6 | 1 | 0 | 6 | 1 | 2 | BE04/CF09 | 3.16 | 4.74 |
| Pinnacle Centre Level 2 | 8 | 5 | 1 | 10 | 2 | 0 | MP01/CF09/EF04 | 6.81 | 10.47 |
| Pinnacle Centre Roof | 0 | 0 | 0 | 0 | 0 | 0 | - | 0.00 | 0.00 |
| Base Terminal Level 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 0.00 | 0.00 |
| Base Terminal Level 1 | 3 | 1 | 0 | 4 | 2 | 0 | BE04/CF09 | 2.57 | 3.85 |
| Base Terminal Level 2 and Platform | 6 | 0 | 0 | 6 | 0 | 0 | CF09 | 2.40 | 3.60 |
| Base Terminal Roof | 0 | 0 | 0 | 0 | 0 | 0 | - | 0.00 | 0.00 |
| **Totals** | 32 | 11 | 1 | 34 | 9 | 2 | | 22.38 | 34.17 |

| | | | | |
|---|---|---|---|---|
| **Fixture Units** | | | | |
| **Total Fixture Units** | 89 | | | |
| **Fixture Unit Flow** | 3.6 | L/s | Extrapolated from AS3500.2:2015 Table 6.2 (B) | |
| | 548 | L/ET/D | TW - WSA 04-2005 V2.1 supplement Table 1.1 | |
| **ADWF - Average Dry Weather Flow** | 18726.3 | L/D | 0.217 | L/s |
| **d' From Taswater Supplement Figure 1.1** | 3.9 | | | |
| **PDWF - Peak Dry Weather Flow** | 73032.4 | L/D | 0.845 | L/s |

**Water Fixture Unit Loadings** AS3500.1:2015 Table 3.2.1

| Fixture | ading Units | | Fixture | Number | Sewer | Hot | Cold |
|---|---|---|---|---|---|---|---|
| | Hot | Cold | Units | | | | |
| Basin | 1 | 1 | 1 | 32 | 32 | 32 | 32 |
| Bath | 8 | 8 | 4 | 11 | 44 | 88 | 88 |
| Cleaners Sink | 3 | 3 | 1 | | 0 | 0 | 0 |
| Cistern - Urinal | | 2 | 1 | | 0 | 0 | 0 |
| Cistern - WC | | 2 | 4 | 34 | 136 | 0 | 68 |
| Drinking Fountain | | 0.5 | 1 | | 0 | 0 | 0 |
| Flushometer | | 2 | 4 | | 0 | 0 | 0 |
| Hose Taps | | 8 | | | 0 | 0 | 0 |
| Kitchen Sink | 3 | 3 | 3 | 9 | 27 | 27 | 27 |
| Laundry Tub | 3 | 3 | 5 | | 0 | 0 | 0 |
| Shower | 3 | 4 | 2 | 2 | 4 | 6 | 8 |
| Washing Machine | 3 | 3 | 5 | 1 | 5 | 3 | 3 |
| EW/SS | | 4 | 2 | | 0 | 0 | 0 |
| FHR | | 49 | | | 0 | 0 | 0 |
| | | | TOTALS | 89 | 248 | 156 | 226 |
| | | | | Pipe Diameter | | 40 | 50 |
| | | | | Flow Rate L/sec | | 1.42 | 1.8 |

| | | | | | |
|---|---|---|---|---|---|
| **Water Demands** | | | | | |
| **Domestic Flow** | 1.8 | L/s | | 800kPa | |
| **Average Day Demand** | 685 | L/ET/D | | TW WSA03-2011-3.1 MRWA V2.0 App 'B' | |
| **Peak day demand (general)** | 1541 | L/ET/D | | 2.25 | x Average Day |
| **ET's** | 22.4 | | | | |
| **Total** | 34490.1 | L/D | | | |
| **Peak day flow** | 0.3992 | L/s | | | |
| **Fire Hydrant Flow** | 20 | L/s | 800kPa | TBC By Fire Engineer | |
| **Fire Sprinkler Flow** | 25 | L/s | 800kPa | TBC By Fire Engineer | |

| **Code Description** | **Code** | **Water** | **Sewer** | **Unit** |
|---|---|---|---|---|
| Pub/bar | EF02 | 0.03 | 0.048 | sqm |
| Resturant Café | MP01 | 0.005 | 0.008 | sqm |
| Single Retail Shop | BE01 | 0.002 | 0.003 | sqm |
| Office | BE04 | 0.004 | 0.006 | sqm |
| Medical Centre | BE07 | 0.4 | 0.6 | room |
| Confrence Centre | EF04 | 0.009 | 0.014 | visitor |
| Public Amenities Per WC | CF09 | 0.4 | 0.6 | |

**Figure 6: Equivalent Tenement Calculations**

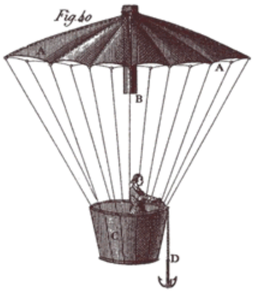
Fig 40
A
A
B
C
D

2nd Nov 2018
MWCC
C/O Ireneinc Planning

**Re: MWCC Development Application Construction Methodology**

Dear Sir/Madam

The following is intended to provide an overview of the construction methodologies proposed for the MWCC Development Application.

The Vos Group of companies have an extensive record of accomplishment in the delivery of relevant and quality developments in Tasmania. Past property developments have included Henry Jones Art Hotel - Hobart, Evans St Apartments – Hobart, Grindelwald Resort – Launceston, Avila Units – Prospect Vale and Grindelwald land subdivision. Current Vos developments include the Hobart waterfront Mac 01 hotel and retail project, Claremont Golf Course subdivision and units, Avila Units Launceston and Boat Harbour Resort. Further to this development experience Vos have undertaken many similar and relevant environmentally sensitive projects in the past such as 3 Capes Huts in Tasman National Park, Maydena Eagles Eyrie at Abbots peak at 1100m elevation and at Mt Mawson Ski Field.

In regard to the MWCC project the following construction methodology for the four broad components:

- Pinnacle
- Base Station
- Road access.
- Tower sites

have some common elements that we will implement if a Development Application (DA) and Building Permit (BP) is achieved.

The four components common methodologies include:

- secure site made safe for the public and workers. A full Project Management Plan incorporating safety and environmental management plan to be developed in consultation with relevant authorities and our client
- environmental protection of flora and fauna assets identified via the DA process and under our independently quality assured system to the following standards

LAUNCESTON 03 6398 8300 | 3 HUDSON FYSH DR, WESTERN JUNCTION TAS 7212
HOBART 03 6229 0300 | 70 BROWNS RD, KINGSTON TAS 7050 | PO BOX 146 KINGSTON TAS 7051
DEVONPORT 03 6424 4444 | 40 APPLEDORE ST, DEVONPORT TAS 7310 | PO BOX 168 DEVONPORT TAS 7310

ADMIN@VOSGROUP.COM | VOSGROUP.COM | VOS CONSTRUCTION & JOINERY P/L ABN 99 009 558 258 | VOS ENTERPRISES P/L ABN 43 921 408 590

MAKING A POSITIVE DIFFERENCE

- Traffic Management as per council and WST guidelines.
- Early investigation work in regard to Geotech work will require helicopter transfer (except at base station) of a small drilling rig, to be landed on platforms built temporarily over and above the rocky terrain and fauna. Water and slurry recycling systems used regularly by Hydro and Taswater at Dam sites will be used as needed at each site depending on ground conditions.

The Pinnacle site construction methodology on top of the above standard items include:

- Implement a similar process to that undertaken at 3 Capes and Maydena to touch the ground outside of the building zone as little as possible.
- At the pinnacle this will include a ramp built from the current road/path to the existing observation shelter to the site to deliver material into and out of the site. This ramp will be of steel frame and timber sleepers or similar and be temporary in nature. This will allow us to negate the need to build a road into the site and therefore avoiding degradation of the site outside of the building line and where the site has been previously untouched. We will as part of this access move the pedestrian access as per plans provided.
- The building structure is predominantly concrete, both in situ poured and precast. We will endeavour to ensure precast components are small enough to be delivered via our ramp system and a small tracked crane that can maintain its presence within the building site.
- Other components of the building are lighter and smaller than the structure and include, cladding, framing, fitout materials and services plant.
- The excavation on the site is to be minimised and majority reused on site to diminish what has to be removed via the ramp and roads.

The Base Station and Road

- The road is to built to LGAT Rural Road design requirements S4 level and all sediment control, flora and fauna protection methods will be utilised as per those standards.
- The base station lower levels are of similar construction to the pinnacle ie precast panel walls and poured in situ slabs. The upper level structure is a steel frame with light weight cladding also installed by mobile cranes and scissor lifts or similar. However the site is much more accessible by larger cranes and trucks and as such will allow for normal sized components to be delivered via road directly adjacent to site. Mobile cranes will be utilised to erect the structure,
- site sheds will be installed on site at the base station to house site management.
- The cable way infrastructure will be installed via mobile cranes.

The Tower Sites

- The tower sites being remote from any roads will require excavation via small to medium excavator mostly helicoptered into site.
- Spoil will need to be removed from site via helicopter if it is not re-used.
- Concrete and reinforcement for footings for towers will need to be pumped from the base station for the two lower sites and for the upper tower site pumped from the road location at the pinnacle.
- The tower structures would be helicoptered in small to medium components.
- The Cableway would be installed via helicopter.

*Figure 1 - Typical Tower Footprint*

*Figure 2 - Tower components installed by helicopter*

*Figure 3 - Towers blend with forest regrowth after construction*

All Vos Group projects are undertaken utilising the best available resources and with a commitment to the highest level of quality, safety and environmental management. We take great pride in using local architects, consultants and subcontractors for all our projects.

If there are any question regarding the above please contact us.

Yours Sincerely,

Mark Millhouse

***Construction Manager Southern Tasmania***

Phone: (03) 6229 0350 or 0407 005 227
Email: mmillhouse@vosgroup.com

# Aboriginal Heritage Assessment Report

# of the proposed

# kunanyi/Mount Wellington Cable Car Footprint

Aboriginal Heritage Assessment Report
By Dr Nic Grguric (Frontier Heritage Consulting Pty Ltd)
for the Mount Wellington Cableway Company Pty Ltd
GPO Box 409, Hobart TAS 7001
Australia
Date of report: 14/05/2021
Version: 1.0

| Quality Assurance Check List | |
|---|---|
| Version | 1.0 |
| Reason for review | |
| Status | |
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| Reviewed and Recommended by | |
| Authorised by | |
| Issued date | |

| Distribution Record | | | |
|---|---|---|---|
| Name | Organisation | Contact Information | Date Distributed |
| | | | |
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Cover image: Summit of kunanyi/Mt Wellington looking east.

# Executive Summary

## Project Background

The Mount Wellington Cableway Company Pty Ltd (MWCC) engaged consulting archaeologist Dr Nic Grguric, of Frontier Heritage Consulting Pty Ltd (FHC), to carry out an archaeological field survey of the proposed development areas for a cable car to the summit of kunanyi/Mt Wellington. The aim of the project was to demonstrate that:

(a) The development does not involve an Aboriginal heritage site as defined under the Aboriginal Heritage Act 1975; or
(b) That impacts on any Aboriginal heritage sites have been reasonably avoided, mitigated or remedied.

This was achieved by means of:

- A desktop study of the location of previously registered Aboriginal heritage sites in the vicinity of the proposed works; and
- An archaeological field survey of the proposed construction footprint for the Mount Wellington Cableway.

The desktop study was carried out by Dr Nic Grguric (FHC). The archaeological field survey was carried out by consulting archaeologist Dr Nic Grguric and archaeological assistant Summer Maskey on the 22nd and 23rd April 2021.

## Desktop Results

An Aboriginal heritage property search was previously undertaken in 2018 during the project design phase in order to identify whether any Aboriginal heritage sites were within or in the immediate vicinity of the proposed development areas. The results of this search identified 14 Aboriginal heritage sites located between 300m and 6km from the development areas. Owing to their distance from the development areas, none of these are believed to be at risk of being disturbed by the development. Additionally, FHC sought a new search in 2021 to check for any updates to the heritage register. The results of both desktop studies indicated that the potential for Aboriginal heritage sites to occur within the development areas was nil to very low. This was due to the fact that the landforms in which the development areas were located were not of the type preferred by Aboriginal people for occupation, being very steep, and removed from reliable water sources and sources of knappable stone for tool making. Furthermore, the known distribution of Aboriginal archaeological sites on the ridges and slopes of kunanyi/Mt Wellington was extremely sparse.

## Field Survey Results

No Aboriginal heritage was found during the field survey. The field survey has demonstrated that no aboriginal heritage sites occur within the development footprint.

## Impact Assessment

The field survey has established that no Aboriginal heritage will be impacted by the development.

## Management Recommendations

It is recommended that providing the development takes place within the surveyed areas, no further management is required. It is noted that Aboriginal Heritage Tasmania have recommended MWCC follow the Unanticipated Discovery Plan procedures for the construction phase.

However, if the development footprint is substantially altered, it is recommended that a new field survey be carried out in any additional areas in order to assess whether or not they contain Aboriginal heritage.

## Contents

## Tables



## Figures

## Introduction

The project was commissioned by the Mount Wellington Cableway Company Pty Ltd (MWCC), and was required as part of a development application by the MWCC to construct a cable car providing access to the kunanyi/Mt Wellington summit. As part of this application, the Hobart City Council (HCC) required MWCC to demonstrate via:

1. Evidence from a suitably qualified person that either:

    (a) The development does not involve an Aboriginal heritage site as defined under the Aboriginal Heritage Act 1975; or

    (b) Demonstrates that impacts on any Aboriginal heritage sites have been reasonably avoided, mitigated or remedied having regard to:

        i) The history of the surrounding area and known surveys of other nearby areas and any necessary prescriptions that set out mitigation or remediation measures; or

        ii) An on-site survey.

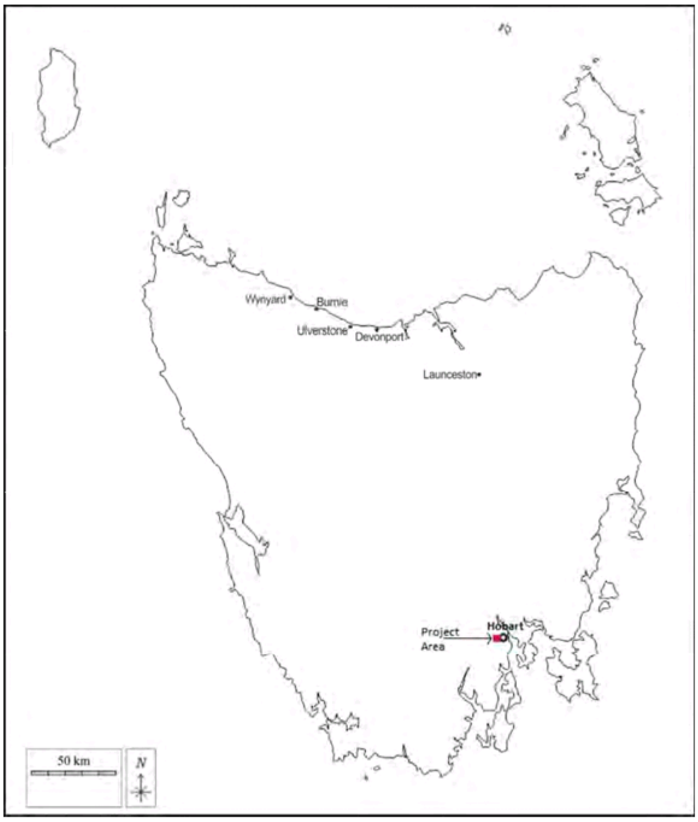


**Figure 1: Map of Tasmania showing the location of the project area.**

The project area was located approximately 2.7km WSW of Hobart, Tasmania (Figure 1). The project can be divided into six development areas that were subjected to the archaeological field survey, these being (from east to west):

- The access road
- The base station
- Towers 1 and 2
- Scaffold
- Tower 3
- The Pinnacle

The access road survey area was approximately 2500m long by 25m wide. It commenced at McRobies Rd and ran along the northern flank of a wooded spur within McRobies Gully Park, before intersecting with the northern end of the base station area (Figure 2).

The base station survey area was located close to the eastern edge of Wellington Park reserve, with the majority being within an artificial clearing (Figure 2). It measured 156m E-W by 75m N-S, and covered an area of 8053m2.

The proposed footprint of towers 1 and 2 were located directly west of the base station area, on a steep rocky hill (Figure 2). The tower 1 area was 137m west of the base station area, and the tower 2 area was 268m west of the base station area. Both tower locations were 22m x 22m squares. An east-west running 308m long by 15m wide tower access route intersected the two tower areas.

The scaffold location was 40m to the west of Pinnacle Road, within Wellington Park. It was located on the very steep rocky eastern flank of kunanyi/Mt Wellington, and was accessed via the Northern Buttress Track (Figure 3). The scaffold location itself was an area of 12m diameter.

The tower 3 area was located 146m to the east of and below the current pinnacle observation shelter (Figure 3). It covered a circular area 12m diameter, and was accessed via a rock climbing track.

The pinnacle development area consisted of a network of boardwalks and a building footprint (Figure 3). The building footprint covered an area of approximately 3215m2. The pinnacle survey area was accessed on foot via the public car park on the summit.

The aim of the project was to establish whether any Aboriginal heritage sites were located within the proposed development areas, and therefore were at risk of being disturbed by the construction of the Mount Wellington Cableway.

The field survey took place on the 22nd and 23rd April 2021. The survey was carried out by consulting archaeologist Dr Nic Grguric and archaeological assistant Summer Maskey. MWCC personnel involved with the project were Christian Rainey and Adrian Bold.

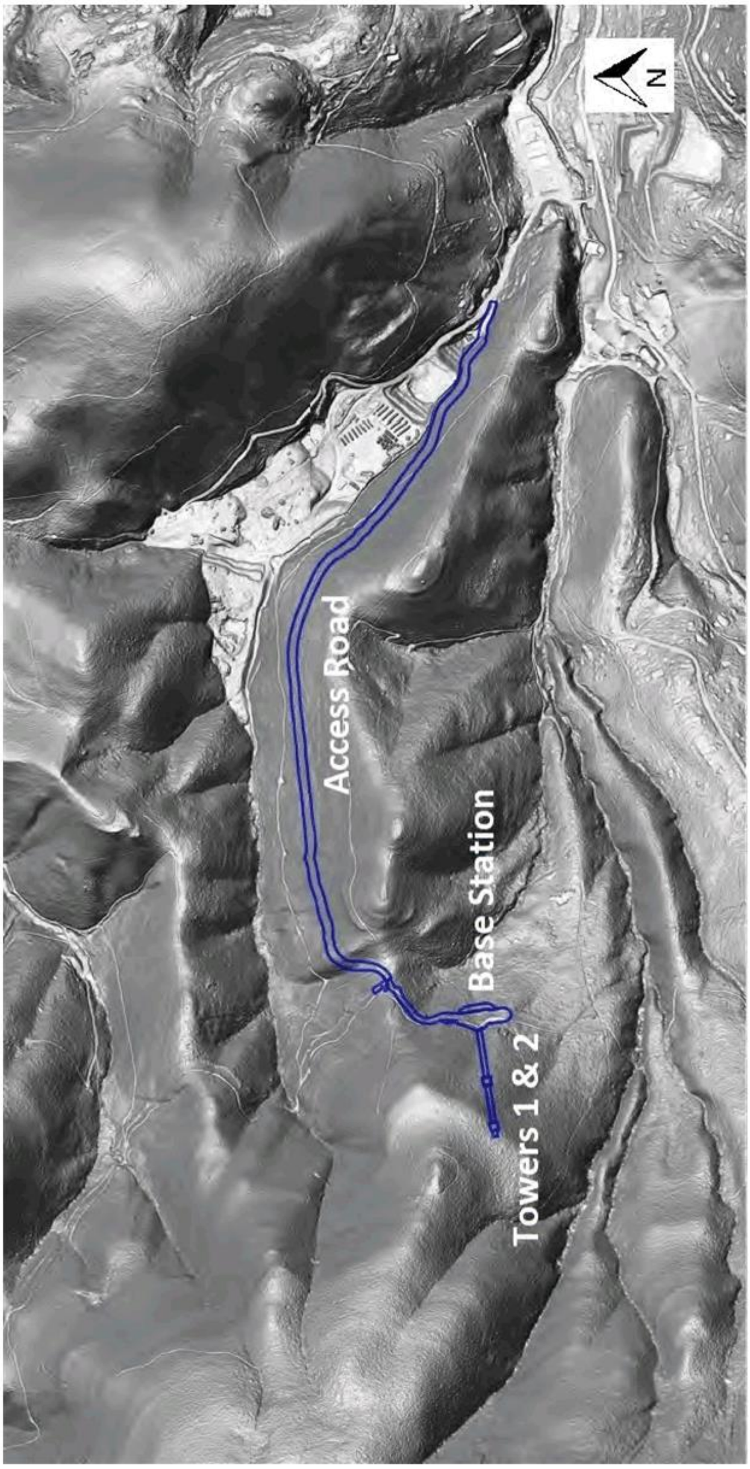


Figure 2: The Access road, base station and towers 1 & 2 survey areas showing the nature of the terrain on which they were situated (LISTmap 2021).

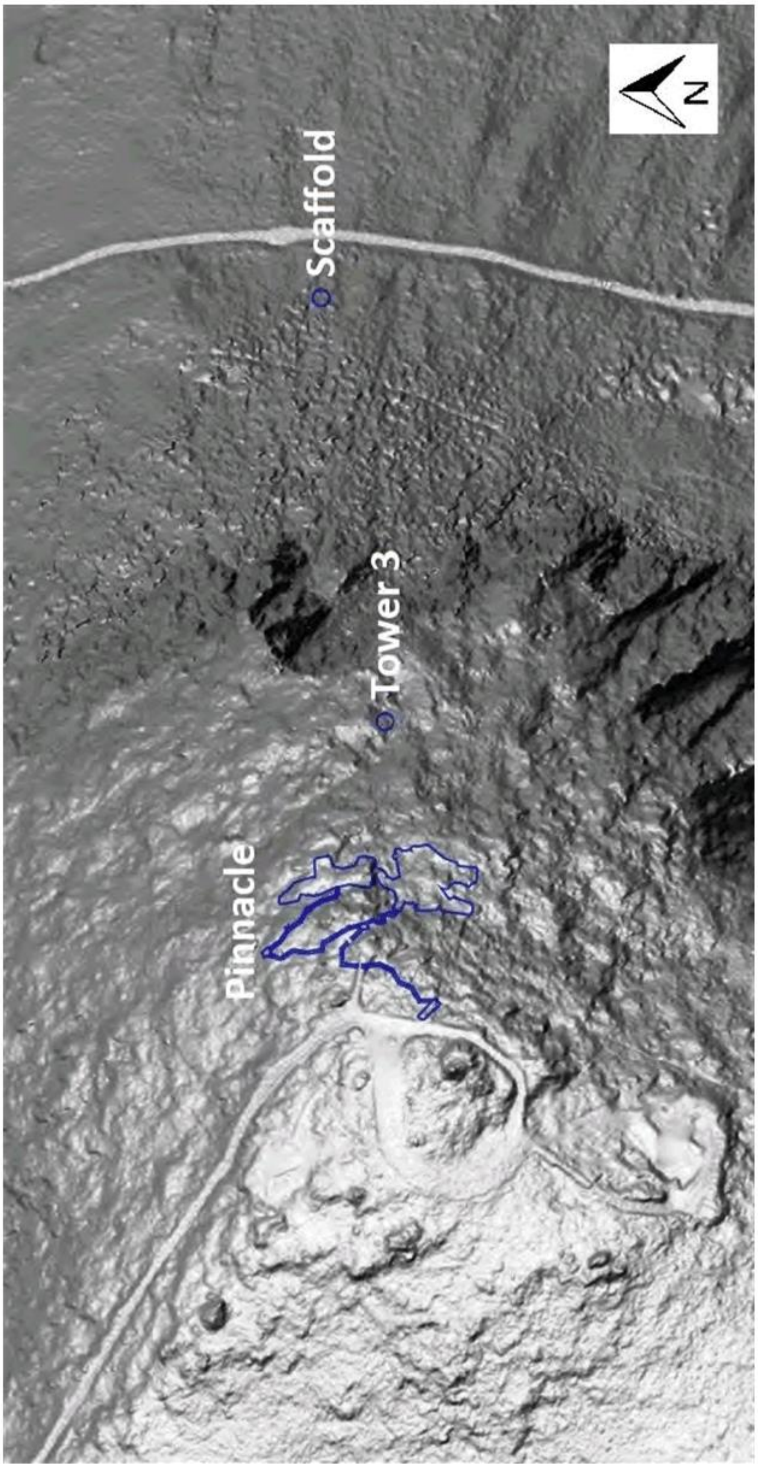


Figure 3: Scaffold, tower 3 and pinnacle survey areas showing the nature of the terrain on which they were situated (LISTmap 2021).

## Project Activity Description

The project entails the development of an aerial cableway and associated visitor facilities within Wellington Park, with the aim of providing sustainable, inclusive and reliable access for all ages and abilities to appreciate the environment and scenic beauty from the summit of the kunanyi/Mt Wellington.

The proposal has been designed to blend naturally with its surrounds and minimise footprint. It includes the development of day-use public amenities, interpretation and hospitality facilities at the pinnacle; three towers to support the cableway, the development of a base station, carpark and entry road on the Main Fire Trail. Some level of ground disturbance and/or excavation will occur at each site. Operationally, the project activity introduces on-site staff to improve waste management, first aid, education and interpretation to improve cultural and environmental awareness.

As recommended in the Wellington Park Management Plan, the proposal will consolidate infrastructure in the pinnacle zone where plausible such as the removal of the non-compliant boardwalks and partial removal of the existing observation shelter. This will aid to restore the natural skyline of the mountain.

## Background Information

### Predictive Statement

During the Late Pleistocene period in Tasmania (ca 40,000-10,000 years ago), the evidence indicates that Aboriginal people heavily concentrated their activities in fertile, sheltered grassland pockets in river valleys in the island's south (Jones et al. 2019:2571). A recent study by Jones et at. (2019) which used a combination of environmental data and archaeological site data to create a model of Aboriginal 'habitat suitability' for the Holocene period (ca10,000BP to contact) indicated that the highest areas of suitability were concentrated around the coast, and along several major river valleys (including the Derwent). Conversely, the areas of lowest suitability included mountain ridges and high alpine plateaus (Jones et al. 2019:2576). The most preferred vegetation habitats were eucalypt woodlands. Heathlands, tussock grasslands, low closed forests/shrublands and shrubby eucalypt forests were also favoured, although to a lesser degree. Rainforests and *Leptospermum* forests on the other hand, were not favoured habitats (Jones et al. 2019:2577). On a broader landscape level, the model indicated that the probability for the presence of occupation decreases with increasing distance from coast, elevation, slope and topographic roughness (Jones et al. 2019:2578).

The terrain in which the development is planned to take place consists of densely forested, steep to very steep terrain which is very difficult to traverse on foot, some of it is so steep and thickly wooded that individuals must climb rather than walk to access it. No watercourses occur within the survey areas, nor do any outcrops or deposits of highly siliceous stone of the types suitable for knapped stone tool manufacture occur in the vicinity of the survey areas. Based on the above factors, it was predicted that the types of landforms and surface geology in which the development areas are located were highly unlikely to contain Aboriginal heritage sites.

Although a wide range of Aboriginal site types have been recorded in forested areas at a national level, including rockshelter occupation and art sites, quarries, axe grinding grooves, scarred and carved trees, stone arrangements, ceremonial grounds, rock engravings, burials and artefact scatters, site types other than artefact scatters are generally extremely rare in forested areas (Lomax 1998:10).

Site types such as burial grounds, scarred trees and ceremonial grounds are generally located in those areas which were the primary focus of Aboriginal exploitation, that is productive riverine areas and coastal and estuarine resource areas, rather than steep and rocky hills, ridges and mountains, as found in the study area. Ceremonial and burial grounds in particular are often associated with riverine landforms rather than forested broken terrain (Lomax 1998:10).

The occurrence of rockshelter occupation, art sites and axe grinding grooves is in a large part determined by the presence of suitable rock outcrops or shelters for occupation (Lomax 1998:10), none of which occur within the survey areas.

In hilly/mountainous terrain, stone quarrying sites often occur where sources of highly siliceous stone, suitable for knapping, are present in the form of outcrops or scree deposits. Such deposits are not present within the development areas, where the surface geology is overwhelmingly composed of coarse grained dolerite and soft sandstone and mudstone, which is unsuitable for knapped tool manufacture.

Although artefact scatters (i.e. camp sites) do occur in forested areas, they generally do so where other favourable environmental factors are present. Such factors can be reasonably flat or level ground, a nearby watercourse or water hole, a nearby rockshelter, or a source of knappable stone is to hand. None of these factors are present within the survey areas. Similarly, scarred trees (used to make implements) are usually found in conjunction with more habitable landforms such as river flats and artefact scatters, rather than difficult to access locations such as steep ridges. Additionally, the repeated burning events that have occurred on kunanyi/Mt Wellington make it unlikely that many trees that were mature enough to be scarred pre-contact have survived to the present.

Due to the very low potential for the landforms on which the development areas are located to have Aboriginal heritage sites, no potential areas of sensitivity (PAS) were identified.

## Environment

kunanyi/Mt Wellington, a dominant and spectacular natural landscape feature, and its associated range provide a forested backdrop to Hobart and parts of the Huon and Derwent Valleys. The Wellington Range, which is approximately 25km long, is relatively flat topped, but slopes gradually towards the west. The vegetation of the Wellington Range is diverse, due largely to differences in altitude and rainfall. There are two major vegetation formations on the Range: Eucalyptus forest, generally below 800m, but stunted above 800m, and an austral-montane formation on the summits of the range on well drained but shallow soils, with swamps on poorly drained areas.

Early European observers were impressed and awe struck by the sheer size and majesty of the trees on kunanyi/Mt Wellington. At the time of fires in the 1930's and 60's some few surviving remnants of these trees might still have existed. It is possible that the extent of eucalypts seen on kunanyi/Mt

Wellington today owes more to the post-colonial burning of the mountain than to fires by Aboriginal people. The sclerophylly seen today could result from a successional pathway which allows rainforest to 'drift' towards sclerophylly after a fire, providing a suitable seed source exists (Thomas 1991:71).

kunanyi/Mt Wellington is capped by a Jurassic dolerite sill approximately 500m in depth, overlying a band of Triassic sandstones, averaging 275m in thickness. The most striking geological feature of the area is the occurrence of dolerite boulder fields, talus slopes and rock columns, particularly toward the higher, eastern part of the Range. In places, the edges of the dolerite sill have weathered to form columns. This columnar jointing is well illustrated by the 'Organ Pipes' immediately below the summit of kunanyi/Mt Wellington. The eastern portion of the survey area consists of fossiliferous sandstones and mudstones present on the foothills. These sedimentary deposits formed during the permian period (around 230-280 million years ago). Triassic sandstones are also present in the area at heights of 600m and above.

## Fauna

Wellington Park is home to a wide range of endemic species. The range of altitude, vegetation and landforms across Wellington Park influences faunal diversity. Consequently, the Park is species rich, with many significant communities and threatened species (Wellington Park Trust 2010-2020). Many of these would have served as food sources for Aboriginal people.

Wellington Park is home for the long–nose potoroo, pademelon, bettong, southern brown and eastern barred bandicoots, brush-tail, ring-tail, pygmy and eastern pygmy possums, eastern quoll, platypus and echidna, swamp rat, long-tailed mouse, dusky antechinus and various species of bats. In damp places in and around the Park reside the Tasmanian and brown froglet, brown tree frog, southern toadlet, bull frogs, spotted grass frogs and the endangered green and gold frog. Reptiles found in the Park include blue–tongued lizards, mountain dragons, a variety of skinks, and all three of Tasmania's snakes – the tiger, copperhead and white–lipped snake. Owing to the diversity in habitats found within Wellington Park, a large proportion of Tasmanian bird life is found within it. A total of 67 bird species have been identified within Wellington Park. A number European-introduced species are found in Wellington Park today including house mice, black rats, rabbits, blackbirds, goldfinches, sparrows, feral cats, goats and bumble bees. These species have a detrimental effect on native flora and fauna, and the integrity of natural systems (Wellington Park Trust 2010-2020).

A description of the geology, geomorphology and vegetation that occurs in each of the designated survey areas is presented in Table 1. The geology of an area is important as it dictates the presence or absence of suitable stone resources for tool making, which was an important factor in determining the attractiveness of an area to Aboriginal people, and hence the likelihood of it containing archaeological sites. The same is true of the geomorphology and plant species present in an area.

**Table 1: Environmental descriptions of the six survey areas. Information drawn from LISTmap 2021, Kitchener & Harris 2013, Wellington Park 2010-2020.**

| Survey Area | Geology | Geomorphology | Vegetation |
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| Access Road | Generally poorly fossiliferous interbedded glaciomarine fine- to medium-grained sandstone, fissile and non-fissile siltstone, lonestones and pebble-rich patches, productid bed at top, basal interval commonly with thick beds of coarse-grained sandstone; Dominantly interbedded richly fossiliferous glaciomarine siltstone and sandstone and subordinate thin beds of granule sandstone, lonestones present, thin- to medium-bedded, commonly leached yellow-cream coloured (Deep Bay Formation); Paralic, massive, laminated, flaser-bedded or ripple cross-laminated micaceous sandstone and siltstone, thin beds of wavy- or cross-bedded sandstone and pebbly granule sandstone, marine bioturbated intervals with pebbles and rare shell fossils ; Undifferentiated Permo-Carboniferous sediments; Undifferentiated generally unfossiliferous glaciomarine fissile and non-fissile siltstone and silty sandstone with lonestones ; Generally unfossiliferous glaciomarine interbedded non-fissile and fissile siltstone and silty sandstone, with common bioturbation and lonestones, rare pebbly beds and fossiliferous beds; top beds of laminated grey to brown siltstone; Talus of dolerite and subordinate Lower Parmeener rocks; Freshwater predominantly cross-bedded quartzose to feldspathic sandstone commonly with overturned cross-bedding, subordinate siltstone with sparse plant and vertebrate fossils. | No watercourses exist within survey area. Nearest watercourse is a minor ephemeral unnamed tributary at the base of McRobies Gully, approximately 140m to the north of the survey area. The survey area hugs the northern flank of a ridge. The terrain here is steep and lacking in suitable landforms for occupation in the form of camp sites (artefact scatters). | <u>Eucalyptus obliqua wet forest</u>: A tall to very tall overstorey of E. obliqua over a well-developed secondary layer of rainforest trees. On fertile sites the rainforest is callidendrous, with Nothofagus cunninghamii and/or Atherosperma moschatum predominating over an understorey of tree ferns, ground ferns and relatively diverse and abundant epiphytic ferns. The rainforest becomes increasingly thamnic as fertility decreases, when secondary dominants may include Eucryphia lucida and Phyllocladus aspleniifolius; Tall to very tall trees with well-formed trunks about two-thirds of the total height of the tree. In regrowth trees, the crowns are relatively small, but mature trees can form large, spreading crowns. Across its distribution range E. obliqua wet forest often occurs in pure stands. In areas with fertile soils and high rainfalls E. regnans may co-occur with E. obliqua. On relatively dry sites, E. viminalis is a frequent codominant that is either replaced or co-occurs with E. globulus in eastern and south-east Tasmania. At altitudes above 300 m, E. dalrympleana replaces E. viminalis as a co-dominant; The understorey is typically composed of broadleaved shrubs, most commonly including Pomaderris apetala, Nematolepis squamea and Olearia argophylla, with a high proportion of ground ferns; Tall to very tall tree canopy of E. obliqua over a dense secondary tree cover of Leptospermum lanigerum and/or Melaleuca squarrosa. Other tall shrub or tree species include Nematolepis squamea and Acacia verticillata. The |

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| | | | ground layer is sometimes sparse, but more often is a dense tangle of Bauera rubioides, Gahnia grandis Gleichenia microphylla and Restionaceae species.<br><br><u>Eucalyptus obliqua dry forest:</u> The dominant tree species is E. obliqua. Acacia dealbata is frequently present, but it is typically in the tall shrub layer rather than the canopy, as is Acacia melanoxylon when present. E. obliqua dry forest occurs as mixed-species stands with eucalypts from both the gum (Series Ovatae and Viminales) and peppermint (Series Piperitae) groups. In dolerite areas in the south-east, E. amygdalina and E. pulchella are common subdominants, and on mudstone, E. tenuiramis is common. E. globulus occurs as a subdominant or minor species on the east coast and in the south-east, either replacing or co-occurring with E. viminalis. E. delegatensis may co-occur with E. obliqua at the higher altitudinal limits of E. obliqua dry forest. At sites where the dolerite-derived substrate is prone to winter waterlogging, and often summer drought, E. ovata may occur with E. obliqua and E. amygdalina, and/or E. pulchella. The forest community typically has trees of medium height with stems of good form. Typically, the understorey is shrubby. The shrub layer is dense and species-diverse, and the ground layer sparse. The exception to this is frequently fired sites, where the shrub layer is sparse and speciespoor, and the dense ground layer is dominated by Pteridium esculentum. Where the shrub layer is dense, common species include Acacia dealbata, Exocarpos cupressiformis, Allocasuarina littoralis, Lomatia tinctoria and Epacris impressa. On siliceous substrates, the |

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| | | | understorey may tend more toward a heathy/shrubby understorey with such species as Amperea xiphoclada, Aotus ericoides and Leucopogon ericoides. Occasionally on siliceous substrates, the understorey can be grassy, often with the only shrubs being Acacia dealbata.<br><br><u>Eucalyptus tenuiramis forest and woodland on sediments</u>: The dominant tree species is E. tenuiramis with other tree species sometimes present include E. pauciflora, E. rubida, E. viminalis, E. obliqua and Acacia melanoxylon. E. perriniana occurs sporadically in small patches on small sites within similar habitat. Trees are rarely more than 25 m in height and are often considerably smaller on highly insolated nutrient-poor sites. Old-growth stands of this community are uncommon, as there is often rapid replacement before senescence due to the frequent fires. Substrate, insolation and fire-frequency strongly influence the understorey, which generally has a low cover and diversity of shrubs. The medium- tall shrub layer is sparse, but includes Banksia marginata, Allocasuarina littoralis, Acacia species and Exocarpos cupressiformis. Pteridium esculentum often dominates the understorey, particularly on sandstone substrates or where fires are frequent. Other low shrubs include Epacris impressa, Astroloma humifusum, Pultenaea species, Aotus ericoides, Lomatia tinctoria and Tetratheca labillardierei. The density of the ground layer is variable. Native grasses such as Poa rodwayi, Austrodanthonia species, Deyeuxia species and Austrostipa species, as well as Lomandra longifolia, often dominate the ground layer where slope and aspect allow soil to form. However, ground cover can become very sparse on |

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| | | | insolated sites where soil development is poor, or where fires are frequent. |
| Base Station | Generally poorly fossiliferous interbedded glaciomarine fine- to medium-grained sandstone, fissile and non-fissile siltstone, lonestones and pebble-rich patches, productid bed at top, basal interval commonly with thick beds of coarse-grained sandstone; Undifferentiated fossiliferous glaciomarine sandstone, siltstone and limestone (Deep Bay Formation, Berriedale Limestone, Nassau Siltstone and Rayner Sandstone). (Pdb+Pca). | No watercourses exist within the survey area. The nearest watercourse is a minor ephemeral unnamed tributary located at the base of the gully approximately 120m to the east of the survey area. The terrain within the survey area is a steep hillside which has been extensively disturbed in the 20th Century by the construction of fire tracks. This landform has no properties that would make is a likely location for Aboriginal occupation in the form of camp sites (artefact scatters) | Eucalyptus pulchella forest and woodland: E. pulchella is normally the dominant tree species. Other tree species that may be present include E. globulus, E. viminalis, E. amygdalina, E. ovata and E. barberi. The tree height in this community rarely exceeds 25 m and may be less than 15 m because of poor sites and low rainfall. The community may have a woodland structure. Due to the high fire-frequency in this community, hollows and butt damage are common. There is normally a sparse cover of tall to medium shrubs, including Banksia marginata, Acacia dealbata, A. mearnsii, Exocarpos cupressiformis, Allocasuarina verticillata and Bursaria spinosa. Callitris rhomboidea occurs locally in fire- protected sites. In situations subject to high fire- frequency and grazing, this tall shrub layer may be absent. The low shrub layer is also sparse. Epacris impressa, Lomatia tinctoria, Astroloma humifusum, Lissanthe strigosa and Acrotriche serrulata occur occasionally. The ground layer is diverse and usually dominated by native grasses and Lomandra longifolia. Common species include those from the genera Poa, Dichelachne, Austrostipa, Notodanthonia and Agrostis. Lomandra longifolia and Lepidosperma spp. are frequent, and common herbs include Brachyscome species, Wahlenbergia species, Leptorhynchos squamatus, Bossiaea prostrata, Gonocarpus tetragynus and Hovea linearis. Leptecophylla divaricata is often prominent on rocky sites, which can often be characteristically shrubbier, with sparse grasses. |
| Tower 1 & Tower 2 | Undifferentiated fossiliferous glaciomarine sandstone, siltstone and limestone (Deep Bay | No watercourses exist within the survey area. The nearest watercourse is a minor ephemeral | Eucalyptus obliqua wet forest: A tall to very tall overstorey of E. obliqua over a well-developed |

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| | Formation, Berriedale Limestone, Nassau Siltstone and Rayner Sandstone). (Pdb+Pca); Generally poorly fossiliferous interbedded glaciomarine fine-to medium-grained sandstone, fissile and non-fissile siltstone, lonestones and pebble-rich patches, productid bed at top, basal interval commonly with thick beds of coarse-grained sandstone. | unnamed tributary located at the base of the gully approximately 195m to the east of the survey area. The terrain within the survey area is a very steep hillside This landform has no properties that would make is a likely location for Aboriginal occupation in the form of camp sites (artefact scatters) | secondary layer of rainforest trees. On fertile sites the rainforest is callidendrous, with Nothofagus cunninghamii and/or Atherosperma moschatum predominating over an understorey of tree ferns, ground ferns and relatively diverse and abundant epiphytic ferns. The rainforest becomes increasingly thamnic as fertility decreases, when secondary dominants may include Eucryphia lucida and Phyllocladus aspleniifolius; Tall to very tall trees with well-formed trunks about two-thirds of the total height of the tree. In regrowth trees, the crowns are relatively small, but mature trees can form large, spreading crowns. Across its distribution range E. obliqua wet forest often occurs in pure stands. In areas with fertile soils and high rainfalls E. regnans may co-occur with E. obliqua. On relatively dry sites, E. viminalis is a frequent codominant that is either replaced or co-occurs with E. globulus in eastern and south-east Tasmania. At altitudes above 300 m, E. dalrympleana replaces E. viminalis as a co-dominant; The understorey is typically composed of broadleaved shrubs, most commonly including Pomaderris apetala, Nematolepis squamea and Olearia argophylla, with a high proportion of ground ferns; Tall to very tall tree canopy of E. obliqua over a dense secondary tree cover of Leptospermum lanigerum and/or Melaleuca squarrosa. Other tall shrub or tree species include Nematolepis squamea and Acacia verticillata. The ground layer is sometimes sparse, but more often is a dense tangle of Bauera rubioides, Gahnia grandis Gleichenia microphylla and Restionaceae species. |
| Scaffold | Talus consisting dominantly of dolerite boulders. | No watercourses exist within the survey area. The | Eucalyptus coccifera forest and woodland: The |

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| | | nearest watercourse is the commencement of a minor ephemeral unnamed tributary located approximately 560m to the southeast of the survey area. The terrain within the survey area is a very steep hillside This landform has no properties that would make is a likely location for Aboriginal occupation in the form of camp sites (artefact scatters) | dominant tree species is E. coccifera. E. subcrenulata, E. gunnii, E. pauciflora, E. delegatensis, Athrotaxis cupressoides and A. selaginoides are sometimes present as subdominants. In subalpine areas, E. delegatensis may form forest or woodland on very rocky ground with a mix of E. coccifera and E. delegatensis on the fringes. Around 1 000 m, E. pauciflora can be co- dominant with E. coccifera such as at Liawenee Moor. At lower altitudes (600–800 m) E. pauciflora largely replaces E. coccifera on these woodland margins. In swampy alpine areas, E. coccifera occupies the better-drained rises and mixes with E. gunnii at the edges. E. archeri occurs on rocky slopes at plateau edges, with or without E. coccifera. E. urnigera is found on rocky alpine plateaus and steep to moderate subalpine slopes down to 800 m, almost always with E. coccifera. Both E. archeri and E. urnigera have very restricted ranges. There is evidence that large trees were more widespread before extensive wildfires in the 1960s. Woodland trees generally range from 5– 10 m in height. At exposed sites, it is usual for trees to show fire and frost damage, with the common form of recovery being regrowth from epicormic buds. E. archeri forms small, often spindly trees less than 8 m tall. Subalpine woodlands generally have a sparse heathy understorey among rocks, commonly including Richea sprengelioides, Orites revoluta, O. acicularis, Leptospermum rupestre, Coprosma nitida, Ozothamnus rodwayi and Cyathodes species. On less rocky sites, Richea pandanifolia and/or R. scoparia may occur together with rainforest species. Grasses, herbs and prostrate shrubs occur in openings. Long-unburned areas may support small conifers (small trees and |

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| | | | shrubs) and/or Nothofagus gunnii. At lower altitudes, understorey dominance may change and include Coprosma nitida, Orites diversifolia, Acacia riceana, Banksia marginata, Telopea truncata, Hakea lissosperma and Tasmannia lanceolata. The ground layer may include Bauera rubioides, Planocarpa petiolaris, Cyathodes straminea and Orites revoluta. E. archeri occurs in exposed rocky areas above shrubby alpine heath. E. urnigera usually occurs over a shrubby understorey composed of Oxylobium ellipticum, Leptecophylla juniperina subsp. parvifolia, C. glauca, and Orites diversifolia. |
| Tower 3 | Dolerite and related rocks. | No watercourses exist within the survey area. The nearest watercourse is the commencement of a minor ephemeral unnamed tributary located approximately 730m downslope to the southeast of the survey area. The terrain within the survey area is a very high elevation steep apron beneath the pinnacle, with a cliff immediately to the east. This landform has no properties that would make is a likely location for Aboriginal occupation in the form of camp sites (artefact scatters) | <u>Eastern alpine heathland</u>: Drainage, exposure and fire history determine the dominant species. Orites revoluta is often the most prominent shrub on well–drained slopes, with O. acicularis prominent in some well–watered areas but slow to recover from fire in others. Other species include Grevillea australis, Leptecophylla juniperina, Cyathodes straminea, Boronia citriodora, Leptospermum rupestre, Baeckea gunniana, Monotoca empetrifolia and Epacris serpyllifolia. Very rocky areas are often dominated by Richea sprengelioides, with Exocarpos humifusus, Olearia erubescens, Leucopogon montanus, Coprosma nitida and Planocarpa petiolaris. Many species are common to both these facies. Open ground is generally covered by prostrate Epacridaceae species (e.g. Pentachondra pumila, Cyathodes dealbata), short Poa gunnii and herbs. As drainage decreases, Richea scoparia may be prominent where heathland is replaced by sedgeland. |
| Pinnacle | Dolerite and related rocks. | No watercourses exist within the survey area. The nearest watercourse is the commencement of a minor ephemeral unnamed tributary located | <u>Eastern alpine heathland</u>: Drainage, exposure and fire history determine the dominant species. Orites revoluta is often the most prominent shrub on |

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| | | approximately 790m downslope to the east-southeast of the survey area. The terrain within the survey area is a very high mountain summit. This landform has no properties that would make is a likely location for Aboriginal occupation in the form of camp sites (artefact scatters) | well–drained slopes, with O. acicularis prominent in some well–watered areas but slow to recover from fire in others. Other species include Grevillea australis, Leptecophylla juniperina, Cyathodes straminea, Boronia citriodora, Leptospermum rupestre, Baeckea gunniana, Monotoca empetrifolia and Epacris serpyllifolia. Very rocky areas are often dominated by Richea sprengelioides, with Exocarpos humifusus, Olearia erubescens, Leucopogon montanus, Coprosma nitida and Planocarpa petiolaris. Many species are common to both these facies. Open ground is generally covered by prostrate Epacridaceae species (e.g. Pentachondra pumila, Cyathodes dealbata), short Poa gunnii and herbs. As drainage decreases, Richea scoparia may be prominent where heathland is replaced by sedgeland. |

## Historical

Several traditional names for Mount Wellington have been recorded across different dialects, such as *poorawetter* (or *pooranetere*), *unghbanyahletta* (or *ungyhaletta*), and *kunanyi* (Milligan 1858). The latter, *kunanyi*, was used by the Muwinina of the Hobart area and has been reestablished today.

Following the European settlement of Hobart during the early 19th century, Charles Augustus Robinson, appointed as the 'Conciliator of Aborigines'[sic], recorded oral histories which described the period of rapid colonisation. Wooraddy (Wurati), a Nuennone man from Bruny Island, recounted to Augustus that, "when the first people settle they cut down the trees, built houses, dug the ground and planted; that by and by more ships came, then at last plenty of ships; that the natives went to the mountains, went and looked at what the white people did, went and told other natives and they came and looked also" (Plomley 1966). Wurati may have been referring to the Wellington Ranges as the location where these events were viewed.

When A.W. Humphrey scaled kunanyi/Mt Wellington in 1804, he described forests of tall tree ferns (Dicksonia antarctica) and groves of 'sassafras trees' (Atherosperma moschatum). More impressive still were the tall eucalypts (E. obliqua) which were truly gigantic. One of these was so large that Humphrey joked that: "a coach and six might be drawn along it" (Thomas 1991:71).

During his 1836 visit to Hobart, naturalist Charles Darwin climbed kunanyi / Mount Wellington, describing some of the vegetation he encountered, "[...]In many parts the Eucalypti grew to a great size, and composed a noble forest. In some of the dampest ravines, tree-ferns flourished in an extraordinary manner; I saw one which must have been at least twenty feet high to the base of the fronds, and was in girth exactly six feet." (Darwin et al. 1989: 449).

When European colonists occupied the area that is now Hobart in 1804, it was what has been termed a 'beachhead frontier' (Connor 2002:33), with relatively little initial conflict between the colonists and the Aboriginal occupants. This is because the Hobart settlement initially occupied a small area of land as its geopolitical purpose was to block French colonial ambitions. Inevitably, however there was conflict, such as when troops of the New South Wales Corps fired on a Moomairremener hunting party across the Derwent at Risdon Cove, killing a substantial number of them (Connor 2002:33-34). While other small-scale acts of violence were perpetrated by both sides in the Hobart area during the initial years of European colonisation (Connor 2002:85; Clements 2019:19), conflict was not sustained enough to regard it as one of the main 'fronts' of the 'Black War' (Clements 2019:xvii). Generally, the small size of the colonial enclave around Hobart meant the two sides were able to coexist. European-introduced diseases devastated the Aboriginal community, but the Europeans also brought dogs, flour and tea, which were enthusiastically adopted by Aboriginal people (Connor 2002:85).

## Land Use History

In the late 18th century French expeditions recorded burning activities by the Muwinina in the foothills of the mountain. The use of fire for the purpose of hunting and clearing vegetation has been observed across mainland Australia, with several reported early accounts of the Muwinina practicing deliberate burning in the Hobart and Mount Wellington area (Ryan 1996).

In 1792, Captain Bligh remarked on the use of fire as land management tool. He correctly supposed that the land at the foot of kunanyi/Mt Wellington was well-inhabited by Aboriginal people. The frequency of fire in the area would have had major effects on the vegetation. Furthermore, the fact that tall wet eucalypt and Atherosperma forests were restricted to fire protected locations at the time of settlement suggests that fires had played a major part in the evolution of vegetation patterns of the Hobart area, and the open grassy nature of Eucalyptus and Allocasuarina woodlands on surrounding hill slopes suggests a high frequency of low intensity burns (Thomas 1991:50).

The description of rainforests or mixed forests on kunanyi/Mt Wellington make it clear that places on the mountain had not been subjected to fire for a very long period of time; certainly since well before the fires recorded by Du Fresne and subsequent maritime explorers. The gigantic trees which so impressed Humphrey could well have been 300 years old in 1804 (Thomas 1991:71).

European exploitation of the project area commended in the eighteen-teens, with convicts felling trees for timber which was required for construction and fuel. This was initially in the foothills along the Hobart Rivulet. The 1830s saw timber getting and milling increase. Robert Barter Wiggins was engaged in quarrying slate below the present Junction Cabin, located some 600m to the north of the proposed cableway alignment, and Australia's first major water pipeline was constructed from the Springs along the Hobart Rivulet. European use of the mountain as a place of recreation commenced in earnest in the 1840s, with a number of huts and tracks constructed, and the first ice houses were built by convicts. In the 1860s a waterworks scheme was initiated, taking water from the mountain to a reservoir in the Sandy Bay Rivulet. These waterworks projects continued in the 1870s and 1880s. Timber getting all but ceased by 1906, with much of the eastern face of Mount Wellington declared a public park (Wellington Park Trust 2010-2020(c)).

## Previous Aboriginal Investigations

Although wider studies have shown that Aboriginal people were in occupation of southern Tasmania at least 35,000 years ago (Bowdler 2010:178), no systematic research has been undertaken in Wellington Park (Wellington Park Trust 2010-2020(b)). A search of the Aboriginal Heritage Register in May 2021 found twelve unpublished reports relating to the broader area in which the proposed development area is located.

## Previously Recorded Aboriginal Heritage Sites

A Search of the Tasmanian Aboriginal Heritage Register in May 2021 showed 15 Aboriginal heritage sites have been previously recorded in the broader area in which the development is proposed between 1992 and 2018. These 15 sites are located between 300m and 5900m from the proposed activity footprints (Figure 4). Summary details of these 15 sites are presented in Table 2. Five of these sites are described as 'unoccupied' rockshelters, meaning that their archaeological potential has not been established (usually through excavation). A further six of these sites are isolated artefacts, meaning a single stone tool which was likely lost or discarded by an individual passing through the landscape, such as might occur during a hunt. Due to their distance from the activity footprints, it can be confidently stated that none of these sites are at risk of being disturbed by the proposed development.

**Table 2: Previously recorded Aboriginal heritage sites in vicinity of the project area (AHT 2021).**

| Number | Site Type | Site Recording Date | Place Name | Locality | Easting | Northing | Shape? | Aliases | Distance from Proposed Activity Footprint (m) |
|---|---|---|---|---|---|---|---|---|---|
| 11786 | Artefact Scatter | 12/02/2013 | Syme Street Hobart Artefact Scatter | South Hobart | 524253 | 5250923 | No | | 300 |
| 6592 | Unoccupied Rockshelter | 29/10/1992 | Knocklofty Reserve | West Hobart | 524753 | 5251693 | No | | 1000 |
| 6593 | Occupied Rockshelter | 29/10/1992 | Knocklofty Reserve | West Hobart | 524754 | 5251705 | No | | 1000 |
| 6594 | Unoccupied Rockshelter | 29/10/1992 | Knocklofty Reserve | West Hobart | 524753 | 5151719 | No | | 1000 |
| 6595 | Unoccupied Rockshelter | 29/10/1992 | Knocklofty Reserve | West Hobart | 524759 | 5251787 | No | | 1100 |
| 6838 | Isolated Artefact | 16/07/1993 | Lenah Valley | Wellington Park | 520812 | 5252782 | No | Site Name – Lenah Valley 1, Field Designation Number 01 | 1800 |
| 6839 | Isolated Artefact | 5/08/1993 | South Hobart | South Hobart | 525352 | 5251082 | No | Field Designation Number - SHP, Site Name - South Hobart Primary School | 1400 |
| 7990 | Isolated Artefact | | | South Hobart | 523134 | 5249699 | No | | 1600 |
| 7991 | Unoccupied Rockshelter | | | Ridgeway | 523735 | 5248933 | No | | 2200 |
| 7992 | Unoccupied Rockshelter | | | Ridgeway | 523512 | 5248982 | No | | 2200 |
| 7993 | Artefact Scatter | | | Ridgeway | 522912 | 5248882 | No | | 2500 |
| 13264 | Isolated Artefact | 2/11/2016 | kunanyi/Mt Wellington | Wellington Park | 521425 | 5251887 | No | Field Designation Number - WP BAS 2016-1 | 730 |
| 13604 | Isolated Artefact | 3/05/2018 | | Wellington Park | 518831 | 5256762 | No | Field Designation Number - Montrose FT 1, Site Name - Goat Hills East Slopes 1 | 5800 |
| 13605 | Artefact Scatter | 3/05/2018 | | Wellington Park | 519377 | 5256859 | Yes | Field Designation Number - Jacksons FT 1, Site Name - Goat Hills East Slopes 2 | 5900 |
| 13606 | Isolated Artefact | 3/05/2018 | | Wellington Park | 519462 | 5256876 | No | Field Designation Number - Jacksons FT 2, Site Name - Goat Hills East Slopes 3 | 5900 |


**Figure 4: Location of previously recorded Aboriginal heritage sites in relation to the designated survey areas (site location data provided by AHT 2021).**

## Research Design and Field Methods

Weather forecasts were observed when planning the timing of the field survey in order to minimise the chance of snow which would adversely affect ground surface visibility, and rainfall which would make working in the steep and often slippery rocky terrain difficult and unsafe.

As the survey areas were relatively small, only two personnel were required in order to effectively survey the required areas within the allotted timeframe of two days. The survey team was led by consulting archaeologist Dr Nic Grguric, who has 14 years of extensive experience carrying out Aboriginal archaeological projects throughout Australia. Dr Grguric was assisted by archaeological assistant Summer Maskey, who is also experienced in Aboriginal field surveys.

The survey was carried out by means of foot transects. The survey personnel were spaced a maximum of 12m apart (notably along the 25m wide access road survey area), however for the majority of the survey their spacing was able to be considerably reduced owing to the small size of the survey areas. Given the very low to nil potential for Aboriginal heritage sites to be present in the landforms surveyed, special attention was paid to any features or exposures that might hold more potential, such as bulldozed cuts in the side of fire tracks. However no knappable stone was observed in these exposures.

Spatial data in the field was captured by means of hand held GPS devices (Garmin GPSMAP 64), capable of sub-5m accuracy. The devices had the footprint of the development uploaded to them, which was used to guide the survey team. The devices created track logs and could be used to take points to record the location of any Aboriginal heritage found.

Photographic records were taken of the landscape and vegetation in each of the development areas that were surveyed. In the event of Aboriginal heritage being found, photographic records would also have been made of them in situ with an appropriate scale.

A hand field diary was kept in which the progress and observations of the survey team were recorded. Aboriginal Heritage Tasmania's Aboriginal Heritage Register (AHR) Site Recording Forms were carried by the survey team which were to be used to record any finds.

Limitations to the field survey included consistently poor ground surface visibility and steep terrain. Vegetation covered 90-100% of the ground owing to dense leaf litter, twigs and fallen branches, and dense grass and bushes. The steep terrain made searching parts of the survey area (particularly the scaffold and tower 3 locations) hazardous.

## Effective Survey Coverage

Survey coverage was calculated on the basis that an individual can effectively scan 1m to either side of them (Burke & Smith 2004:65). Survey coverage ranged from 21% along the access road area to 100%. Ground surface vegetation was very dense throughout, ranging from 90-100%. The survey coverage achieved for the six development areas, calculated as per AHT's prescribed method, is presented in Table 2 below. The GPS track logs of the survey team are shown in Figures 2-6.

**Table 3: Summary details of survey area results.**

| Area (m2) | Geomorphic Unit | Landforms | Exposure Type (%) | Vegetation Cover % | Effective Coverage in m2 (% of Transect Total) | Sites Found |
|---|---|---|---|---|---|---|
| Access Road (61842) | Hills and Ridges | Flank of wooded ridge line | Occasional gaps in vegetation (5) | 90-100 | 13140 (21) | Nil |
| Base Station (8053) | Hills and Ridges | Deforested clearing on hill side | Bulldozed vehicle tracks (30) | 90-100 | 3430 (42) | Nil |
| Towers 1 and 2 (3751) | Hills and Ridges | Steep thickly forested hill side | Occasional gaps in vegetation (5) | 95-100 | 4134 (100) | Nil |
| Scaffold (113) | Mountain | Very steep rocky and thickly vegetated mountain side | Occasional gaps in vegetation (5) | 100 | 62 (55) | Nil |
| Tower 3 (113) | Mountain | Steep and rocky thickly vegetated mountain side | Occasional gaps in vegetation (5) | 95-100 | 44 (39) | Nil |
| Pinnacle (3958) | Mountain | Rocky and thickly vegetated mountain top | Occasional gaps in vegetation (5) | 95-100 | 5788 (100) | Nil |

25


Figure 5: Access road, base station and towers 1 & 2 areas showing GPS track logs (in red).


Figure 6: Closer view of base station and towers 1 and 2 areas showing GPS track logs (in red).

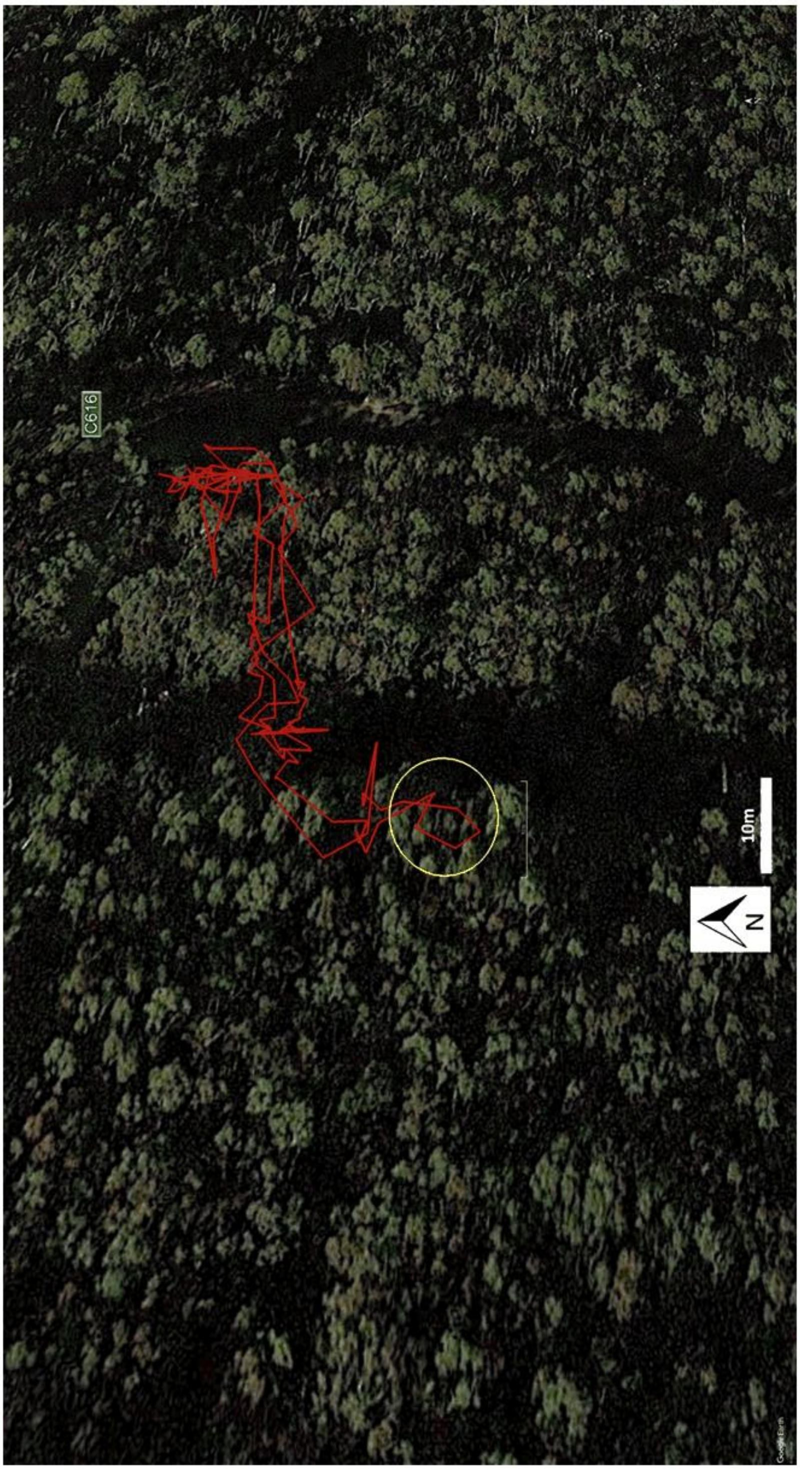


Figure 7: Scaffold area showing GPS track logs (in red).

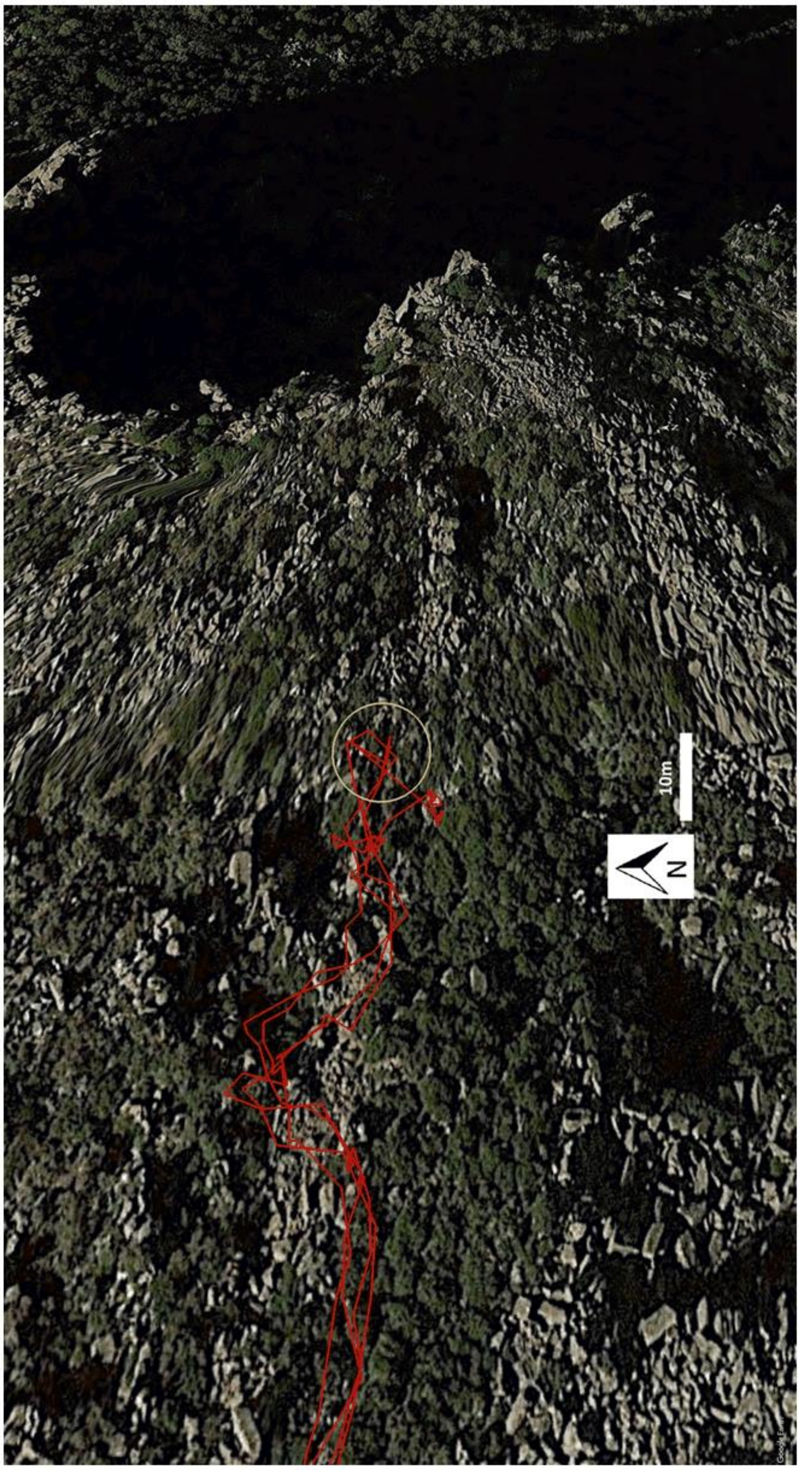


Figure 8: Tower 3 area showing GPS track logs (in red).


Figure 9: Pinnacle area showing GPS track logs (in red).

## Results

### The Access Road

This was an approximately 2500m long by 25m wide corridor. It was surveyed from west to east. Its western end commenced at the northern end of the base station area in Wellington Park, and followed the course of the Main Fire Trail for a distance of 240m until it reached the junction of three fire trails. This western portion of the survey area was heavily disturbed by the construction of fire trails. Exposures in the sides of the fire trail cuts showed the geology to be composed of creamy white to grey medium grained mudstone and sandstone in a pale tan coloured silty matrix. From this point the survey area passed through an area containing a network of approximately 1m wide bike tracks and hiking tracks (Figure 10), some of which incorporated drystone walling retaining walls and paving. Very occasional very small (<10mm) fragments of natural while quartz was observed in this portion of the survey area, however no large enough pieces that could be a source of raw material for stone tool manufacture were observed. From this point on the survey corridor hugged the steep northern flank of the southern ridge of McRobies Gully. Vegetation was dense in general, consisting of low Eucalypt obliqua dry forest and Eucalyptus tenuiramis forest (LISTmap 2021). The terrain was steeply sloping down to the north and ground surface visibility ranged from nil to very low with 90-100% vegetation in the form of leaf litter. Surface geology throughout the central portion of the corridor consisted of light grey medium grained mudstone over light grey silt. The survey corridor terminated at McRobies Road near the entrance to the McRobies Gully Waste Management Centre. No Aboriginal heritage was found.

**Figure 10: Western end of access road survey area, looking north. Dry eucalypt forest over siltstone and sandstone. Note the considerable slope and mountain bike track disturbance.**

## The Base Station and Towers 1 and 2

The proposed base station site was an approximately 8053m2 irregularly shaped area, located in an artificial clearing along the 4m wide Main Fire Trail near the eastern edge of Wellington Park. The ground in this area was undulating and sloped steeply down to the east, where the survey area entered 5-10m into the low Eucalyptus pulchella forest (LISTmap 2021 2021) along its eastern edge. This forested area contained 90-100% ground cover composed of leaf litter. A 4m wide overgrown bulldozed track also ran along the tree line on the eastern side of the survey area. With the exception of the Main Fire Trail, which was covered with introduced gravel, the remainder of the clearing was covered with tufts of reeds and dense approximately 30mm tall grass, which reduced surface visibility to nil. The northern portion of the area contained scattered reeds and bracken clusters over the aforementioned dense grass. The clearing in general showed evidence of heavy disturbance from tree removal and earthworks associated with the construction of the fire trails in the form of grassed-over mounds and dozer pushes of soil (Figure 11). The base station footprint was surveyed with a series of north-south transects, in addition to targeting any potential exposures such as eroded channels and the edge of the bulldozer cuts. No Aboriginal heritage was found.

**Figure 11: The base station area, looking north. Dry eucalypt forest over siltstone and sandstone. Note extensive earthmoving disturbance from construction of fire trails and modern deforestation.**

## Towers 1 and 2

The proposed access route to Towers 1 and 2 was a 15m wide, 308m long corridor, starting on the western side of the base station area, along which the 22m x 22m tower footprint areas were located. The corridor and tower areas were on steep, thickly wooded Eucalyptus obliqua wet forest (LISTmap 2021) and rocky terrain with dense undergrowth in the form of bushes. This vegetation covered 95-100% of the ground surface. The tower 1 location was on steeply sloping ground with 95-100% surface vegetation of leaf litter and dolerite boulders (Figure 12). Most of the trees were saplings or young trees although a few mature trees were present. The tower 2 location was situated on moderately steep ground. The ground surface here was covered in large dolerite scree, fallen trees and twig/leaf litter, the vegetation covering 95-100% of the ground surface (Figure 12). A large mature Eucalyptus tree stood close to the centre of the footprint. No Aboriginal heritage was found in either of the tower footprint areas, nor along the tower access corridor.

**Figure 12: The tower 1 location, looking west. Dense wet eucalypt forest over sandstone, siltstone and limestone with dolerite scree on surface.**

**Figure 13: The tower 2 location, looking west. Dense wet eucalypt forest over sandstone and siltstone, with dolerite scree on surface.**

## Scaffold

This area measured 12m diameter and was located approximately 40m to the west (i.e. up slope) of Pinnacle Road, within Wellington Park. It was located on the very steep rocky eastern flank of kunanyi/Mt Wellington and was accessed via the Northern Buttress Track. The location itself is a steep rocky (dolerite) semi-clearing surrounded by very dense trees and bushes (Eucalyptus coccifera forest) (LISTmap 2021). Vegetation and leaf litter reduced ground surface visibility to nil (Figure 14). No Aboriginal heritage was found.

Figure 14: Scaffold location, looking east. Dense dry eucalypt forest over dolerite boulders.

## Tower 3

This was a 12m diameter area located 146m to the east of and below the current pinnacle observation shelter. It covered a circular area 12m diameter, and was accessed via a rock climbing track. The area itself was on a dolerite boulder-strewn apron of the mountain, with a steep drop to the east and a steep boulder rise to the west. Dense alpine heathland (LISTmap 2021) shrubs and bushes covered 95-100% of the ground surface (Figure 15). No Aboriginal heritage was found.

Figure 15 Tower 3 location, looking north. Highland vegetation over dolerite.

## The Pinnacle

This was an irregularly shaped area covering approximately 3958m2, along with a network of boardwalks, located on top of kunanyi/Mt Wellington. The area was easily accessible via the pinnacle road. Survey of the pinnacle building footprint was at times difficult owing the presence of very large boulders with hazardous crevices between. Vegetation was alpine heathland (LISTmap 2021) composed of very dense bushes which grew between the dolerite rocks and boulders, covering 95-100% of the ground surface (Figure 16). No Aboriginal heritage was found.

Figure 16: View of the southern portion of the proposed pinnacle structure area, looking southeast. Highland vegetation over dolerite.

## Interpretation and Discussion

All six of the survey areas were notable for the total absence of suitable raw material for making knapped stone tools. The surface geology was composed of either extremely hard, coarse-grained dolerite or soft, medium to coarse-grained mudstone, siltstone and sandstone. While these latter rock types can be used to make knapped stone tools, it is a very poor substitute for other locally available fine-grained stone that is known to have been used by the local Aboriginal people such as hornfels (a hard, fine-grained metamorphosed stone), fine-grained basalt, or metamorphosed siltstone (Kerrison & Binns 1984:61).

The nature of the terrain, too, was unfavourable for occupation owing to its steepness, rocky ground surface and distance from reliable water sources. It has been well demonstrated that Aboriginal people, both in Tasmania and on the mainland, preferred to camp on reasonably flat ground close to water sources. Jones et al. in their recent comprehensive study of the relationship between the known archaeological record and the pre-contact Tasmanian environment, found that landscapes with the least evidence for Tasmanian Aboriginal utilisation can be characterized as, "inland locations that are: (a) high elevation; (b) steep; (c) wetter and/or (d) topographically rough. A sizeable proportion is rain forest, open shrubby forest, wet sclerophyll forest or sedgeland. Notably, they are definitively not woodland landscapes" (Jones et al. 2019:2578). The above description aptly describes the terrain in which the survey areas here were located. As an example of this occupation pattern, hundreds of middens (evidence of camping activity) as well as quarry sites and rockshelters have been identified along both sides of the Derwent estuary from New Norfolk to Tryworks Point (Kerrison & Binns 1984:53), clearly demonstrating the preferred settlement pattern. Thomas states that the lack of archaeological evidence from Mt. Wellington near Hobart points to a very low rate of visits above the snowline, and that this might be expected in an environment located so close to rich sources of marine and forest resources (Thomas 1991:131).

Occasionally, Aboriginal people did venture into the steeper terrain, particularly for hunting expeditions, ceremonial practices, or to seek refuge during times of conflict. The archaeological footprint of ceremonial activities, hunting, and refuges are by their nature extremely sparse and ephemeral, composed as they are of small groups and short term, transient occupations. These activities may explain the occasional isolated artefacts and occupied rockshelters found in the kunanyi/Mt Wellington area, however none were found during the course of the field survey.

In terms of potential future research directions into the Aboriginal occupation of the kunanyi/Mt Wellington area, a targeted landform-element based approach would be most effective. This would involve identifying and then surveying flatter areas and saddles in the foothills, outcrops of knappable stone and rockshelters/overhangs. No such features were encountered in or near the designated survey areas.

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**Curriculum Vitae**

**Of**

# Dr Nic Grguric

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Email: eqeta@yahoo.com.au

**Indigenous Skills/Experience**

- Leading and carrying out Indigenous heritage surveys.
- Supervising/directing Aboriginal excavations
- Extensive fieldwork experience in various regions in Australia.
- Recording sites to a range of levels from basic site avoidance to detailed/salvage level.
- Working with Aboriginal representatives in surveying, site recording and excavation.
- Report writing.

**Historical Skills/Experience**

- PhD in Australian historical archaeology.
- Historical artefact analysis.
- Directing historical archaeological projects.
- Excavation of historical sites, structures and human burials.
- Research design and significance assessments.
- Historical archaeological report writing.
- Specialist knowledge of Australian vernacular architecture.
- Specialist knowledge of 19th century firearms-related artefacts.
- Conducting archival background research.

**General Skills/Experience**

- Leadership skills.
- Results driven.
- Versatile, able to quickly grasp and apply procedures and methodologies.
- Writing for publication to a range of audiences.
- Completed 4WD training courses.
- Senior First Aid certificate.
- Use of GPS.
- Working in remote locations.
- Working in high temperatures.
- Team work.

**Employment History (2008 – Present)**

January March 2021 – Site Supervisor. Directing historical excavation in Young, NSW.

July – December 2020 –Archaeologist, Team Leader (casual) with ACHM. Aboriginal Heritage salvage and surveys in metropolitan and regional Victoria.

March - June 2020 – Archaeologist at Port Arthur Historic Site Management Authority. Carrying out historical excavation at Port Arthur Historic Site.

October 2019 – December 2019 – Leading Aboriginal heritage surveys and detailed Aboriginal site recording in Western Australia for Waru Consulting.

October 2019 – Director – Callington Smelting Works Archaeological Project. Historical excavation.

September 2019 – Senior Archaeologist (casual) with Waru Consulting. Aboriginal heritage projects in Goldfields region of WA.

May 2019 – July 2019 – Senior Archaeologist (full time casual) with Andrew Long & Associates. Supervising and directing historical archaeological excavations in Melbourne and environs.

February 2019 – April 2019 – Archaeologist with Godden Mackay & Logan, excavating historical sites in Melbourne CBD.

November 2018 – February 2019 – Archaeologist (team leader/trench supervisor) with ArchLink, supervising historical excavations in the Melbourne CBD.

May 2018 – November 2018 – Archaeologist (assistant team leader) with Andrew Long & Associates, excavating historical sites in Melbourne CBD.

December 2017 – May 2018 – Team leader of Aboriginal salvage excavations in western N.S.W. for Niche Environment & Heritage. Work involves leading excavations and working with Traditional Owners.

November 2016 – Ongoing (intermittent) - Directing and managing the excavation of the 1860s Callington Smelting Works, South Australia. This project involves working with volunteers from the local community.

May 2010 – Ongoing (intermittent) - Senior Archaeologist for Waru Consulting, managing Aboriginal heritage projects in WA Goldfields and the Pilbara regions.

March 2016 to May 2016 – Niche Environment & Heritage – Team Leader, conducting Aboriginal test excavations in the Broken Hill/Wentworth region.

August – December 2016 – Historical artefact specialist for Austral Archaeology, carrying out artefact analysis for the Windsor Bridge Realignment test excavation project, Windsor, NSW.

April –June 2016 Carried out heritage assessment on the Callington Smelting Works, for the Callington Recreation Park.

May 2016 – Archaeologist for Niche Environment & Heritage Services, salvage excavating Aboriginal hearths in Western NSW.

October 2015 – February 2016 – Archaeologist for Austral Archaeology. Carried out excavation of historical site in Adelaide CBD, followed by artefact analysis and preparation of artefact report.

August – November 2016 – Archaeologist for Navin Officer Heritage Consultants. Carried out Indigenous open site excavations in northern NSW.

January and February 2015 – Archaeologist for Australian Heritage Services. Carried out Indigenous heritage surveys in Cooper Basin, SA.

October, December 2014 – Archaeologist for Niche Environment & Heritage. Role involved Indigenous heritage surveys, site recording and report writing.

June 2013 – Archaeologist for Australian Heritage Services. Role included taking part in excavation of the Adelaide Observatory site and carrying out artefact analysis.

February - March 2013 – Archaeologist for Austral Archaeology. Role involved taking part in historical excavation of the C.H. Smith site in Launceston, Tasmania.

January – May 2010 – Archaeologist with Kelleher Nightingale Consulting, carrying out salvage excavations of Indigenous sites in southern N.S.W.

June – December 2008 – Archaeologist with Archae-Aus. This involved carrying out Indigenous heritage surveys and site recording in the Pilbara region of W.A.

**Educational Background**

March 2008 – Awarded PhD in Archaeology from Flinders University, South Australia. Thesis title: "Fortified homesteads: The architecture of fear in frontier South Australia and the Northern Territory, ca 1847-1885."

2005, 2006 and 2007 – Completed training courses in sessional teaching through Flinders University Staff Development & Training Unit.

December 2002 – Received Bachelor of Arts with First Class Honours in Classical Studies from the University of Adelaide.

April 2002 – Received Bachelor of Archaeology from Flinders University of South Australia.

**Academic Publications**

Grguric, N. (in preparation) Archaeological Excavations of an 1860s Welsh-Style Copper Smelting Works, at Callington, South Australia.

Grguric, N. (in preparation) Uniform Buttons of the Native Mounted Police in Queensland, 1852-1904.

Grguric, N. (in preparation) The Fortified Homestead of the Australian Frontier. *Terra Australis.*

Grguric, N. (2018) Archaeological insights into a South Australian Volunteer Rifle Company: The Buttons of the Kapunda Mine Rifles. *The Artefact*, Vol. 41.

Grguric, N. (2018) Fortified Homesteads. In Smith, C. (Ed.) *Encyclopedia of Global Archaeology.* New York: Springer.

Grguric, N. (2017) Nic Grguric's Guide to Firearms Related Artefacts. In Burke, H, Morrison, M & C. Smith. *The archaeologist's field handbook : the essential guide for beginners and professionals in Australia*. Crows Nest, NSW: Allen & Unwin.

Grguric, N. (2010) Staking a Claim: Fortified Homesteads and their Place in Australian Settler Identity Construction. *Archaeological Review from Cambridge, Volume 25.1.*

Grguric, N. (2008) Fortified Homesteads: The Architecture of Fear in Frontier South Australia and the Northern Territory, ca 1847-1885. *Journal of Conflict Archaeology, Volume 4*, 59-85.

Grguric, N. (2005) *The Mycenaeans*. London: Osprey.

**Volunteer Work**

2014- Ongoing – Curator of the Nairne Community Museum, South Australia. Role involves directing the museum, developing programs and exhibitions.

2001-2008 – Conservator, SA Museum. Role involved conserving and researching the Pitt and Aiston collections of historical arms.

**Referees**

**Joe Mattner.** Director, Waru Consulting Pty Ltd (WA)
Ph: 0488 338 966

**Bec Parkes.** Director, Lantern Heritage Pty Ltd (NSW)
Phone: 0402 831 291

MIDSON traffic pty ltd

Mount Wellington Cable Car Company

# Mount Wellington Cable Car South Hobart Base Station Traffic Impact Assessment

May 2021

ENGINEERS AUSTRALIA

PROFESSIONAL ENGINEER OF THE YEAR INDIVIDUAL AWARDS TASMANIA WINNER 2016

# Contents

## Figure Index



## Table Index

# 1. Introduction

## 1.1 Background

Midson Traffic were engaged by the Mount Wellington Cable Car Company (MWCC) to prepare a traffic impact assessment for a proposed Mount Wellington cable car Base Station development located in Wellington Park, South Hobart.

The proposed cable car will travel up 1,000 metres of incline, making it the tallest cable car in the Southern Hemisphere. The base station will provide the car parking and the starting point for an alternative method for travel to the summit of Mount Wellington. The cable car route from the Base Station to the Pinnacle is shown in Figure 1.

**Figure 1 MWCC Masterplan**


## 1.2 Traffic Impact Assessment (TIA)

A traffic impact assessment (TIA) is a process of compiling and analysing information on the impacts that a specific development proposal is likely to have on the operation of roads and transport networks. A TIA should not only include general impacts relating to traffic management, but should also consider specific impacts on all road users, including on-road public transport, pedestrians, cyclists and heavy vehicles.

This TIA has been prepared in accordance with the Department of State Growth publication, *A Framework for Undertaking Traffic Impact Assessments*, September 2007. This TIA has also been prepared with reference to the Austroads publication, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2009.

Land use developments generate traffic movements as people move to, from and within a development. Without a clear understanding of the type of traffic movements (including cars, pedestrians, trucks, etc), the scale of their movements, timing, duration and location, there is a risk that this traffic movement may contribute to safety issues, unforeseen congestion or other problems where the development connects to

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the road system or elsewhere on the road network. A TIA attempts to forecast these movements and their impact on the surrounding transport network.

A TIA is not a promotional exercise undertaken on behalf of a developer; a TIA must provide an impartial and objective description of the impacts and traffic effects of a proposed development. A full and detailed assessment of how vehicle and person movements to and from a development site might affect existing road and pedestrian networks is required. An objective consideration of the traffic impact of a proposal is vital to enable planning decisions to be based upon the principles of sustainable development.

The Hobart Interim Planning Scheme, 2015, states that a TIA is required if the increase in the number of vehicle movements per day is more than 40. It further states that the planning authority may require "*an assessment, by a suitably qualified person, of parking demand created by a use or development and the ability for such demand created by a use or development and the ability for such demand to be satisfied in the vicinity of a proposed use of development, if reliant on performance criteria to satisfy E6.6.1, E6.6.3 or E6.6.4*".

This TIA addresses E5.0, *Road and Railway Assets* Code, and E6.0, *Parking and Access Code,* of the Hobart Interim Planning Scheme, 2015.

The site is located within Wellington Park. As such, the report also addresses the relevant traffic clauses within the Wellington Park Management Plan, 2013.

## 1.3 Statement of Qualification and Experience

This TIA has been prepared by an experienced and qualified traffic engineer in accordance with the requirements of Council's Planning Scheme and The Department of State Growth's, *A Framework for Undertaking Traffic Impact Assessments*, September 2007, as well as Council's requirements.

The TIA was prepared by Keith Midson. Keith's experience and qualifications are briefly outlined as follows:

- 23 years professional experience in traffic engineering and transport planning.
- Master of Transport, Monash University, 2006
- Master of Traffic, Monash University, 2004
- Bachelor of Civil Engineering, University of Tasmania, 1995
- Engineers Australia: Fellow (FIEAust); Chartered Professional Engineer (CPEng); Engineering Executive (EngExec); National Engineers Register (NER)

## 1.4 Project Scope

The project scope of this TIA is outlined as follows:

- Review of the existing road environment in the vicinity of the site and the traffic conditions on the road network.

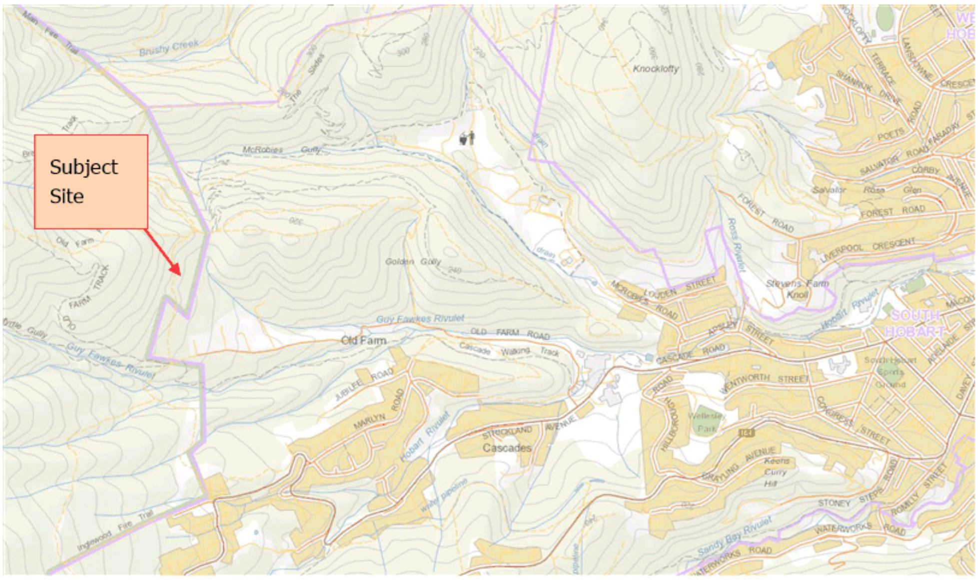
- Provision of information on the proposed development with regards to traffic movements and activity.
- Identification of the traffic generation potential of the proposal with respect to the surrounding road network in terms of road network capacity.
- Review of the parking requirements of the proposed development. Assessment of this parking supply with Planning Scheme requirements.
- Traffic implications of the proposal with respect to the external road network in terms of traffic efficiency and road safety.

## 1.5 Subject Site

The subject site is located within Wellington Park, on the Main Fire Trail that connects between Old Farm Road and Lenah Valley Road.

The subject site and surrounding road network is shown in Figure 2.

**Figure 2 Subject Site & Surrounding Road Network**




*<u>Image Source</u>: LIST Map, DPIPWE*

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## 1.6 Reference Resources

The following references were used in the preparation of this TIA:

- Hobart Interim Planning Scheme, 2015 (Planning Scheme)
- Wellington Park Management Plan, 2013
- Austroads, *Guide to Traffic Management,* Part 12: *Traffic Impacts of Developments*, 2009
- Austroads, Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections, 2019
- Austroads, Guide to Road Design, Part 3: Geometric Design, 2017
- Department of State Growth, *A Framework for Undertaking Traffic Impact Assessments*, 2007
- Australian Standards, AS2890.1, *Off-Street Parking*, 2004 (AS2890.1:2004)
- Institute of Public Works Engineering Australia (Tasmania Division)/ Local Government Association Tasmania, Tasmanian Standard Drawings, 2012 (LGAT Standard Drawings)

# 2. Existing Conditions

## 2.1 Subject Site Transport Network

For the purposes of this report, the transport network in the local vicinity of the subject site consists of Cascade Road, McRobies Road, Degraves Street and Apsley Street.

### 2.1.1 Cascade Road

Cascade Road connects between Macquarie Street and Strickland Avenue. It is a collector road that provides access to a large residential and commercial catchment in South Hobart. The posted speed limit of Cascade Road is 50-km/h.

Cascade Road carries approximately 9,300 vehicles per day[1] east of the McRobies Road junction.

**Figure 3 Cascade Road/ McRobies Road Junction**


[1] Source: City of Hobart traffic data, 2014.

### 2.1.2 Degraves Street

Degraves Street is a local residential street that provides one-way connectivity between Degraves Street and Apsley Street. The Historic Female Factory site is located mid-way along Degraves Street. Degraves Street and Apsley Street provide the sole return journey connection between the Hobart Refuse site and Cascade Road.

An on-street cycle lane has been installed along the southern side of Degraves Street, with on-street parking spaces clearly line marked adjacent to the cycle lane.

Degraves Street carries all traffic that travels from McRobies Road, Symes Street, Louden Street, Apsley Road and other connecting roads due to the one-way connection through to Cascade Road. Based on the residential catchment of Degraves Street, surrounding land use, etc., then the estimated traffic volume on Degraves Street is in the order of 1,100 vehicles per day (one-way flow).

Weekend traffic volume is reasonably dominant on Degraves Street due to its connectivity to the McRobies Gully refuse site, as well as the tourist attraction of the Female Factory.

Degraves Street adjacent to the Female Factory is shown in Figure 4.

**Figure 4 Degraves Street**

### 2.1.3 McRobies Road

McRobies Road provides connectivity between Cascade Road and Hobart City Council's refuse site. It also provides access to Degraves Street and Symes Street and a small residential catchment along its length.

Council traffic data indicates that McRobies road carries approximately 1,300 vehicles per day between Louden Street and Symes Street.

Due to topography, McRobies Road connects to Cascade Road at a T-junction that only permits right turn entry only. No exit manoeuvres are permitted. The roundabout is shown in Figure 3.

McRobies Road

**Figure 5 McRobies Road near Site Access Road Junction Location**

### 2.1.4 Apsley Street

Apsley Street is a one-way residential street that connects between Degraves Street and Cascade Road. It provides access to Tara Street. Degraves Street and Apsley Street provide the sole return journey connection between McRobies Road (including the Hobart Refuse site) and Cascade Road.

Council traffic data indicates that Apsley Street carries approximately 1,100 vehicles per day (one-way flow from Degraves Street to Cascade Road).

## 2.2 Mount Wellington Transport Network

In the broader context of the development, the transport network also consists of Huon Road, Pillinger Drive and Pinnacle Road. These roads provide the only access to the summit of Mount Wellington.

### 2.2.1 Pinnacle Road

Pinnacle Road provides access to Mount Wellington, connecting to Pillinger Drive in Fern Tree. It provides the only vehicular access to the summit of Mount Wellington. Pinnacle Road has a number of relatively straight sections that connect to a series of tight bends as it traverses up Mount Wellington.

The typical road width of Pinnacle Road is approximately 5.0 to 5.5 metres, with wider sections through the tight bends.

A series of five gates have been installed on Pinnacle Road. These are used to close the road during periods of heavy snow.

Traffic volumes on Pinnacle Road are highly seasonal. Typically it carries between 380 and 1,600 vehicles per day, with an average of 730 vehicles per day throughout the year. The posted speed limit of Pinnacle Road is 50-km/h.

### 2.2.2 Pillinger Drive

Pillinger Drive connects between Huon Road and Pinnacle Road (at the Bracken Lane junction), connecting Huon Road with access to Mount Wellington. It also provides access for a small residential catchment in Fern Tree.

Pillinger Drive has varying road width between 5 and 6 metres. It has winding geometry and numerous driveway accesses along its length.

### 2.2.3 Huon Road

Huon Road connects between Davey Street and Huon Highway, traversing along the foothills of Mount Wellington, providing access to arears such as South Hobart, Fern Tree, Neika and Kingston. Huon Road provides access to Pillinger Drive in Fern Tree, which provides access to Mount Wellington.

Huon Road carries approximately 4,000 vehicle per day. The posted speed limit varies from 50-km/h at its eastern end to 70-km/h

## 2.3 Road Safety Performance

Crash data can provide valuable information on the road safety performance of a road network. Existing road safety deficiencies can be highlighted through the examination of crash data, which can assist in determining whether traffic generation from the proposed development may exacerbate any identified issues.

The Road safety performance of two sections of the road network were examined: the road network that services the subject site; and the road network that currently accesses the summit of Mount Wellington. The proposed development will alter traffic flows in both locations and therefore it is important to understand the combined impacts of these traffic flow changes.

Crash data was obtained from the Department of State Growth for a 5+ year period between 1st January 2013 and 30th June 2018 for the following roads:

*Local Road Network Near Site*

- Cascade Road between Hillborough Road and Congress Street
- Degraves Street
- Apsley Street
- McRobies Road

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*Mount Wellington Road Network*

- Pinnacle Road
- Pillinger Drive

The findings of the crash data are summarised in the following sections.

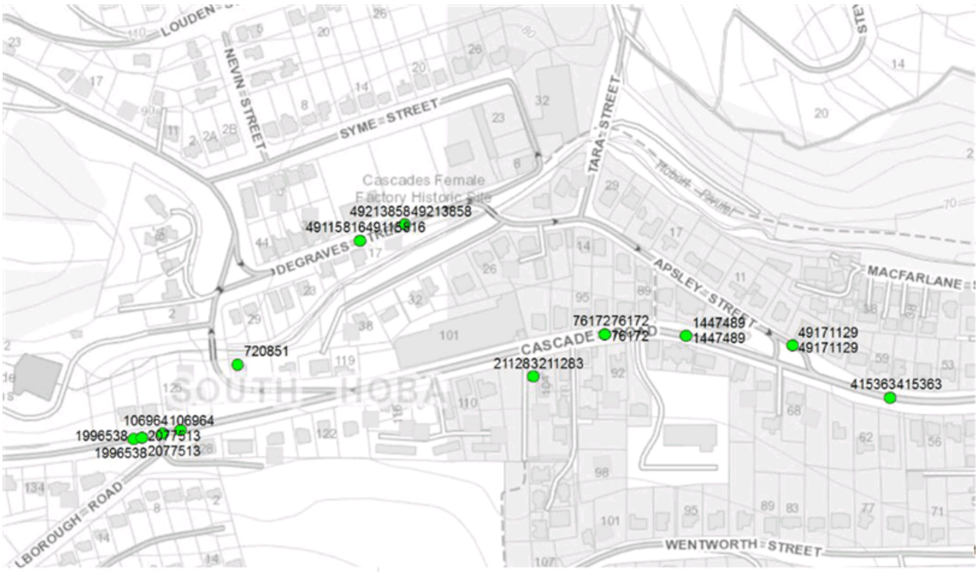
### 2.3.1 Local Road Network Safety Performance

The findings of the crash data in the South Hobart road network relevant to the Base Centre site is summarised as follows:

- There were a total of 10 crashes reported in these roads during this time period.
- Severity: 1 crash involved serious injury; 3 crashes involved minor injury; 2 involved first aid at the scene; and 4 involved property damage only.
- Day of week: there was a relatively even distribution of crashes by day of week. Tuesdays were the only day of the week without a recorded crash. Fridays had the highest crash frequency, with 3 reported crashes.
- Crash types: no real crash trend was evident. 2 crashes involved 'other-manoeuvring'; 2 x 'leaving parking'; and various other crash types.
- Vulnerable road users: 2 crashes involved bicycles (Apsley Street and Cascade Road); 2 crashes involved motorcycles (Cascade Road and Degraves Street); no crashes involved pedestrians.
- Crash locations: 7 crashes were reported in Cascade Road; 1 crash was reported in Apsley Street; and 2 crashes was reported in Degraves Street. No crashes were reported in McRobies Road (some crashes were reported within the Council refuse site, however these were not investigated as they do not relate to the connecting road network). The crash locations are shown in Figure 6.

The crash history on Cascade Road is consistent with a busy collector road through an urban environment. The crash rate in the McRobies Road/ Degraves Street/ Apsley Street network is relatively low.

**Figure 6 South Hobart Crash Locations**




### 2.3.2 Mount Wellington Road Safety Performance

The findings of the crash data in the Mount Wellington road network (Pillinger Drive and Pinnacle Road) is summarised as follows:

- There were a total of 30 crashes were reported during this time.
- Severity: 2 crashes involved serious injury; 4 crashes involved minor injury; 1 crash involved first aid at the scene; and 23 crashes involved property damage only
- Day of week: Weekend crash rates were higher than weekdays. Saturday had the highest crash rate, with 9 reported crashes, followed by Sundays with 5 reported crashes. Weekday crashes varied between 2 and 4 crashes.
- Time of day: the majority of crashes were reported between 7:00am and 7:00pm (26 crashes). 4 crashes were reported during the evening, between 9:00pm and 11:00pm.
- Month: Crash rates appear to be seasonal, with a higher rate during warmer months (particularly during the beginning of the year). The crashes by month of year is shown in Figure 8.
- Crash types: The majority of crashes involved vehicles leaving the carriageway (14 crashes total, comprising of various off-road and loss of control crashes). 7 crashes involved a 'head-on'

collision; 4 involved 'other-manoeuvring', 3 involved 'rear-end' collisions; and various other crash types.

- Vulnerable road users: 4 crashes involved motorcyclists; no crashes involved pedestrians or bicyclists.
- Crash locations: Crashes were relatively evenly disbursed along Pinnacle Road and Pillinger Drive. Some clusters of crashes were noted at some tight bends and the car park at the summit. The crash locations are shown in Figure 10.

The crash rate on Pillinger Drive and Pinnacle Road is of concern. The incidence of 'head-on' collisions is unusual in a low speed low volume road. This is likely due to the narrow road width, lack of pullover area and winding geometry. Weather conditions and seasonal trends also appear to play a role with crash rates.

**Figure 7 Mount Wellington Crashes by Day of Week**

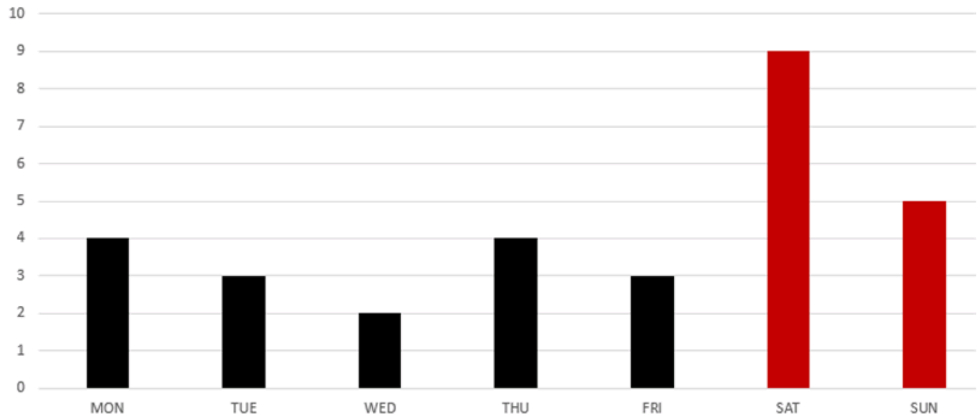


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**Figure 8 Mount Wellington Crashes by Month**

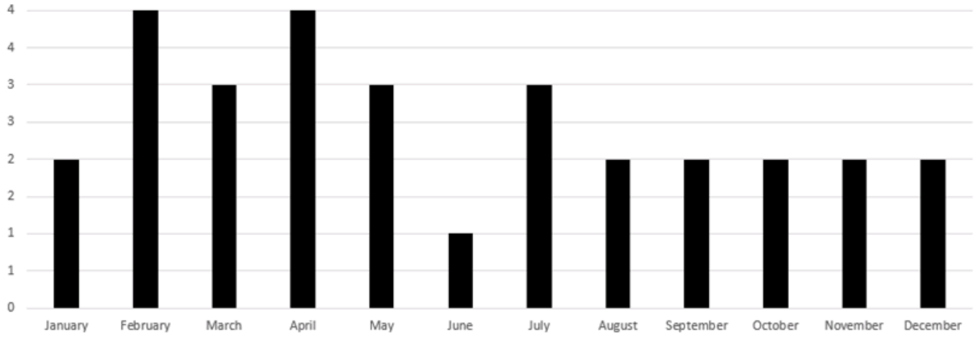


**Figure 9 Mount Wellington Crash Types**

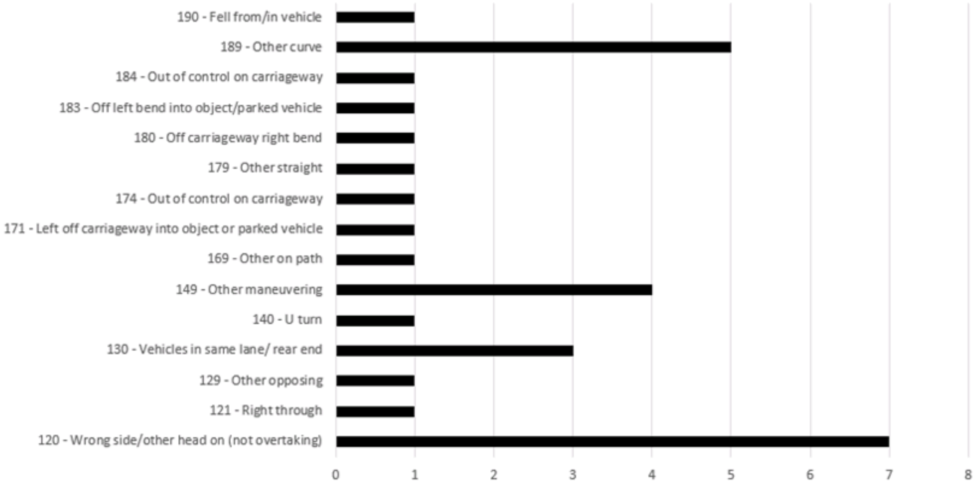

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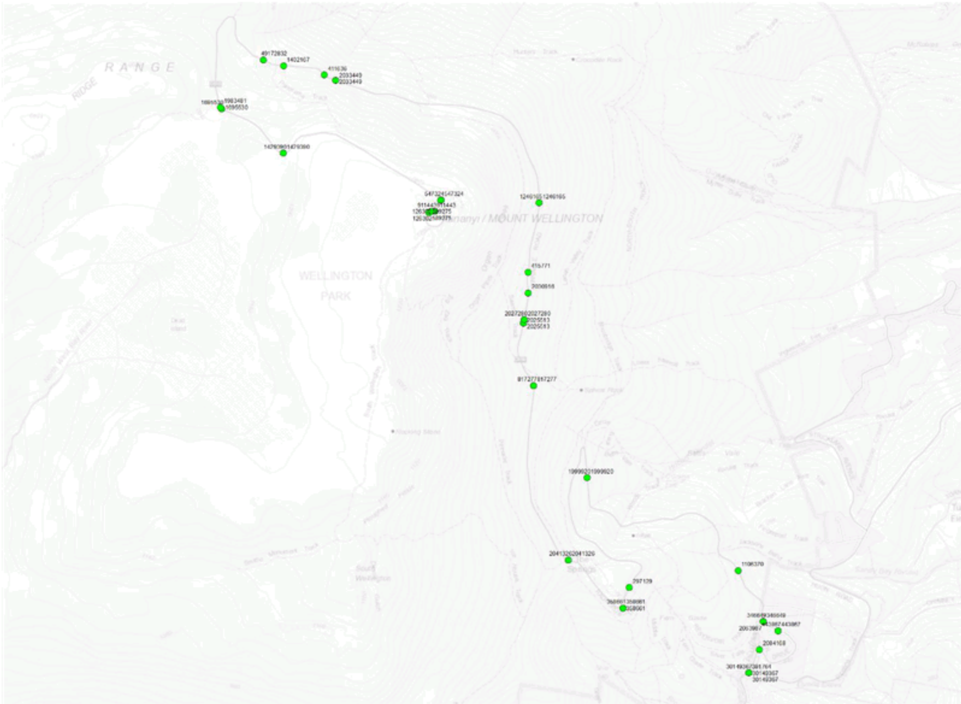
**Figure 10 Mount Wellington Crash Locations**



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# 3. Proposed Development

## 3.1 Development Proposal

The proposed development involves the construction of a base station for a cable car that connects to the summit of Mount Wellington. The development includes the construction of a new road that connects to McRobies Road.

### 3.1.1 Base Station

The development consists of the following components:

*Platform Level*

| | |
|---|---|
| ▪ Air-conditioned space | 215 $m^2$ |
| ▪ Toilets | 55 $m^2$ |
| ▪ External platform area & veranda | 266 $m^2$ |

*Staff Level*

| | |
|---|---|
| ▪ Staff area | 283 $m^2$ |
| ▪ Toilets | 31 $m^2$ |

*Loading Level*

| | |
|---|---|
| ▪ Machine room | 270 $m^2$ |

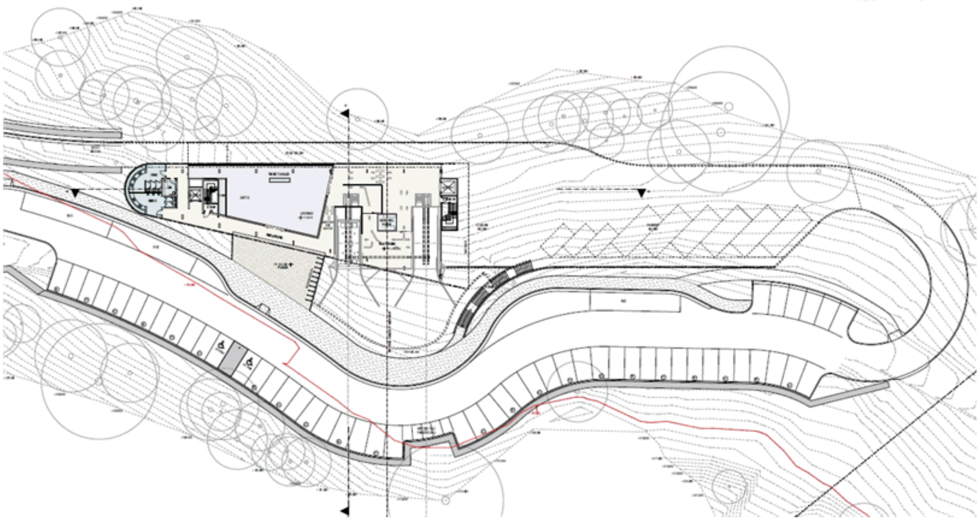
*Car Parking*

- 52 car parking spaces (including 5 x staff spaces and 2 x disabled parking spaces).
- 3 car parking spaces for drop-off and pick-up, located adjacent to the base station on the entry road.
- 6 minibus parking spaces (8.8m). 45-degree spaces located adjacent to the base station on the return exit road through the site.
- 3 bus/ coach parking spaces – parallel to the main access entry road.
- 5 motorcycle parking spaces.
- Bicycle parking for 20 bicycles, located immediately adjacent to the main entrance to the base station.

The proposed development access road and car parking layout are shown in Figure 11 Figure 12.

**Figure 11 Overall Site Layout Plan**

**Figure 12 Base Station Road Layout and Car Parking**



### 3.1.2 Proposed Transport Infrastructure Changes

A new access road is required to service the base site. This road link road will be an S4 class sealed rural road and is designed to follow existing 4WD/ fire trails where practical. It joins the Main Fire Trail and the high-voltage transmission lines at the boundary of Wellington Park.

The access road will connect to McRobies Road, near its northern end at the existing roundabout near the McRobies Gully Waste Management Centre and extends approximately 2.3 kilometres to the Base Station site. The existing junction of the access road with McRobies Road is shown in Figure 5. The modifications to the roundabout are shown in Figure 13.

**Figure 13 Base Station Access Road Alignment**

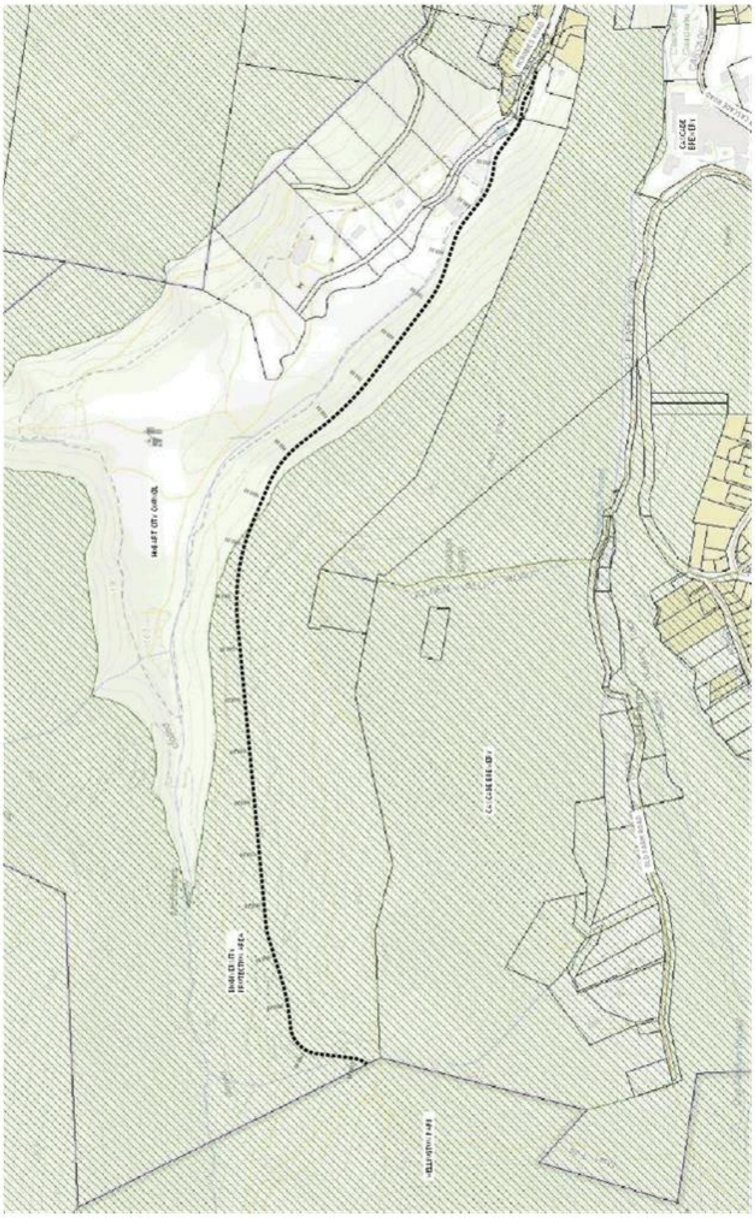


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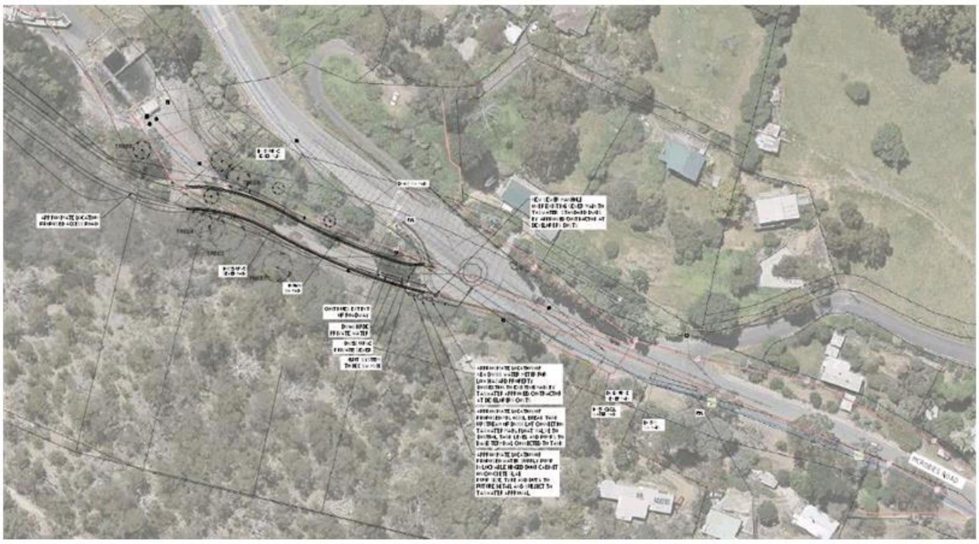
**Figure 14 McRobies Rd Roundabout**



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# 4. Traffic Impacts

## 4.1 Traffic Generation

### 4.1.1 Daily Traffic Generation

The traffic generation of the development was derived from first principles. The analysis of the traffic generation derived from patronage forecasts is summarised in Table 1. The traffic generation in Table 1 is divided into three scenarios: minimum, average and maximum.

The daily traffic volumes were based on patronage forecasts and estimates of vehicle arrival types. Estimates of number of passengers per passenger vehicle were based on surveys undertaken on Mount Wellington in 2017. Passenger numbers per coach/ bus are based on licenced capacities of bus types.

It can be seen from Table 1 that the daily traffic generation of the development is likely to be between 398 and 611 vehicles per day, with an average of 505 vehicles per day.

**Table 1 Daily Traffic Generation Calculations**

| | Minimum | Average | Maximum |
|---|---|---|---|
| Total forecasted MWCC customers per annum | 395,623 | 470,979 | 546,336 |
| Wholesale customers arriving by bus/ coach/ tour – 40% | 158,249 | 188,392 | 218,534 |
| Tourists and local customers arriving by private vehicle/ taxi – 60% | 237,374 | 282,588 | 327,802 |
| People per coach/ bus | 24 | 39.5 | 55 |
| People per vehicle | 3.2 | 3.3 | 3.4 |
| Total bus/ coach per annum (one-way movements) | 2,877 veh | 5,991 veh | 9,106 veh |
| Total car/ taxi per annum (one-way movements) | 69,816 veh | 86,127 veh | 102,438 veh |
| Total vehicles per annum (one-way movements) | 72,693 veh | 92,118 veh | 111,544 veh |
| **Total forecast vehicle trips per day (two-way movements)** | **398 vpd** | **505 vpd** | **611 vpd** |

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#### 4.1.2 Peak Traffic Generation Calculations

Peak volumes were calculated using the hourly patronage of two similar developments: Scenic World in the Blue Mountains; and Table Mountain Aerial Cableway in Cape Town.

Scenic World is a private, family owned tourist attraction located in Katoomba in the Blue Mountains, New South Wales, (approximately 100 kilometres west of Sydney). Scenic World has four main attractions, the Scenic Railway, the Scenic Skyway, the Scenic Cableway and Scenic Walkway a 2.4 km elevated boardwalk through ancient rainforest.

Table Mountain Aerial Cableway (TMAC) is located in Cape Town, South Africa. It caters for up to 880 passengers per hour and spans a vertical distance of 765 metres.

The typical hourly flow multipliers for Scenic World and TMAC by season and time of day are summarised in Table 2. These multipliers were used to determine the peak hourly flows of the proposed development during summer and winter seasons.

**Table 2 Hourly Demands by Season**

| | | 8-9am | 9-10am | 10-11am | 11-12pm | 12-1pm | 1-2pm | 2-3pm | 3-4pm | 4-5pm | 5-6pm | 6-7pm | 7-8pm | 8-9pm | 9-10pm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Weekday Summer Average | Hourly multiplyer | - | 100% | 135% | 160% | 185% | 145% | 150% | 125% | 75% | 50% | 50% | 17% | 8% | - |
| | Hourly volume | 0 | 37 | 50 | 60 | 69 | 54 | 56 | 47 | 28 | 19 | 19 | 6 | 3 | 0 |
| Weekend Summer Average | Hourly multiplyer | 65% | 65% | 88% | 164% | 124% | 95% | 98% | 82% | 49% | 33% | 33% | 11% | 5% | 3% |
| | Hourly volume | 43 | 43 | 59 | 109 | 83 | 63 | 65 | 55 | 33 | 22 | 22 | 7 | 3 | 2 |
| Weekday Winter Average | Hourly multiplyer | - | 108% | 125% | 125% | 120% | 100% | 135% | 110% | 53% | 24% | - | - | - | - |
| | Hourly volume | 0 | 39 | 45 | 56 | 43 | 36 | 49 | 40 | 19 | 9 | 0 | 0 | 0 | 0 |
| Weekend Winter Average | Hourly multiplyer | 73% | 73% | 98% | 116% | 135% | 105% | 109% | 91% | 55% | 36% | 36% | 12% | 6% | - |
| | Hourly volume | 44 | 44 | 59 | 70 | 81 | 63 | 65 | 55 | 33 | 22 | 22 | 7 | 4 | 0 |

The peak hourly traffic generation is summarised in Table 3. It can be seen that the weekend peak will be in the order of 109 vehicles per hour during summer weekends (between 11:00am and 12:00pm). The winter peak will be lower, in the order of 81 vehicles per hour (12:00pm to 1:00pm).

Weekday peaks will be lower than weekend peaks: 69 vehicles per hour during summer months (12:00pm to 1:00pm) and 56 vehicles per hour during winter months (11:00am to 12:00pm).

The traffic generation during normal commuter peak periods will be relatively low: 44 vehicles per hour during the morning peak period (8:00am to 9:00am) and 22 vehicles per hour during the evening peak period (5:00pm to 6:00pm).

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**Table 3 Peak Traffic Generation Calculations**

| | Summer | Winter |
|---|---|---|
| Peak forecast vehicle trips per hour, two-way movements. Based on Sunday hourly volumes in Table 2. | Weekend 11:00-12:00pm: 109 vph | Weekend 12:00-1:00pm: 81 vph |
| Peak forecast vehicle trips per hour, two-way movements, peak period 2:00-3:00pm. Based on Monday hourly volumes in Table 2. | Weekday 12:00-1:00pm: 69 vph | Weekday 11:00-12:00pm: 56 vph |
| Commuter AM network peak vehicle trips per hour, two-way movements, peak period 8:00-9:00am. Based on Monday hourly volumes in Table 2. | AM weekday peak: 43 vph | AM weekday peak: 44 vph |
| Commuter PM network peak vehicle trips per hour, two-way movements, peak period 5:00-6:00am. Based on Monday hourly volumes in Table 2. | PM weekday peak: 22 vph | PM weekday peak: 22 vph |

## 4.2 Trip Distribution

The trip distribution is considered in two components:

- Local trip distribution associated with the Base Site access; and
- Mount Wellington trip distribution associated with reduced traffic on Pillinger Drive/ Pinnacle Road.

The trip distribution for each of these networks is examined in the following sections.

### 4.2.1 Local Trip Distribution

All traffic generation of the development site will access the site via the new access road connecting to McRobies Road. The majority of traffic would therefore access the site from Hobart CBD via Cascade Road/ McRobies Road to the site. The redesigned intersection of McRobies Road and Cascade Road will result in a reduction of traffic utilising Degraves Street and Apsley Street.

The greatest impacts will therefore be experienced in Cascade Road. The increased traffic volumes on Cascade Road are summarised in Figure 15, Figure 16, Figure 17, and Figure 18 for summer weekday, summer weekend, winter weekday and winter weekend flows respectively.

It can be seen that whilst the greatest traffic generation occurs on weekends, this impacts on the local road network are lower than weekday flows. This is due to the higher traffic volumes on the road network

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on weekdays and the relatively low traffic volume increase due to the traffic generation of the development proposal.

Importantly the traffic generated by the development has little impact on commuter peak periods of Cascade Road (particularly during the morning peak where no traffic is generated by the development).

**Figure 15 Cascade Road Hourly Weekday Average Volumes (Summer)**

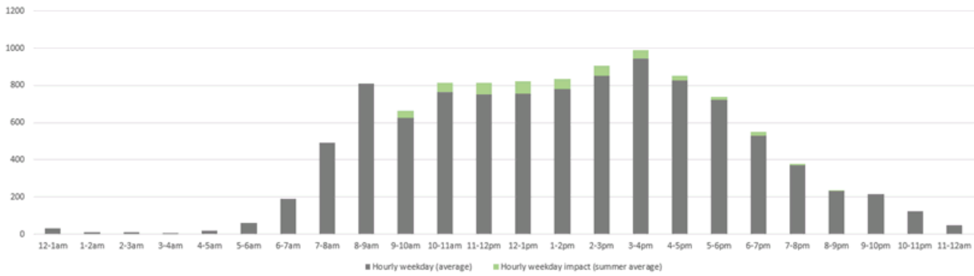



**Figure 16 Cascade Road Hourly Weekend Average Volumes (Summer)**

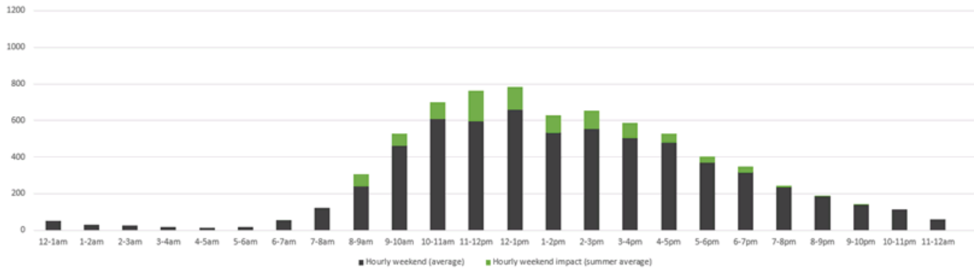



**Figure 17 Cascade Road Hourly Weekday Average Volumes (Winter)**

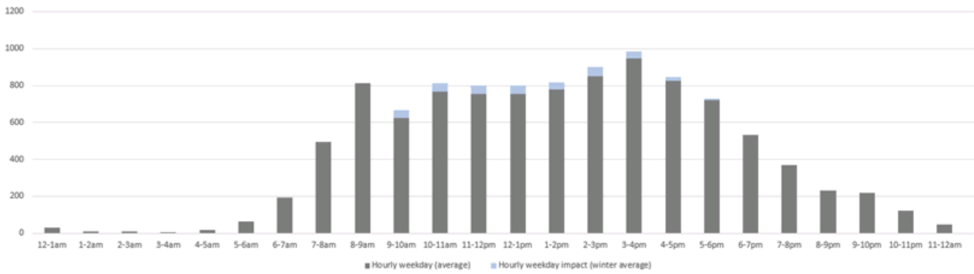
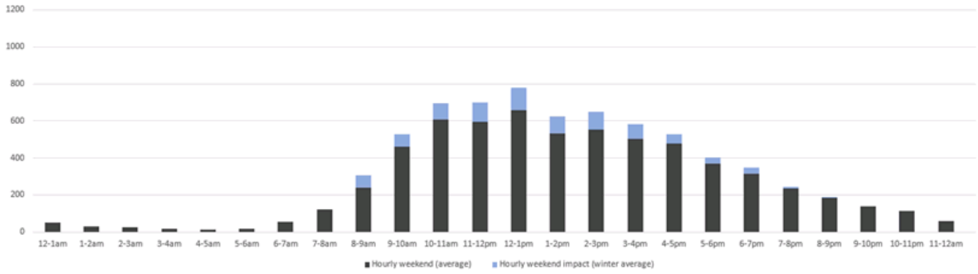


**Figure 18 Cascade Road Hourly Weekend Average Volumes (Winter)**




#### 4.2.2 Mount Wellington Trip Distribution

The development proposal will reduce the number of vehicular trips on Mount Wellington access roads. It will also facilitate access to Mount Wellington summit during periods when Pinnacle Road is closed during periods of heavy snowfall.

A simplistic scenario is that all traffic generated by the development in the local road network near the subject site will be removed from the Mount Wellington road network. This would equate to an average reduction of 505 vehicles per day (corresponding to the average traffic forecasts provided in Table 1).

A comprehensive and more realistic scenario is to acknowledge that the proposed facilities at the summit of kunanyi/ Mt Wellington will generate increased visitor demand and that some of this demand will continue to use the existing Mount Wellington road network. Based on patronage forecasts, it is likely that the net traffic volume reduction will be an average of 445 vehicles per day. With the average daily volume on Pinnacle Road of 730 vehicles per day, this represents a significant decrease in traffic flow.

The traffic generation of the development includes buses and coaches that do not currently access the summit of Mount Wellington. The use of buses and coaches at the development site will further reduce the number of vehicles used to access the mountain, both using the Pinnacle Road access and the proposed base station (ie. buses and coaches will carry more visitors per vehicle than cars).

### 4.3 Access Impacts

The development involves modifications to an existing intersection. The primary access to the development site will be via a junction at the northern end of McRobies Road.

The Acceptable Solution A3 of Clause E5.5.1 of the Planning Scheme states that "*The annual average daily traffic (AADT) of vehicle movements, to and from a site, using an existing access or junction, in an area subject to a speed limit of 60km/h or less, must not increase by more than 20% or 40 vehicle movements per day, whichever is the greater*".

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In this case, the development will generate an average of up to 611 vehicles per day, which is greater than 40 vehicle movements per day (being the greater of 20% of the existing volume and 40 vehicles per day). The Acceptable Solution A1 of Clause E5.5.1 is therefore not met.

The Performance Criteria P3 of Clause E5.5.1 of the Planning Scheme states:

> *"Any increase in vehicle traffic at an existing access or junction in an area subject to a speed limit of 60km/h or less, must be safe and not unreasonably impact on the efficiency of the road, having regard to:*
>
> *(a) the increase in traffic caused by the use;*
>
> *(b) the nature of the traffic generated by the use;*
>
> *(c) the nature and efficiency of the access or the junction;*
>
> *(d) the nature and category of the road;*
>
> *(e) the speed limit and traffic flow of the road;*
>
> *(f) any alternative access to a road;*
>
> *(g) the need for the use;*
>
> *(h) any traffic impact assessment; and*
>
> *(i) any written advice received from the road authority".*

The following is relevant to the proposed development:

a. The increased traffic generation is estimated to be in the order of up to 611 vehicles per day. This equates to a peak increase of up to 109 vehicles per hour (occurring on weekends). This level of traffic generation can be absorbed in the surrounding road network without any significant loss of efficiency. Noting particularly that a roundabout has been installed at the junction with McRobies Road, thus providing an efficient traffic control device to cater for development traffic and existing refuse site traffic.

b. The traffic generated by the development will be tourist traffic. This is consistent with traffic in the surrounding road network (noting that other tourist attractions, such as the Female Factory and Cascade Brewery, are located nearby).

c. The existing junction is a roundabout. Existing traffic flows at the roundabout are in the order of 130 vehicles per hour (two-way flow), with all traffic currently travelling to and from Council's refuse site. The introduction of up to 109 vehicles per hour on the access road at the roundabout will maintain a high level of service for the intersection with relatively balanced flows on all three legs of the roundabout.

d. McRobies Road is a minor collector road that plays an important role in access to Council's refuse site, as well as other key destinations (including the Female Factory, childcare centre, commercial sites and residential properties). The additional traffic generated by the development will not increase the traffic flow beyond its existing capacity.

e. The speed limit of McRobies Road is 50-km/h. The existing traffic volumes are estimated to be in the order of 1,300 vehicles per day near the junction. The speed and volume environment of McRobies Road is suitable for the increase in traffic generated by the proposed development

f. The only alternative access to the site is via Old Farm Road. This road is not considered suitable due to its geometry and narrow construction.

g. The need for the use has not been assessed in this report.

h. This report documents the findings of a traffic impact assessment.

i. No written advice has been received by the road authority (Council).

Based on the above assessment, the proposed development meets the requirements of Performance Criteria P3 of Clause E5.5.1 of the Planning Scheme.

## 4.4 Sight Distance

The Acceptable Solution A1 of Clause E5.6.4 of the Planning Scheme states that "*an access or junction must comply with the Safe Intersection Sight Distance shown in Table E5.1*".

McRobies Road has a posted speed limit of 50-km/h. Table E5.1 of the Planning Scheme requires a Safe Intersection Sight Distance of 80 metres for a vehicle speed of 50-km/h. The 'vehicle speed' is the actual or recorded speed of traffic passing along the road and is the speed at or below which 85% of passing vehicles travel. The 85$^{th}$ percentile speed adjacent to the site's access was estimated to be 30-km/h from a small sample of vehicle speeds obtained with a hand-held radar device. This is due to the presence of the roundabout itself, as well as the gates to Council's refuse site and traffic calming devices installed to the west of the roundabout. This would require a lower sight distance value (noting that the Planning Scheme does not provide values for vehicle speeds below 50-km/h).

The available sight distance exceeds 80 metres to the southeast along McRobies Road (shown in Figure 19) and approximately 55 metres to the northwest. Acceptable Solution A1 of Clause E5.6.4 of the Planning Scheme is met to the southeast. Acceptable Solution A1 is met to the northwest when the Planning Scheme requirements are interpolated back to an 85$^{th}$ percentile speed of 40-km/h or less. It is further noted that the access is at a junction that is controlled by a roundabout, which has very low operating speeds and where vehicles are only required to give way to the right.

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**Figure 19 McRobies Road Sight Distance**

## 4.5 Design of Vehicular Access

The roundabout at McRobies Road was tested using a 'long rigid bus' (14.5 metre) and 'single unit truck' (12.5 metre) templates for inward and outward movements. This is shown in Figure 20 and Figure 21 respectively. This demonstrates that the roundabout can cater for these design vehicles associated with the development.

The Acceptable Solution A1 of Clause E6.7.2 of the Planning Scheme states:

> *"Design of vehicle access points must comply with all of the following:*
>
> *(a) in the case of non-commercial vehicle access; the location, sight distance, width and gradient of an access must be designed and constructed to comply with section 3 – "Access Facilities to Off-street Parking Areas and Queuing Areas" of AS/NZS 2890.1:2004 Parking Facilities Part 1: Off-street car parking;*
>
> *(b) in the case of commercial vehicle access; the location, sight distance, geometry and gradient of an access must be designed and constructed to comply with all access driveway provisions in section 3 "Access Driveways and Circulation Roadways" of AS2890.2 - 2002 Parking facilities Part 2: Off-street commercial vehicle facilities".*

In this case the access is a junction to an existing roundabout. The road has been designed in accordance with Institute of Public Works Engineering Australia (IPWEA)/ Local Government Association Tasmania

(LGAT) Tasmanian Standard Drawings for rural roads. Low Speed Rural Roads are roads having many curves with radii less than 150 metres. Operating speeds on the curves generally vary from 50–70 km/h.

On the approach to the roundabout the road cross-section will consist of a 6-metre sealed carriageway (2 x 3.0 metre lanes), 0.4 metre shoulder and 0.5 to 1.0 metre verge. These cross-section elements are in accordance with LGAT Standard Drawings: S4. The LGAT Standard Drawing standards have been adopted by local government in Tasmania as the basis for urban and rural road design. The LGAT requirements are summarised in Figure 24.

The slope at the connection with the roundabout (the vehicular access to the site) has a slope that conforms to the requirements of AS2890.2. The geometry accommodates the swept paths of the design vehicle (long rigid bus) and the sight distance complies with the requirements of AS2890.2 (noting that the sight distance complies with the high requirements of Austroads for a road junction).

The access therefore complies with the requirements of Acceptable Solution A1 of Clause E6.7.2 of the Planning Scheme.

**Figure 20 McRobies Road Roundabout – 14.5m Bus Movements**

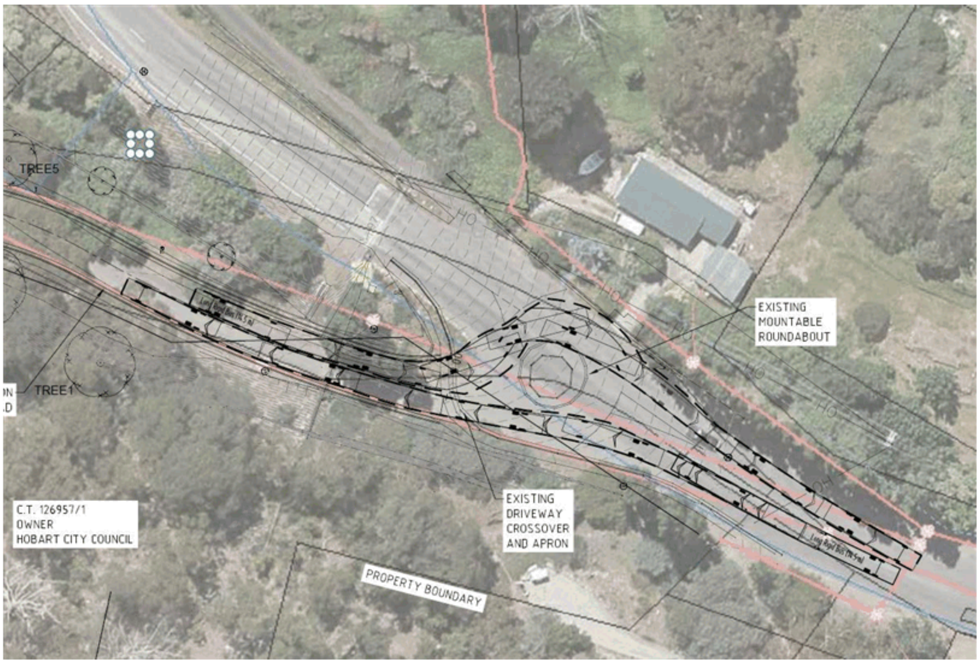
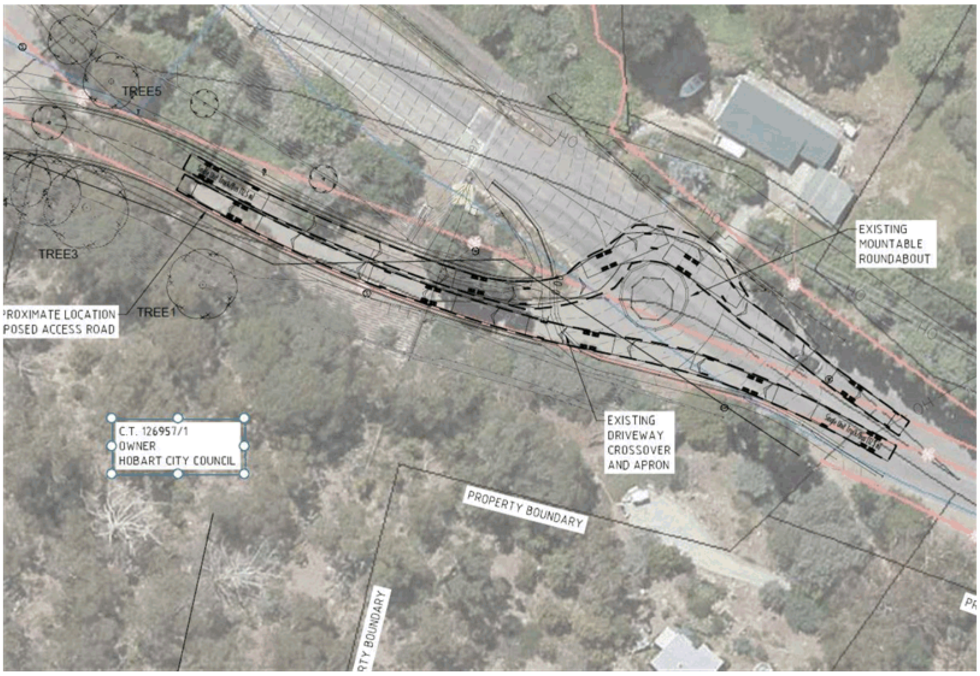


**Figure 21 McRobies Road Roundabout – 12.5m Truck Movements**




## 4.6 Pedestrian Impacts

The development proposal is located in a relatively isolated area and is therefore unlikely to generate significant pedestrian trips in the existing road network.

Access to the site is possible via existing walking tracks within the Wellington Park area however. It is possible that some pedestrian trips may originate on these tracks.

## 4.7 Road Safety Impacts

The cable car base station will alter the traffic associated with Mount Wellington access. It will reduce the pressure of traffic accessing Mount Wellington and transfer a large portion of traffic to the road network associated with the Base Station in South Hobart. This will have obvious road safety benefits with the identified road safety issues associated with Pillinger Drive and Pinnacle Road (notably the high incidence of head-on collisions).

The proposal also provides the following road safety benefits:

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- Reduced distance of travel for vehicles to access Mount Wellington Summit. The reduction of travel distance reduces the exposure risk for vehicle collisions. The reduced travel distance is a result of a reduction of vehicle traffic on Huon Road, Upper Davey Street, Pillinger Drive and Pinnacle Road.
- Reduced incidence of 'head-on' collisions in particular which currently have an unusually high frequency on Pillinger Drive and Pinnacle Road. This is due to the reduced traffic volumes on Pinnacle Road and Pillinger Drive.
- The route to the base station is on roads that are constructed to a higher geometric standard that the existing Pillinger Drive and Pinnacle Road access.

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# 5. Parking Assessment

## 5.1 Parking Provision

The development provides the following parking provision:

- 52 x car parking spaces – 90-degree spaces along the main access entry road. Two of these are disabled parking spaces. Approximately every second parking space has an electric charging station.
- 6 x mini bus parking spaces (8.8m) – 45-degree spaces located adjacent to the base station on the return exit road through the site.
- 3 x bus/ coach parking spaces.
- Lay off zone for drop-off and pick-up, located adjacent to the base station on the entry road.

These parking spaces are shown in Figure 12.

## 5.2 Planning Scheme Requirements

The Acceptable Solution A1 of E6.6.1 of the Planning Scheme states: "*the number of on-site car parking spaces must be no less than and no greater than the number specified in Table E6.1*". The development is classified as Use Class 'Transport Depot and Distribution[2]' under the Planning Scheme. The requirements of Table E6.1 for Transport Depot and Distribution are 3.5 spaces to each 100m$^2$ of floor area.

With a total floor area of 850 m$^2$ (total floor area excluding the machine room), the parking requirement is 30 spaces. The parking provision is greater than 30 spaces and therefore the development does not comply with the requirements of Acceptable Solution A1 of Clause E6.6.1 of the Planning Scheme.

The Performance Criteria P1 of Clause E6.6.1 of the Planning Scheme states:

> *"The number of on-site car parking spaces must be sufficient to meet the reasonable needs of users, having regard to all of the following:*
>
> *(a) car parking demand;*
>
> *(b) the availability of on-street and public car parking in the locality;*
>
> *(c) the availability and frequency of public transport within a 400m walking distance of the site;*
>
> *(d) the availability and likely use of other modes of transport;*
>
> *(e) the availability and suitability of alternative arrangements for car parking provision;*

[2] Use Class definition: "Use of land for distributing goods or passengers, or to park or garage vehicles associated with those activities, other than Port and shipping. Examples include an airport, bus terminal, council depot, heliport, mail centre, railway station, road or rail freight terminal and taxi depot".

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*(f) any reduction in car parking demand due to the sharing of car parking spaces by multiple uses, either because of variation of car parking demand over time or because of efficiencies gained from the consolidation of shared car parking spaces;*

*(g) any car parking deficiency or surplus associated with the existing use of the land;*

*(h) any credit which should be allowed for a car parking demand deemed to have been provided in association with a use which existed before the change of parking requirement, except in the case of substantial redevelopment of a site;*

*(i) the appropriateness of a financial contribution in lieu of parking towards the cost of parking facilities or other transport facilities, where such facilities exist or are planned in the vicinity;*

*(j) any verified prior payment of a financial contribution in lieu of parking for the land;*

*(k) any relevant parking plan for the area adopted by Council;*

*(l) the impact on the historic cultural heritage significance of the site if subject to the Local Heritage Code;*

*(m) whether the provision of the parking would result in the loss, directly or indirectly, of one or more significant trees listed in the Significant Trees Code".*

The following sections address the relevant components of the Performance Criteria (noting that components e, h, I, and j are not relevant to the development):

### 5.2.1 P1(A):E6.6.1 – Car Parking Demand

The actual car parking demand relates to the nature of the use. Detailed patronage forecasting has been undertaken with respect to the operation of the development. The weekend peak traffic generation of the site has been estimated to be 109 and 81 vehicles per hour for summer and winter seasons respectively. This equates to 55 and 42 vehicle arrivals per hour (assuming that vehicle arrivals and departures are equal throughout the peak period). This traffic generation will include 2 bus/ coach vehicles and up to 10 drop off vehicles (such as taxis).

The peak vehicle arrivals seeking a parking space are therefore likely to be in the order of 43 vehicles per hour. With a turnaround time of approximately one-hour duration (consisting of 14 minutes cable car journey up Mount Wellington, 30 minutes average stay on the summit, and 14 minutes return cable trip), then the parking accumulation would be approximately 55 spaces accounting for delays associated with parking manoeuvring, ticketing, lining up, gift shop, etc.

The provision of 55 parking spaces accounts for this peak parking demand (52 spaces plus 3 drop-off/ pick-up spaces). Note that the site also provides a total of 10 bus parking spaces (6 x minibus and 3 x larger bus/coach) to accommodate bus arrivals, and a drop-off zone to accommodate short term parking associated with drop-off and pick up activity (taxis, cars, etc). The provision for bus parking reduces car parking demands by enabling alternative modes of transport to and from the site.

#### 5.2.2 P1(B):E6.6.1 – On-Street Parking and Public Car Parking

Note that the parking provision *exceeds* the requirements of Table E6.1. The actual parking provision is considered adequate to cater for the likely needs of the development.

No nearby on-street car parking is available. There are no public car parking facilities other than a small area located at the western end of Old Farm Road.

#### 5.2.3 P1(C):E6.6.1 – Public Transport

No public transport services operate through the site, however tour operators will provide bus and coach services to and from the site on a regular basis. Parking is provided for buses on-site.

#### 5.2.4 P1(D):E6.6.1 – Other Modes of Transport

It is possible that some customers will access the site via the existing trails located within the Wellington Park area. It is further noted that the developers propose to upgrade the trails in the area.

Some pedestrian and cyclist trips may therefore be generated to and from the site.

#### 5.2.5 P1(F):E6.6.1 – Shared Parking Principles

Shared parking principles are not applicable.

#### 5.2.6 P1(G):E6.6.1 – Existing Parking Deficiency

Not applicable.

#### 5.2.7 P1(K):E6.6.1 – Adopted Parking Plan

Not applicable.

#### 5.2.8 P1(L):E6.6.1 – Local Heritage Code

Not applicable.

#### 5.2.9 P1(M):E6.6.1 – Significant Trees

Not applicable.

#### 5.2.10 Performance Criteria Summary

The proposed development provides more parking than required under Table E6.1 of the Planning Scheme. Based on the analysis of arrivals during peak periods, the parking provision is considered to be adequate.

The requirements of Performance Criteria P1 of Clause E6.6.1 are therefore met.

### 5.3 Accessible Parking

The Acceptable Solution A1 of Clause E6.6.2 of the Planning Scheme states:

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*"Car parking spaces provided for people with a disability must:*

*(a) satisfy the relevant provisions of the Building Code of Australia;*

*(b) be incorporated into the overall car park design;*

*(c) be located as close as practicable to the building entrance".*

The Centre is classified as a Class 6 building under the Building Code of Australia[3]. Class 6 buildings require the provision of 1 disabled parking space for every 50 car parking spaces or part thereof. This is a requirement for 2 parking spaces.

A total of 2 disabled parking spaces are provided within the car park, thus complying with the requirements of the BCA Code and Acceptable Solution A1 of Clause E6.6.2 of the Planning Scheme.

## 5.4 Motorcycle Parking

The Acceptable Solution A1 of Clause E6.6.3 of the Planning Scheme states:

*"The number of on-site motorcycle parking spaces provided must be at a rate of 1 space to each 20 car parking spaces after the first 19 car parking spaces except if bulky goods sales, (rounded to the nearest whole number). Where an existing use or development is extended or intensified, the additional number of motorcycle parking spaces provided must be calculated on the amount of extension or intensification, provided the existing number of motorcycle parking spaces is not reduced".*

Based on parking provision of 58 parking spaces, a total of 2 motorcycle parking spaces should be provided. The total provision of 5 motorcycle parking spaces therefore satisfies the requirements of Acceptable Solution A1 of Clause E6.6.3 of the Planning Scheme.

## 5.5 Bicycle Parking

The Acceptable Solution A1 of Clause E6.6.4 of the Planning Scheme states:

*"The number of on-site bicycle parking spaces provided must be no less than the number specified in Table E6.2".*

There is no bicycle parking requirement for Use Class 'Transport Depot and Distribution'. The development is likely to attract bicycles however, due to its location near mountain bike trails. The development therefore provides bicycle racks near the main entrance of the site (10 racks = 20 bicycle spaces).

[3] Class 6 buildings are typically shops, restaurants and cafes. They are a place for the sale of retail goods or the supply of services direct to the public.

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## 5.6 Car Parking Layout

Acceptable Solution A1 of Clause E6.7.5 states that "*The layout of car parking spaces, access aisles, circulation roadways and ramps must be designed and constructed to comply with section 2 "Design of Parking Modules, Circulation Roadways and Ramps" of AS/NZS 2890.1:2004 Parking Facilities Part 1: Off-street car parking and must have sufficient headroom to comply with clause 5.3 "Headroom" of the same Standard*".

The proposed development provides parking within an access road that wraps around the subject site. The car parking has been designed in accordance with AS2890.1 for User Class 2[4], thus complying with the requirements of Acceptable Solution A1 of Clause E6.7.5 of the Planning Scheme.

[4] AS2890.1 User Class 2: "Long-term city and town centre parking, sports facilities, entertainment centres, hotels, motels, airport visitors (generally medium term parking)".

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# 6. Wellington Park Management Plan

The subject site is located within the Wellington Park Management Plan area. The Wellington Park Management Plan contains management objectives, policies and actions that further the purposes for which the Park is reserved under the Wellington Park Act 1993, namely:

a. The provision of recreational and tourism uses and opportunities consistent with the purposes specified in paragraphs (b) to (e);

b. The preservation or protection of the fauna or flora contained in or on the land;

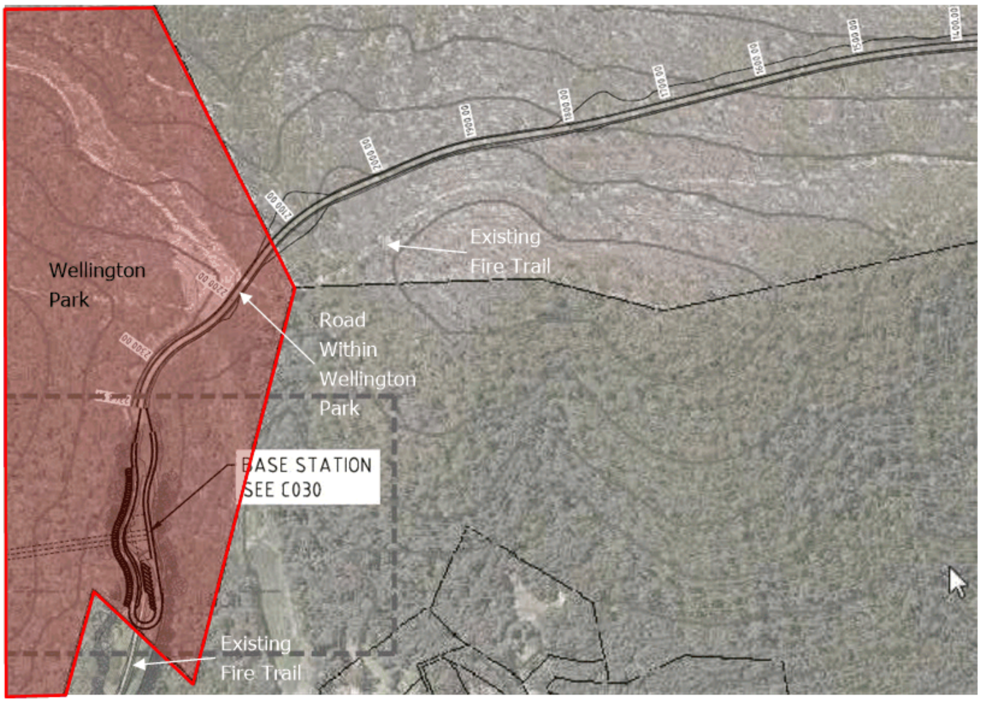
c. The preservation or protection of the natural beauty of the land or of any features of the land of natural beauty or scenic interest;

d. The preservation or protection of any features of the land being features of historical, Aboriginal, archaeological, scientific, architectural or geomorphological interest;

e. The protection of the water catchment values of the land.

The development involves the construction of a public road connecting between the base station and McRobies Road. Several hundred metres of this public road will be constructed within the Wellington Park area. This is shown in Figure 22.

**Figure 22 Wellington Park Road Alignment**




Acceptable Solution A7.1 of the Wellington Park Management Plan states:

> *The design capacity and construction of any public road or access are in accordance with Australian Roads Standards (Austroads) appropriate to a public road in a mountain environment.*
>
> *And*
>
> *Road speed controls or other measures are utilised in order to minimise road kill.*
>
> *And*
>
> *The design and maintenance of any fire trail meets the standards required by a Bushfire Management Strategy prepared in accordance with this Management Plan.*

This report deals with the first and second aspects of A7.1 (design standard and speed controls). Bushfire Management is covered in a separate Bushfire Management Study relating to the project.

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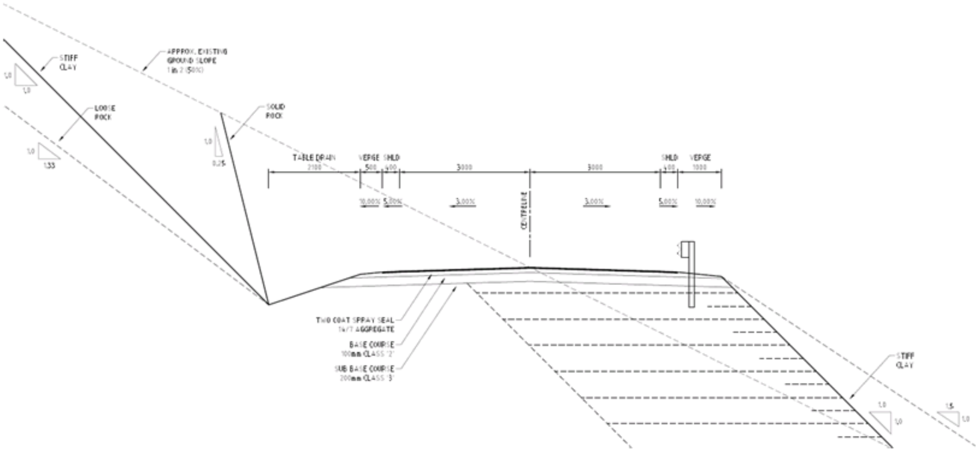
## 6.1 Road Design

The alignment of the proposed road accessing the site follows an existing fire trail for the majority of its length within the Wellington Park area. The road has been designed in accordance with Institute of Public Works Engineering Australia (IPWEA)/ Local Government Association Tasmania (LGAT) Tasmanian Standard Drawings for rural roads. Low Speed Rural Roads are roads having many curves with radii less than 150 metres. Operating speeds on the curves generally vary from 50–70 km/h. The proposed alignment is shown in Figure 22. The typical road cross section is shown in Figure 23.

**Figure 23 Typical Road Cross-Section**




The typical road cross-section will consist of a 6-metre sealed carriageway (2 x 3.0 metre lanes), 0.4 metre shoulder and 0.5 to 1.0 metre verge. Safety barrier will be used to protect steep embankments. These cross-section elements are in accordance with LGAT Standard Drawings: S4. The LGAT Standard Drawing standards have been adopted by local government in Tasmania as the basis for urban and rural road design. The LGAT requirements are summarised in Figure 24.

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**Figure 24 LGAT Rural Road Design Requirements**

TABLE 2

| CODE* | A.A.D.T. | EXISTING INFRASTRUCTURE (w) SEALED TRAFFIC WIDTH | NEW DEVELOPMENT (w) SEALED TRAFFIC WIDTH | SEALED SHOULDER | GRAVEL SHOULDER | VERGE | PAVEMENT WIDTH | LOGGING ROUTE | HEAVY VEHICLES |
|---|---|---|---|---|---|---|---|---|---|
| S1 | < 30 | 4000 (S) | – | – | 500 | NO | 5000 | NO | < 5% |
| S2 | 30 – 100 | 4000 (S) | – | – | 1000 | NO | 6000 | YES < 5% | < 5% |
| S3 | 100 – 300 | 5500 (D) | 5500 (D) | 400 Refer Note 7. | 500 | 500 | 6500 | YES | < 10% |
| S4 | 300 – 2000 | 6000 (D) | 6000 (D) | 400 Refer Note 7. | 500 | 500 | 7000 | YES | > 10% |
| S5 | > 2000 | 7000 (D) | 7000 (D) | 500 | 500 | 500 | 9000 | YES | > 10% |

*To satisfy a Road Class (eg. S3) the capability to comply with all A.A.D.T, LOGGING ROUTE, HEAVY VEHICLE and BUS ROUTE is necessary.
(S) – SINGLE LANE
(D) – DUAL LANE

Austroads provides guidance on road cross section. It states that the number and width of traffic lanes have a significant influence on the safety, capacity and comfort of driving. The number and width of traffic lanes usually depends on (with specific comments relating to these elements of the design in square brackets):

- Traffic volumes [low]
- Number of trucks [low]
- Presence of cyclists [low]
- Crash rates [new road, not applicable]
- Driver expectations [high]
- Available road reserve width [constrained due to terrain geography]
- Side friction generated by abutting access [none]

The road cross-section accounts for all above factors for a rural low-speed road. Austroads provides specific guidance for rural road widths as follows:

- Traffic lane widths 2 x 3.1m = 6.2 metres
- Shoulder widths 2 x 1.5m = 3.0 metres
- Total road width 9.2 metres

The proposed road cross-section does not require with the Austroads specifications listed above. The design meets the intent of the Austroads design requirements and meets the LGAT Standard Drawings requirements (which have been adopted by Local Government for the purpose of road design standards in Tasmania).

The road design was therefore assessed against Performance Criteria P7.1 of the Wellington Park Management Plan. P7.1 states:

*Where use or development involves a new or upgraded road or access, or increased use of an existing road or access, appropriate measures must be put in place, in consultation with the relevant road authority, to ensure that the free movement and safety of traffic, people and wildlife are protected.*

In this case, the following is relevant with respect to the proposed road design:

- The road has been designed in accordance with LGAT Standard Drawings. The LGAT Standard Drawings have been adopted by local government. Hobart City Council (as the road authority) refer to the LGAT Standard Drawings for the design of new roads in the Hobart municipality. The road design, when applied appropriately, should provide an acceptable level of safety and efficiency for all road users.
- The design speed of the new road shall be 60-km/h. This is considered a safe and appropriate speed for the surrounding environment and geometry of the road.
- The majority of the road design within the Wellington Park area is located on an existing fire trail alignment. Much of the area has been cleared for the fire trail and thus there is a reduced impact on wildlife. Note that the impacts associated with flora and fauna are covered in the North Barker report for the development.
- New paths are proposed around the proposed development for bicycles and pedestrians. This will improve accessibility and mobility to, from and around the development site.

Based on the above assessment, the development meets the requirements of Performance Criteria P7.1 of the Wellington Park Management Plan.

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# 7. Conclusions

This traffic impact assessment (TIA) investigated the traffic and parking impacts of a proposed cable car base station development in Wellington Park, South Hobart.

The proposed cable car will travel up 1,000 metres of incline to Mount Wellington summit. The base station will provide the car parking and the starting point for an alternative method for travel to the summit of Mount Wellington. The base station will be accessed via a new road to be constructed from the existing roundabout towards the western end of McRobies Road.

The key findings of the TIA are summarised as follows:

- The development will provide a total of 52 on-site car parking spaces, 7 mini-bus parking spaces, 3 bus parking spaces, and a short-term parking area for pick-up and drop-off (3 spaces).
- The parking provision meets the requirements of Performance Criteria P1 of Clause E6.6.1 of the Planning Scheme (noting that the development provides a greater number of parking spaces than required under the Acceptable Solution A1 of Clause E6.6.1).
- Electric charging stations are provided at approximately every second parking space.
- Parking for 20 bicycles is provided.
- The development is likely to generate between 400 and 600 vehicles per day, with a weekend peak between 80 and 110 vehicles per hour. Weekday peak volumes will be lower, with approximately 22 vehicles per hour.
- The development will reduce traffic volumes on Pinnacle Road and Pillinger Drive on Mount Wellington by providing an alternative method for visitors to reach the summit.
- There is a relatively high crash rate on Pinnacle Road (notably a disturbingly high proportion of head-on collisions). The reduction of traffic on Pinnacle Road and Pillinger Drive will have positive road safety benefits through the reduced reliance on these roads to access the pinnacle.
- The development will also provide reduced distance of travel for vehicles to access Mount Wellington Summit. The route to the base station will also be constructed to a higher geometric standard that the existing Pillinger Drive and Pinnacle Road access. The reduction of travel distance will also provide positive road safety and environmental benefits through reduced vehicle-kilometres travelled.
- A new public road is required to service the base site. This road link road will be an S4 class sealed rural road (IPWEA/ LGAT Standard design). It connects the Main Fire Trail and the high-voltage transmission lines at the boundary of Wellington Park to McRobies Road, a distance of approximately 2.3 kilometres.
- The development meets the requirements of Performance Criteria P7.1 of the Wellington Park Management Plan in terms or road design and safety. Approximately 300 metres of this road is located within the Wellington Park area.

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Based on the findings of this report the proposed development is supported on traffic and parking grounds.

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**Document Status**

| Revision | Author | Review | Date |
|---|---|---|---|
| 0 | Keith Midson | Zara Kacic-Midson | 1 November 2018 |
| 1 | Keith Midson | Zara Kacic-Midson | 5 November 2018 |
| 2 | Keith Midson | Zara Kacic-Midson | 13 May 2019 |
| 3 | Keith Midson | Zara Kacic-Midson | 14 June 2019 |
| 4 | Keith Midson | Zara Kacic-Midson | 23 September 2019 |
| 5 | Keith Midson | Zara Kacic-Midson | 29 October 2019 |
| 6 | Keith Midson | Zara Kacic-Midson | 18 May 2021 |

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Keith Midson
Midson Traffic Pty Ltd
25 Hinman Drive
Kingston TAS 7050
0437 366 040

23 September 2019

Irene Duckett
IreneInc Planning and Urban Design
49 Tasma Street
North Hobart TAS 7000

Dear Ms Duckett,

**100 PINNACLE ROAD, MOUNT WELLINGTON & 30 MCROBIES ROAD, SOUTH HOBART – CABLEWAY AND ASSOCIATED FACILITIES, INFRASTRUCTURE AND WORKS**

**RESPONSE TO COUNCIL RFI**

This letter has been prepared in response to City of Hobart's request for further information regarding the abovementioned development. Specifically, this letter responds to items T1 to T7 in Council's RFI letter dated 3rd July 2019.

## 1. T1 – Uses within the Pinnacle Building

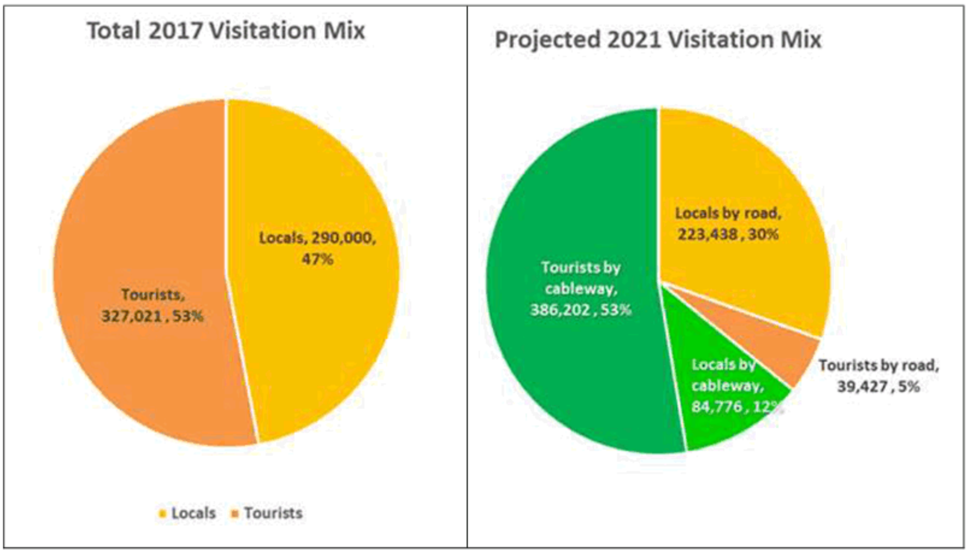
*"An amended Traffic Impact Assessment that provides justification as to why uses within the Pinnacle Building, which will generally be open to the public, will not increase traffic movement to the Pinnacle and parking demand in the area. The current TIA assumes a reduction in traffic and parking on the basis that the uses in the Pinnacle Building will be accessed via the cable car only. Given that the Pinnacle Building will be accessible via an existing public road it would be reasonable to assume that some patrons will arrive by means other than the cable car".*

The uses within the Pinnacle building will largely be accessible to the public and will replace existing facilities (such as the observation deck). Components such as the restaurant will require bookings that include a cable car ticket and therefore will not increase traffic on Pinnacle Road.

The traffic generation associated with the development assumes an overall increase in patronage to the Pinnacle. This accounts for both vehicles and cable car visitation to the Pinnacle. This is detailed in Section 4.2.2 of the TIA.

The forecast visitation of the Pinnacle by tourists and locals for 2017 (without cableway) and 2021 (with cableway) scenarios is provided in Figure 1.

**Figure 1 Visitation Summary**




It can be seen that the total patronage to the summit increases from 617,021 to 733,843 people. The use of the cableway results in a net reduction of traffic on Pinnacle Road.

## 2. T2 – McRobies Rd/ Cascade Rd

*"The Traffic Impact Assessment recommends improvements to the McRobies Road/ Cascade Road intersection and two-way traffic flow onto McRobies Road; however, under section 1.2.2 of the planning report it is identified that these works do not form part of the development application. Accordingly, clarification is required as to whether these form part of the application.*

*If they are to be included, then please provide an updated planning report.*

*If they are not to be included, please provide an amended Traffic Impact Assessment which demonstrates that these works are not necessary for the proposal to demonstrate consistency with the Road and Railway Assets Code under the Hobart Interim Planning Scheme 2015. An amended suite of civil engineering drawings and master plan image which excludes these works should also be provided".*

The modifications of Cascade Road and McRobies Road are not proposed for the development. References to the intersection modifications have been removed in the TIA.

The Road and Railway Assets Code is not relevant for the McRobies Road/ Cascade Road intersection as it is not immediately adjacent to the subject site.

In simplistic terms however, the traffic volumes are forecast to increase in accordance with the volumes provided in Table 3 of the TIA (maximum weekend peak generation of 109 vehicles per hour between 11:00am and 12:00pm during summer). The increase in traffic volume on McRobies Road and Degraves Street will not cause this part of the transport network to reach capacity noting that the forecast traffic volume is two-way flow. Half of this peak traffic flow enter via McRobies Road at Cascade Road (approximately 55 vehicles per hour) and exit via Degraves Street (approximately 55 vehicles per hour) due to its one-way nature, with the inward flow utilising McRobies Street.

## 3. T3 – Traffic Generation Calculations

*"An amended Traffic Impact Assessment that provides further details on:*

*(a) how survey results were used to derive estimated number of passengers per vehicle as outlined in section 4.1.1;*

*(b) the basis for adopting a traffic distribution of 40% buses/coaches/tours and 60% private vehicles/taxis;*

*(c) how the hourly multipliers in Table 2 were derived noting that the TIA indicated information from Scenic World and Table Mountain Aerial Cableway were used to derived figures;*

*(d) whether there is adequate car parking at the base station based on that information and the visitor information requested in P4".*

The responses to these sections are outlined as follows:

a. Surveys were undertaken at the Springs of all vehicles travelling towards the summit at various times in summer and winter months between 2014 and 2016. The surveys recorded the number of people per vehicle.

b. The proportion of buses/ cars was based on comparable Australian operators, notably Scenic World and Sky Rail.

c. The hourly multipliers in Table 2 (relating to seasonal variation throughout the year) were obtained from Scenic World and Table Mountain Aerial Cableway patronage data.

d. The car parking was derived from first principles as outlined in Section 5.2.1 of the TIA. The parking was derived from the forecast peak demands and the duration of stay associated with the cableway. On this basis, the car parking provision is considered to be adequate.

## 4. T4 – Cascade Rd/ McRobies Rd Intersection

*"Commentary within the Traffic Impact Assessment on how the giveway priority of the upgraded intersection of Cascade Road and McRobies Road as shown in the Gandy and Roberts Drawing 13.0041 – CO50 Rev 1 and CO51 Rev 1, is intended to function.*

*Please note that if these works are to not comprise part of the application (see request T2) then this information may not be required".*

These works do not comprise part of the application.

## 5. T5 – McRobies Rd Roundabout Design

*"Commentary within the Traffic Impact Assessment on the compliance of the proposed roundabout at the junction of the new access road with McRobies Road as shown in the Gandy and Roberts Drawing 13.0041 – CO35 Rev 1, with Austroads Guide to Road Design Part 4B: Roundabouts".*

The roundabout at McRobies Road is an existing roundabout. The southern leg of the roundabout will be used to access the site. The roundabout has been designed to cater for the movements of heavy vehicles (and cars with trailers) to undertake U-turn manoeuvres at times when the refuse site is closed.

Being an existing roundabout, its design has been assumed to comply with the requirements of Austroads. The southern leg of the roundabout connects to the roundabout at an angle less than 90-degrees. This is due to site constraints due to terrain. This leg of the roundabout was tested using design vehicles (14.5m bus and 12.5m truck) as detailed in the response to T6 and included in the revised TIA.

## 6. T6 – Bus Swept Paths

*"Turning path diagrams demonstrating that a bus can negotiate the proposed roundabout at the function of the new access road with McRobies Road as shown in the Gandy and Roberts Drawing 13.0041 – CO35 Rev 1".*

Swept paths are provided in the TIA for 14.5m buses and 12.5m trucks. These swept paths demonstrate that the roundabout can cater for the movement of these vehicles. The swept paths are included in the revised TIA.

## 7. T7 – Commercial Vehicles

*"Details of the type and size of commercial vehicles that will be using the access road and confirmation that the grade of the access road will comply with Clause E6.7.2 under the Hobart Interim Planning Scheme 2015".*

Coaches and small trucks will access the site. The maximum grade of the access road is 20.08% (chainage 115.28 to 240.0). Several sections of 20% grade are also present along the access roads' length.

The access road between the McRobies Road roundabout to the site has been designed as a public road in accordance with the requirements of LGAT road design standards as outlined in Section 6.1 of the TIA. The grades of the road are relatively common in the Greater Hobart area.

Within the site itself (the circulation roadway, parking and loading areas), the circulation roadway and access roads within the site have been designed to cater for the movement of these design vehicles. The maximum grades within this area of the site are less than 15.4% as required by AS2890.2.

Please contact me on 0437 366 040 if you require any further information.

Yours sincerely,

Keith Midson BE MTraffic MTransport FIEAust CPEng EngExec NER

**DIRECTOR**
**Midson Traffic Pty Ltd**

another perspective drafting&design

# View Shed Mapping

# 3D Photomontages

## Proposed Mount Wellington Cable Car, Tasmania

2 January 2020

Prepared For: Mount Wellington Cable Car Company (MWCC) Pty Ltd
3 Salamanca Square
HOBART, TAS 7000

Prepared By: Andrew Strugnell
Another Perspective Pty Ltd
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Ph. (03) 6231-4122

# 1 CONTENTS

# 2 INTRODUCTION & DOCUMENT DETAILS

## 2.1 PRELIMINARY STATEMENT

I, Andrew James Strugnell, of Another Perspective Pty Ltd, am the author of this process report.

I am a qualified Building Designer and Survey Draftsman with more than thirty years' experience collecting and working with survey data, specifically on overshadowing and visualisation.

I have been instructed by MWCC to provide Viewshed Mapping & 3D Photomontages of the project.

## 2.2 PROJECT REFERENCE NUMBER

**Project Number:** AP2019-1702

Disclaimer

All efforts were made both digitally and on the ground, to ensure that the information presented in this report is as accurate as possible. Any errors / omissions were not intended and should be reported to the author for rectification or inclusion (if feasible).

## 2.3 VERSION HISTORY

| Version | Prepared By | Date | Details |
|---|---|---|---|
| 1 | Andrew Strugnell | 2 January 2020 | Initial Report |
| | | | |
| | | | |
| | | | |

## 2.4 ACKNOWLEDGEMENTS

Unless otherwise noted, background maps are courtesy of LIST (State of Tasmania).

# 3 THE PROPOSAL

The proposed development is for a cable car, consisting of a Base Station in a clearing on the Main Fire Trail on the fringe of Wellington Park (accessed by a new road from McRobies Road), linked via a 2.6km cableway to a Pinnacle Centre housing various facilities, situated on the summit of Mount Wellington in Hobart, Tasmania.

The Base Station will house the cableway motor room and backup generator, loading bay and service utilities, along with ticketing office, mountain bike hire and staff amenities.

The Pinnacle Centre will house a mixture of public amenity, hospitality and service infrastructure, and will be access by either the proposed cable car, or via a boardwalk from the existing pinnacle carpark.

The cableway will be supported by three separate towers, tower one and tower two close to the base station (45m and 55m high respectively) and a third tower (tower three) close to the Pinnacle Centre (36m high). The longest span will be 2.1km between tower two and tower three.

# 4 SCOPE

The scope of this report is to provide viewshed diagrams demonstrating potential visibility of the proposed Base Station, cableway and Pinnacle Centre from the surrounding greater Hobart area, to accurately position the provided models of the proposal, and to provide photomontages of the proposed development in photographs taken from various locations around greater Hobart.

# 5 EQUIPMENT / SOFTWARE / DATA / IMAGERY / REFERENCES

The information contained in this report was created from the following plans, documents, photos, on the following software and using the following equipment. All survey data is on GDA and AHD datums.

- Viewshed Modelling completed with Bentley OpenSite Designer 3D CAD software.
- 3D model of base station and Pinnacle Centre provided by JAWS Architects & 1+2 Architecture.
- 3D model of cableway towers, cable cars and cables provided by Riser & Gain.
- Material & colour renders of proposed models provided by Riser & Gain.
- Ground Photos by Ethos Urban P/L (Taken 11 & 12 November 2019, and 27 November 2019).
- Canon EOS 6D 26MP (Full Frame) Digital SLR camera (EF70-200mm & EF16-35mm lens).
- Image editing using Adobe Photoshop.
- Camera location survey coordination by Veris Pty Ltd.
- Mount Wellington summit terrain mesh derived from Point Cloud data by Geoscience Australia.
- Base terrain model (for viewshed mapping) derived from 1” Arc SRTM 1010 DEM-H LIDAR copyright Commonwealth of Australia (Geoscience Australia) 2012.
- Proposal details by Mount Wellington Cableway Company (MWCC website).
- Base maps – LIST – State of Tasmania.

# 6 THE SITE

The proposed development site is on Mount Wellington, within the Wellington Park Reserve. The development site includes the Base Station at the foot of the mountain, the Pinnacle Centre at the summit of the mountain, and the area in between that links the two sites.

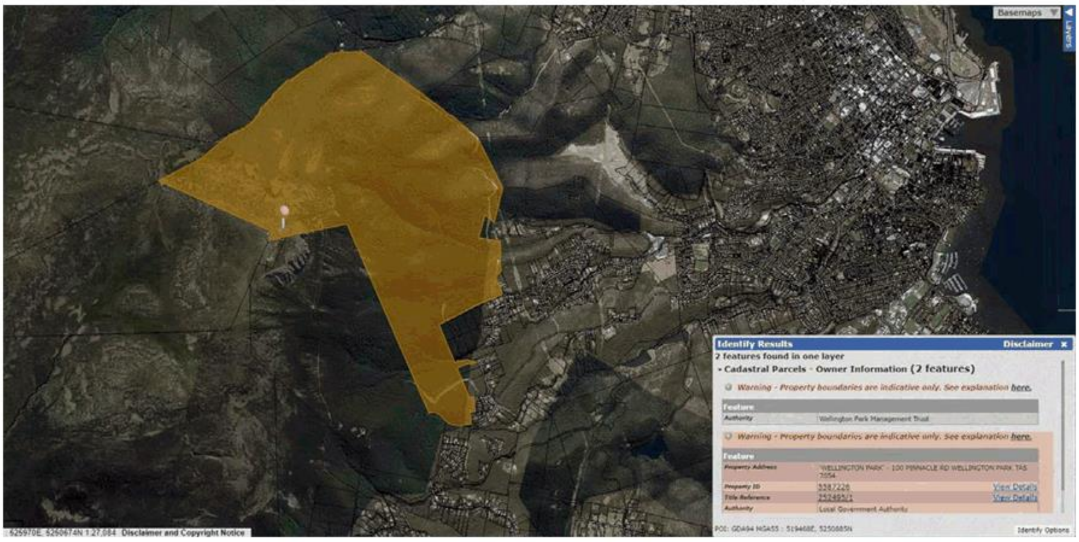



Figure 1. Site Location (List – State of Tasmania)

The following image (figure 2) show the proposed locations for the Base Station, Pinnacle Centre and cableway.


Figure 2. Proposed Base Station, Pinnacle Centre and cableway location (image courtesy of MWCC)

# 7 3D MODELLING PROCESS

## 7.1 TERRAIN MODEL & PROPOSED BASE STATION, PINNACLE CENTRE AND CABLEWAY MODELS

The representative 3D modelling of the bulk and form of the proposed Base Station and Pinnacle Centre was developed and supplied by JAWS architects & 1+2 Architecture, whilst a 3D model of the cableway that links the Base Station and Pinnacle Centre was developed and supplied by Riser & Gain.

A terrain model was prepared by Another Perspective Pty Ltd (derived from LIDAR Point Cloud data) and was combined with the models of the proposed development. Note that all data is on GDA/AHD datums.

Figure 3 shows a representative CAD render of the combined CAD model showing the terrain, proposed Base Station, Pinnacle Centre and cableway.

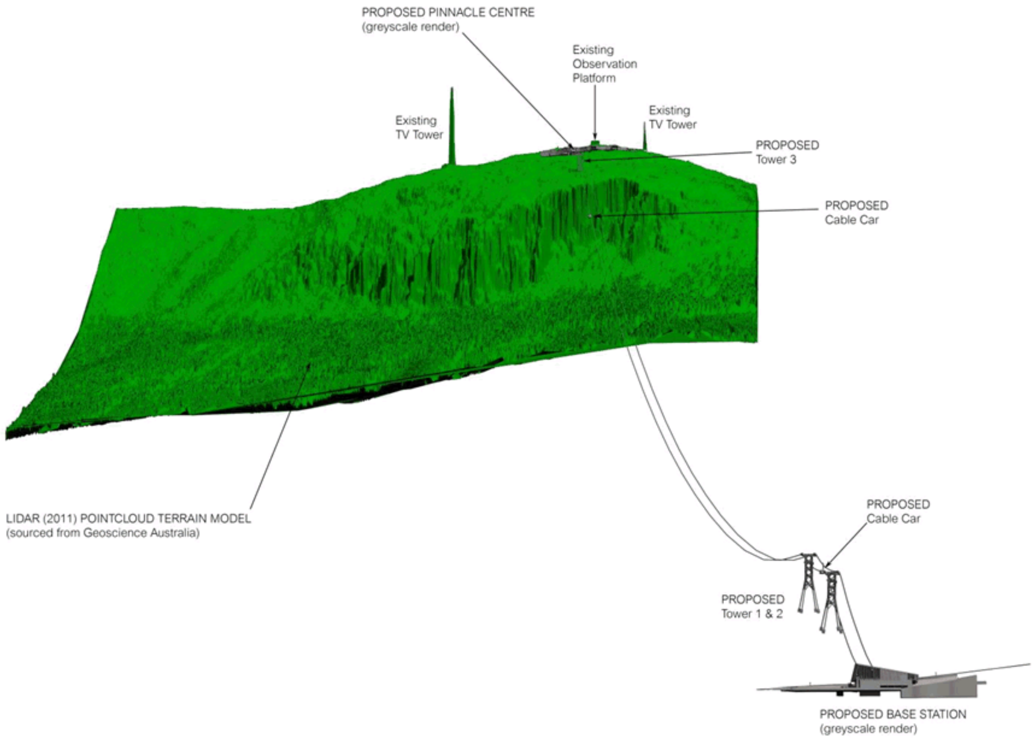



Figure 3. Rendered model of terrain, Base Station, Pinnacle Centre and cableway

# 8 VIEWSHED MAPPING

Viewshed maps are a useful tool in identifying where in an area a specific point may or may not be visible from, providing a mapped representation of the area within which the proposal may have influence on the views. In this instance, viewshed maps were created for various positions on the Base Station, Pinnacle Centre and cableway towers.

Also note that viewshed mapping is not a definitive tool to determine exactly where a point can or cannot be seen, it is a tool to indicate areas where a point is likely or unlikely to be visible, in order to determine suitable locations for further analysis via photo montages.

## 8.1 BASE TERRAIN MODEL

The terrain model area created was approximately 41km east to west by 50km north to south, and was derived from 1" of arc LIDAR data, sourced from Geoscience Australia.

The Base Station, Pinnacle Centre and cableway towers were placed at the correct locations based on the information provided in the architectural documentation and digital data.

The terrain obstruction mapping process considers terrain only, and does not take into consideration the potential obstruction of views from existing vegetation or structures that exist over the modelled area.

The fidelity of the view shed mapping terrain data is also coarse in nature, (equating to an approximate 31 x 24m grid). The result of this is that some terrain features may be flattened, which in turns results in the mapping showing visibility when not actually visible.

As a consequence of all these factors, areas that display as unobstructed, may in fact not allow visibility of the proposal.

Note that the extent of the viewshed maps was limited to the distances listed above (to allow the models to be displayed at a manageable scale). It is possible that there may be visibility beyond the extent of the terrain model however, if it were possible, any visibility would be limited due to the large distances.

Figure 4. 1" Arc gridded terrain model

## 8.2 VIEWSHED MAPS - SOFTWARE OPERATION

This software function takes a 3D coordinate (object position) as input and performs a viewshed analysis on a specified surface terrain model (STM).

The mapping is a worst-case scenario, taken from variety of points on the Base Station, cableway towers and the Pinnacle Centre (points are as shown in the title block of respective viewshed maps).

The coordinate (easting, northing, level) for the each of the selected points on the Base Station, cableway towers and Pinnacle Centre was entered into the software, generating an overlay depicting areas of the STM with a direct line of site to the nominated coordinate.

Viewshed fans were produced for each location. Areas free of shading are those where the view of that point is likely to be obstructed by terrain, whilst conversely, areas shown in shade are those that are likely to have a view of that point (subject to structures and vegetation).

Note that as the mapping is from the selected point only and does not provide an indication of how much of the actual Base Station, cableway tower or Pinnacle Centre might be visible.

The images below show an example of a viewshed fan map for a single point (figure 5), and a set showing combined viewshed fans for all mapped locations (figure 6).

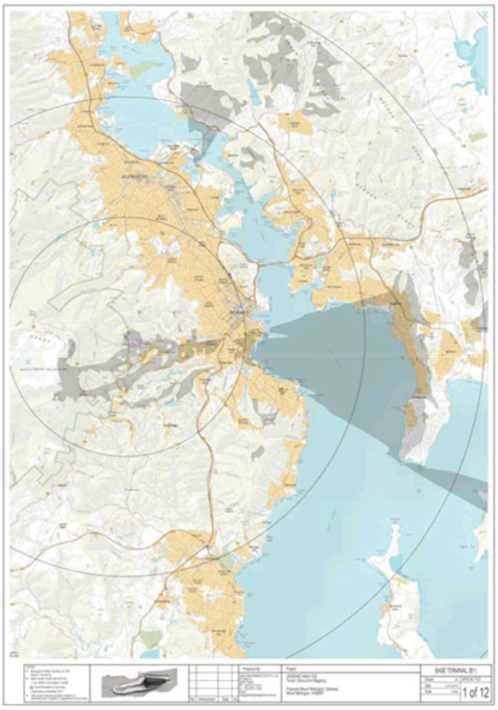



Figure 5. Resultant Viewshed Fan (single point overlaid on base map)

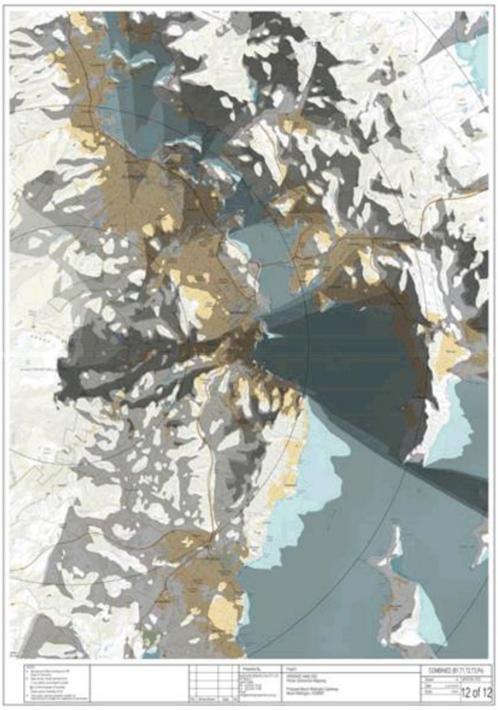



Figure 6. Resultant Viewshed Fans (all points overlaid on base map).

The completed viewshed maps were provided to Ethos Urban to assist in the identification of sites to be considered photomontage production.

Refer to Appendix 1 (Section 10) for the full set of viewshed maps.

# 9 PHOTOMONTAGE PROCESS

## 9.1 PHOTOMONTAGE IMAGE LOCATIONS

Image locations and nominated focal lengths were selected by Ethos Urban. In general, each photo was centred on the existing observation deck.

During site visits by Ethos Urban conducted on 11 & 12 November 2019, and 27 November 2019, photos of the proposed development area were taken from multiple viewpoints at various times of the day around greater Hobart.

For each location, camera position coordinates were collected by Veris, and for locations 1, 3, 4, 5, 6 & 10, some additional coordinated photo control survey points were also collected.

Photos from ten (10) locations were subsequently provided by Ethos Urban for the purpose of preparing photomontages.

| Photomontage | Location | Approx. Distance to Summit | Focal Length | Camera RL (AHD) | Easting | Northing |
|---|---|---|---|---|---|---|
| 1 | Hobart Waterfront (Victoria Dock) | 8.0km | 70mm | 3.92 | 527392.05 | 5252253.60 |
| 2 | Mount Wellington Summit (looking towards City) (ST90 Trig Point) | N/A | 35mm | 1272.13 | 519374.95 | 5250706.04 |
| 3 | South Hobart | 6.2km | 70mm | 57.29 | 527768.13 | 5251034.57 |
| 4 | Kingston Beach | 12.1km | 70mm | 2.64 | 526535.63 | 5240857.74 |
| 5 | Glenorchy (GASP) | 9.2km | 70mm | 4.25 | 523291.16 | 5259200.26 |
| 6 | Salamanca Place | 7.8km | 70mm | 4.98 | 527327.64 | 5251718.72 |
| 7 | Old Springs Hotel | 2.3km | 35mm | 724.43 | 520146.50 | 5248587.26 |
| 8 | Tranmere | 14.7km | 70mm | 5.34 | 534063.97 | 5248936.18 |
| 9 | Rosny Hill Lookout | 10.2km | 70mm | 91.31 | 529262.68 | 5253542.75 |
| 10a | Huon Road | 4.7km | 35mm | 191.05 | 524195.06 | 5250223.22 |
| 10b | Huon Road | 4.7km | 70mm | 191.05 | 524195.06 | 5250223.22 |

Refer to Appendix 2 (Section 11) for Photomontage Locations Map and Photomontage Images.

## 9.2 PHOTOMONTAGE IMAGE GENERATION PROCESS

Photomontages were generated for each location using the method detailed below.

The original JPEG images (as provided by Ethos Urban) were approximately 26 megapixels in size (5472 x 3648 pixels). Due to the distances involved with the majority of the locations and the apparent size of the proposed development within those images at those same distances, rendering the model at this resolution would not have provided an appropriate level of detail.

In order to provide a suitable final image, the size of the base image was doubled to 10944 x 7296 pixels.

Note that increasing the resolution of the original image has no visible effect on the clarity or fidelity of that base image – it is solely done for the purpose of allowing the render of the proposed development to be viewed at an improved resolution.

Also note that due to software limitations it was not possible to import a model that incorporated colours and materials of the proposal. Therefore, this required two renders to be produced from each camera location, one prepared by Another Perspective (grey scale) and the other by Riser & Gain (full materials and colours).

### 9.2.1 CAD VIEW SETUP

The exact position of photographs being taken by Ethos Urban were used to set up CAD views in OpenSite Designer software at each of the surveyed camera locations, using matching focal lengths to that of the original image, and centred on the existing observation deck as per the original image.

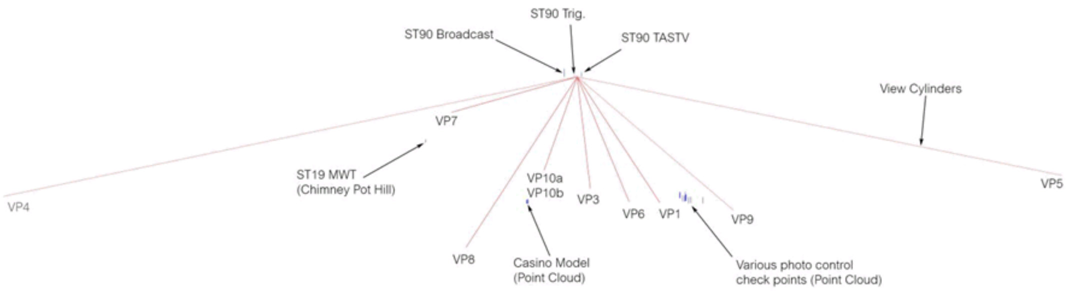



Figure 7. View lines and selected photocontrol.

CAD representations (cylinders) of the view lines and selected control objects (as shown in figure 7) were exported and supplied to Riser & Gain. This allowed Riser & Gain to produce the same rendered images, but also including materials and colours and with the exact same perspective.

This process allowed Another Perspective to provide the most accurate position possible of the development in each image, and only use the Riser & Gain renders for materials, colours and lighting (sunlight).

### 9.2.2 SCALING, POSITIONING & IMAGE EDITING

Figure 8 below shows the render by Another Perspective containing a highly detailed point cloud model of the summit and organ pipes, localised photo control surveyed by Veris, additional photo control (existing TV towers), and a grey scale model of proposed development.

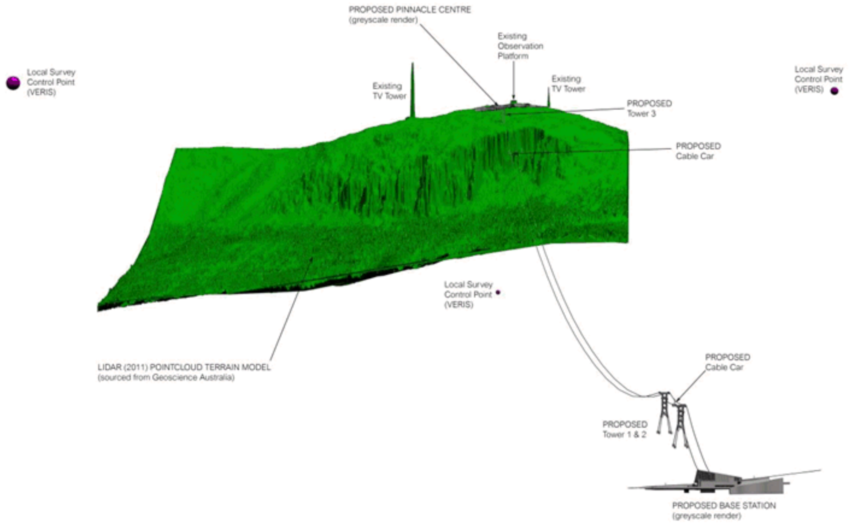



Figure 8. Another Perspective CAD render

Figure 9 below shows the render by Riser & Gain containing localised photo control surveyed by Veris, additional photo control (existing TV towers), and a model of proposed development including materials and colours. The render also incorporates the appropriate date and time of day settings.

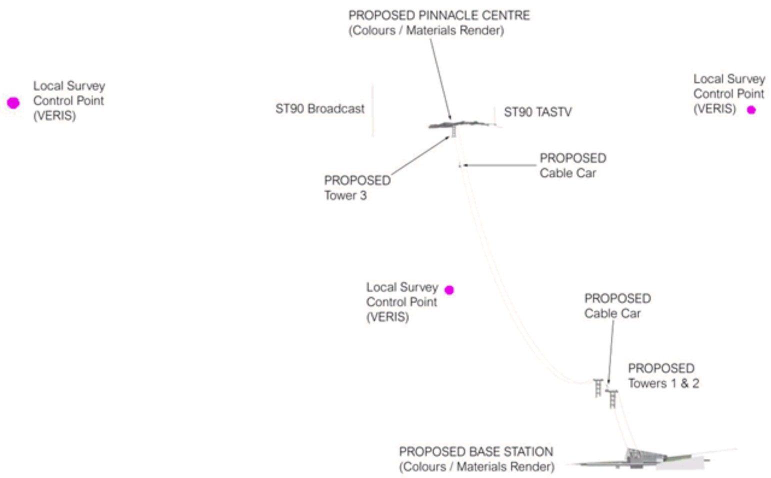



Figure 9. Riser & Gain CAD render

Using photoshop, the initial image rendered by Another Perspective (see figure 8) was adjusted in scale and rotation based on the terrain features and surveyed photo control to match the same features in the base photo (see figure 10 below).


Figure 10. Another Perspective CAD render scaled and rotated to match base photo

Figure 11 is an enlargement of the image above, and demonstrates the high level of accuracy achieved in the match between the terrain model and the silhouette of the summit.

Figure 11. Enlargement demonstrating accuracy of matching summit features

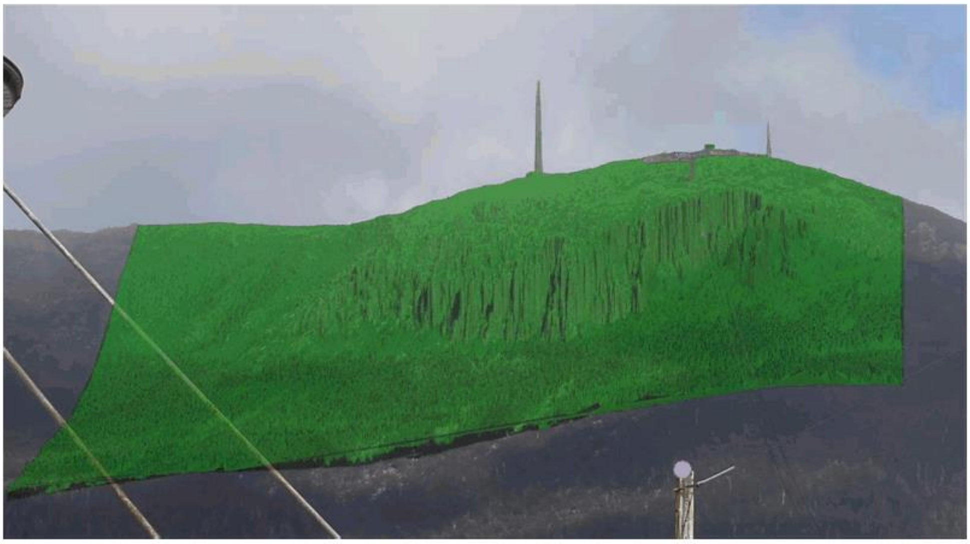


Figure 12. Riser & Gain render scaled and rotated over both original base image and AP rendered image

Figure 13. Riser & Gain rendered image over original base image (pre editing of background)

Note that where appropriate, Photoshop techniques adjusting hue, saturation and exposure settings were used to adjust the render of the proposed development to best match the climatic conditions in the original base image.

Also note that in photomontages 8, 10a & 10b indicative vegetation management has been shown around tower 1 & 2 and from tower 1 to the Base Station.

Figure 14. Final image with existing observation deck removed

To assist in identification of elements of the proposed development, including those that may be hidden by vegetation, structures or terrain, a highlighted outline has been applied to the full extents of the development in each of the final images as per figure 15 below.

Figure 15. Final image with proposed development highlighted

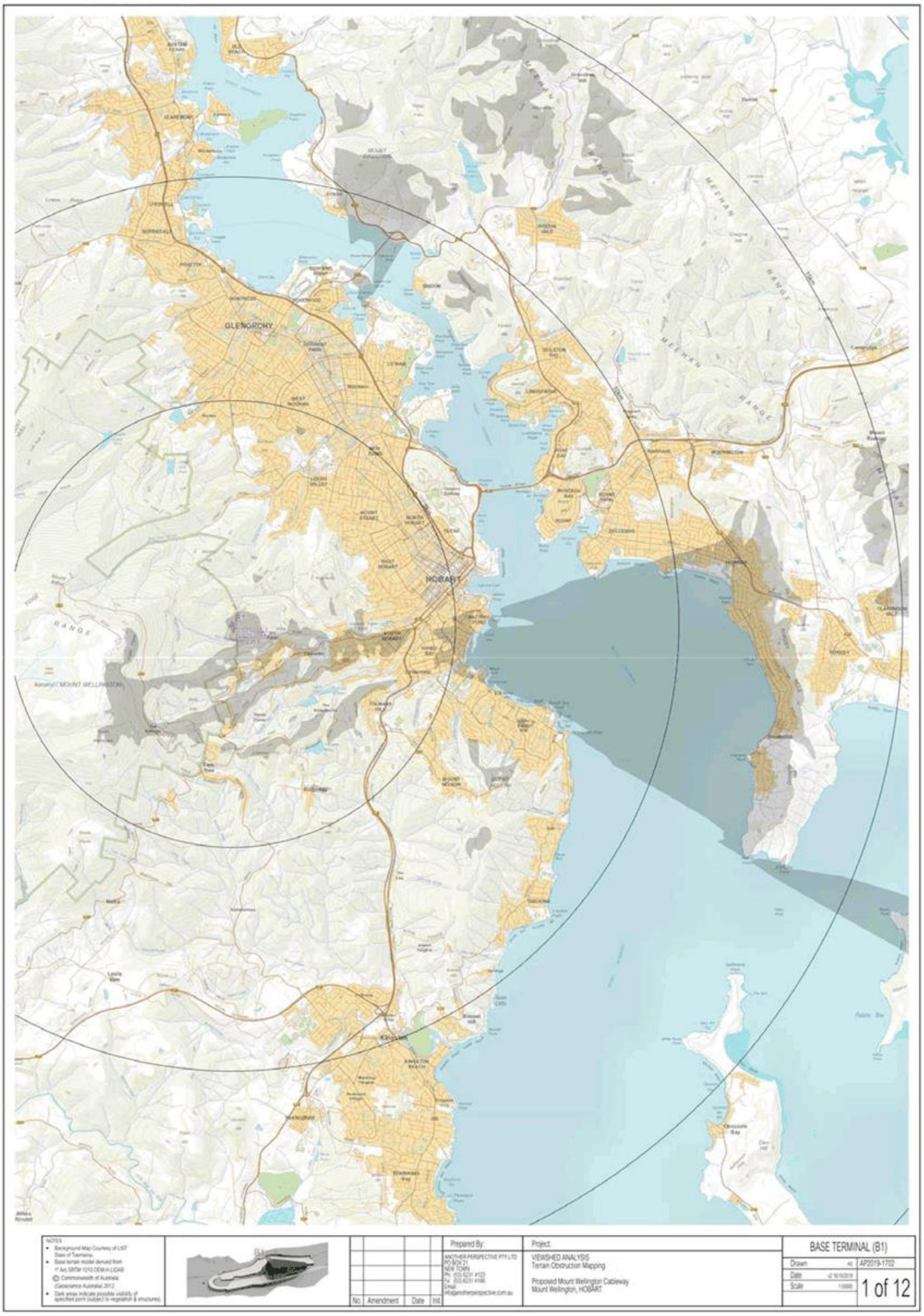
Refer to Appendix 2 (Section 11) for A3 images of the existing, proposed and proposed with development highlighted for each photo location.

# 10 APPENDIX 1 – TERRAIN OBSTRUCTION MAPPING IMAGES

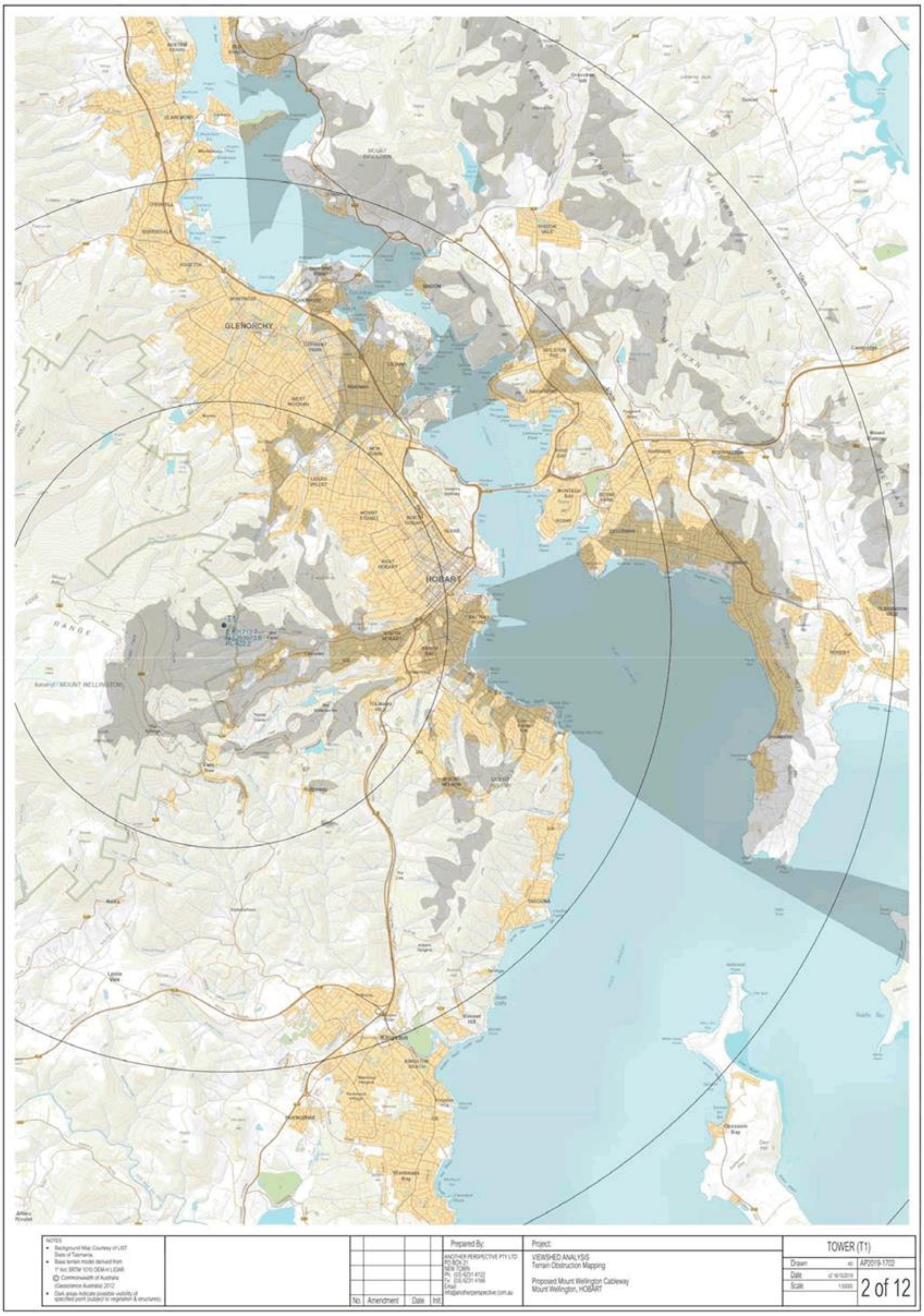
The following are terrain obstruction maps for each of the individual selected points on the Base Station, cableway towers and Pinnacle Centre, along with terrain obstruction map showing all terrain mapping fans combined.

## 10.1 TERRAIN OBSTRUCTION MAPS

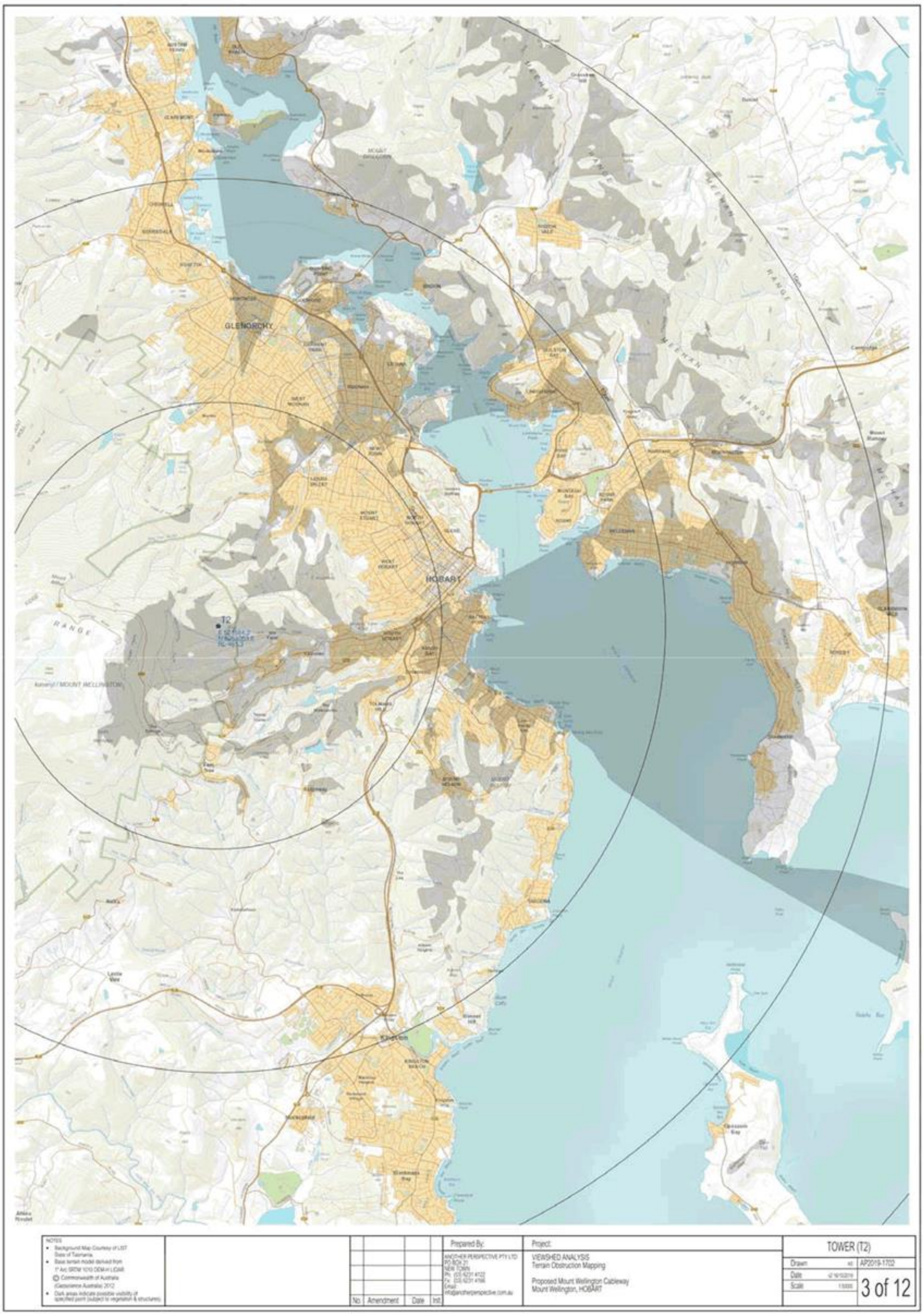
### 10.1.1 BASE TERMINAL (B1)



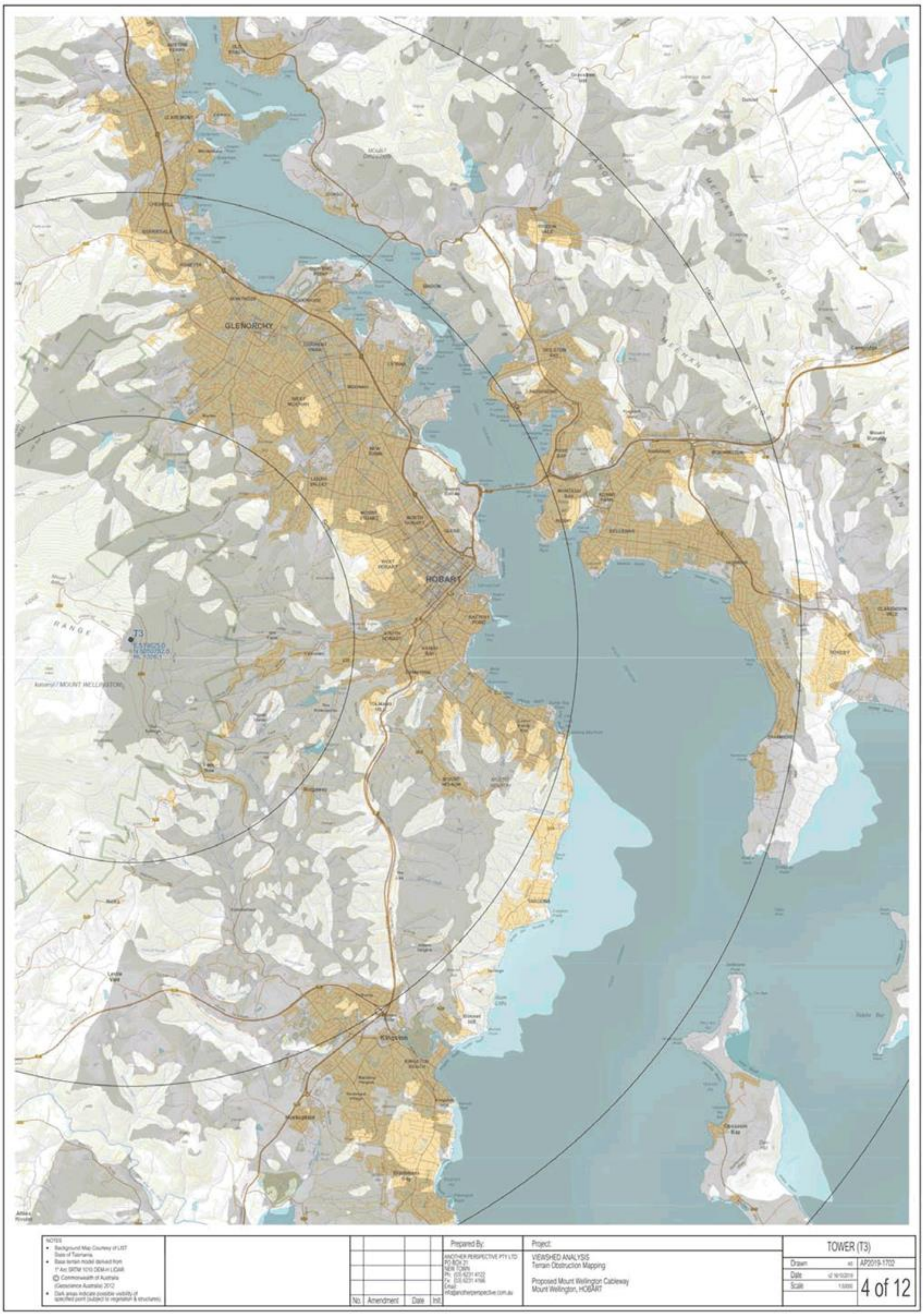
10.1.2 TOWER (T1)



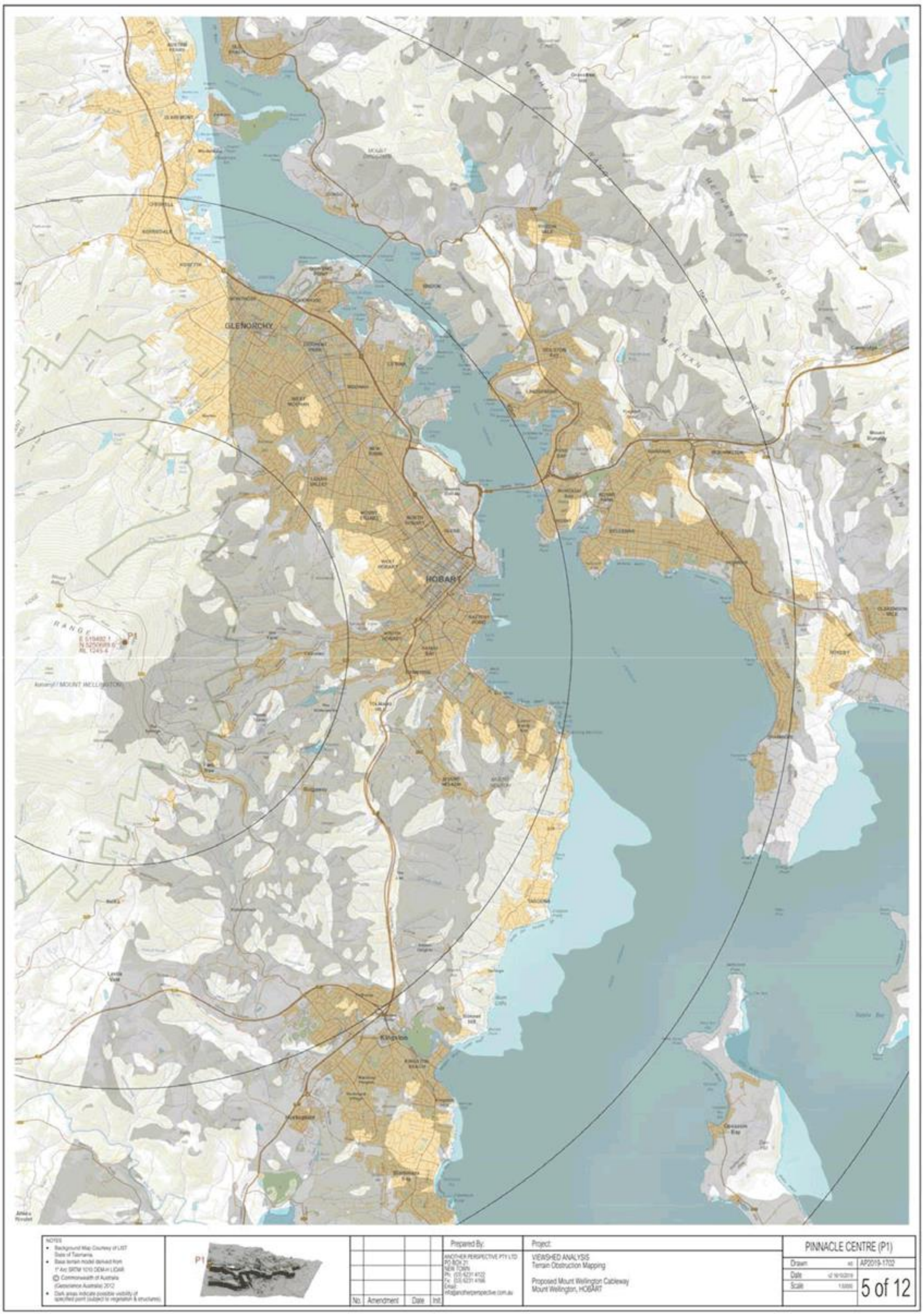
10.1.3 TOWER (T2)



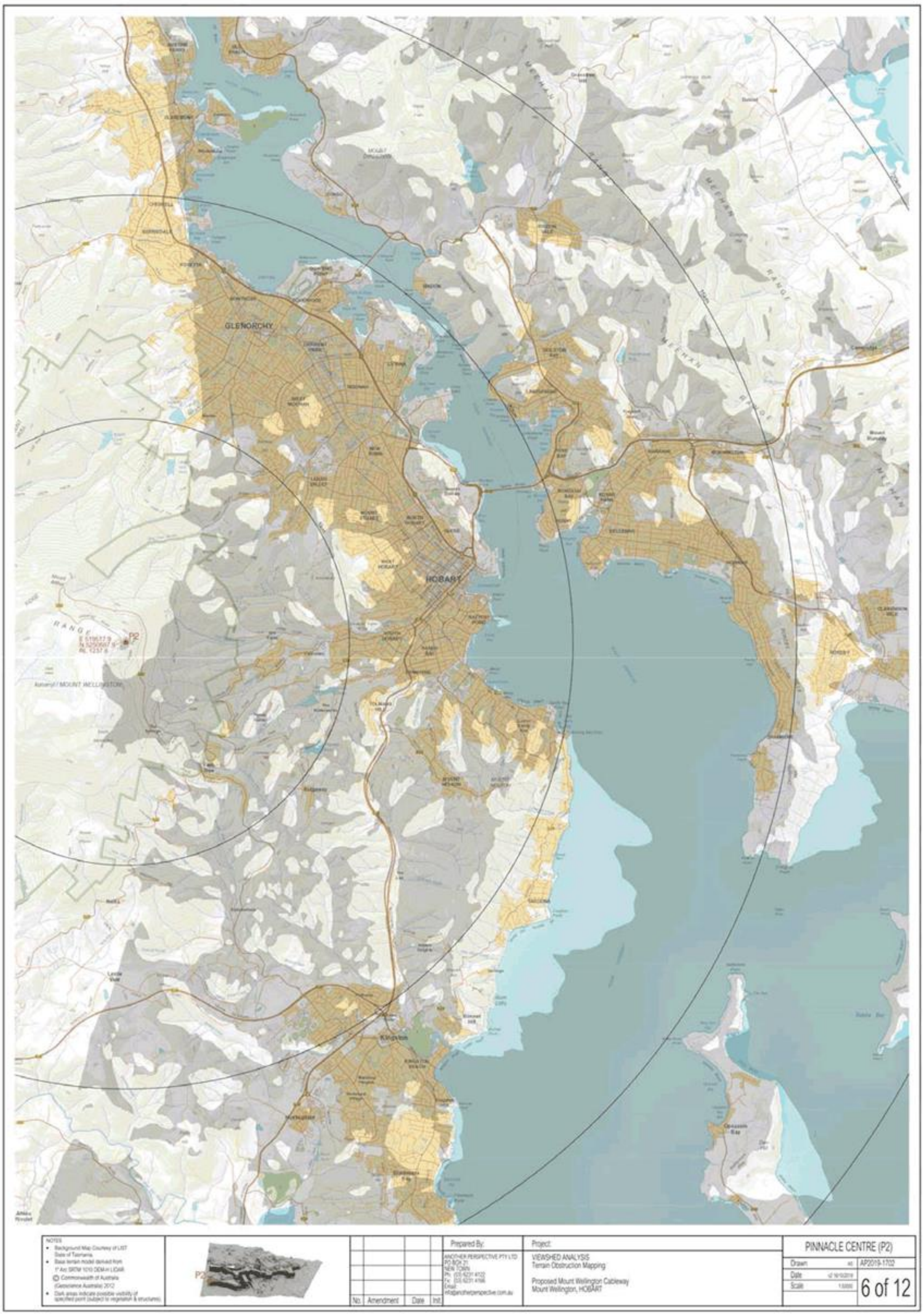
10.1.4 TOWER T3



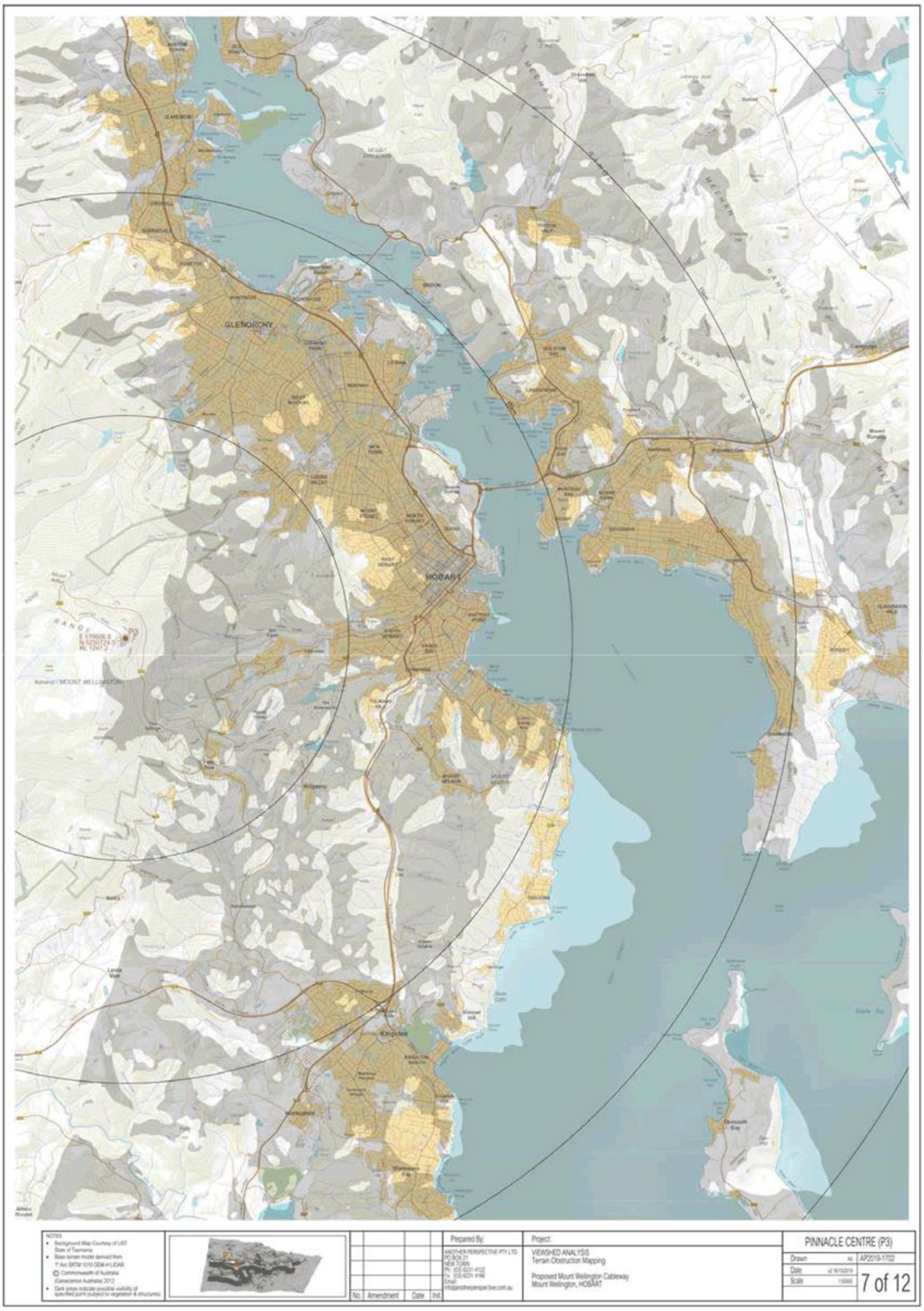
10.1.5 PINNACLE CENTRE (P1)



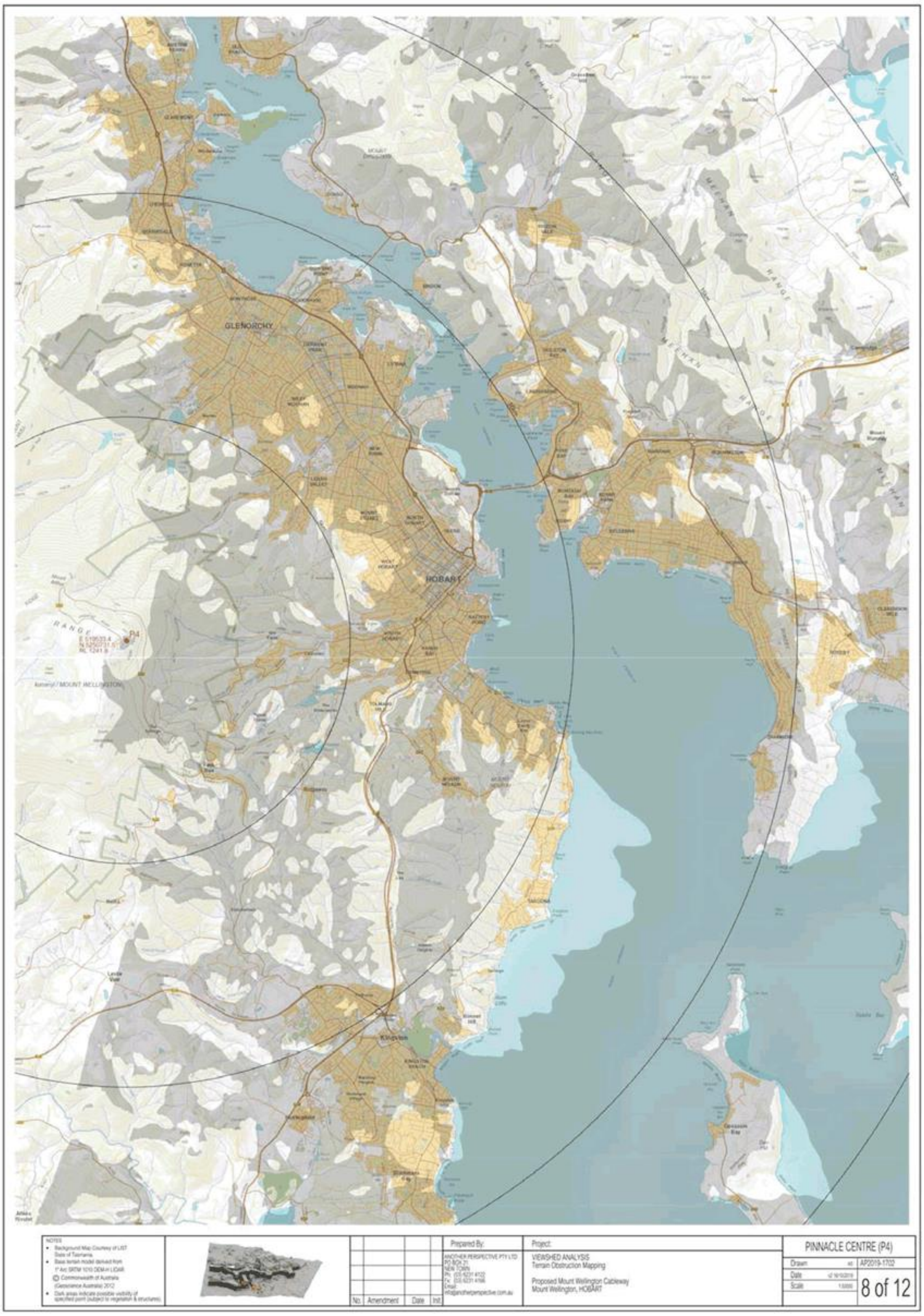
### 10.1.6 PINNACLE CENTRE (P2)



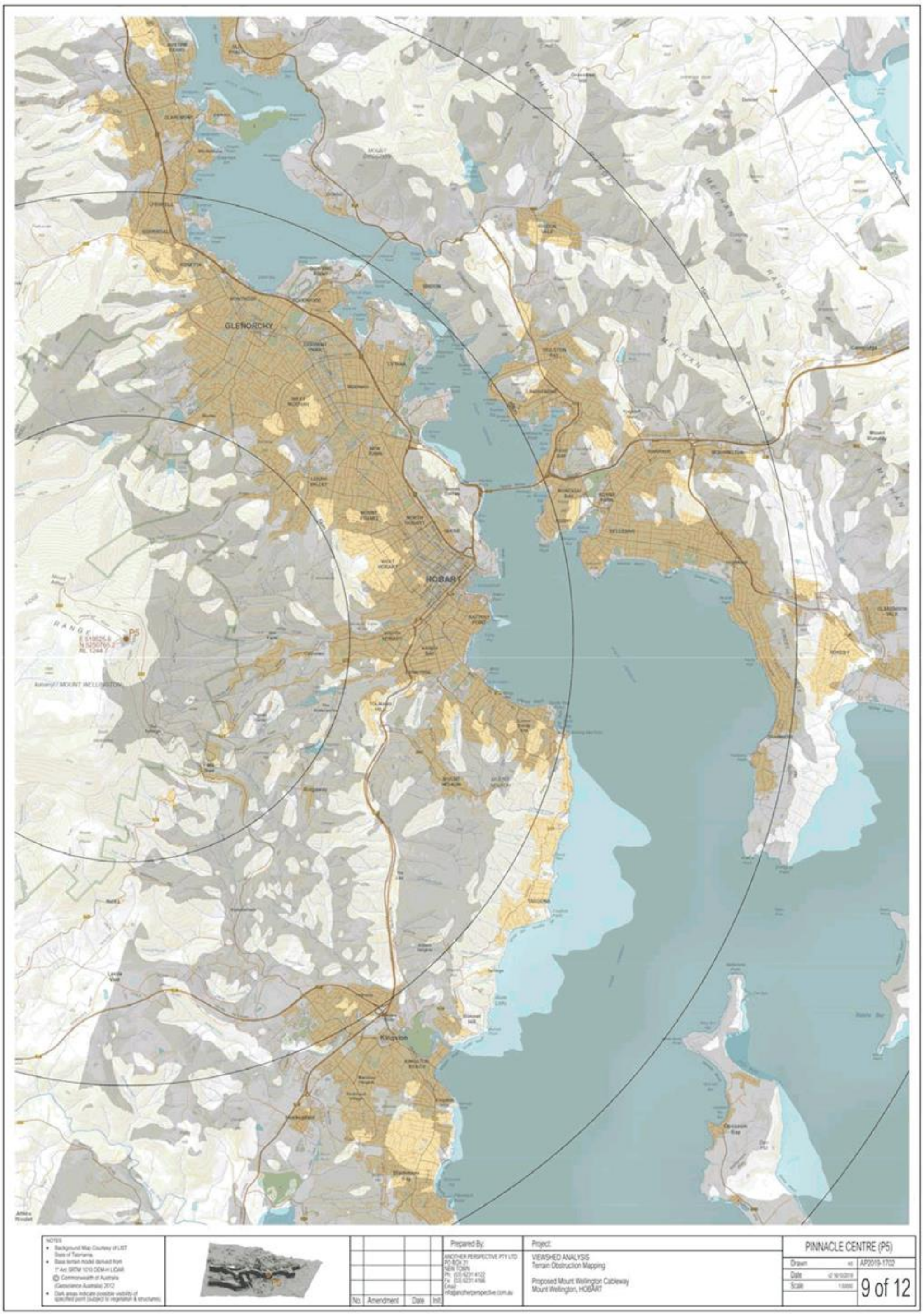
10.1.7 PINNACLE CENTRE (P3)



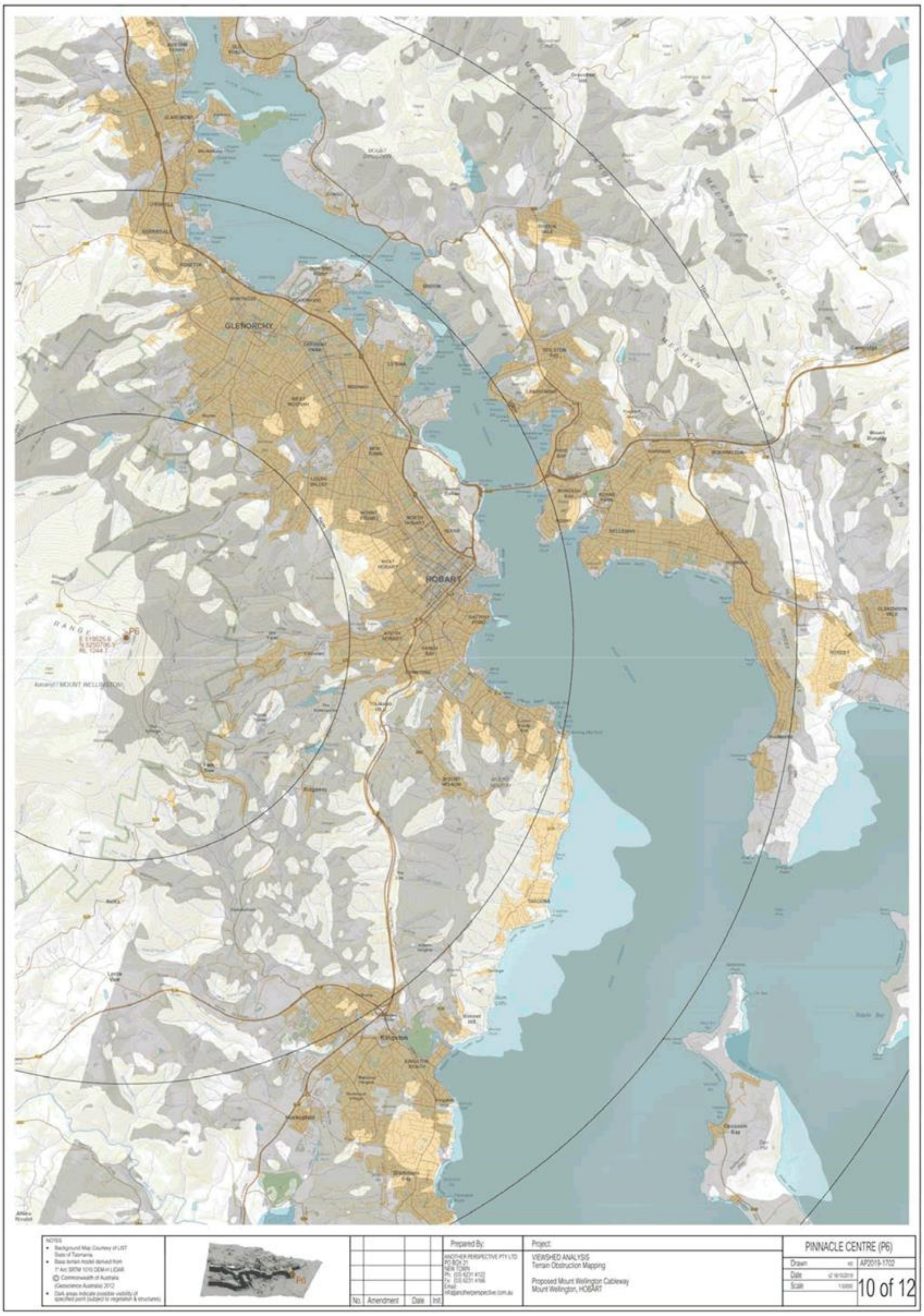
10.1.8 PINNACLE CENTRE (P4)



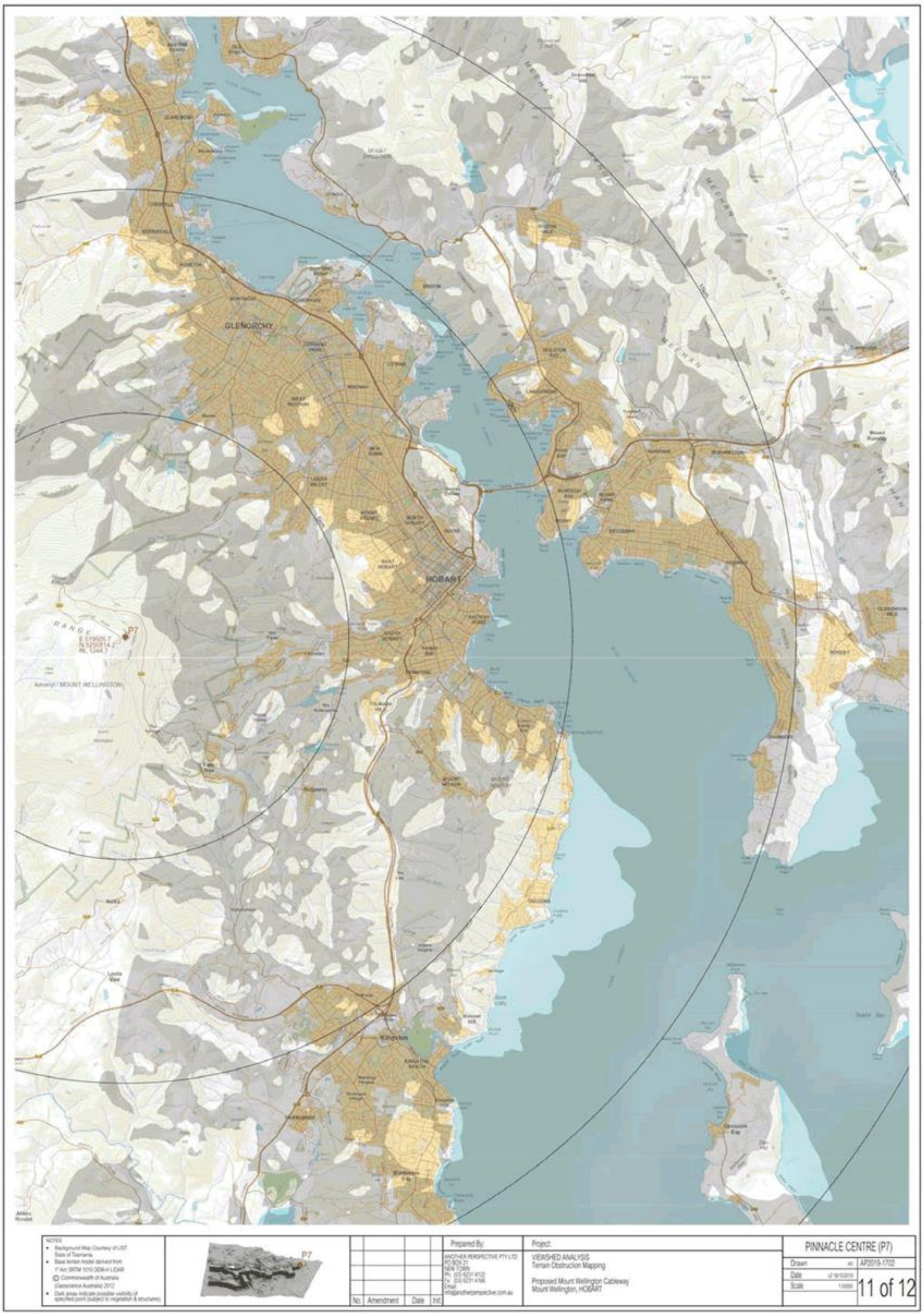
## 10.1.9 PINNACLE CENTRE (P5)



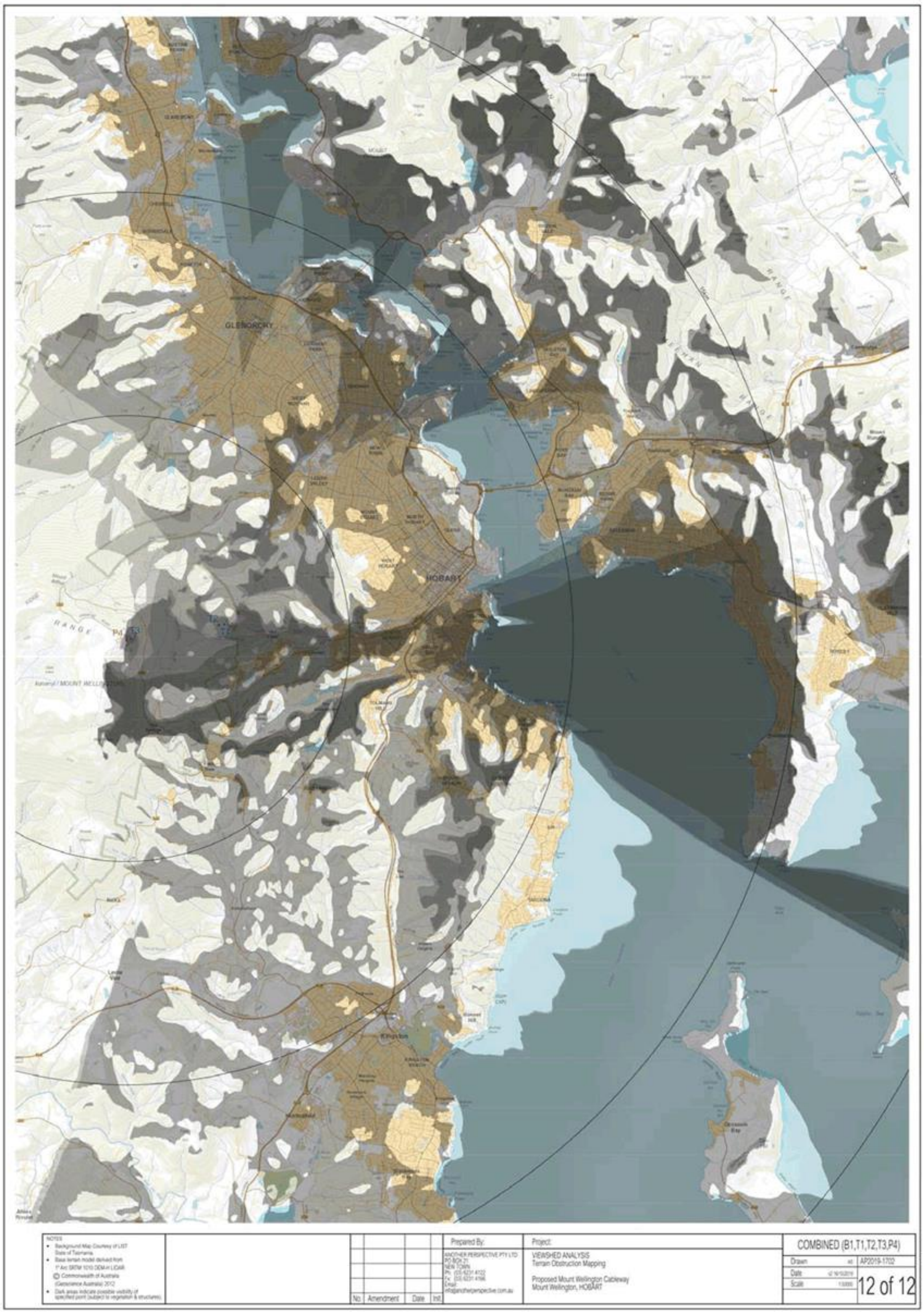
10.1.10 PINNACLE CENTRE (P6)



### 10.1.11 PINNACLE CENTRE (P7)



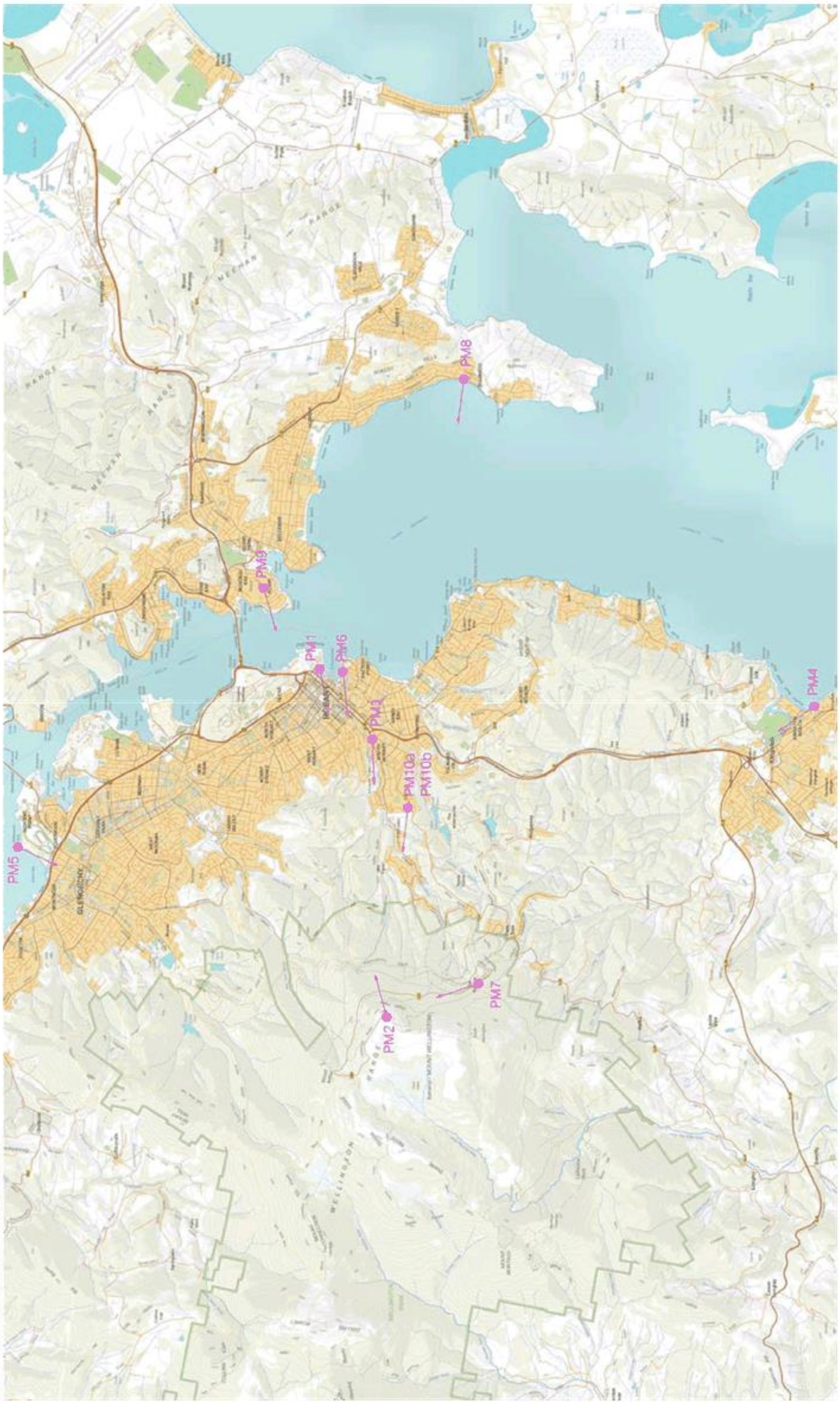
10.1.12 COMBINED (B1, T1, T2, T3, P4)



## 11 APPENDIX 2 – 3D VISUALISATION IMAGES

The following are a combination of EXISTING & PROPOSED images for the selected photomontage locations.

## 11.1 PHOTOMONTAGE LOCATIONS MAP



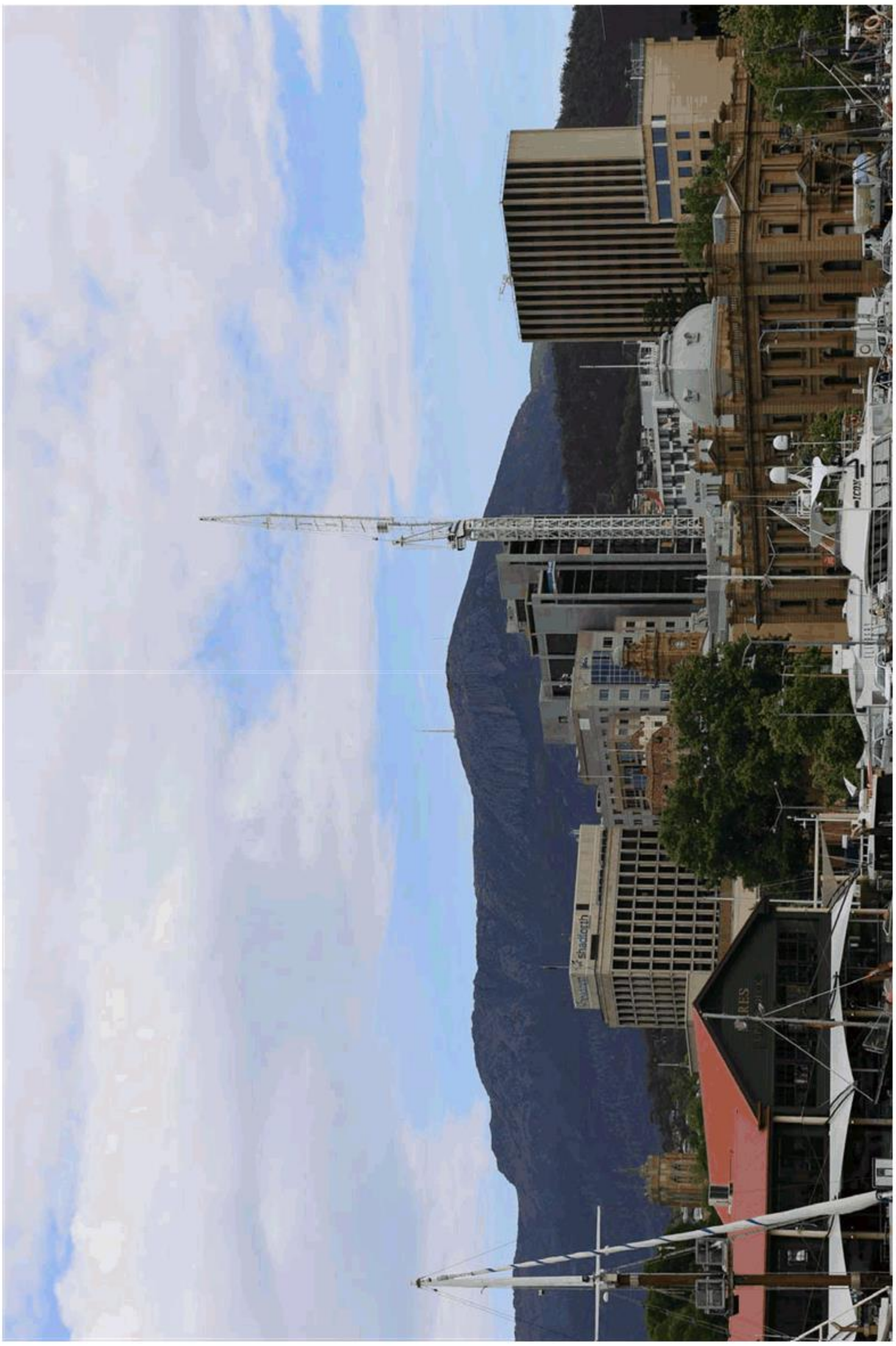
## 11.2 PHOTOMONTAGE 1 – HOBART WATERFRONT

### 11.2.1 EXISTING

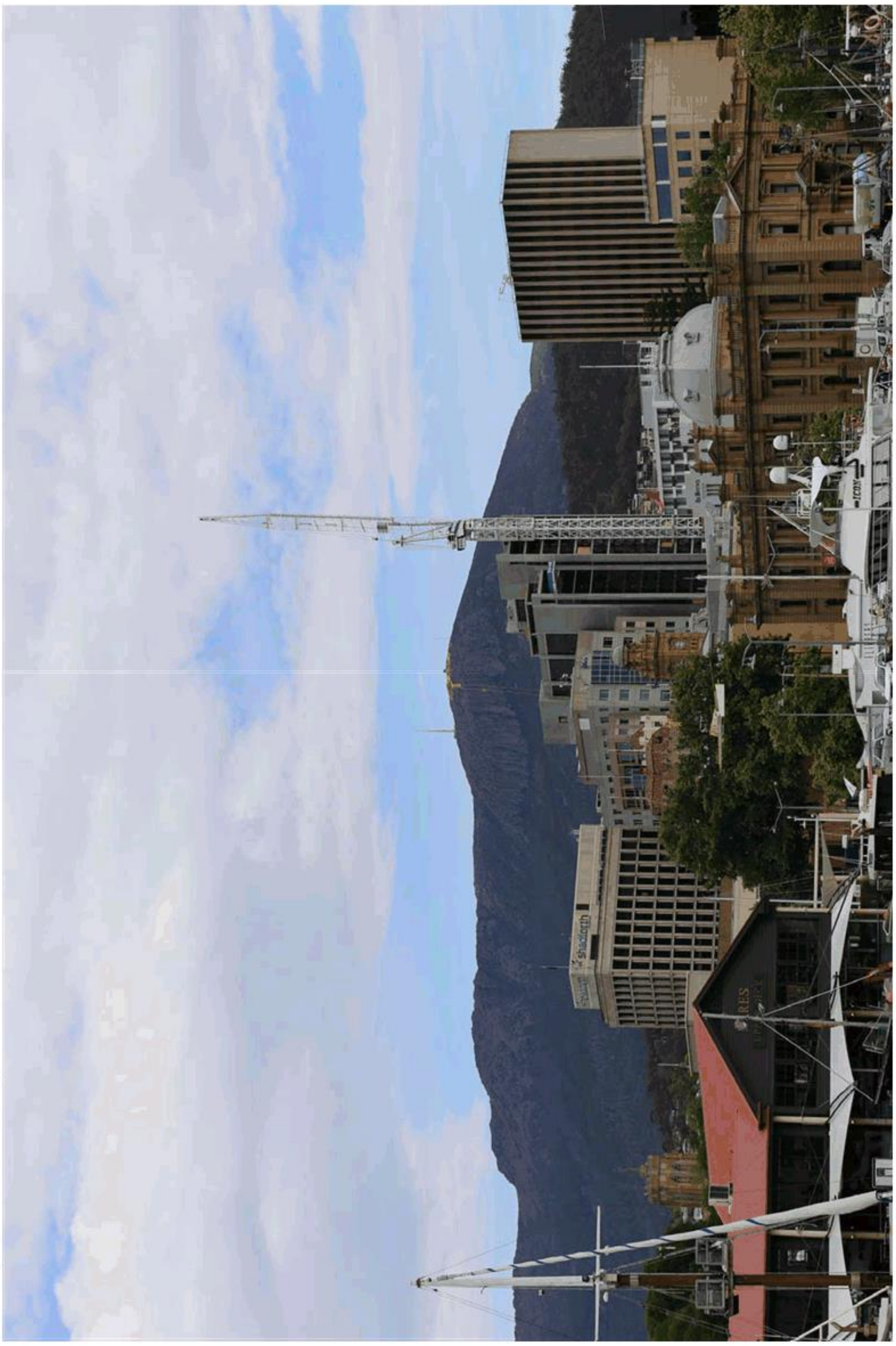

Photomontage Location 1 - Taken by Ethos Urban 11/11/2019 9:44am Canon EOS 6D 26MP (EF70-200mm & EF16-35mm lens) – 70mm FL

11.2.2 PROPOSED

View Shed Mapping / 3D Photomontages – Mount Wellington Cable Car TASMANIA

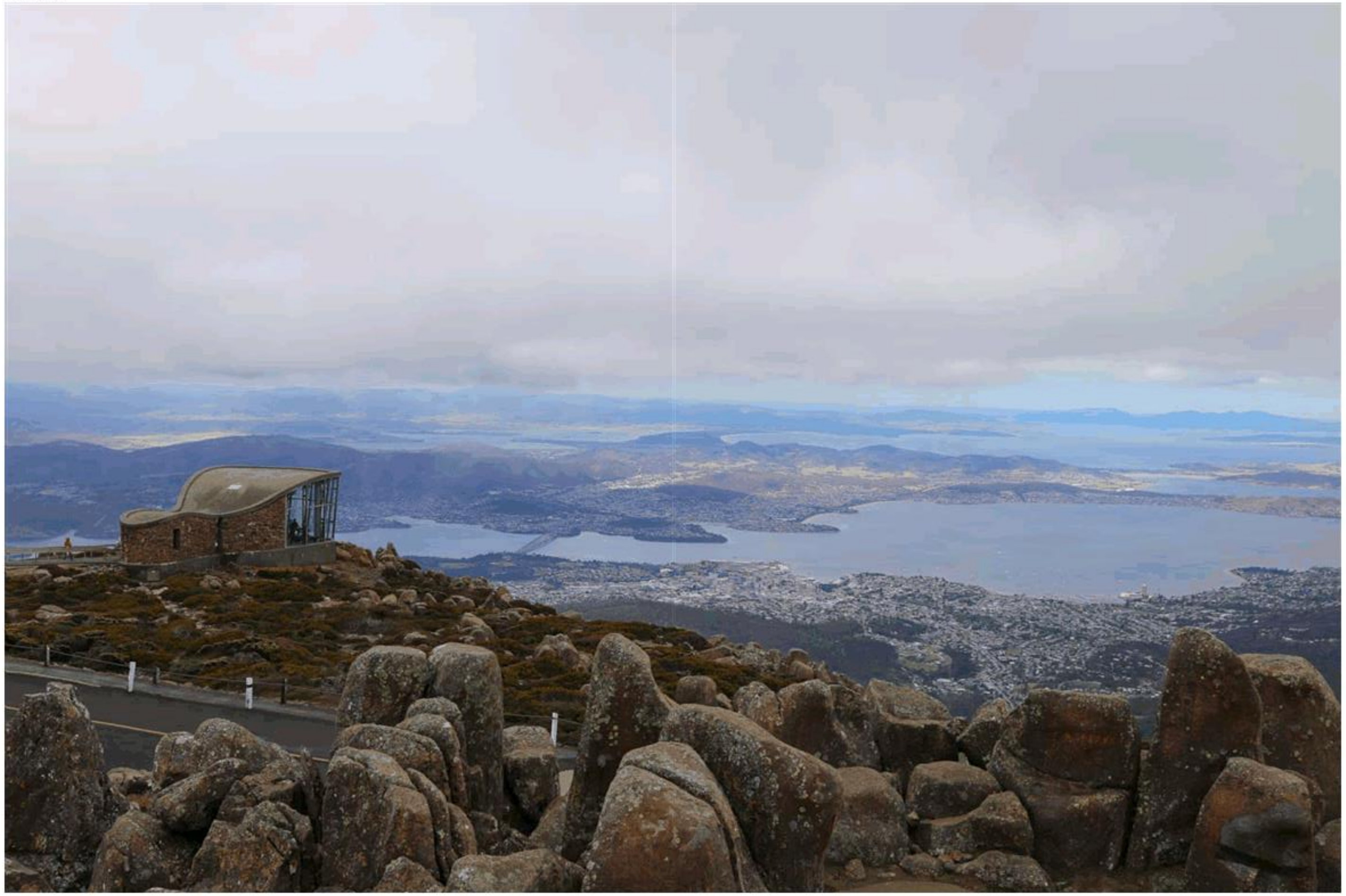


11.2.3 PROPOSED (DEVELOPMENT HIGHLIGHTED)



## 11.3 PHOTOMONTAGE 2 – MOUNT WELLINGTON SUMMIT (LOOKING TOWARDS CITY)

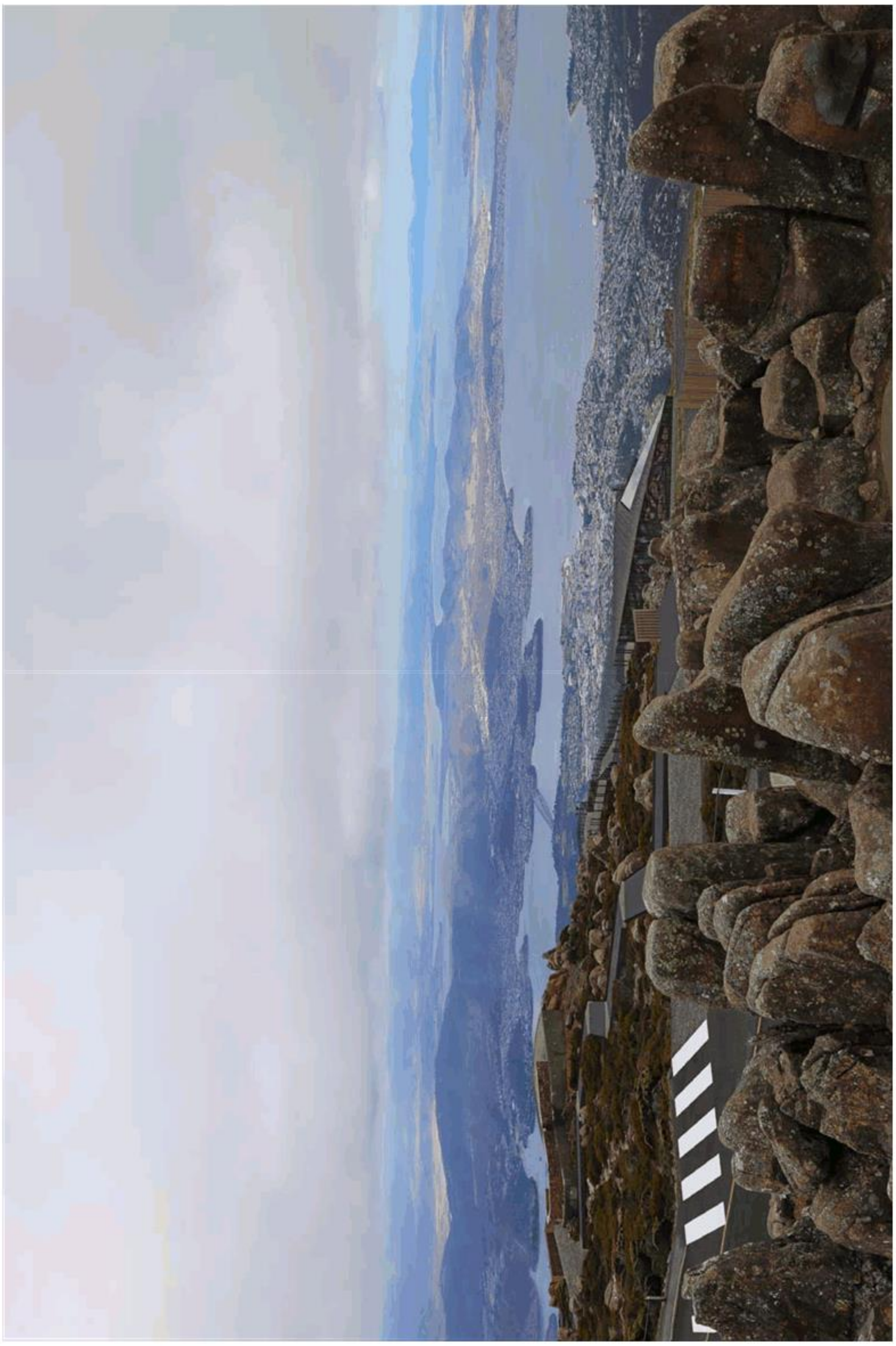
### 11.3.1 EXISTING



Photomontage Location 2 - Taken by Ethos Urban 27/11/2019 15:15pm Canon EOS 6D 26MP (EF70-200mm & EF16-35mm lens) – 35mm FL

11.3.2 PROPOSED

View Shed Mapping / 3D Photomontages – Mount Wellington Cable Car TASMANIA



11.3.3 PROPOSED (DEVELOPMENT HIGHLIGHTED)

## 11.4 PHOTOMONTAGE 3 – SOUTH HOBART

### 11.4.1 EXISTING


Photomontage Location 3 - Taken by Ethos Urban 12/11/2019 10:54am Canon EOS 6D 26MP (EF70-200mm & EF16-35mm lens) – 70mm FL

View Shed Mapping / 3D Photomontages – Mount Wellington Cable Car TASMANIA


11.4.2 PROPOSED

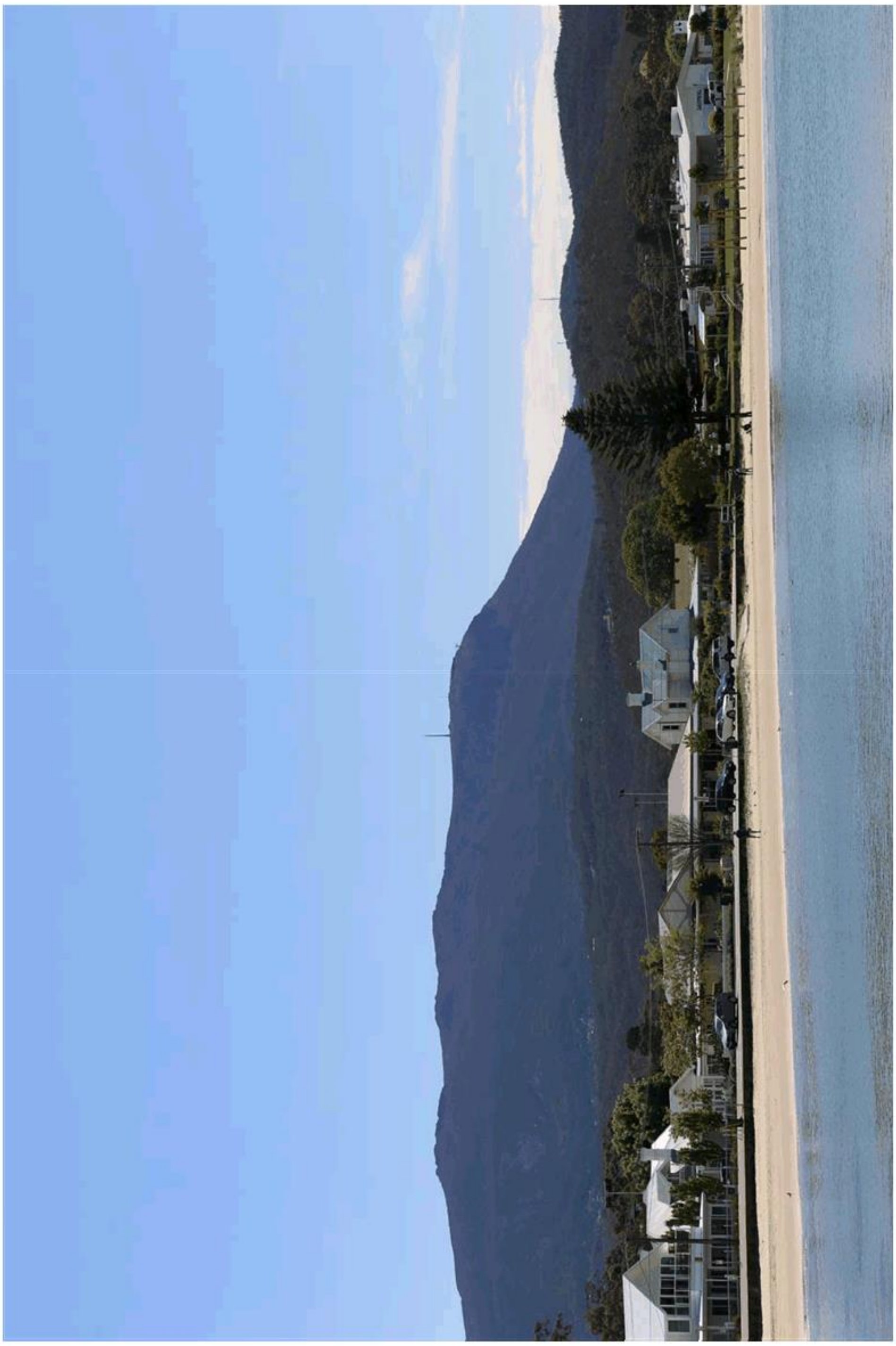
11.4.3 PROPOSED (DEVELOPMENT HIGHLIGHTED)

## 11.5 PHOTOMONTAGE 4 – KINGSTON BEACH

### 11.5.1 EXISTING

Photomontage Location 4 - Taken by Ethos Urban 11/11/2019 14:33pm Canon EOS 6D 26MP (EF70-200mm & EF16-35mm lens) – 70mm FL

11.5.2 PROPOSED



11.5.3 PROPOSED (DEVELOPMENT HIGHLIGHTED)

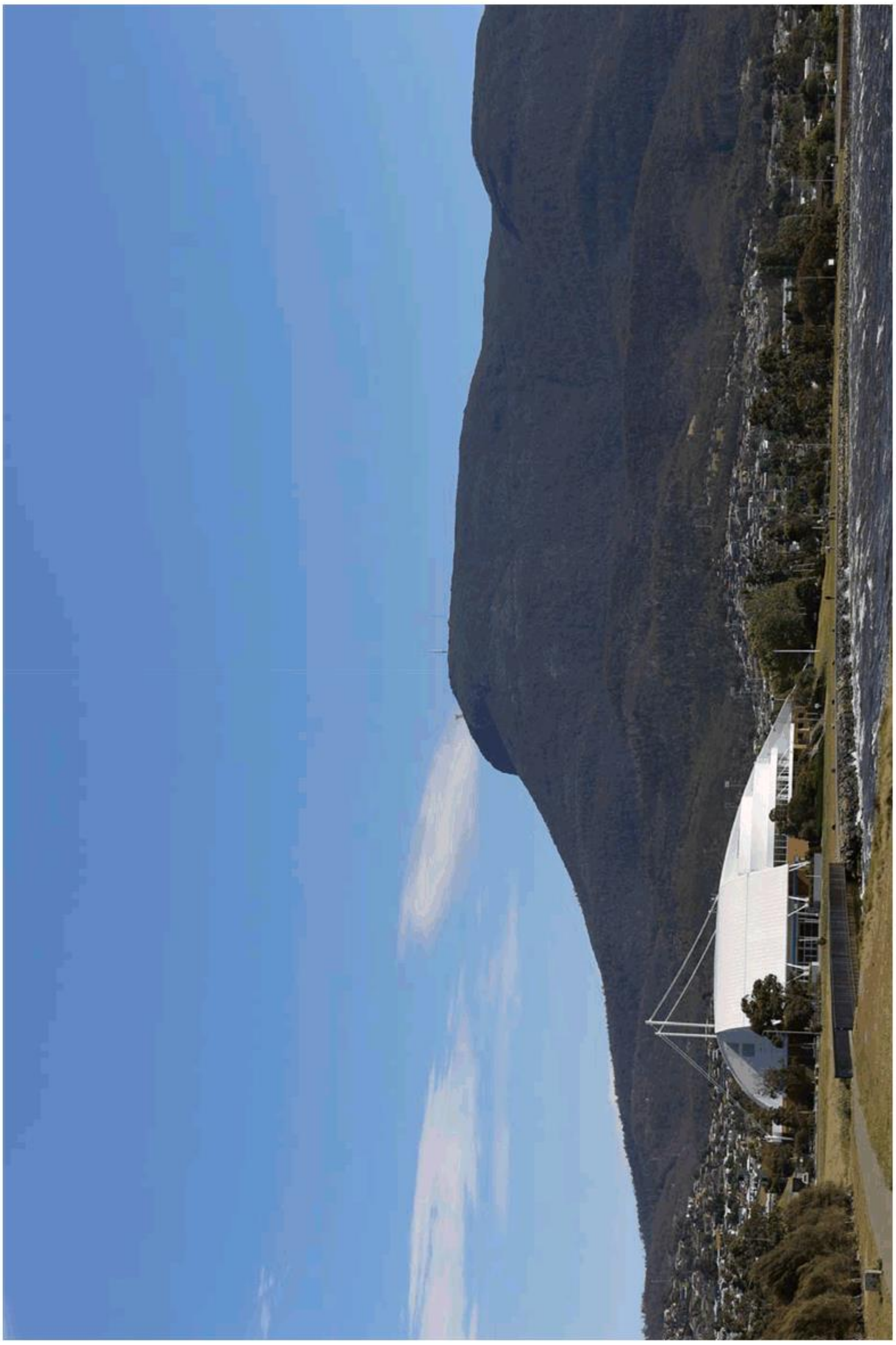
## 11.6 PHOTOMONTAGE 5 – GLENORCHY (GASP)

### 11.6.1 EXISTING

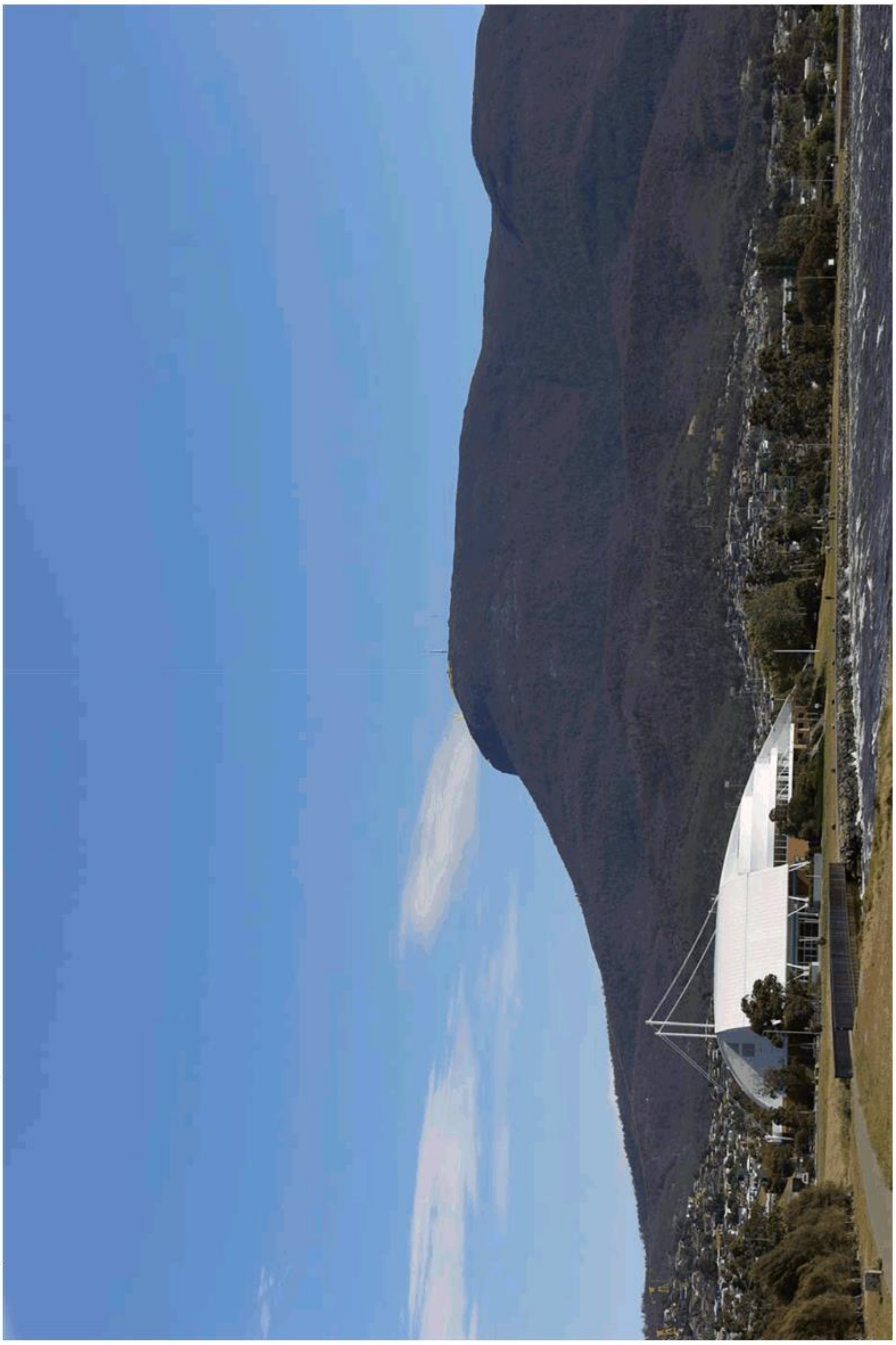
Photomontage Location 5 - Taken by Ethos Urban 11/11/2019 16:03pm Canon EOS 6D 26MP (EF70-200mm & EF16-35mm lens) – 70mm FL

View Shed Mapping / 3D Photomontages – Mount Wellington Cable Car TASMANIA

11.6.2 PROPOSED

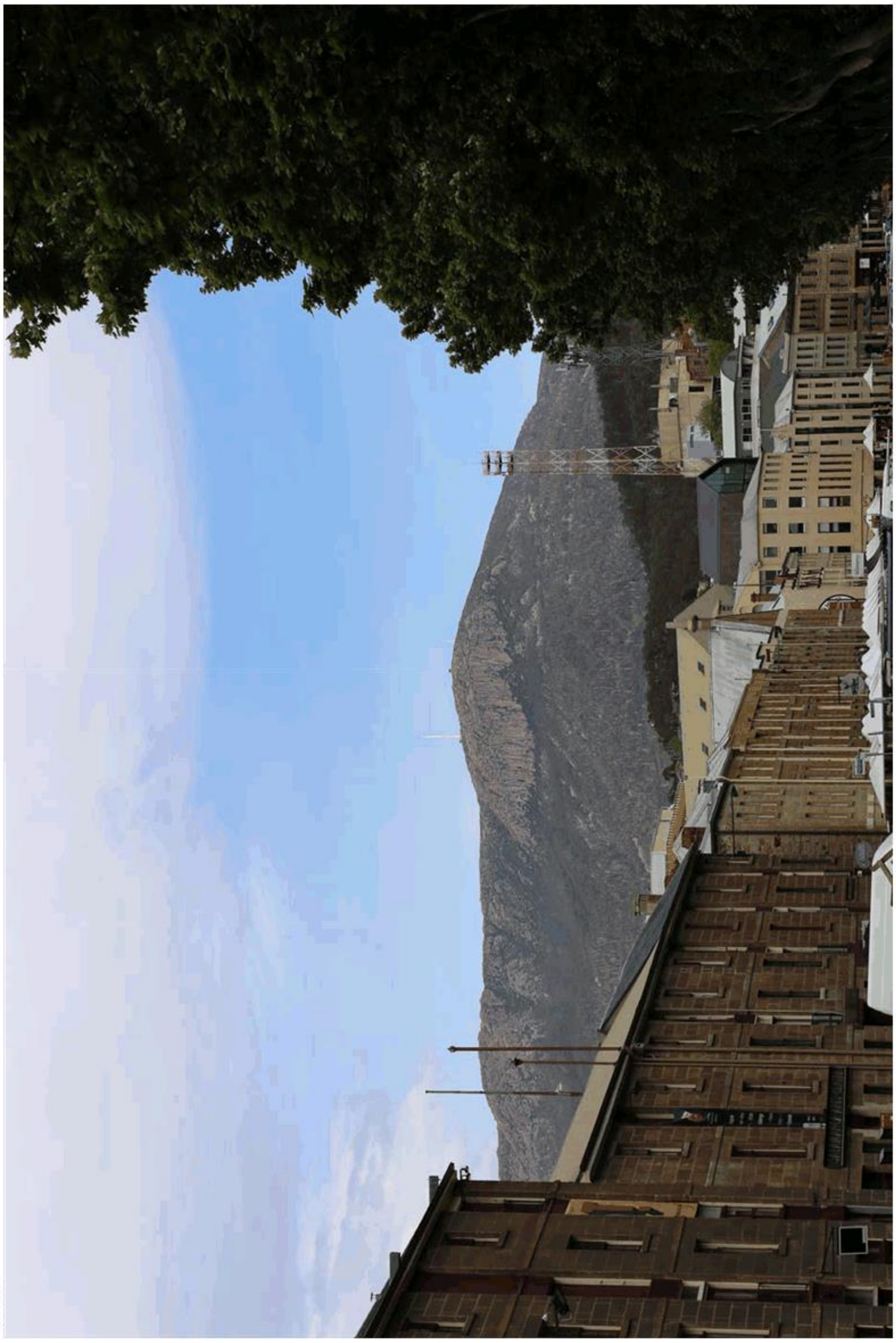


11.6.3 PROPOSED (DEVELOPMENT HIGHLIGHTED)



## 11.7 PHOTOMONTAGE 6 – SALAMANCA PLACE

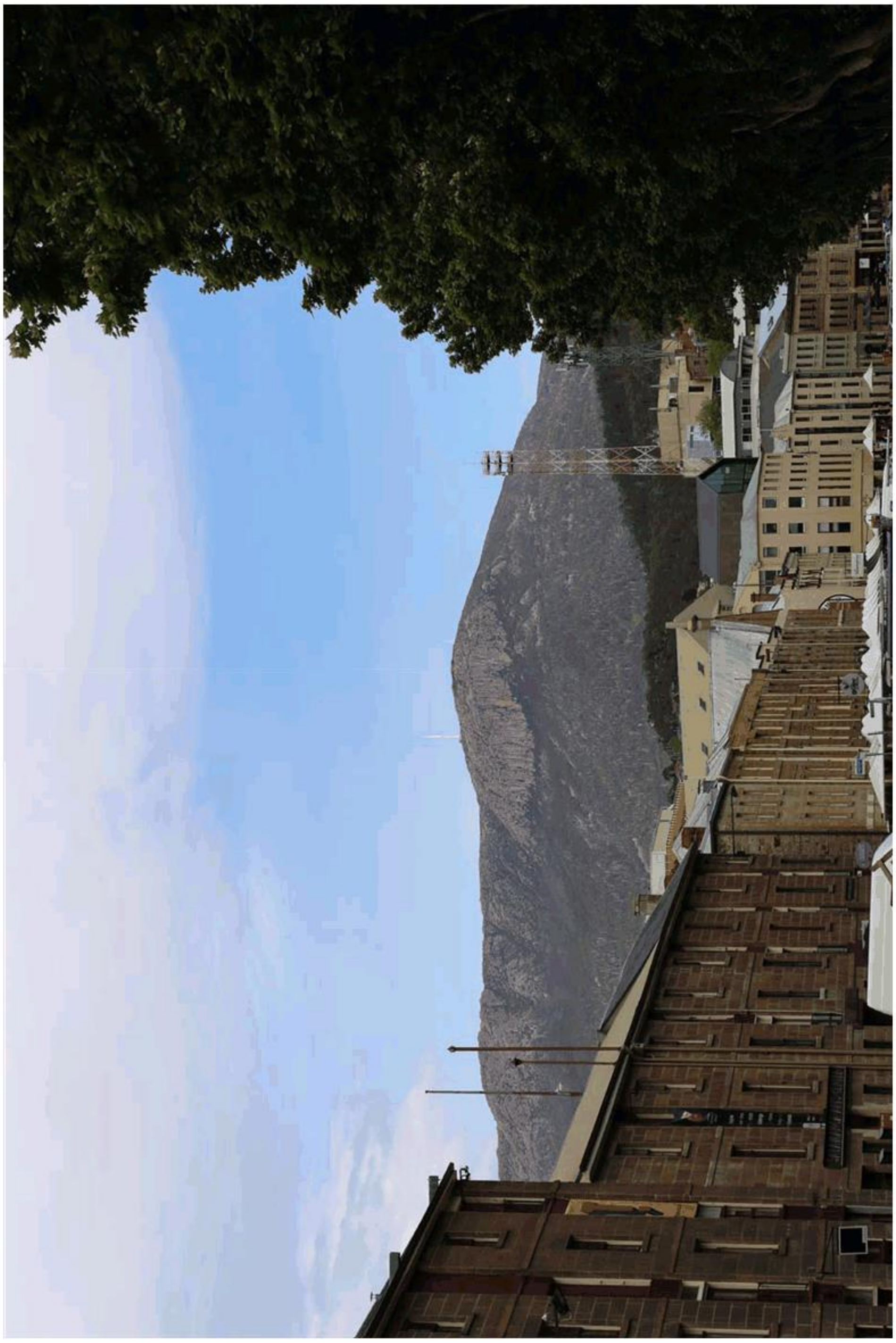
11.7.1 EXISTING



Photomontage Location 6 - Taken by Ethos Urban 11/11/2019 10:39am Canon EOS 6D 26MP (EF70-200mm & EF16-35mm lens) – 70mm FL

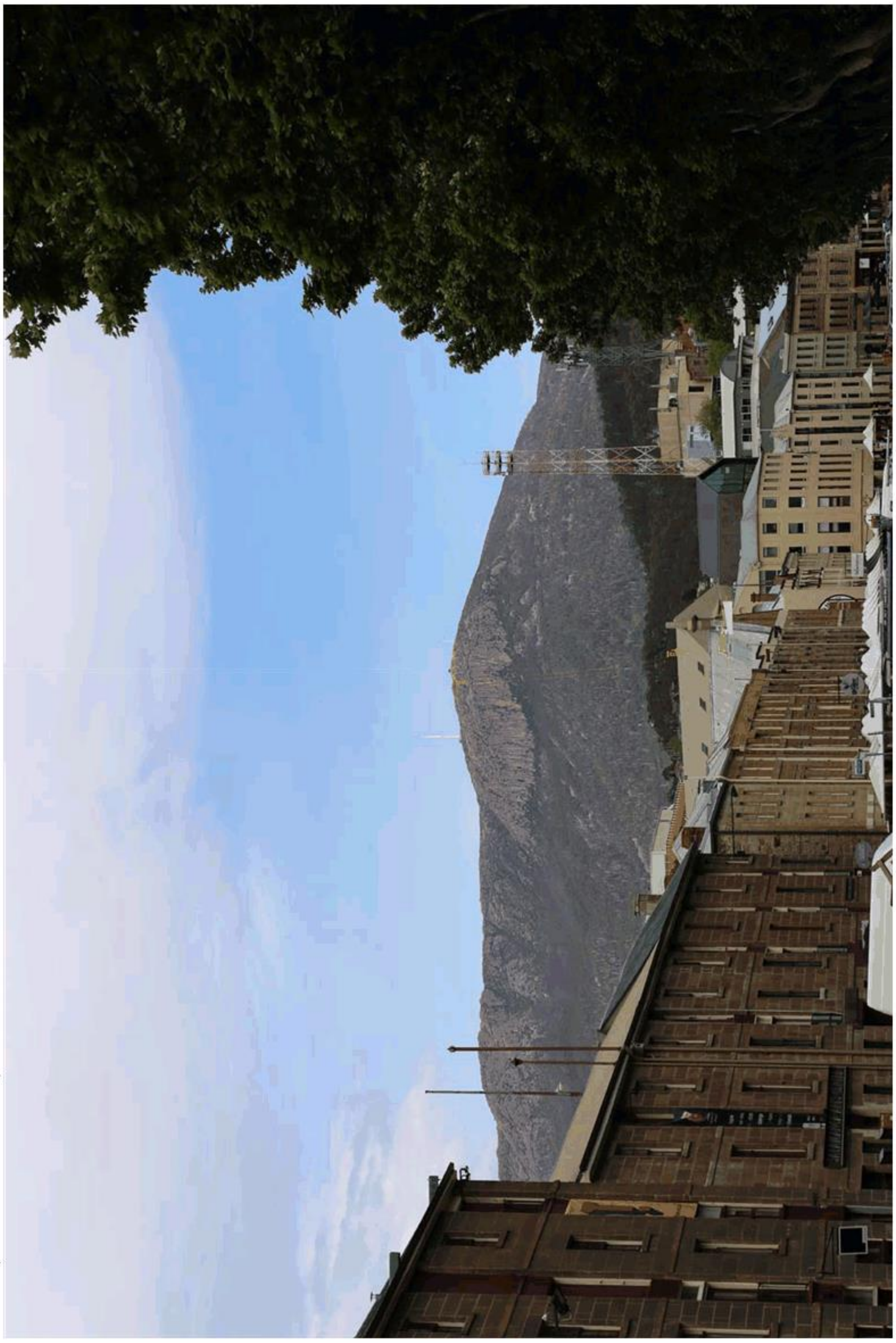
View Shed Mapping / 3D Photomontages – Mount Wellington Cable Car TASMANIA

11.7.2 PROPOSED



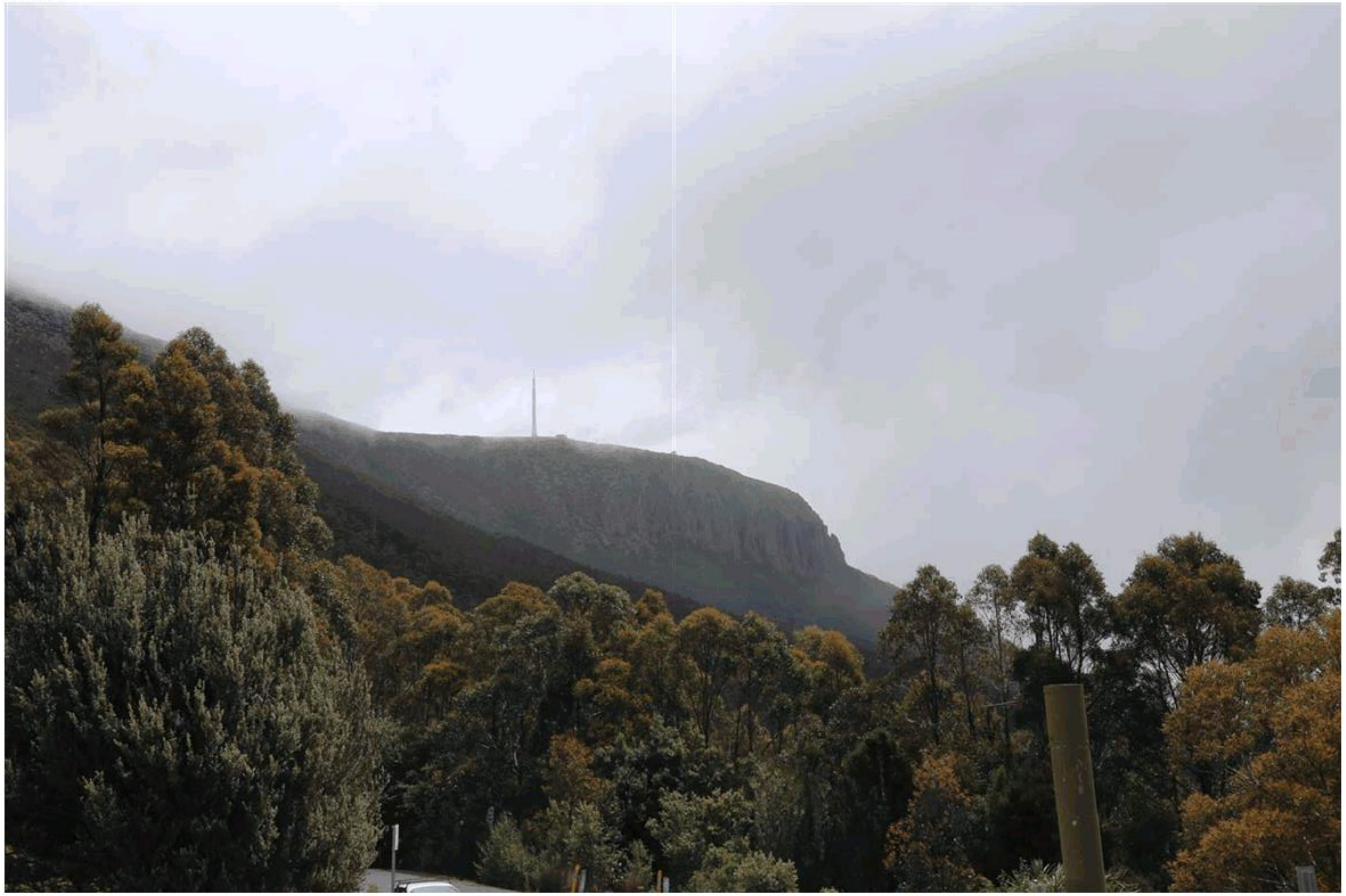
View Shed Mapping / 3D Photomontages – Mount Wellington Cable Car TASMANIA

11.7.3 PROPOSED (DEVELOPMENT HIGHLIGHTED)



## 11.8 PHOTOMONTAGE 7 – OLD SPRINGS HOTEL

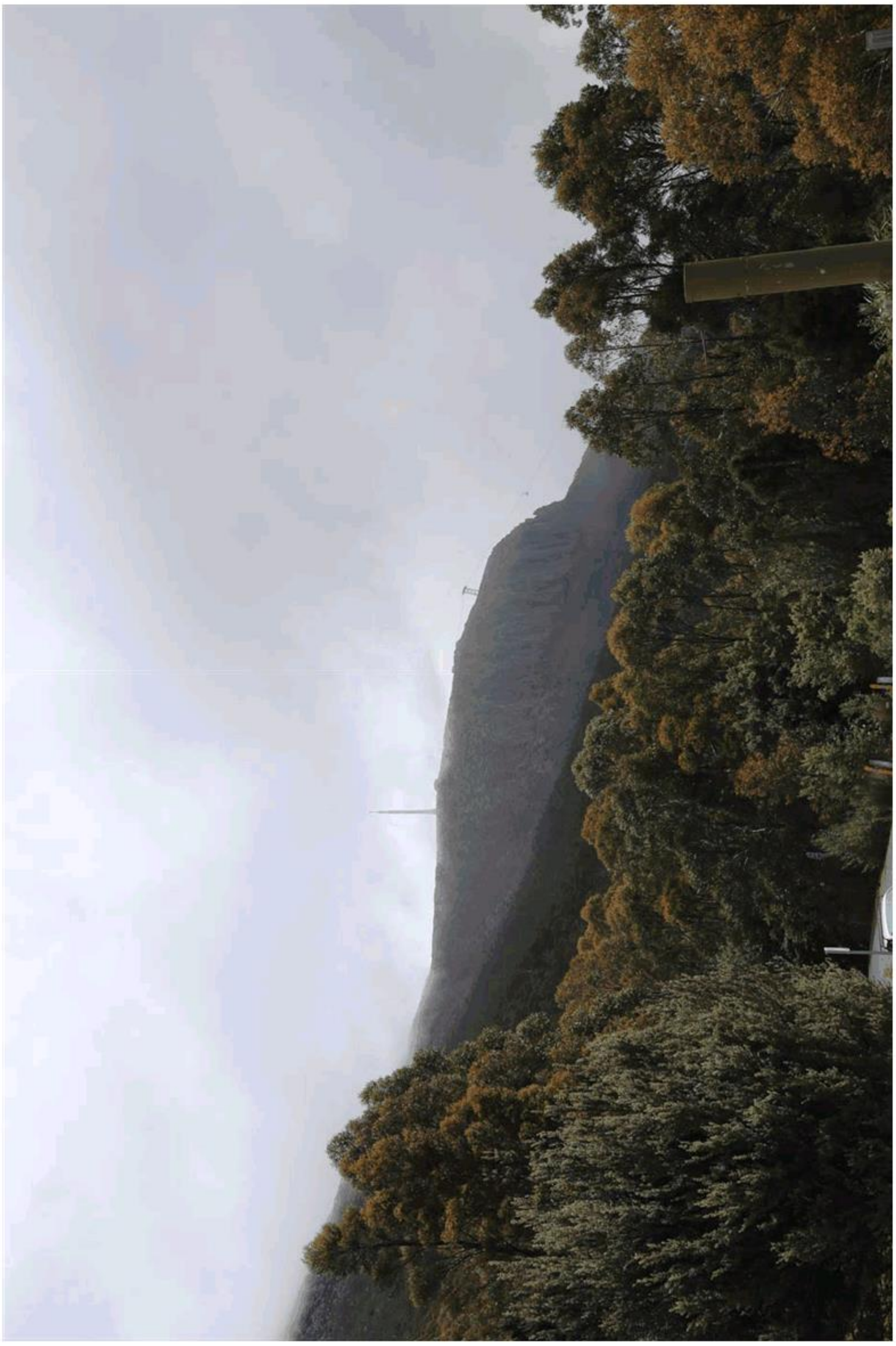
### 11.8.1 EXISTING



Photomontage Location 7 - Taken by Ethos Urban 12/11/2019 13:06pm Canon EOS 6D 26MP (EF70-200mm & EF16-35mm lens) – 35mm FL

View Shed Mapping / 3D Photomontages – Mount Wellington Cable Car TASMANIA

11.8.2 PROPOSED



11.8.3 PROPOSED (DEVELOPMENT HIGHLIGHTED)

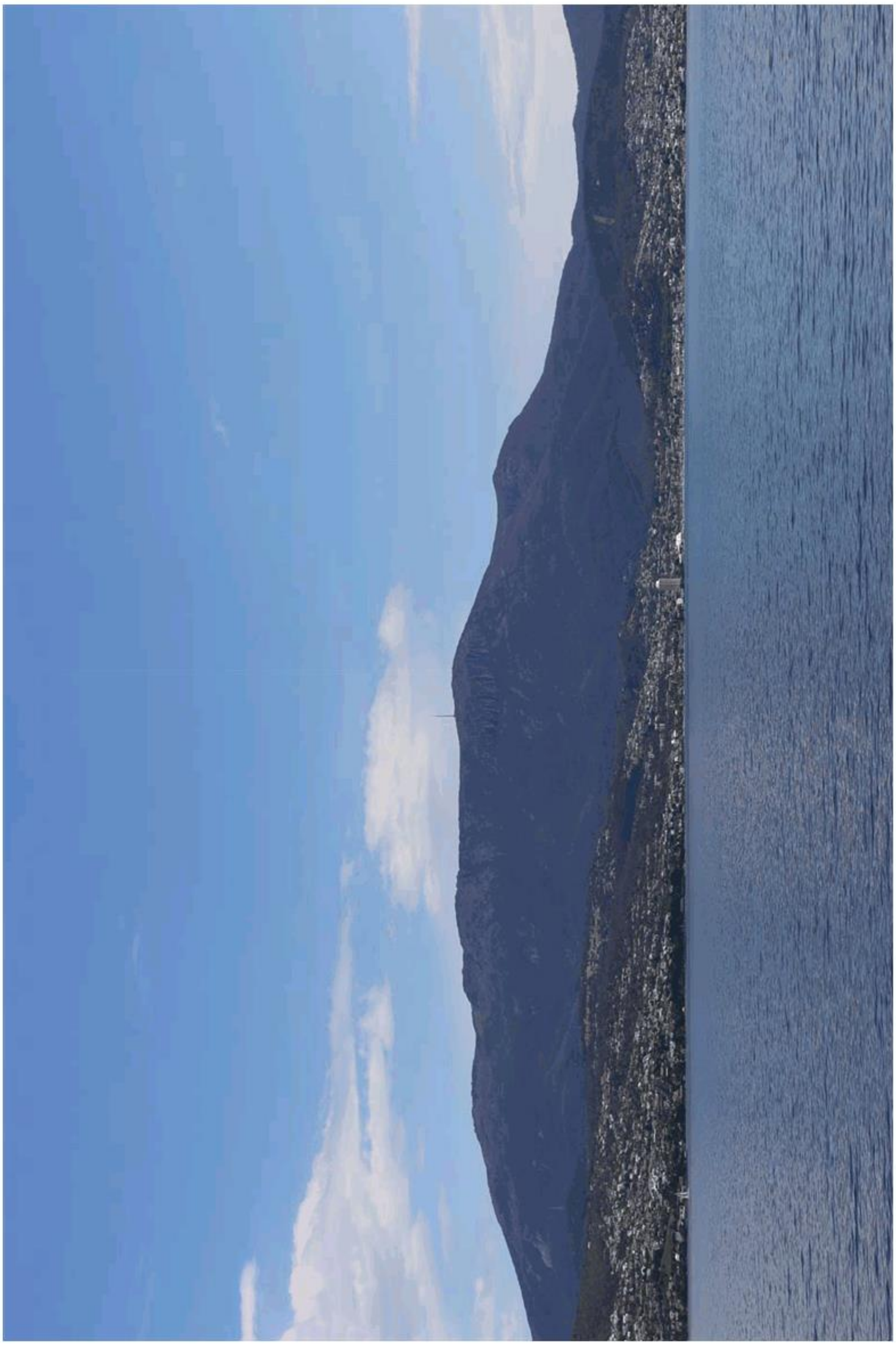
View Shed Mapping / 3D Photomontages – Mount Wellington Cable Car TASMANIA

## 11.9 PHOTOMONTAGE 8 – TRANMERE

### 11.9.1 EXISTING

Photomontage Location 8 - Taken by Ethos Urban 11/11/2019 12:52pm Canon EOS 6D 26MP (EF70-200mm & EF16-35mm lens) – 70mm FL

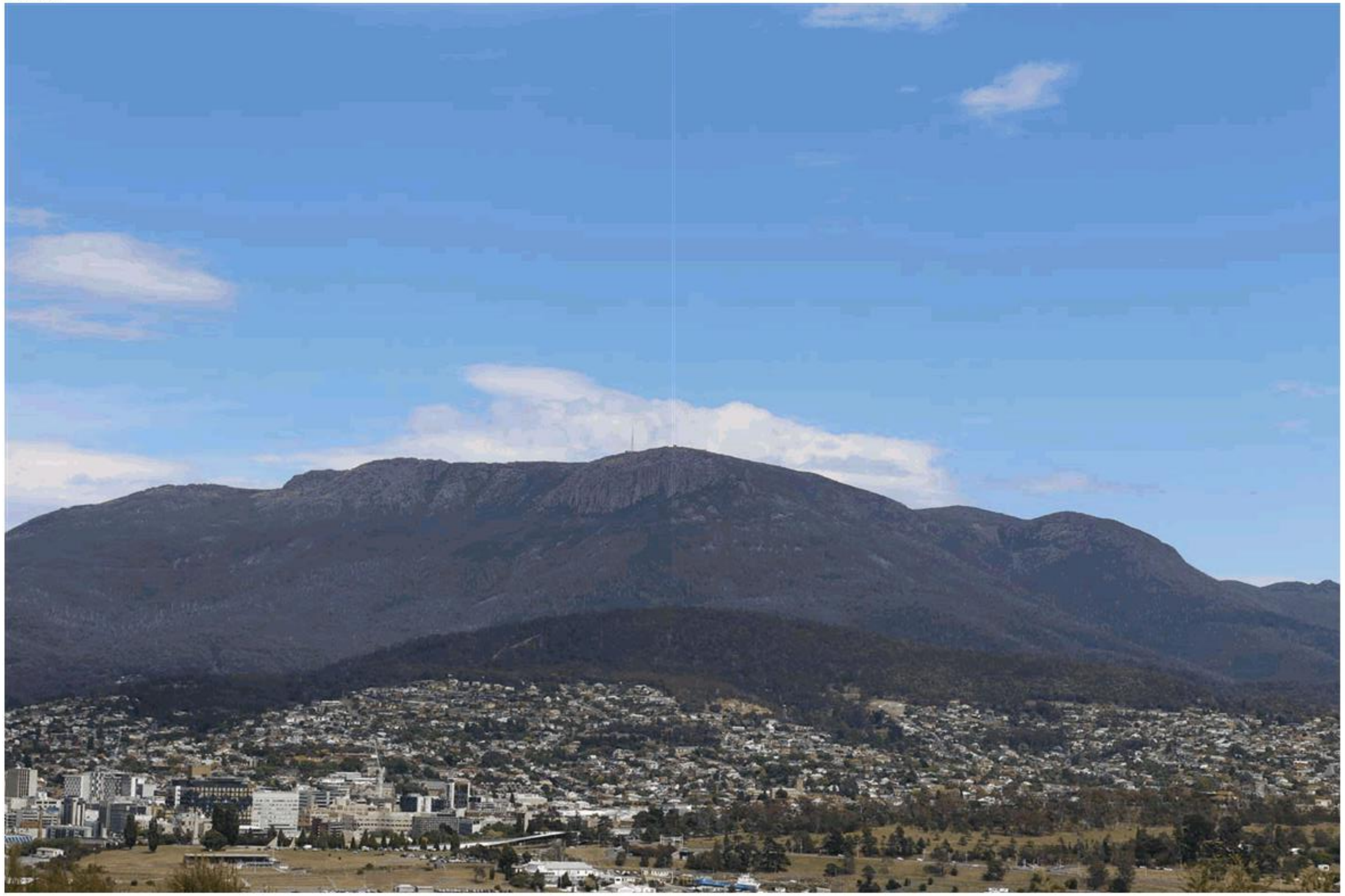
11.9.2 PROPOSED



11.9.3 PROPOSED (DEVELOPMENT HIGHLIGHTED)

## 11.10 PHOTOMONTAGE 9 – ROSNY HILL LOOKOUT

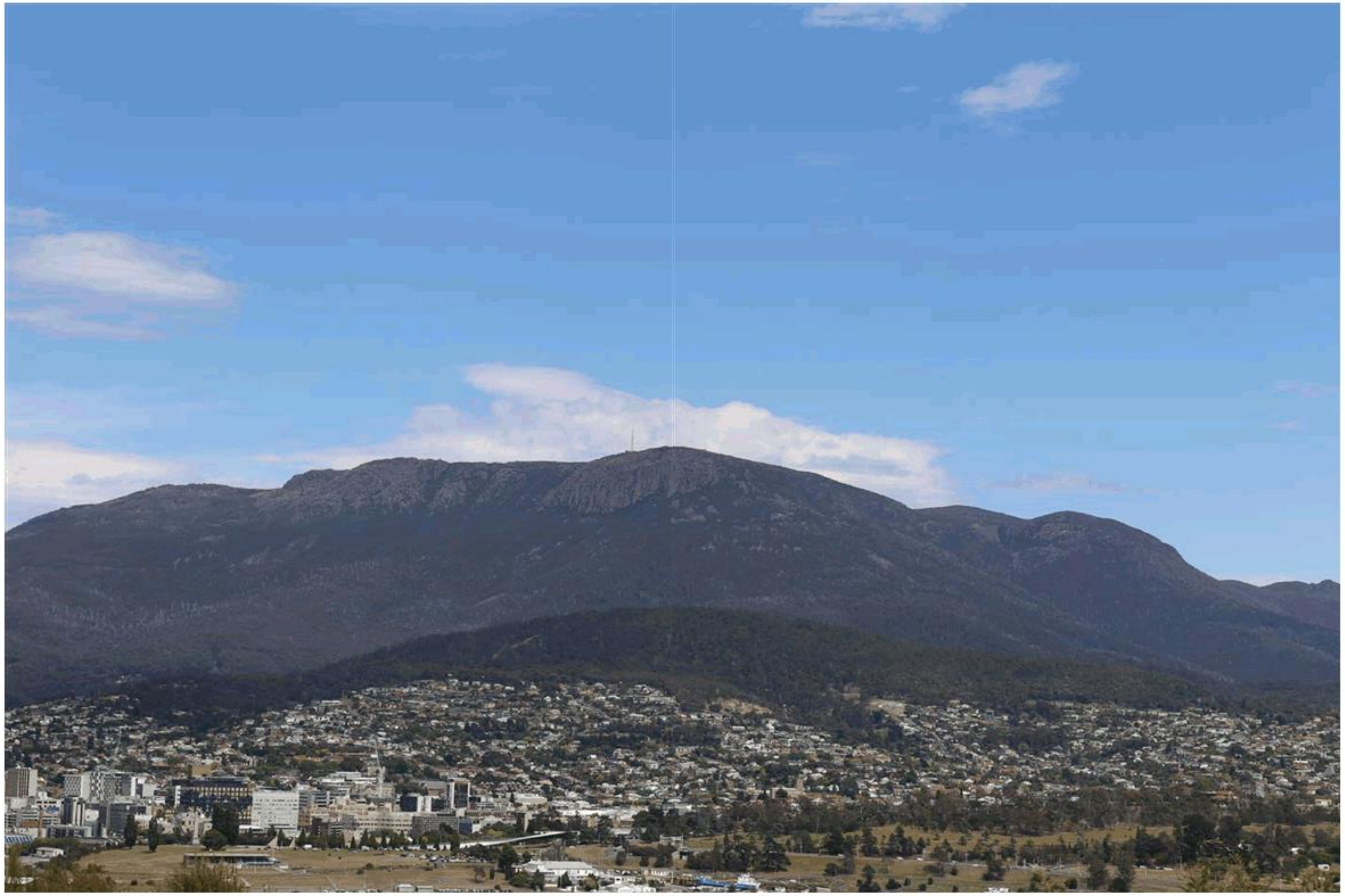
### 11.10.1 EXISTING



Photomontage Location 9 - Taken by Ethos Urban 11/11/2019 11:54am Canon EOS 6D 26MP (EF70-200mm & EF16-35mm lens) – 70mm FL

View Shed Mapping / 3D Photomontages – Mount Wellington Cable Car TASMANIA

11.10.2 PROPOSED



11.10.3 PROPOSED (DEVELOPMENT HIGHLIGHTED)

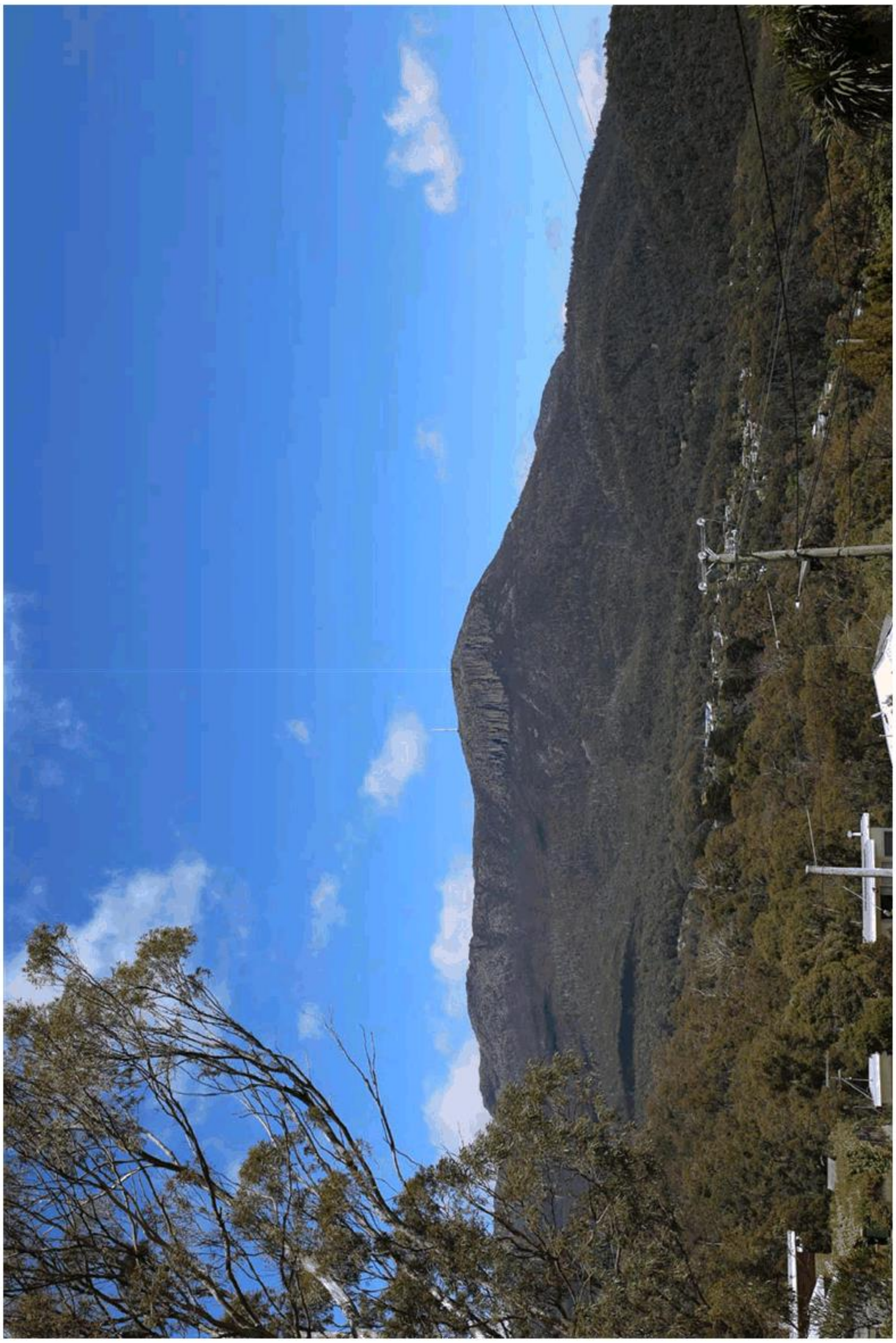
## 11.11 LOCATION 10A – HUON ROAD (70MM FOCAL LENGTH)

### 11.11.1 EXISTING

Photomontage Location 10a - Taken by Ethos Urban 12/11/2019 11:42pm Canon EOS 6D 26MP (EF70-200mm & EF16-35mm lens) – 35mm FL

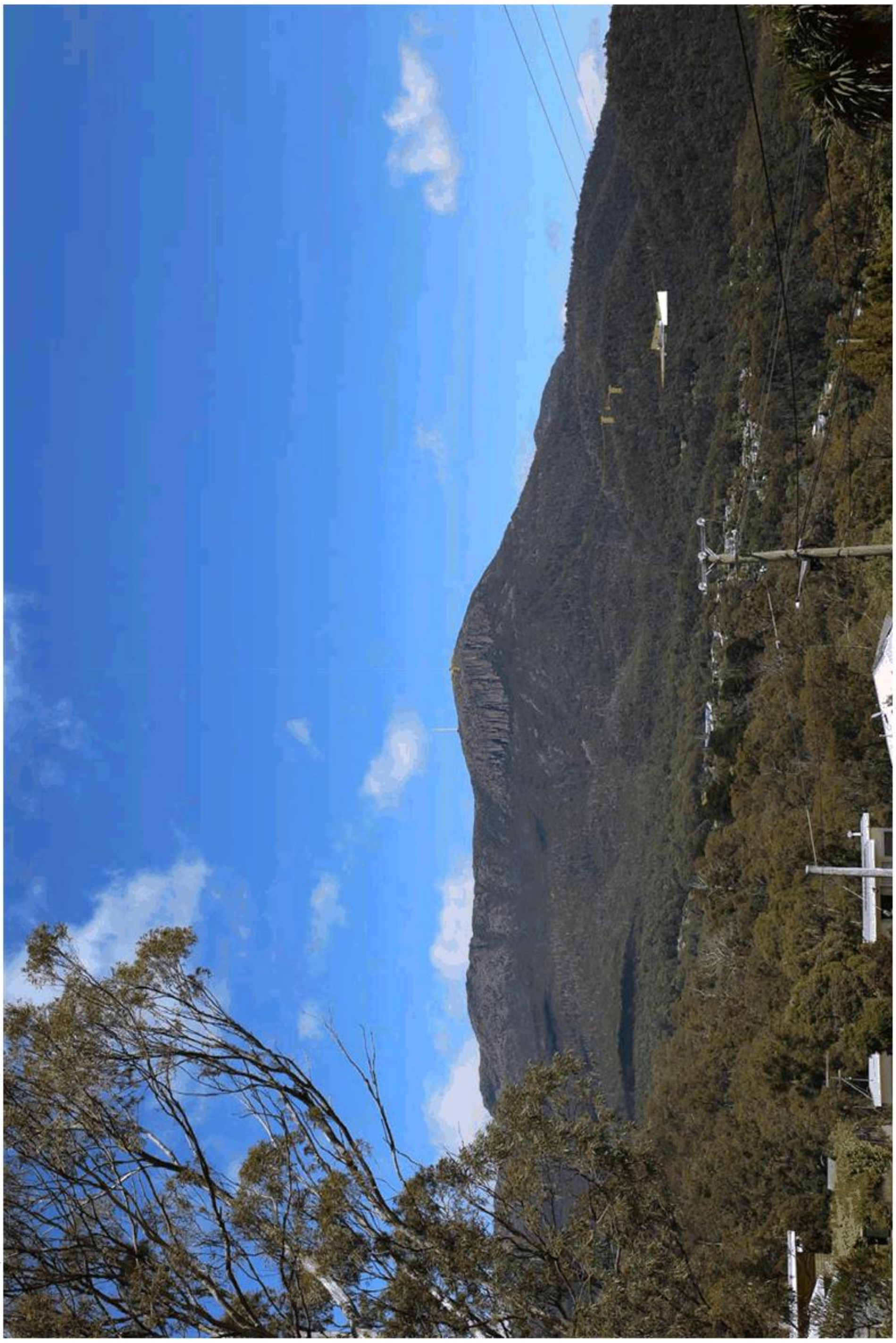
View Shed Mapping / 3D Photomontages – Mount Wellington Cable Car TASMANIA

11.11.2 PROPOSED



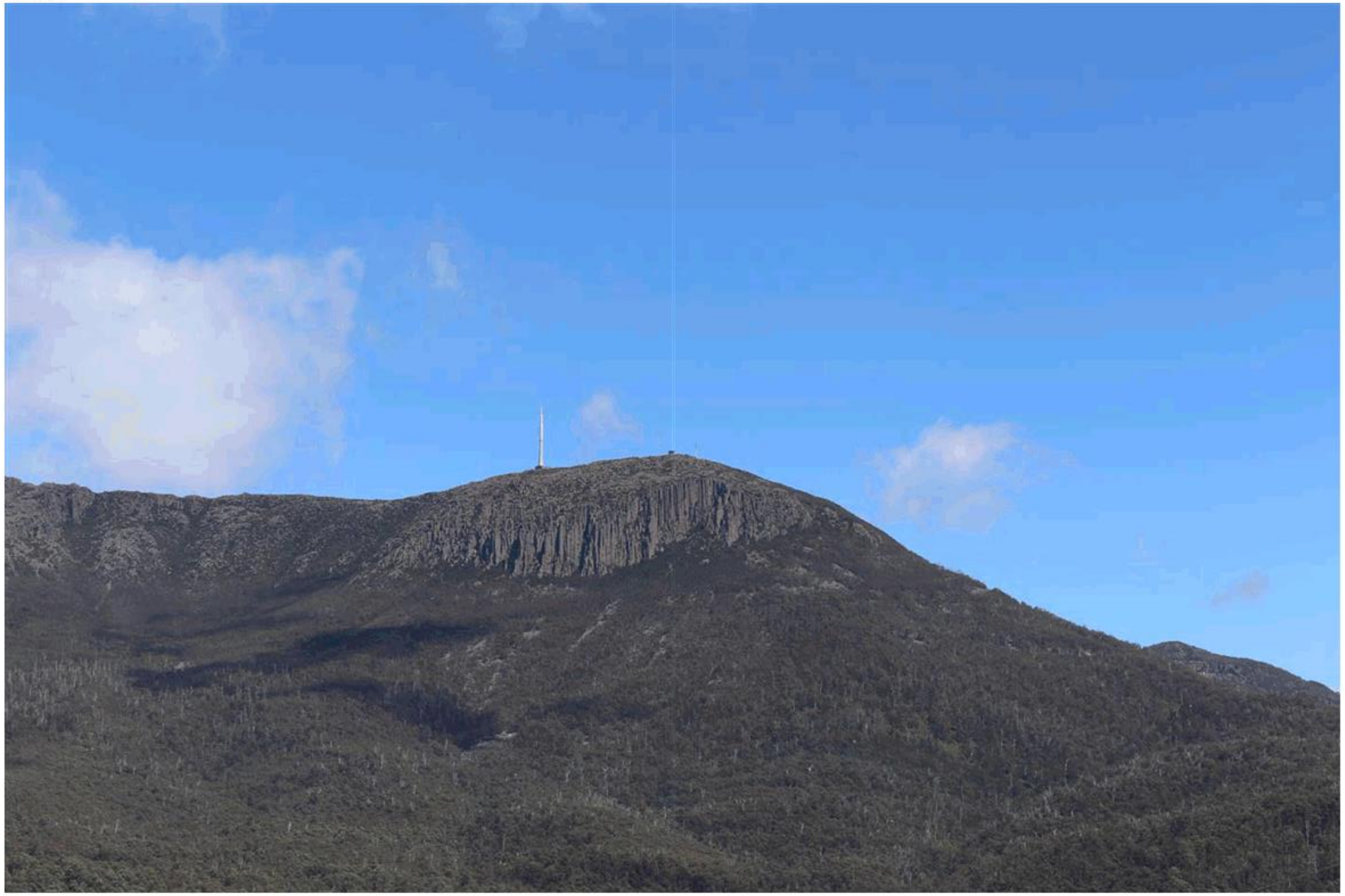
View Shed Mapping / 3D Photomontages – Mount Wellington Cable Car TASMANIA

11.11.3 PROPOSED (DEVELOPMENT HIGHLIGHTED)



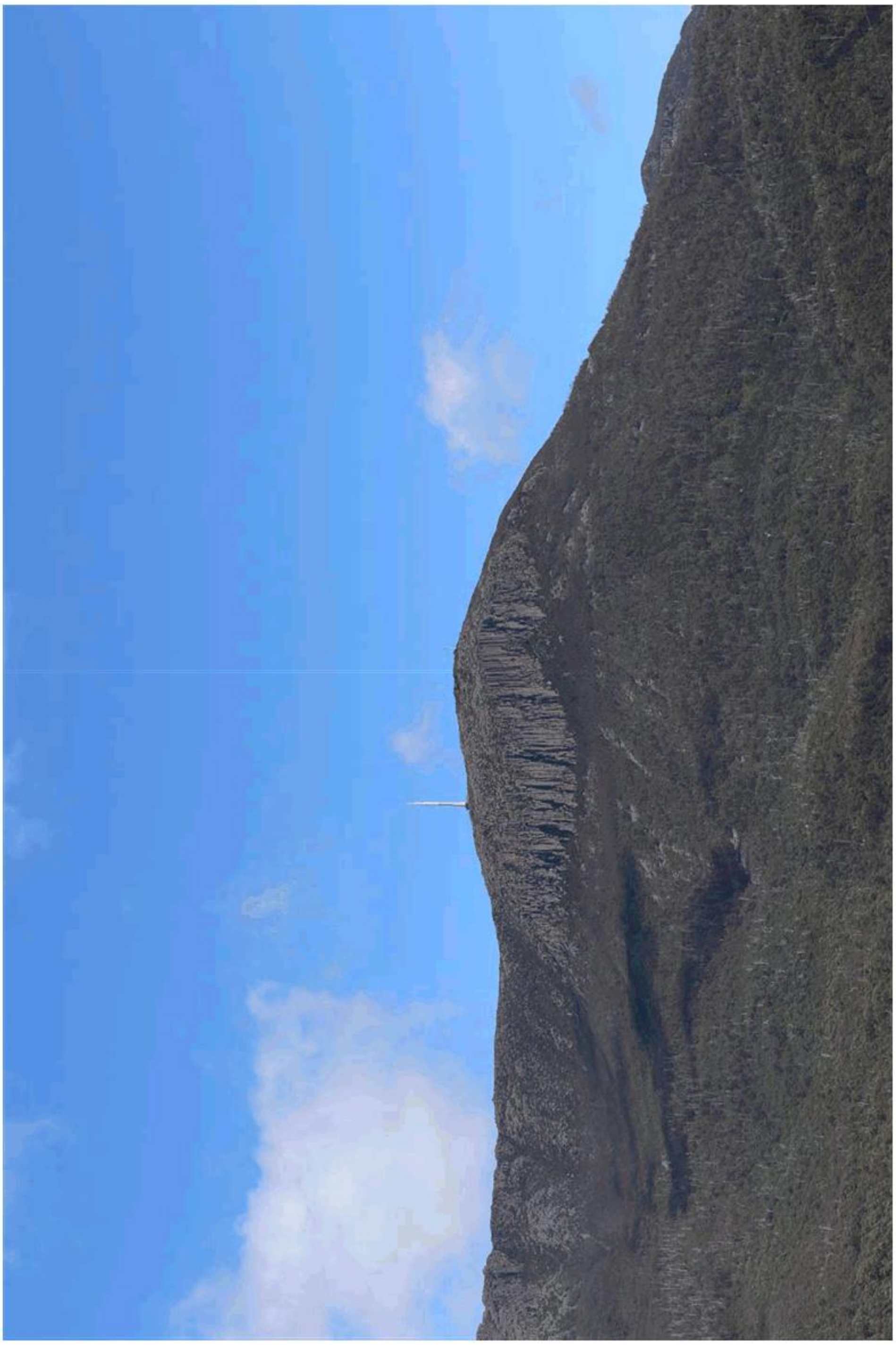
## 11.12 LOCATION 10B – HUON ROAD (35MM FOCAL LENGTH)

### 11.12.1 EXISTING

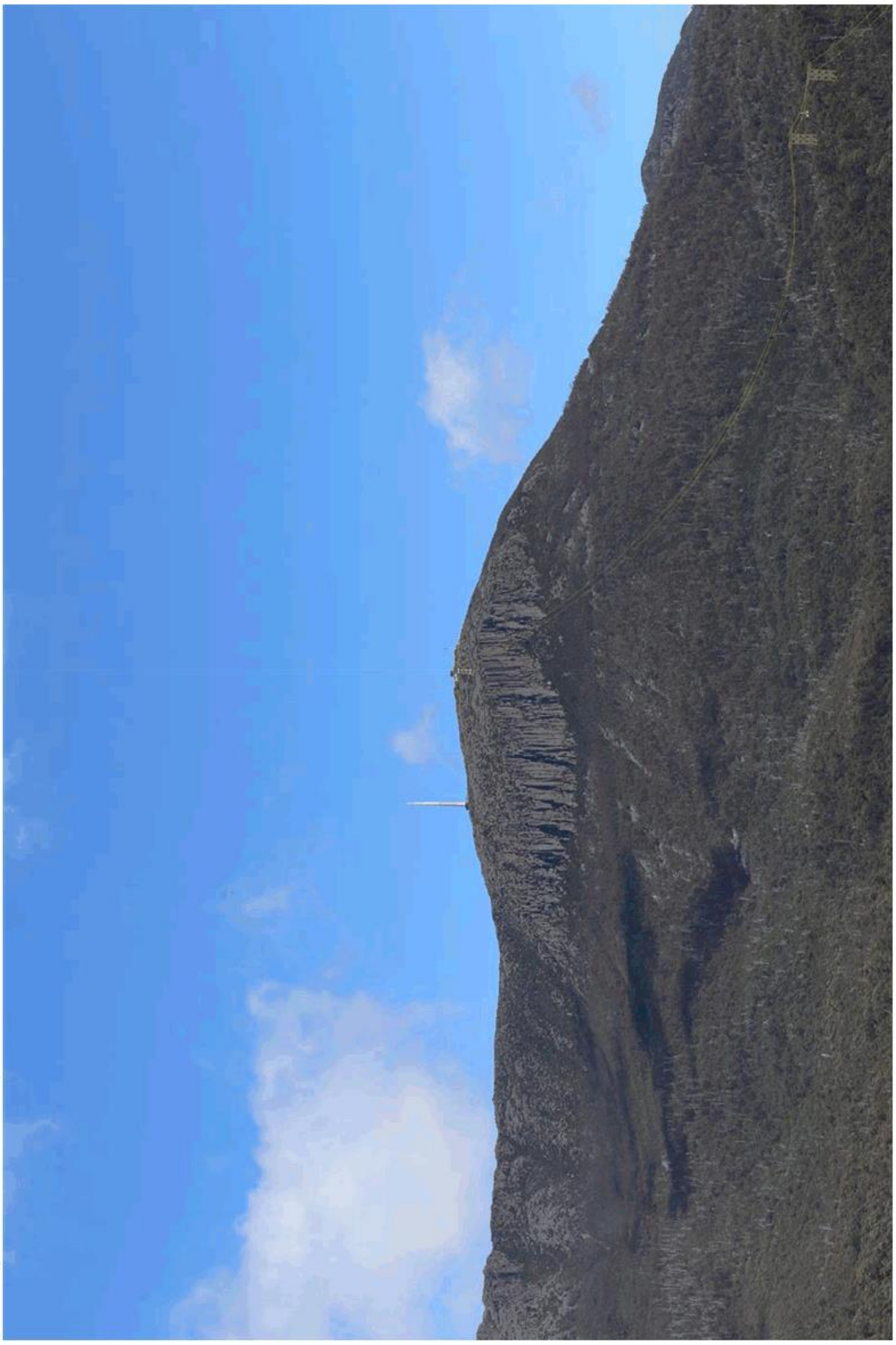


Photomontage Location 10b - Taken by Ethos Urban 12/11/2019 11:42pm Canon EOS 6D 26MP (EF70-200mm & EF16-35mm lens) – 70mm FL

11.12.2 PROPOSED



11.12.3 PROPOSED (DEVELOPMENT HIGHLIGHTED)



# 12 ABOUT ANOTHER PERSPECTIVE PTY LTD

Another Perspective Pty Ltd was formed over 15 years ago and provides accurate visual and shadow analysis products to a range of clients. The information we provide is based on accurate survey information wherever possible. Andrew Strugnell has more than thirty years' experience in the fields of survey mapping and three-dimensional modelling, which commenced in the mid nineteen eighties in the Survey Department of the Hydro Electric Commission. During this time Andrew Strugnell received training in the setup, use of electronic surveying equipment such as levels and theodolites. Another Perspective Pty Ltd has over recent years made numerous appearances at both RMPAT hearings / mediation conferences and prepared visual analysis data for Planning Applications. Recent jobs include (but not limited to);

- 3D Vis. Proposed Extensions - Freycinet Lodge, COLES BAY
- 3D Vis. RMPAT Mediation - "Sapphire Resort", COLES BAY
- 3D Vis. RPDC - Waddamana to Risdonvale T/L
- 3D Vis. Public Consultation - Bass Highway, Upgrade Noise Walls, ULVERSTONE
- 3D Vis. DA Application - SOLIS Residential & Golf Course, ORFORD
- 3D Vis. DA Application - Commercial Carwash, Shoreline Drive, HOWRAH
- 3D Vis. RMPAT - Proposed Jetties, Prosser River, ORFORD
- 3D Vis. RMPAT - Proposed Warehouses, Whitestone Drive, AUSTINS FERRY
- 3D Vis. Sales - 17th Green Modelling – SOLIS Golf Course, ORFORD
- Shadows DA Application - Proposed Extension – 12 Beddome St SANDY BAY
- 3D Vis. DA Application - Proposed Nursing Home – 46 Cross St NEW TOWN
- 3D Vis. RMPAT - Remarkable Lodge, Crescent Bay PORT ARTHUR
- 3D Vis. DA Application - Proposed commercial building Cole Street SORELL
- 3D Vis. DA Application - Proposed Car Park Bathurst St HOBART
- Terrain Obstruction Mapping - Golf Course Development BICHENO
- 3D Vis. RMPAT Proposed Motel 35 Queen Street BURNIE
- 3D Vis. RMPAT Proposed Flats 59-61 Grosvenor Street SANDY BAY
- 3D vis. DA Proposed Residence Dennes Point BRUNY ISLAND
- 3D Vis. RMPAT - Proposed Development 3 Clarence Street BELLERIVE
- 3D Vis. DA - Proposed Residential Development - Claremont Golf Club CLAREMONT
- 3D Vis. DA - Proposed Marina DSS, SANDY BAY
- 3D Vis. DA - Proposed Marina Bellerive Yacht Club, BELLERIVE
- 3D. Vis RMPAT – Proposed Viewing Platform, BINALONG BAY
- 3D. Vis DA – Proposed Low Head Wind Farm, LOW HEAD
- 3D Vis. DA – Proposed Alterations 141 Hampden Road, HOBART
- 3D. Vis RMPAT – Proposed Dwelling 766 Sandy Bay Road SANDY BAY
- 3D. Vis RMPAT – Proposed Multiple Dwellings 1 Cremorne Avenue CREMORNE

View Shed Mapping / 3D Photomontages – Mount Wellington Cable Car TASMANIA

- 3D. Overshadowing RMPAT – Proposed Additional Dwellings 186 Bathurst Street HOBART
- 3D. Vis Overshadowing RMPAT – Proposed Multiple Dwellings 3-4 Montgomery Court SANDY BAY
- 3D. Vis Overshadowing RMPAT – Proposed Multiple Dwellings 34 Patrick Street HOBART
- 3D. Vis Overshadowing RMPAT – Proposed Additional Dwelling 19 Corinth Street HOWRAH
- 3D. Vis RMPAT – Proposed Telecommunications Tower 105 Green Rises Road CRESSY
- 3D. Overshadowing RMPAT – Proposed Gorge Hotel LAUNCESTON
- 3D. Vis RMPAT – Proposed Dwelling 91 Esplanade COLES BAY
- 3D. Vis. DA – Proposed Wind Farms Robbins Island & Jims Plain NORTH WEST TASMANIA

ETHOS
URBAN

**Amended Mt Wellington Cable Car Visual Impact Assessment (Version D)**

Submitted to Mt Wellington Cable Car Company

18 December 2019 | 318285

**CONTACT**

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This document has been prepared by:

This document has been reviewed by:

Tim Nichols 18.12.2019

Tim Nichols 18.12.2019

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| VERSION NO. | DATE OF ISSUE | REVISION BY | APPROVED BY |
|---|---|---|---|
| A | 29.11.2018 | Tim Nichols | Tim Peggie |
| B | 17.01.2019 | Tim Nichols | Tim Peggie |
| C | 24.01.2019 | Tim Nichols | Tim Peggie |
| D | 18.12.2019 | Chris Bain | Tim Nichols |

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Melbourne VIC 3000

# Contents

# Contents



## Figures

# Contents

## Tables



## Appendices

## Important note for this version (version D)

This report is version D of the visual impact assessment prepared by Ethos Urban for the proposed Mount Wellington Cable Car. It can be referenced as the 'amended VIA'. Versions A and B were for internal Ethos Urban review. Version C is the version that was submitted to the Hobart City Council as part of the development application for the proposed Cable Car.

The amended VIA has been prepared in response to the matters raised in the Hobart City Council Request for Further Information PLN-19-345 RFI 03 (RFI) made on 1 July.

It is to be read in conjunction with the covering letter that outlines where each matter raised in this RFI is addressed in this amended VIA.

In addition to addressing the matters raised in the RFI, this version also includes a fully independent visual catchment analysis. On this basis, the amended VIA can be considered a full VIA as opposed to a preliminary VIA.

The level of zoom for photos has also been amended to better reflect the visual experience of the human eye. In general, a 70mm lens has been used for longer range viewpoints, and a 35mm lens for closer range viewpoints.

# 1.0 Executive Summary

The Mountain plays a central role in the psyche of Hobart residents, as the pre-eminent representation of place. It looms over the city, with its vast scale providing a consistent bulk and mass as the backdrop to most westerly aspects within the wider city. Its form is an anchoring feature for people in Hobart, for its constant presence provides an immediately accessible landmark to orient oneself. In addition to grounding its viewers in place, its constant presence too serves to ground viewers in time, as an ever-present reminder of geological deep-history and the relative fleetingness and impermanence of the lives of those living below and playing upon its mass. The Mountain symbolises not only permanence and grounded-ness, but is the very symbol itself of the 'wilderness' that is central to Hobart and Tasmania's identity and sense of place. It signifies the wilderness that exists beyond the human settlement of Hobart, serving as a reminder and evidence of this defining juxtaposition from the built form and settlement that most often sits in the fore and mid-ground of views to its recognisable form and bulk.

Given that it is both a symbol of the wilderness characteristic of Hobart, and also the grounding reminder of geological timescales, any element of change that is proposed or potential must be considered with utmost care to ensure it will not disrupt of interfere with its performance of a symbol and representation of meaning and sense of place.

## 1.1 Scope

The scope of this report comprises of a study on the visual impact of the proposed Mount Wellington Cable Car. This report will establish the visual character of Mount Wellington and assess the visual impact of the modelled effects associated with the proposed cable car.

Relevant policy and legislation relating to the landscape and visual character of Mount Wellington were identified, in addition to the identification of existing visual and landscape conditions of the area. Key tasks undertaken included:

- Literature review of strategic, policy and historical documents;
- Identification of landscape characteristics;
- Identification of visual characteristics;
- Identification of potential visual impacts;
- Assessment of visual effects and impact;
- Assessment of significance of effects and impact.

## 1.2 Landscape Character

Mount Wellington is a significant landscape feature of Tasmania and is characterised by its heavily vegetated slopes and ridges, creating primarily a large and wild character contrasting the urban settlements along the base of the mountain. It is a focal point in the wider Hobart landscape with flat, open rocky landforms at the summit surrounded by steep slopes, providing a transition to the forested areas. It contains a strongly defined vegetation pattern with a variety of native alpine vegetation, in addition to major streams and reservoir catchments. The Organ Pipes are another distinctive scenic feature on the Eastern face of Mount Wellington, featuring dolerite rock columnar cliffs.

It is important to note that while Mount Wellington largely possesses a natural, wild and mountainous landscape character, the Pinnacle on Mount Wellington is distinctively different to the rest of the Wellington Park area. The Pinnacle represents a developed area on Mount Wellington for the purposes of tourism and industry. It is home to a car park, telecommunications tower and its associated infrastructure, viewing shelter and boardwalk. These elements combine to create a more altered environment in comparison to other parts of the mountain. This is difference is acknowledged in the Management Plan as a specific area.

The character of the eastern face of Mount Wellington also differs from the majority of the Park, in that it represents the wall or edge that separates the city below from the 'wilds' beyond (Shipway, 2002). The line of cleared trees formed by Pinnacle Road (or 'Ogilvie's Scar') visually connects the settled fringe of the city to the summit. At the summit the modified area of the Pinnacle with its communications tower and other infrastructure including a lookout shelter, represents the conquering of this lofty peak by human exploration, and a crucial vantage from which the largely uninhabited south west can be surveyed from safety of the peak.

### 1.3 Visual Character

Assessing the visual character of a landscape feature involves consideration of both the social / cultural values of the landscape and the determination of the aesthetic values. The visual values of the Mountain are complex and interwoven with the social and cultural values of it and the wider setting that constitutes Hobart as a place. There is an extraordinary wealth of literature detailing the what the Mountain means to residents and visitors of Hobart alike, and whilst the persistent recognition is that it represents and signifies different meaning to different people, the common valued characterisations of the Mountain are intrinsically linked to its visual nature:

- The Mountain as a picturesque and commodified backdrop to the city,
- The Mountain as a symbol of place,
- The Mountain as a protective bulwark, or
- The Mountain as a conduit for the above non-human spaces, and
- The Mountain as a neighbour.

This assessment does not aim to rank or prioritise any one value above another, but rather concludes that the Mountain is of the highest social and cultural value to the people of Hobart, and that this value is intrinsically connected to the visual elements of the Mountain.

#### 1.3.1 Aesthetic Values

The assessment of the Mountain as a landscape feature determines the aesthetic values of the Mountain that are consistent to the common representations, meanings and cultural values of it. In order to determine the overall aesthetic value of landscape, three 'landscape components' are assessed:

- **Landscape feature**

  The Mountain, emblematic of the wider Wellington Park landscape, is highly distinctive, attracting numerous views in the region and in particular from the settlement of Hobart below, and is demonstrated in a wealth of literature, art and popular culture to inspire and evoke a highly emotional response.

- **Edges or contrasts**

  The edges and contrasts of the Mountain provide a high level of visual variety in their transitory nature and high levels of visual interest, and are considered to be highly aesthetically compelling.

- **Composition**

  The compositional elements of the Mountain combine to provide a unified whole of outstanding compositional quality, evidenced by its highly photographed nature and role as a representative symbol for Hobart and many of its constituent communities.

In order to determine a level of aesthetic significance for each landscape component, and ultimately each landscape, the following 'rating considerations' are applied:

- Exemplary
- Iconic
- Scarce

Levels of significance are attributed to each landscape component, and an overall significance level in relation to aesthetic value is determined. The significance levels are:

Moderate = Local Significance
High = Regional Significance
Exceptional = State Significance (Or Higher)

The Mountain rates Exceptional in all aesthetic categories, and as such is considered of State Significance for aesthetic value.

### 1.3.2 Significant Visual Elements

The following visual elements are the key components of the above aesthetic value, and are consistently cited in references to the Mountain. The impact of the modelled effects of the proposal upon these elements is considered in the impact analysis of section 7.3.

1. Skyline
2. Tree-line and change in texture
3. Edge of settlement
4. Variability (colour and 'mood')
5. Scale (height, bulk, mass)
6. Geological features.

### 1.3.3 Pattern of Viewing

Views associated the Mountain can be grouped into four categories, distant views, mid-distance from the surrounding city, close from within the reserve, off the Mountain.

There are a range of expected and potential visual effects associated with the development of a cable car on Mount Wellington. In particular, this section assesses the visible components of the cable car and includes the Pinnacle Centre and tramway infrastructure. This represents the full range of possible effects on the landscape and visual amenity of the mountain, with further discussion regarding impact on specific views in section 7.3. A number are derived from the Mount Wellington LVCA and supplemented with effects identified as part of this report.

## 1.4 Visual Effects of the Proposal

The following effects have been described, independent of any view or vantage point. The actual visual impact of the visual effects must take into account the impact that these effects have on the character or elements of specific views.

- Degree of existing modification / dominance of man-made elements verses naturalness and stability
- Scale of proposed alteration
- Relation to existing uses and / or pattern
- Deviation from existing character
- Soil colour
- Soil erosion potential
- Existing vegetation pattern
- Vegetation screening potential
- Topographic screening potential
- Slope of the mountain
- Bushfire
- Materiality
- Demolition
- Short-term temporary effects
- Reversibility of effects

### 1.5 Visual Impact Assessment

#### 1.5.1 Viewpoints

~~A sample of viewpoints were chosen (by others) to assess the visual impact of the proposed cable car from specific locations that attract high numbers of viewers and represent the popular views from around Mount Wellington. A visual catchment analysis has not been undertaken as part of this assessment and its scope is limited to assessing the impact on the following viewpoints nominated for which visualisations have been produced.~~

A visual catchment analysis determined that the following viewpoints were suitable as the basis for the visual impact assessment:

- Viewpoint 1 – Hobart Waterfront
- Viewpoint 2 – Summit to City
- Viewpoint 3 – From South Hobart
- Viewpoint 4 – From Kingston
- Viewpoint 5 – From Glenorchy
- Viewpoint 6 – From Salamanca
- Viewpoint 7: Rosny Park Lookout
- Viewpoint 8: Tranmere
- Viewpoint 9: Huon Road
- Viewpoint 10: Old Springs Hotel.

#### 1.5.2 Summary of Visual Impact Significance

**Table 1 Significance of Impact Summary**

| Impact | | Viewpoint | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Magnitude of Change - Significant Visual Element | 1 | Minor | Negligible | Minor | Moderate | Moderate | Minor | Minor | Negligible | Moderate | Moderate |
| | 2 | Minor | Moderate | Moderate | Minor | Minor | Minor | Minor | Negligible | Moderate | Moderate |
| | 3 | Negligible | Moderate | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible |
| | 4 | Minor | Negligible | Moderate | Minor | Minor | Minor | Minor | Negligible | Moderate | Moderate |
| | 5 | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible |
| | 6 | Minor | Negligible | Minor | Minor | Moderate | Minor | Minor | Negligible | Moderate | Moderate |
| Viewpoint Sensitivity | | **High** | **High** | **High** | **Medium** | **High** | **High** | **High** | **Medium** | **High** | **High** |
| **Total** | | **Low** | **Moderate** | **Moderate** | **Low** | **Moderate** | **Low** | **Low** | **Negligible** | **Moderate** | **Moderate** |

The viewpoint impact significance ratings range from Low to High, with three rated Low and three Moderate. The Moderate ratings reflects the particular visual effects in the foreground from the Pinnacle, the increased sensitivity from viewing locations closer to the mountain, and the effects created when a specific viewing angle positions the cable car upper tower such that it is associated with the significant visual element of the Organ Pipes. The viewpoints from the more populous and popular viewing areas of the Hobart city centre and waterfront are rated Low, largely owing to the distance from the proposal and the ability for the Pinnacle Centre and upper tower to harmonise with the landscape below the skyline from these perspectives.

The weighted significance of visual impact from these viewpoints is Moderate. Given the High sensitivity of all but one of the assessed viewpoints, and the lack of screening opportunities or further mitigation opportunities it is considered that this is a reasonable level of impact on the assessed landscape and visual values.

## 2.0 Introduction

### 2.1 Project Overview

Mount Wellington Cableway Company (MWCC) is proposing to construct a new cableway at Mount Wellington that spans 2,040 metres from the base station at the fringe of Wellington Park, to a new visitor centre at the Pinnacle.

This ~~preliminary~~ visual impact assessment relates to the whole proposal which comprises:

- 6.9m x 3.9m 'Skytram' cable cars;
- New, replacement visitor centre ('Pinnacle Centre') that incorporates new amenities such as a Park Ranger office, medical room, seating, security, waste management and parenting rooms;
- New non-slip elevated and ramped boardwalk, removing the existing non-compliant restrictive timber walkways;
- The removal of the rooftop and glazing from the existing lookout at the summit of Mount Wellington;
- Operational hub on the fringe of Wellington Park at the base of Mount Wellington;
- New road from McRobies Road, including underground services.

Vegetation is proposed to be cleared and/or pruned as part the development, however this is largely contained to the two towers near the base station. The base station is positioned in existing cleared land, however will require minor vegetation modification for bushfire management purposes. Whilst the Pinnacle Centre requires clearing of land, it is located near the summit in an area of sub-alpine vegetation featuring low lying shrubs and groundcovers, and won't require the clearing of any areas of trees or forest. Additionally, the tramway will not carry any electricity to the summit which ensures that there is no requirement for a cleared vegetation easement below the cable cars. A bushfire assessment report has also confirmed that vegetation clearance is minimised for bushfire management purposes, with some minor vegetation modification on the lower side of the base station.

### 2.2 Study Area

The Mount Wellington Cable Car is proposed at Mount Wellington, Wellington Park, Tasmania, with a visitor centre at the Pinnacle of the Mountain (Pinnacle Centre) and a base station at the existing clearing on the Main Fire Trail on the fringe of Wellington Park. The cable car aerial tramway will connect the Base Station and Pinnacle Centre over a distance of 2,040 metres above the forest canopy.

The Pinnacle Centre will sit within the Pinnacle Specific Area of the Management Plan and includes a new visitor centre that introduces amenities such as a Park Ranger office, medical room, seating, security, waste management and parenting rooms. The proposal also includes the removal of the existing lookout structure and boardwalks.

The Base Station will be sited within an existed cleared area of land on the outskirts of Wellington Park. It is positioned to minimise vegetation clearing and maximise vegetation screening of the facility. It will host the cableway motor room, backup generator, loading bay and utility services, as well as the front ticket office, mountain bike hire and staff amenities. A new road from McRobies Road will be installed, along with other infrastructure that contribute to the operations, public and utility access as well as bushfire management.

### 2.3 Purpose of the Report

The purpose of this report is to provide a Visual Impact Assessment of the Mount Wellington Cable Car to determine the extent and significance of visual impacts from the proposal. For the purpose of this assessment, the extent of impact has been determined by considering the sensitivity of the viewpoint and the magnitude of change expected as a result of the cable car, which is then considered against established values to determine the significance of the impacts. If necessary, mitigation measures or design modifications that could avoid or minimise impacts have been recommended.

The original report (version C) was prepared by Tim Nichols, a Registered Landscape Architect and qualified urban planner with over 12 years of professional post-graduate experience. Tim has prepared a number of Landscape and Visual Impact Assessments across Tasmania, Victoria, and NSW, including expert evidence for the Resource

Management and Planning Appeals Tribunal in Tasmania and input into an Environmental Effects Assessment process in Victoria. This amended VIA has been prepared by Tim Nichols in partnership with Chris Bain, a qualified urban planner with over 19 years of professional post-graduate experience. Chris has prepared a number of Visual Impact Assessments in NSW.

## 3.0 Methodology

The methodology is derived from, and consistent with, the Guidelines for Landscape and Visual Impact Assessment (LI & IEMA 2013). There is no guidance on the assessment of landscape and visual impacts specific to Australia, however the Guidelines are an accepted professional guidance document in this country.

The significance of the landscape values was established in accordance with the principles outlined in the Burra Charter, using the methodology outlined in Kerr (1990). In particular, this followed the process of 'Understanding the Place'; gathering evidence (documentary and physical), coordinating and analysing evidence, and assessing and stating significance.

### 3.1 Scope

The scope of this report comprises of a ~~preliminary~~ study on the visual impact of the proposed Mount Wellington Cable Car. This report will establish the visual character of Mount Wellington and assess the visual impact of the modelled effects associated with the proposed cable car.

Relevant policy and legislation relating to the landscape and visual character of Mount Wellington were identified, in addition to the identification of existing visual and landscape conditions of the area. Key tasks undertaken included:

- Literature review of strategic, policy and historical documents;
- Identification of landscape characteristics;
- Identification of visual characteristics;
- Identification of potential visual impacts;
- Assessment of visual effects and impact;
- Assessment of significance of effects and impact.

#### 3.1.1 Limitations and Assumptions

This visual impact assessment is limited by a number of assumptions and limitations that were required to be made at the outset of the assessment, as detailed below:

- This Visual Impact Assessment considers the Pinnacle Centre, base station, cables and cable way infrastructure as one project, and considers their impact accordingly.
- Visualisations assessed were produced by Another Perspective, with spatial accuracy undertaken by Veris. Initial site photography by Ethos Urban. See Appendix A for full images.
- This Visual Impact Assessment considers the social or cultural values associated with the Mountain to determine the level of visual sensitivity, however does not assess any potential wider social impacts that changes to the scenic value may entail.
- Consideration is given to night time impact, however detailed modelling has not been undertaken for lighting.
- The scope of this study does not consider Aboriginal heritage visual values or assess the impact on Aboriginal or heritage cultural associations of landscape.

### 3.2 Visual Character Analysis

The first step in this visual character analysis is to understand the compile the visual values from a review of the existing literature surrounding Mount Wellington. This establishes the consistent qualities and features of the mountain that contribute to the visual character and ensures those features are considered throughout the assessment. These visual elements are assessed in terms of their aesthetic value employing landscape character assessment methodology pioneered by Ethos Urban (under previous name Planisphere) that has become accepted standard practice in Victoria and since been used in other Australian states including Tasmania. Then, the nature of viewing with relation to the landscape character in the area identified.

In considering the pattern of viewing the visual character of the study area was identified through the background literature review. This review identified the study area's contribution to views within the visual catchment, including both the physical contribution to composition of views and the contribution to meaning and significance of the views.

Potential places of visual significance in terms of natural, cultural or scenic value were identified by Mount Wellington Cable Company and these were described in terms of the nature and frequency of views from that location. Clusters of people or places that will be visually affected by the changes were identified as "visual receptors". Visual receptors can include people who live or work in the area, people travelling through or by, people visiting promoted landscapes or attractions, and people engaged in recreation of various types.

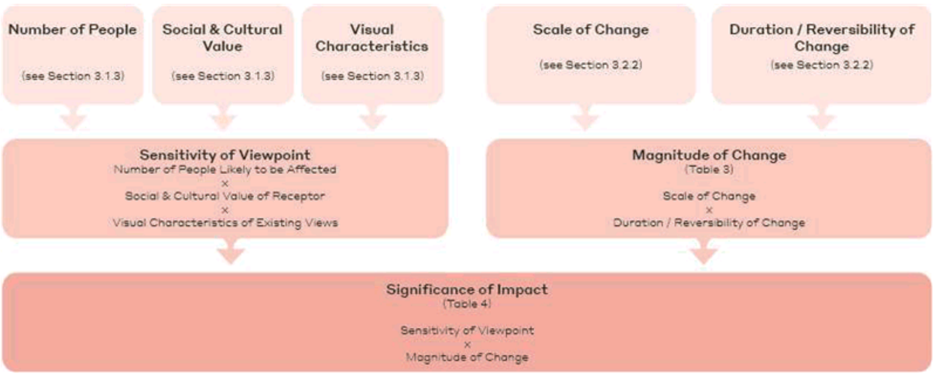
The viewpoints associated with each visual receptor were identified and categorised in terms of whether they are representative of a number of similar views (representative), specific viewpoints at key or promoted viewing locations (specific), or viewpoints that will demonstrate a particular effect or issue relating to the proposed cable car (illustrative).

Each viewpoint was then assessed in terms of their sensitivity, with the following considered to identify the high, medium and low sensitivity receptors:

- Number of people likely to be affected and their sensitivity
- Distance and duration of the view
- Viewing direction to the proposed development
- Social and cultural value of the viewpoint
- Visual characteristics of the existing views (nature of view, composition, foci and scale).

### 3.3 Significance Assessment

The outcomes of the visual analysis described in the preceding section were then brought together with the modelled effects of the cable car to predict the visual impact.



### 3.4 Photos and Visualisations

The visualisations produced and used as part of this Visual Impact Assessment were developed by Another Perspective, who were commissioned by Mount Wellington Cableway Pty Ltd for the proposal. The photomontages are attached at Appendix A.

#### 3.4.1 Magnitude of Change

The effect's magnitude of change on the viewpoint was assessed in terms of its size or scale of change, the geographical extent of area influenced, and the duration and reversibility of the change. The size and scale of the change describes the scale of the change (major, moderate, minor or insignificant) considering the following, as well as whether it affects a wide or restricted geographical area within the view:

- The scale of loss or new features within the view;
- The degree to which the loss or modification alters the compositional qualities of the view;
- The nature of the view (i.e. extended view, filtered, glimpse);
- The effect of loss or new features on the environmental conditions (such as soil and vegetation pattern);
- The amount of interference with the social or recreational enjoyment of the viewpoint.

The duration of the change considers whether the change is persistent or has a limited life span, and the reversibility considers the practicality of removing the effect. The magnitude of change is determined by assessing the scale of change against the duration and/or reversibility of the change as detailed in Table 2:

**Table 2: Magnitude of Change - Visual Effects**

| Scale of Change | Duration and/or Reversibility of Change | | | |
|---|---|---|---|---|
| | An ongoing and irreversible change | An ongoing change that is able to be reversed | A change with a limited life of 5-10 years | A change with a limited life of less than 5 years |
| A major change affecting a wide area | Dominant | Considerable | Considerable | Noticeable |
| A major change over a restricted area, or A moderate change over a wide area | Considerable | Considerable | Noticeable | Noticeable |
| A moderate change over a restricted area, or A minor change over a wide area | Considerable | Noticeable | Noticeable | Perceptible |
| A minor change over a restricted area, or An insignificant change | Perceptible | Perceptible | Perceptible | Imperceptible |
| An imperceptible change | Imperceptible | Imperceptible | Imperceptible | Imperceptible |

#### 3.4.2 Significance of Impact

The magnitude of change caused by the likely effects were then assessed against the sensitivity of the setting within which they are proposed to take place, to determine the significance of the impact caused as per Table 3:

**Table 3: Significance of Visual Impacts**

| | | Magnitude of Change | | | | |
|---|---|---|---|---|---|---|
| | | Dominant Change | Considerable Change | Noticeable Change | Perceptible Change | Imperceptible Change |
| Viewpoint Sensitivity | **High** | Major | High | Moderate | Low | Negligible |
| | **Medium** | High | Moderate | Low | Low | Negligible |
| | **Low** | Moderate | Low | Low | Negligible | Negligible |
| | **Negligible** | Low | Low | Negligible | Negligible | Negligible |

## 4.0 Legislations and Policy

A review of the broader statutory framework and existing studies relating to landscape and visual qualities has informed the identification of the visual values of Mount Wellington.

### 4.1 Commonwealth Legislation

No commonwealth legislation is specifically relevant to the Visual Impact Assessment.

### 4.2 State Legislation

#### 4.2.1 Land Use Planning and Approvals Act 1993

The Land Use Planning and Approvals Act establishes a framework for planning the use, development and protection of land in Tasmania. It sets the broader objectives for planning in Tasmania and the procedures for preparing and amending the Tasmanian planning scheme. This proposal requires planning approval under this Act, and the mechanism for approval is the Hobart Interim Planning Scheme. This scheme has been used to identify landscape and visual values in the study area.

### 4.3 Hobart Interim Planning Scheme 2015

Mount Wellington and the cable car infrastructure are within the City of Hobart. The following sections of the Hobart Interim Planning Scheme are relevant to this Visual Impact Assessment.

#### 4.3.1 29.0 Environmental Management Zone

The purpose of the Environmental Management Zone is:

'To provide for the protection, conservation and management of areas with significant ecological, scientific, cultural or aesthetic value, or with a significant likelihood of risk from a natural hazard.'

'To only allow for complementary use or development where consistent with any strategies for protection and management.'

'To facilitate passive recreational opportunities which are consistent with the protection of natural values in bushland and foreshore areas.'

Applicable provisions relevant to this study (see section 9.1.1):

- 29.4.1 Building Height 1
- 29.4.2 Setback 1, 2

- 29.4.3 Design 1, 2, 3

#### 4.3.2 E14.0 Scenic Landscapes Code

This code is not used in this planning scheme.

#### 4.3.3 F3.0 Wellington Park Specific Area Plan

The purpose for the Specific Area Plan is:

> 'The purpose of this specific area plan is to ensure that use and development in Wellington Park is undertaken in accordance with the Wellington Park Management Plan.'

Application of the Specific Area Plan

> This specific area plan applies to Wellington Park as defined (L1) in the Wellington Park Act 1993.
> Notwithstanding any other provision of this planning scheme, any use or development of land in Wellington Park must be undertaken in accordance with the provisions of the Wellington Park Management Plan (L2).
>
> Footnotes
> **L1**
> Wellington Park means:
> (a) the area of land indicated as bounded by a heavy black line on Plan No. 2789 in the Central Plan Register, a reduced copy of which is set out, by way of illustration only, in Schedule 1 (Wellington Park Act 1993); or
> (b) that area of land as varied pursuant to sections 6, 7 and 8 of the Wellington Park Act 1993.
> **L2**
> Management plan means any management plan approved under section 23 (Wellington Park Act 1993) and for the time being in force in respect of Wellington Park.

### 4.4 Local Plans and Policies

#### 4.4.1 Wellington Park Management Plan Amended 2015

As noted in section 4.3.3 above, the planning scheme requires use and development of the subject land to be undertaken in accordance with the Wellington Park Management Plan.

The Wellington Park Management Plan was prepared by the Wellington Park Management Trust and outlines the vision for the Park and the components required to achieve it. The plan encompasses the entirety of Wellington Park and ensures that a balance between the natural and cultural values, community desires and recreational opportunities is achieved. This plan identifies a number of key outcomes for the area and a selection of park values that are applicable to the Pinnacles area. Development associated with the cable car needs to ensure compliance with these outcomes and not diminish the promoted values of the wider Wellington Park.

The key desired outcomes of the Wellington Park Management Plan include (pg. 26):

- The enhancement of the visitor experiences in the Park;
- The protection, maintenance and, where appropriate, restoration of the ecological and cultural integrity of the Park;
- The enhancement of an ethic of care for the Park within the community consciousness.

The most important identified values of Wellington Park, after walkability, include (in order of importance):

- Naturalness / wildness of the Park;
- Landscape of the Park at a general level;

- Park's location as a natural area next to Hobart, or bookending Hobart with the Derwent on the other side;
- Native biota;
- Park's general aesthetic quality.

**Management Zoning**

The proposal area is within three management areas of Mount Wellington, the Recreation Zone, Natural Zone and the Pinnacle Specific Area in accordance with the Wellington Park Management Plan (2015). The Pinnacle Specific Area encompasses the built-up summit and the associated tourism and industry infrastructure, while the Natural Zone comprises the surrounding landscape.

The Recreation Zone provides for easily accessible, relatively high use nature-based tourism and recreation in a predominantly natural or natural looking setting in a number of separate locations in the park. The proposed Base Station, Towers 1 & 2, and part of the access road are located in the Recreation Zone.

The key management objectives for the Recreation Zone include:

- Provide for relatively high levels of nature based tourism and recreational day use and enjoyment of the area;
- Preserve environmental and cultural features and values;
- Provide education about and promote, the values of the Park via high quality signs, interpretation and visitor activities;
- Develop key visitor services and facilities in the Zone appropriate to the allowable level and type of use; and,
- **Protect the scenic qualities of the Zone when viewed both from within the Zone and from outside the Park.**

The Natural Zone includes large parts of undisturbed forest and alpine areas, with disturbance limited to existing access corridors. Parts of the natural zone area is of significance to flora and fauna conservation and contains features of geodiversity and forested landscapes for recreation. This zone aims preserve the undisturbed condition of the land, protect the biodiversity and scenic qualities of the area in addition to the appropriate development of tourism services and facilities in limited locations. The proposed tramway and Tower 3 are located in the Natural Zone.

The key management objectives for the Natural Zone include:

- Preserve the Zone in an undisturbed condition, except for where necessary disturbance associated with approved use and development;
- Protect cultural features and values;
- **Protect the scenic qualities of the Zone when viewed both from within the Zone and from outside the Park;**
- Develop visitor services and facilities in a few, limited locations in the Zone appropriate to the permitted level and type of use;
- Compatible with the above objectives, provide a variety of environmentally low impact, low density, non-intrusive visitor opportunities in a natural setting.

The Wellington Park Management Plan also provides an outline specifically for the Pinnacle at the summit of Mount Wellington. This is known as the Pinnacle Specific Area Plan and provides guidelines for change at this specific location on the mountain. In particular, the plan identifies that the focus of the Pinnacle is the provision of a variety of tourism and recreational opportunities based on sightseeing of the environment. The landscape and visual values associated with the area and eastern face of the mountain should be maintained and enhanced. Additionally, sustainable development at the Pinnacle is facilitated by this plan through the protection of the scenic qualities of the area when observed from inside and outside Wellington Park and minimising skyline intrusions. Important scenic and visual components of the landscape can then be maintained for future generations.

The Pinnacle Specific Area includes the Pinnacle of Mount Wellington and indicates a major visitor and communications site on the mountain. This zone covers the summit of the mountain and allows for a variety of uses, including telecommunications infrastructure, commercial activities, transport depots and visitor services. It aims to develop and provide for a range of daily tourism and recreation opportunities based on sightseeing and scenic tourism. Consolidation of existing visitor facilities is encouraged, and the management zone seeks to protect the environmental and cultural qualities of the area. The proposed Pinnacle Centre and associate access are located within the Pinnacle Specific Area Plan.

The management objectives for the Pinnacle Specific Area include:

- Provide for a range of day-use tourism and recreational opportunities based on sightseeing, scenic tourism and appreciation of the alpine environment;
- Consolidate and contain existing visitor facilities by enhancing or removing them;
- Protect environmental and cultural features and values;
- **Protect the scenic qualities of the area when viewed both from within and from outside the Park and, except for existing or already approved communications facilities, minimise skyline intrusions when the Zone is viewed from municipalities surrounding the Park.**

This plan also outlines a number of relevant objectives that contribute to the assessment of visual impact from the cable car. These are listed below, and detailed in section 9.2:

Recreation Zone and Natural Zone

- Issue 2: Flora and Fauna Conservation, Geoconservation and Natural Process
- Issue 5: Landscape, Visual Quality and Amenity

Pinnacle Specific Area

- Issue 2: Flora and Fauna Conservation, Geoconservation and Natural Process
- Issue 5: Landscape, Visual Quality and Amenity
- Issue 9: Building Design
  - (a) Building Height
  - (b) Building Size
  - (c) Appearance and Lighting
- Issue 10: Building Siting

#### 4.4.2 Wellington Park Landscape and Visual Character Assessment 2011

The Wellington Park Landscape and Visual Character Assessment (LVCA) was prepared by Inspiring Place for the Wellington Park Management Trust and aims to understand the landscape character, visual quality and scenic values for the entire Wellington Park for management purposes. This LVCA is an unpublished document and informs the Wellington Park Management Plan, providing descriptions of the landscape and visual character of Wellington Park, identifies threats to the desired future character and outlines management priorities for the protection and management of visual values.

The Wellington Park LVCA outlines several factors that affect the significance of impact from potential developments to the landscape. These factors Assessment are outlined in Figure 1below, addressed in our methodology and integrated into our visual impact assessment. In responding to the visual impact, we refer to the relevant factors identified in this assessment in order to ensure consistent evaluation of visual effects and impact from all viewpoints.

| | | Potential Significance of Impact | | |
|---|---|---|---|---|
| **Category** | **Criteria** | **High** | **Medium** | **Low** |
| viewing situation | number of viewers/views | high | | low |
| | sensitivity of viewers | high | | low |
| | viewing time | long | | short |
| | viewing distance | near (e.g. foreground) | | far (background or distant background) |
| | viewing angle to aspect | facing perpendicular to view and targeted, straight ahead | oblique | angled away from view |
| | observer position | above | level | below |
| | target position | alteration viewed on skyline or in a prominent site | | alteration not viewed in the skyline or is subordinate to existing features |
| existing character | degree of existing modification/ dominance of man-made elements verses naturalness and stability | unmodified (e.g. naturally appearing/ wilderness) | semi-natural | Modified to highly modified (e.g. developed or previously disturbed land) |
| | features of high scenic quality | many | | few |
| nature of proposed alteration | scale | major | | minor |
| | relation to existing uses and/or pattern | introduces new land-use type/ in contrast to colour or form/pattern of existing land-uses | | consistent with existing land-uses/existing land-uses continue |
| | deviation from existing character | introduces contrasting line, form, colour, etc. (incl. shadow) against natural elements | borrows from existing line, form, colour and texture | repeats existing line, form, colour, texture, scale |
| nature of proposed alteration (cont.) | scenic interest[23] | low scenic interest | high scenic interest | n/a |
| environ-mental conditions[24] | soil colour | bright | | dark |
| | soil erosion potential | high | | low |
| | existing vegetation pattern | uniformly dense or open | | varied, partially open |
| | vegetation screening potential | low height | | high height |
| | topographic screening potential | none | | high |
| | slope | steep | | flat |
| cultural conditions | interferes with artistic/cultural associations with past landscapes (Aboriginal or European) | substantially modifies the identified cultural or artistic value so as to make it unrecognizable | | maintains artistic or cultural links to past landscapes |
| | interferes with the social or recreational enjoyment of a location (e.g. by overpowering presence or effect). | on-going interference or interference at high use times | intermittent interference | minimal interference or interference at low-use times only). |
| manage-ment consider-ations | potential for mitigation of impacts (alternatives) | low | | high |
| | cost of mitigation measures | high | | low |

**Figure 1: Factors Affecting Visual Impact (from WPLVCA 2012)**

The Wellington Park LVCA also outlines a number of visual objectives for the Mount Wellington area, this includes:

- Avoid introducing visibly contrasting zones especially on steep slopes;
- Not disturbing vegetation on steep slopes greater than 1 in 3 and target development towards less steep slopes and hidden zones.
- Avoid visual interference to the mountain skyline and ridgelines from exposed structures, seen from both on and off the mountain. Combined with below point;

Additionally, the LVCA states that a cable car from urban areas to the mountain possesses potential for contrast from the disturbance of an unvegetated skyline and the visible traits of vegetation on the slopes below. Distance from the city is ideal for a view of these elements and any visible changes will disrupt the character of the mountain and summit. The objective for cable car developments is therefore to:

- Avoid skyline exposure;
- Avoid any introduced contrasting changes of line or point on exposed forested slopes.

#### 4.4.3 Wellington Park Social Values and Landscape 2012

The social values of Wellington Park are intrinsically bound within the landscape values of the Park, and in some cases border on a "spiritual attachment". The assessment is intended to provide information critical to successful long-term management of the park.

The relevant results of the survey and assessment indicate that while the whole of the Park is valued for a range of reasons, the strong focus of values is on Mount Wellington. It also finds that landscape and place values are valued more highly than personal or community meanings or associations. The following places and features within the Park were identified as being of special social value.

- Summit of Mount Wellington (most highly valued natural place),
- the Springs,
- the Organ Pipes,
- Sphinx Rock,
- the Pipeline Track,
- and the Zig Zag Track.

The most important single values identified by the assessment (in order of importance) are –

1. the ability to walk in the Park on what is seen as a good track network;
2. the naturalness/wilderness quality of the Park;
3. the landscape of the Park at a general level;
4. the Park's location next to Hobart, as a natural area next to Hobart, or bookending Hobart with the Derwent on the other side;
5. the native biota; and
6. the aesthetics of the Park at a general level.

Other important values (ie, noted by more than 20% of respondents) include –

- the views to/of Mount Wellington,
- the changeability and variability of the Park,
- the atmospheric nature of the Park (primarily Mount Wellington),
- Mount Wellington and the Park as a backdrop to Hobart,
- the sense/spirit of place of Hobart engendered by Mount Wellington and the Park,
- that Mount Wellington is a landmark (or signature) for Hobart and 'home',

- family associations,
- bike riding, and
- the accessibility of the Park.

## 5.0 Existing Conditions - Landscape Character

The following description of the landscape character of Mount Wellington utilises the assessment conducted as part of the Wellington Park Landscape and Visual Character Assessment 2011, and is a summary of the relevant sections of that report.

Landscape characteristics are informed and defined by physical features and evident transitions in geology, geomorphology, topography, hydrology, vegetation and development pattern. The Mount Wellington study area is considered to be a "High Mountains" landscape character type in accordance with Forestry Tasmania (Forest Practice Authority, 1990).

Mount Wellington is a significant landscape feature of Tasmania and is characterised by its heavily vegetated slopes and ridges, creating primarily a large and wild character contrasting the urban settlements along the base of the mountain. It is a focal point in the wider Hobart landscape with flat, open rocky landforms at the summit surrounded by steep slopes, providing a transition to the forested areas. It contains a strongly defined vegetation pattern with a variety of native alpine vegetation, in addition to major streams and reservoir catchments. The Organ Pipes are another distinctive scenic feature on the Eastern face of Mount Wellington, featuring dolerite rock columnar cliffs.

It is important to note that while Mount Wellington largely possesses a natural, wild and mountainous landscape character, the Pinnacle on Mount Wellington is distinctively different to the rest of the Wellington Park area. The Pinnacle represents a developed area on Mount Wellington for the purposes of tourism and industry. It is home to a car park, telecommunications tower and its associated infrastructure, viewing shelter and boardwalk. These elements combine to create a more built environment in comparison to other parts of the mountain. This is difference is acknowledged in the Management Plan as a specific area.

The character of the eastern face of Mount Wellington also differs from the majority of the Park, in that it represents the wall or edge that separates the city below from the 'wilds' beyond (Shipway, 2002). The line of cleared trees formed by Pinnacle Road (or 'Ogilvie's Scar') visually connects the settled fringe of the city to the summit. At the summit the modified area of the Pinnacle with its 'communications tower and other infrastructure including a lookout shelter, represents the conquering of this lofty peak by human exploration, and a crucial vantage from which the uninhabited south west of Tasmania can be surveyed from safety of the peak.

## 6.0 Existing Conditions - Visual Character

### 6.1 Visual Character Assessment

Assessing the visual character of a landscape feature involves consideration of both the social / cultural values of the landscape and the determination of the aesthetic values. The visual values of the Mountain are complex and interwoven with the social and cultural values of it and the wider setting that constitutes Hobart as a 'place'. There is an extraordinary wealth of literature detailing the what the Mountain means to residents and visitors of Hobart alike, and whilst the persistent recognition is that it represents and signifies different meaning to different people, the common valued characterisations of the Mountain are intrinsically linked to its visual nature:

- The Mountain as a picturesque and commodified backdrop to the city,
- The Mountain as a symbol of place,
- The Mountain as a protective bulwark against the 'chastening non-human spaces' that lurk behind it, or
- The Mountain as a conduit for the above non-human spaces, and
- The Mountain as a neighbour.

This assessment does not aim to rank or prioritise any one value above another, but rather concludes that the Mountain is of the highest social and cultural value to the people of Hobart, and that this value is intrinsically connected to the visual elements of the Mountain.

The following is an assessment of the Mountain as a landscape feature to determine the aesthetic values of the Mountain that are consistent to the common representations, meanings and cultural values of it. In order to determine the overall aesthetic value of landscape, three 'landscape components' are assessed:

- Landscape feature
- Edges or contrasts
- Composition

In order to determine a level of aesthetic significance for each landscape component, and ultimately each landscape, the following 'rating considerations' are applied:

**Exemplary**

How representative or illustrative is the landscape (and its features, edges or contrasts, and composition)? Is it 'the best' of its type? Is it exemplary within the local, regional or state context?

**Iconic**

Is the landscape (and its features, edges or contrasts, and composition) instantly recognisable? Is it symbolic for its visual qualities? Has it been represented in art, photography, literature etc.? Is it iconic within the local, regional or state context?

**Scarce**

How uncommon, rare or endangered is the landscape (and its features, edges or contrasts, and composition)? Is it scarce within the local, regional or state context?

Levels of significance are attributed to each landscape component, and an overall significance level in relation to aesthetic value is determined. The significance levels are:

Moderate = Local Significance
High = Regional Significance
Exceptional = State Significance (Or Higher)

The final determination of significance level for aesthetic value is not a matter of adding up the number of 'moderate' or 'high' ratings. Rather, if a landscape rates 'high' for example in one or more of the landscape components, that level is the overall significance rating attributed to the aesthetic values of that landscape. (Just as the usual standard for listing a place on a heritage register, for instance, is that a place meets one or more criteria.)

### 6.1.1 Landscape Feature

A landscape feature is a topographic feature or prominent landmark such as a headland, mountain range or volcanic cone that is visually dramatic and provides the landscape with its 'wow' factor. The prevalence or concentration of a particular landscape element or vegetation type e.g. River Red Gums, rocky outcrops, dry stone walls etc., may also be classified as a landscape feature. In relation to landscape features, the following criterion has been developed, which informs the determination and level of significance:

The landscape is distinctive or inspirational for its landscape feature or features that attract the viewer and may evoke an emotional response.

Mount Wellington is a landmark that is highly prominent and visually dramatic. Its prominence and drama is largely defined by its sheer scale, its significant height at some 1,250m and extensive bulk in the table-top form. These elements combine to the oft-cited characteristic of mass, which links its form to the characteristic of its permanence. The scale of the Mountain is a consistent element in literature, described often as 'lofty' and looming over Hobart.

The appearance of the eastern face of the Mountain can vary dramatically depending on the weather, season and time of day, attracting views and serving as a continual reminder of its presence.

The geological feature that is the Organ Pipes are a prominent element within the overall eastern face, and can also be said to be a landscape feature within the overall feature of the Mountain.

The Mountain, emblematic of the wider Wellington Park landscape, is highly distinctive, attracting numerous views in the region and in particular from the settlement of Hobart below, and is demonstrated in a wealth of literature, art and popular culture to inspire and evoke a highly emotional response.

### 6.1.2 Edges and Contrast

Edges or contrasts include the point of intersection between two landscape elements e.g. the coastline (the boundary between sea and land); the edge of a forest or a lake; the boundary between vegetation types or different landform types; the intersection between a mountain range and a plain; or an incised valley etc. The existence of edges or contrasts in the landscape provides visual diversity, a quality associated with scenic value. In relation to edges or contrasts, the following criterion has been developed:

The landscape is aesthetically compelling for its edges or contrasts that provide visual variety and interest.

The most significant edge associated with Mount Wellington is its skyline, which provides a distinctive outline to its form. The skyline is the most distinctive element in distant views, in particular from the south and north where the westerly plateau lends the Mountain a table-top form. From closer, yet still long-distance views such as those from Hobart city below, the skyline of the landform is punctuated by the communications tower, and to a lesser extent the lookout shelter. However, in low light these elements read as part of the skyline. The skyline is a sharp distinction, in particular in certain light conditions such as days of high cloud or when silhouetted, the high contrast between the Mountain and sky beyond darkens the form of the Mountain, increasing its sense of bulk and scale. The skyline is given extra significance by the valued 'wildness' of the Mountain and Park, representing the limiting edge between the known, and the unknown beyond the ramparts.

Additional horizontal lines representing the edges of different land cover progressively emphasising the height of Mount Wellington. The next below the skyline is the tree-line, the point at which the forested slopes transition to the sub-alpine vegetation above, where the geology becomes more pronounced and the geomorphology of the Mountain is revealed, in particular the cliff face of the Organ Pipes where strong vertical lines are a unique and contrasting feature, the vertical columns emboldened by a play of light and shadow. The tree-line is enhanced in the opposite light conditions to those that exaggerate the skyline, particularly the early morning light that dramatically draws the pink, yellow and purple hues out of the rocks in contrast to the duller matte of the forested slopes below.

When the Mountain is capped by snow there is a temporary line of contrast that marks the extent of the snowfall, often in heightened contrast to the darker slope below. This line is temporary and transitory, at times extending further down the Mountain or completely blanketing it. Often when heavy snow falls, the Organ Pipes stand out as the only element not covered. Another temporary and transitory line of contrast is the edge between the Mountain and shrouding mists or clouds on days where the Mountain is concealed.

The limit of sub-urban development's march up the slopes forms a distinct edge condition, and one that is deeply connected to the Mountain's valued 'wildness'. It marks the distinction between the settlement of Hobart and the Park, a visible distinction between housing and solid forested slopes above. However, it also marks the boundary where human settlement and the transition to the 'wilds' of the Park beyond.

The edges and contrasts of the Mountain provide a high level of visual variety in their transitory nature and high levels of visual interest, and are considered to be highly aesthetically compelling.

### 6.1.3 Composition

> The composition of a landscape is its make-up or constitution, including arrangements or patterns of colour, textures, features etc. and the form, scale and unity of these and other elements. In relation to composition, the following criterion has been developed:
>
> The landscape has outstanding compositional qualities, the combination of which achieve a unified whole, and provide the setting or subject of notable views.

The main compositional quality of the Mountain is its role as a backdrop to Hobart, forming a distinct darker band of consistent matte slope fringed in mottled rocky summit and defined by a sharp skyline. The immense scale of the backdrop provides the setting for elements in the fore or mid-ground, a setting of geological deep history and wilderness against which the foreground of built form (human ingenuity) can be contrasted. This is a common theme in representations of built form, in particular heritage buildings, for example around the waterfront, Salamanca, Cascade Brewery. These elements in foreground, as for the Mountain itself, would be features of notable views on their own, however the composition of the two as unified yet contrasting element elevates these views to a unique and iconic status.

More detailed compositional elements characterise the feature of the Mountain itself. The gradation of pattern and texture from forested tree-tops to rocky slopes. The ever-changing colouration of the eastern face that acts as a canvas for changes in light and weather. The geological feature of the Organ Pipes, a highly visible focal point within the Mountain's form.

The Mountain also contributes as a vantage point to outstanding views. Its height affording humbling and scarce views of the incredibly scenic landscape formed by Hobart's urban form laid out along the Derwent, contrasting to the rolling hills beyond that extend into a series of peninsulas cut by inlets of rivers and bays extending impossibly far toward the horizon. In these views the Mountain becomes the foreground, for example where the viewing infrastructure and slope above the Organ Pipes define the foreground in the iconic view from the Pinnacle, with the dramatic drop cutting out the mid-ground and attracting the eye naturally outward across the landscape laid out beyond.

The elements of the Mountain combine to provide a unified whole of outstanding compositional quality, evidenced by its highly photographed nature and role as a representative symbol for Hobart and many of its constituent communities.

### 6.1.4 Significance Rating

**Exemplary**

Mount Wellington is highly exemplary of the High Mountains landscape character type (though other mountains, particularly in the southwest are more exemplary of this character type). The Mountain also exemplifies the meeting of the High Mountains landscape character type with the settled area of Hobart, a relationship that gives meaning to the city. For this it is undoubtedly the best example of mountainous backdrop to a centre of population in the State, and draws international comparisons such as Table Mountain in South Africa. On this basis, it is considered exceptionally exemplary of the meeting of the High Mountains landscape character type and a relatively large urban area.

**Iconic**

Its role as a symbol is demonstrated in its persistent use in marketing such as logos, where the distinctive form of the skyline and Organ Pipes in particular are used to symbolise the Mountain and in a broader sense Hobart. The significant body of literature and art that represent its form demonstrates the emotional connection with Hobart residents and the inspiration drawn from its slopes. In this sense it is exceptionally iconic

**Scarce**

The Mountain and its compositional relationship to Hobart is a one-of-a-kind arrangement that is not found anywhere else in the State, and as such is considered exceptionally scarce.

**Significance**

The Mountain rates exceptional in all aesthetic categories, and as such is considered of State Significance for aesthetic value.

### 6.1.5 Summary of Significant Visual Elements

The following visual elements are the key components of the above aesthetic value, and are consistently cited in references to the Mountain. The impact of the modelled effects of the proposal upon these elements is considered in the impact analysis of section 7.3.

1. Skyline
2. Tree-line and change in texture
3. Edge of settlement
4. Variability (colour and 'mood')
5. Scale (height, bulk, mass)
6. Geological features

## 6.2 Pattern of Viewing

Views associated the Mountain can be grouped into four categories, distant views, mid-distance from the surrounding city, close from within the reserve, off the Mountain.

**Distant**

From the regional setting where the Mountain appears as a "sentinel in the regional landscape from distant points such as Dunalley in the east, Spring Hill on the Midlands highway, and Port Huon in the south" (Inspiring Place, 2011, p27).

From these views, the key visual element is the skyline of the Mountain's recognisable summit. The scale of the Mountain's form is also a visual element perceived from these distant views.

**Mid-Distance from Surrounding City**

The Mountain is a dominating feature within views from surrounding townscapes, such as the Hobart, Kingborough and Glenorchy urban areas. The Wellington Park skyline is characterised by the rocky summit, cliffs and forested slopes of Mount Wellington with views towards the Park from distance encompassed by the sheer scale and structure of the Mountain. The shape and silhouette of the Mountain is a key focal point of the views towards Wellington Park with seasonal effects of lighting, shadows and weather also contributing to the visual character of the Mountain. Unique landforms such as the Organ Pipes represent locations of high scenic quality. From angle oblique to the eastern face such as the visual units of Glenorchy and Kingston, the steep face and Organ Pipes are pronounced in profile.

Most houses of Hobart feature an outlook toward the Derwent river or up to the Mountain, or both. Part of the daily ritual for many residents is to 'look up at the Mountain and check its 'mood'. This mood can vary dramatically depending on the weather, season and time of day, and in particular when a cold snap has dusted, sprinkled or dumped a covering of snow on the peak. When this happens the snow highlights the rocky top of the Mountain, sparing and isolating the Organ Pipes, and also illuminating the contrast to the lower treed slopes. On a clear day the early morning light illuminates the eastern face in spectacular array of colour, in particular the dolerite Organ Pipes. Evening light is foreshortened by the massive bulk of the Mountain, in particular on the western side of the Derwent where it can reduce daily sunlight by as much as 30 minutes. Once the sun disappears behind its bulk, its outline becomes prominent, with other features reduced to a dark mass. It can be shrouded in a cloak of fog, and on cloudy days the Mountain can, somewhat disconcertingly, retreat from view altogether.

All significant visual elements are key to typical views from the surrounding city and built-up areas.

**Close from Within Reserve**

In addition to views towards the mountain from distance, Mount Wellington is also a significant feature within views from within the Wellington Park area. A variety of walking trails and parks, in addition to the Springs visitor area, all below the summit of the Mountain provide important scenic views with the silhouette of the peak in the background. The typical view from the eastern face within the reserve is enclosed and confined to foreground detail by vegetation, until one emerges from the tree-line at height. Openings permit wider views and allow for the viewer to orient themselves and gauge distances, in particular where feature such as the Organ Pipes or Mountain skyline are visible.

From these views, the key visual elements are the skyline of the Mountain's recognisable summit and the geological features of the Organ Pipes. The tree-line is also an element that is visible and experienced upon crossing the threshold, and the variability of colours and weather effects are also visible at an intimate scale.

**From on the Mountain**

For visitors the mountain not only provides a consistent landmark to orient oneself for wayfinding. Its peak draws visitors to its summit, which is one of the top sights to see in the city[1]. From the summit, sweeping panoramas are afforded across the Hobart landscape. Its height affording humbling views of the scenic landscape formed by Hobart's urban form laid out along the Derwent, contrasting to the rolling hills beyond that extend into a series of peninsulas cut by inlets of rivers and bays extending impossibly far toward the horizon. In these views the Mountain becomes the foreground, for example where the viewing infrastructure and slope above the Organ Pipes define the foreground in the iconic view from the Pinnacle, with the dramatic drop cutting out the mid-ground and attracting the eye naturally outward across the landscape laid out beyond.

Views on the summit also extend along the Mountain's plateau to the east, where the complete absence of visible human intervention in the landscape stands out in stark contrast to the views of the greater Hobart area to the north, east and south-east.

[1] Listed third Top Sight on the Lonely Planet 'Experiences' section of the online guide. https://www.lonelyplanet.com/australia/tasmania/hobart accessed 16/11/2018

## 7.0 Visual Impact Analysis

The Wellington Park Landscape and Visual Character and Quality Assessment (Inspiring Place, 2011) identified a number of key issues for the visual management of Mount Wellington (pg. 90). The mountain possesses large areas with a high scenic quality and these areas, the skyline and slopes are all sensitive to impact. Disturbance to the continuity of vegetation cover and soils will increase the contrast between the vegetation and rocky landforms, as well as the impact on the texture and patterns of vegetation as viewed from surrounding areas, ultimately negatively affecting the visual connectedness of the Mountain and park.

This section presents

- an outline of the proposed built form of the proposal having regard to the matters raised by the Hobart City Council in their RFI
- the expected and potential visual effects associated with the cable car
- provide the visual impact assessment from key viewpoints.

### 7.1 Outline of the proposed built form

In their Request for Further Information PLN-19-345 RFI 03 (RFI) made on 1 July 2019, Hobart City Council has requested:

'further analysis by the author of the VIA (rather than reliance on the architectural statement) of the proposed built form against the following criteria:

- (i) Colour
- (ii) Form
- (iii) Line
- (iv) Texture
- (v) Scale
- (vi) Spatial Characteristics'.

The following provides assessment of these criteria for the Base Station and the Pinnacle Centre.

#### 7.1.1 Base Station

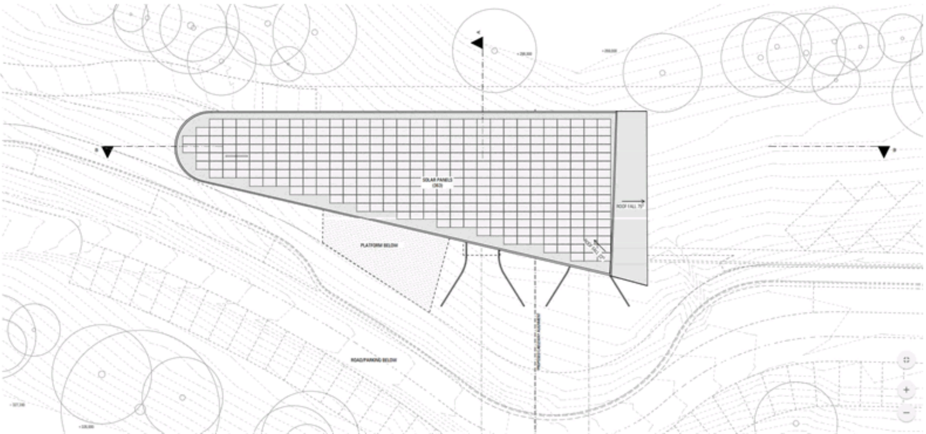


**Figure 2: Base Station: Site Plan**

Source: Jaws Architects

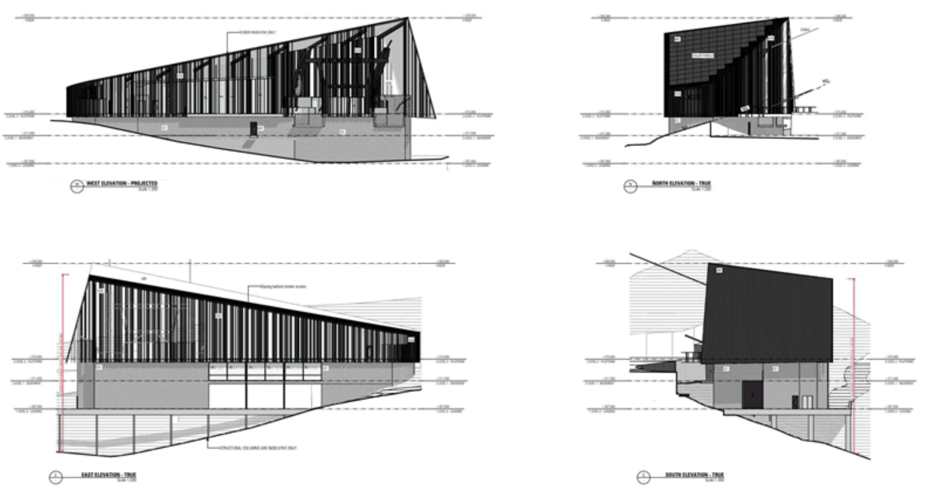


**Figure 3: Base Station: Elevations**
Source: Jaws Architects

**Figure 2** shows the Base Station site plan. **Figure 3** shows the Base Station elevations.

### Colour

Overall, the colour scheme of the externally visible parts of the Base Station comprise a range of grey and browns, including:

- light grey
- very dark grey
- mid brown.

In general, the composition of colours comprises darker colour for the upper parts of its elevations and lighter colours for lower parts of its elevations.

Due to their low reflectivity and high levels of grey, the colours are considered recessive.

### Form

In plan view, the Base Station has a triangular wedge form. Its long elevations are oriented north-south and its short elevations are oriented east-west. Its northern end is curved. This creates three elevations.

Due to the slope of the land, each elevation has three components:

- upper
- lower
- base.

The building is capped with a skillion roof.

#### Line

In both plan and elevation, lines on the Base Station are largely straight and angular. The exception to this is the northern elevation which comprises a single curve.

The large proportion of vertical, semi-transparent timber and steel screens on the western and northern elevations provides a lightweight appearance that counterbalances the more solid lines of the roof and base.

#### Texture

The elevations will comprise a combination of the following materials:

- metal (Colourbond Monument)
- timber and steel composite
- concrete,
- glazing
- solar panels.

The overall textural impression is smooth.

#### Scale

The Base Station has the following dimensions:

- building footprint of 635sqm (approx.)
- maximum height 29m above natural ground level (three storeys)
- maximum height of 15.5m from the access road and carpark.

The scale of the building has largely been determined by the functional requirements of the cab car operating plant. In addition to this, the building comprises other associated functional elements such as ticket sales and bathrooms. The building does not incorporate other elements that could have otherwise been appropriate to such a use, including cafes.

#### Spatial Characteristics

In terms of overall spatial characteristics, the Base Station sits together with an access road, carpark and servicing area in a narrow, grassed clearing surrounded by vegetation.

### 7.1.2 Pinnacle Centre

Figure 4 shows the Pinnacle Centre site plan. Figure 5 shows the Pinnacle Centre western elevation. Figure 6 shows the Pinnacle Centre eastern elevation

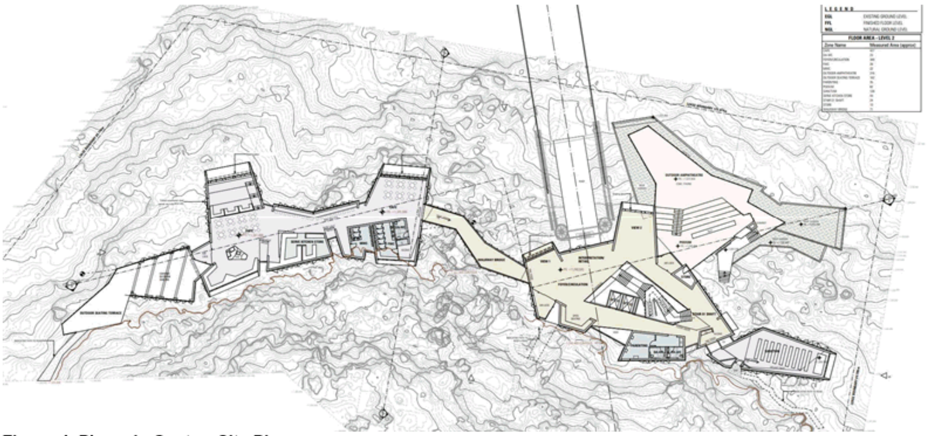


**Figure 4: Pinnacle Centre: Site Plan**
Source: Jaws Architects

**Figure 5: Pinnacle Centre: Western Elevation**
Source: Jaws Architects

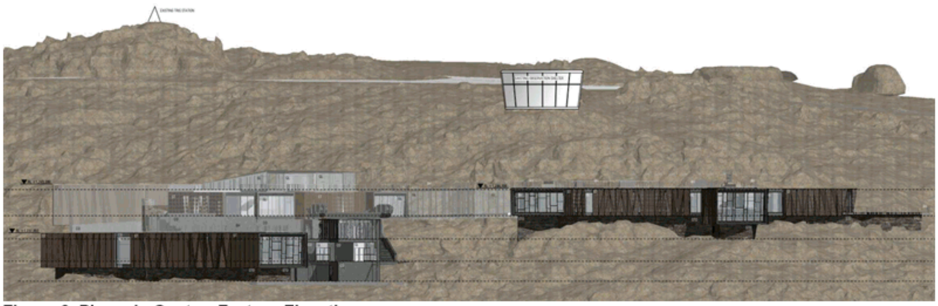


**Figure 6: Pinnacle Centre: Eastern Elevation**
Source: Jaws Architects

### Colour

Overall, the colour scheme of the externally visible parts of the Pinnacle Centre comprise a range of greys, browns and greens, including:

- light grey
- mid grey
- mid to dark grey

- dark brown
- light green.

Due to their low reflectivity and high levels of grey, the colours are considered recessive.

The colours are compatible with the surrounding natural landscape elements, in particular rock formations and vegetation.

**Form**

The proposal has a highly fragmented, linear form. In plan view, it comprises two main parts linked by an enclosed pedestrian bridge. The edges of both of these parts comprise deep recesses and projections to give the centre an almost crenelated or castellated edge.

In elevation, the centre also presents as linear and highly fragmented. The northern part of the centre appears largely as a single storey, while the southern part of the complex appears as multiple storeys. While appearing as multiple storeys, the setting back of each respective level from the one immediately below greatly reduces its appearance of bulk.

**Line**

In both plan and elevation, lines on the centre are straight and angular.

**Texture**

The elevations (including the roof) will comprise a combination of the following materials:

- dolerite stone
- concrete
- steel panels
- glazing
- vegetation.

That part of the base comprised of dolerite stone will have a coarse, rough texture. While comprises of materials having a more smooth texture than natural stone, the recesses and projections of the elevations and the part folding and perforation of the steel panels will providing shadowing that will give depth and texture to the elevations.

**Scale**

The centre has the following dimensions:

- enclosed building footprint of 1925.03sqm (approx.)
- outdoor amphitheatre of 216sqm (approx.)
- outdoor seating of 161.72sqm (approx.)
- maximum height 11.9m above natural ground level.

**Spatial Characteristics**

The dominant spatial characteristic of the centre is its linear, fragmented form. This is a highly unusual shape, but compared to alternative designs is one which is appropriate to its mountain context.

Development of the Pinnacle Centre also enables the partial demolition of the existing observation shelter by removal it its glazing and easternmost roof. It is considered that the proposed partial demolition is a positive visual change.

### 7.2 Visual Effects of the Proposal

There are a range of expected and potential visual effects associated with the development of a cable car on Mount Wellington. In particular, this section assesses the visible components of the cable car and includes the Pinnacle Centre and tramway infrastructure. This represents the full range of possible effects on the landscape and visual amenity of the mountain, with further discussion regarding impact on specific views in section 7.3. A number are derived from the Mount Wellington LVCA and supplemented with effects identified as part of this report.

The following describes these effects, independent of any view or vantage point. The actual visual impact of the visual effects must take into account the impact that these effects have on the character or elements of specific views.

Degree of existing modification / dominance of man-made elements verses naturalness and stability

The elements to be inserted into the landscape are the Pinnacle Centre, the base station and associated towers, the tramway cables and the cable cars themselves. All of these elements represent existing modification and 'human-made' elements.

The base station and associated towers are not located in prominent locations. The Pinnacle Centre has adopted design measures and recommendations of the Wellington Park Infrastructure and Design Guidelines and references the proximate landscape elements in order to minimise the 'human-made' character of the built form when viewed from close range, and to harmonise with the surrounding landscape when viewed from afar. The tramway cables are thin and light elements that are visually recessive, in particular at medium to long distance and when viewed against the dark mass of the Mountain, and the cable cars are small elements, in particular when viewed against the massive scale of the Mountain.

[Notwithstanding, the term 'naturalness' is problematic as it places humans outside of 'nature', denying the longstanding human associations and involvement with this landscape.]

Scale of proposed alteration

The visually recessive nature of the tramway cable and the associated cable cars mean that the entire proposal will not be perceived in its entirety from any singular vantage point. The visible portion of the cables will be minimal in any view. The cable cars will also be minimal in distant views where viewed for an extended time, or more substantial in closer although brief views. The scale of the proposed alterations are highly dependent on the vantage points from which they are viewed, for example the Pinnacle Centre is one of larger elements, yet will be of almost insignificant scale when viewed from the long-distance vantage points below. When visible from more proximate vantage points, the siting of the building below topography and into the landscape reduces its scale similar to that of surrounding development.

Relation to existing uses and / or pattern

The Summit of Mount Wellington is home to existing tourism uses, including a lookout building, boardwalks and extensive car parking. The Pinnacle Centre is in keeping with the existing uses and development pattern of the Summit area. The tramway cables represent change to the existing use of the forested areas on the slopes, however the actual visibility of these must be appraised from each view.

Deviation from existing character

The landscape character of Mount Wellington and the wider Wellington Park is that of a wild landscape, and this theme is central to the community's sense of place. As such the introduction of new 'human-made' elements into this landscape has the potential to detract from the perceived 'wildness'. However, as noted in section 5.0 the character of the eastern face of Mount Wellington differs from the majority of the Park, in that it represents the wall or edge that separates the city below from the 'wilds' beyond (Shipway, 2002), so there is greater capacity to absorb the proposed elements without fundamentally changing the character. The extent to which the new elements will alter the existing character is dependant on the view that they are considered from. The significant visual elements of the Mountain's visual character are identified in section 6.1.5.Scenic interest of proposed alteration

Scenic interest refers to the aesthetic qualities of the proposal, and the existing context of the aesthetic qualities of its setting. The visual character of the mountain is derived from the primary visual catchment of the city below, where the recognisable skyline and Organ Pipes feature, in additional to the contrast of the dark bulk and mass of the Mountain from the settlement below, and the consistent cover of vegetation form a consistent yet ever-changing backdrop. From these vantage points these elements of scenic interest will not be altered. From atop the Mountain, the scenic interest differs, with a wider view to the city of Hobart and its existence within the wider landscape. This view is gained from the tourism infrastructure at the Pinnacle. Within this view the Pinnacle Centre is an element of scenic interest, providing foreground compositional value and contrast to the distant views beyond.

It must be noted as well, that the cable car and Pinnacle Centre provide a dramatic increase in scenic amenity as viewed from the proposal itself. The Pinnacle Centre provides an increase in diversity of viewing experience at the summit, and the cable cars offer a completely new scenic experience, one previously limited to paragliders.

Soil colour

A potential consequence of the construction process is the exposure of sub-soils that are lighter in colour than the surrounding rock. These soils will be visible in the landscape and contribute to the visual effects of the development. While the proposed buildings will ensure that these soils are not visible, the construction process and possible future removal of the infrastructure may expose these soils. Large areas of exposed soils would have a significant impact on the wider views. This is not an intended visual effect of the proposal and as such is a construction management issue.

Soil erosion potential

As above, this is a potentially significant impact on the visual character of the area, although is not intended and is a construction management issue.

Existing vegetation pattern

A significant potential visual effect for development of Mount Wellington's eastern face is a prominent scar left by cleared trees such as that of the existing roadway. This is due to the steep slope which permits views from below to perceive gaps in the vegetation. The cable car will not clear vegetation along the mountain slopes (aside from two small and not at all prominent areas near the base station) and this allows the forests along the face of the mountain to absorb the visual change resulting from the tramway. Minor vegetation clearing will occur as part of the development of the Pinnacle Centre, however this is very low vegetation that is not utilised for screening and will be replaced by built form that has been designed to visually integrate and reference the landscape. This ensures that there will be no disruption to the vegetation pattern on the mountain and the visual character created by the vegetation will be maintained. No screening vegetation is available at the summit and along the tramway due to the use of the Pinnacle Centre as a lookout and the practical needs of a clear tramway.

Vegetation screening potential

The broader Wellington Park features an expansive forested area, however elevated nature of a cable car lowers the potential for screening vegetation. Nevertheless, the tower infrastructure associated with the cable car is surrounded by forested areas, screening them from the road and the abundant vegetation throughout the lower parts of the mountain screen the Pinnacle Centre from particular views. The operational requirement of a clear tramway also lowers the potential for screening vegetation of the cable car.

Topographic screening potential

The proposal extends above and along the face of the mountain, reducing the potential for screening from topographical features. The Pinnacle Centre at the summit of Mount Wellington does have a high potential for topographical screening when viewed from lower parts of the mountain. The sheer cliffs of the Organ Pipes screen a large proportion of the development at the Pinnacle and ensures the impact of development is minimised when viewed from lower elevations.

Slope of the mountain

The steep slope of Mount Wellington's eastern face and high vegetation cover raise the potential for some significant potential visual effects. The exposure of soil and erosion are discussed above, as is the clearing of vegetation. Another potential visual effect is for built form to project above the slope, and above skylines or ridgelines. The proposed buildings do not project above the skylines or ridgeline from any vantage point studied, and are designed to be set down into the slope as much as possible to avoid visual prominence and even reference the fine grain nature of the slope at the Pinnacle, with a broken façade form echoing the nature of the rocky slope.

### Bushfire

Fire and its effects are an influence on the character of the landscape and will change the nature of views and visual character of Mount Wellington. While the aftermath of a bushfire has not been assessed as part of this visual impact assessment, it is expected that the magnitude of impact from all development on the mountain will be compounded as a result, however the significant effects will be that of the reduced canopy coverage. Bushfire may open certain views to the proposed Pinnacle Centre currently screened (such as from Pinnacle Road), and as such it is important to consider the effects bushfire may have on visual and scenic amenity in bushfire management.

### Materiality

Materiality is an important consideration in regarding visual effects as it affects the development's ability to harmonise with its surroundings. A potentially significant visual effect is for the proposal to visually intrude through introduced and prominent materials. The proposal, where possible, utilises a simple and raw vocabulary in its palette of materials in accordance with the Wellington Park Design and Infrastructure Manual 2006. This, in combination with the built form design strategy of breaking up facades to reference the scale of the geomorphological context of the site, allows the Pinnacle Centre in particular to harmonise with its setting and not be visually dominant.

### Demolition

The proposal removes the existing lookout rooftop and glazing, leaving only the footprint of the structure. This structure although relatively small in size, currently projects above the skyline of Mount Wellington which is an important visual feature associated with the Mountain's visual character. Removing the structure will reduce the amount of built structures interrupting the 'natural' skyline of the Mountain, and also reduce the extent of built form visible at the summit from views around Hobart. It currently forms part of the foreground of the view from the summit and Pinnacle Road at the carpark at the summit, and as such its removal will facilitate greater range of views of Hobart and the broader landscape below. Existing walkways at the summit are also proposed to be removed and replaced.

The demolition will alter the viewer experience at the summit as the lookout will no longer be sheltered, however this effect is largely mitigated by the creation of new sheltered viewing opportunities in the Pinnacle Centre.

### Short-term temporary effects

Construction works represent the expected short-term effects associated with the cable car. The construction methodology is tailored to this proposal and will ensure that there is minimal ground disturbance at the site, however significant temporary change is expected as a result of the construction equipment and works. Material storage, temporary ramps and a small tracked crane will increase the presence of bulky features at the Pinnacle for a period of time, however these will be removed once works are complete and the landscape at the summit will be restored. These effects are considered to be major, though restricted in their location, for the extent of construction.

### Reversibility of effects

The cable car and associated infrastructure can be decommissioned and removed in the future, and the reversibility of effects should be considered. The tramway cables and cable cars could be completely removed without any lasting effects. The base station building is proposed in an existing clearing and as such could be removed with no lasting effects of significance. However, the tower locations near the base station and the Pinnacle Centre require modification to the landscape in the form of clearing / earthworks that will have lasting effects beyond any future demolition.

The towers near the base station require clearing of existing vegetation. Removal of these towers could involve revegetation of the sites, however this may take time to reach the maturity of the surrounding vegetation and as such there would be a lasting effect. Though it is noted that these locations are not prominent.

The change on the landscape as a result of the construction of the Pinnacle Centre is considered to be lasting, and the restoration of the land at the site is considered to be slow due to the alpine climate. Whilst remediation of the landscape could be undertaken to a standard at which the average visitor may not notice or ever perceive of the change, the likelihood is that to the trained eye the change would be subtly perceptible and therefore permanent. This creates permanent change to the terrain of the Mountain and results in a modified landscape at the Pinnacle.

### 7.3 Viewpoints

Another Perspective has prepared a Visual Catchment Assessment (VCA) based on Zones of Theoretical Visibility (ZTV) for each part of the proposal. These ZTVs are provided at **Attachment 1**. Note that multiple points on the apex of the Pinnacle Centre are required due to its fragmented form.

Each of these individual ZTVs have then been combined to create an overall ZTV for the entire proposal. This figure is provided as a 'heat' map, with the darker the grey the greater the number of parts of the proposal for which the location has a line of sight. This is provided at **Figure 8**.

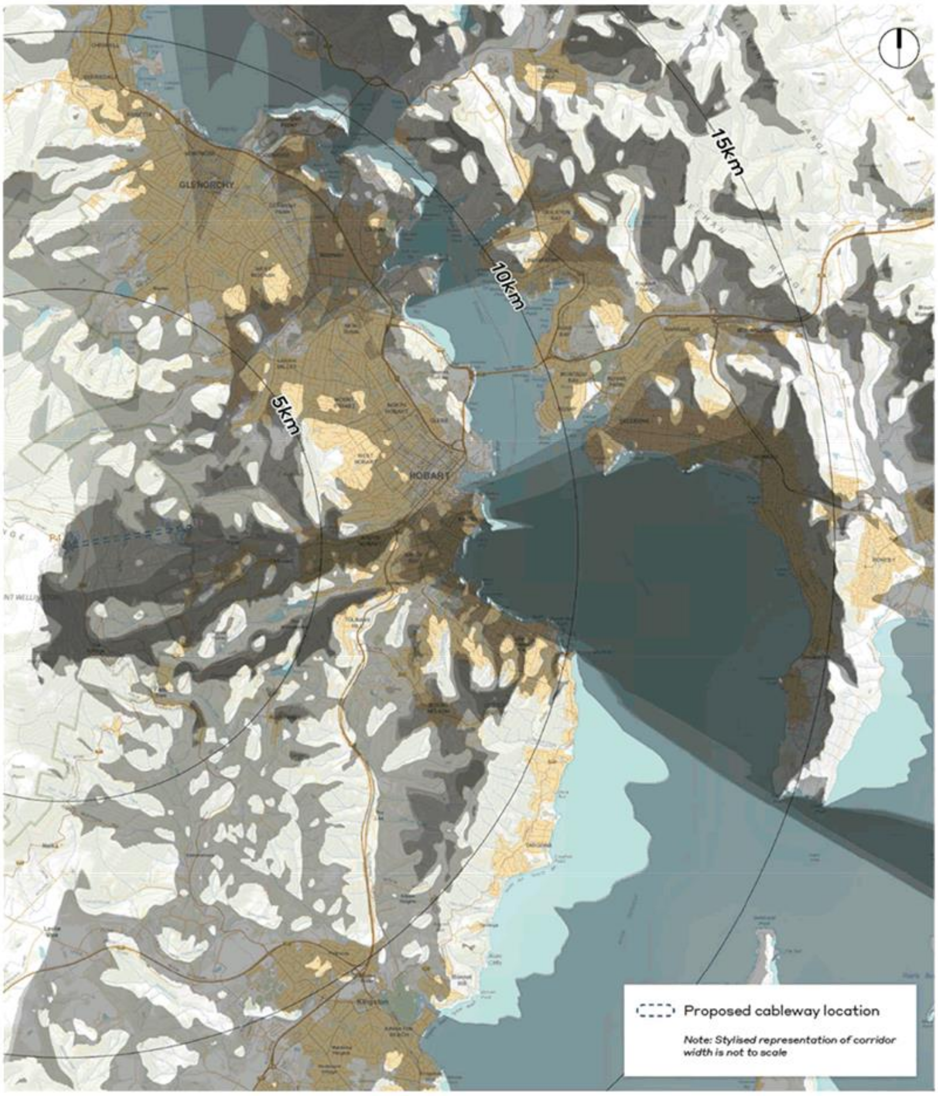



**Figure 7: Overall Zone of Theoretical Visibility**

Source: Another Perspective

Upon review, the ZTV shows:

- The visual catchment is broad, extending as far north as Mona/Glenorchy and as far south as Kingston.
- There are areas in which the proposal cannot be seen such as from Taroona, areas of Sandy Bay, Tolmans Hill, West Hobart and Rokeby.
- The River Derwent including, Rosny Park, Howrah and Tranmere on the Eastern Shore are areas of high visibility but of greater viewing distance
- Most areas of South Hobart and along Huon Road are of high visibility, subject to built form and effects of vegetation
- Huon Road forms part of a journey, along the Hobart rivulet and is representative of neighbourhoods that are scattered at the foothills of the mountain
- There is a clear view of the summit from parts of the Old Hotel site at the Springs, but not the majority of the Springs precinct due to vegetation screening. For example, the area most would consider the Springs 'proper' (i.e. the kiosk, toilets, car-parking and picnic areas) does not offer a view of the summit
- The proposal can be seen along the trails of Mount Wellington however the viewshed does not consider the effects of vegetation and will need to be confirmed via site observations
- The proposal can be seen by the entire CBD however the viewshed does not consider built form and will need to be confirmed via site observations.

Through the above ZTV, an initial 13 viewpoints were identified. Further desktop review and site inspections by Ethos Urban were conducted to arrive at a consolidated set of 10 viewpoints.

**Table 4** identifies the viewpoints representative of the visual character of the primary visual catchment that were selected for further analysis. **Figure 9** identifies the location of the selected viewpoints.

**Table 4: Viewpoints**

| Key | Considered Viewpoint | Selected Viewpoint | Location |
|---|---|---|---|
| 1. | | ● | Hobart Waterfront |
| 2. | | ● | Summit to City |
| 3. | | ● | South Hobart |
| 4. | | ● | Kingston |
| 5. | | ● | Glenorchy |
| 6. | | ● | Salamanca Place |
| 7. | | ● | Old Springs Hotel |
| 8. | | ● | Tranmere |
| 9. | | ● | Rosny Park Lookout |
| 10. | | ● | Huon Road |
| 11. | ● | | Howrah |
| 12. | ● | | MONA |
| 13. | ● | | Organ Pipes Track |

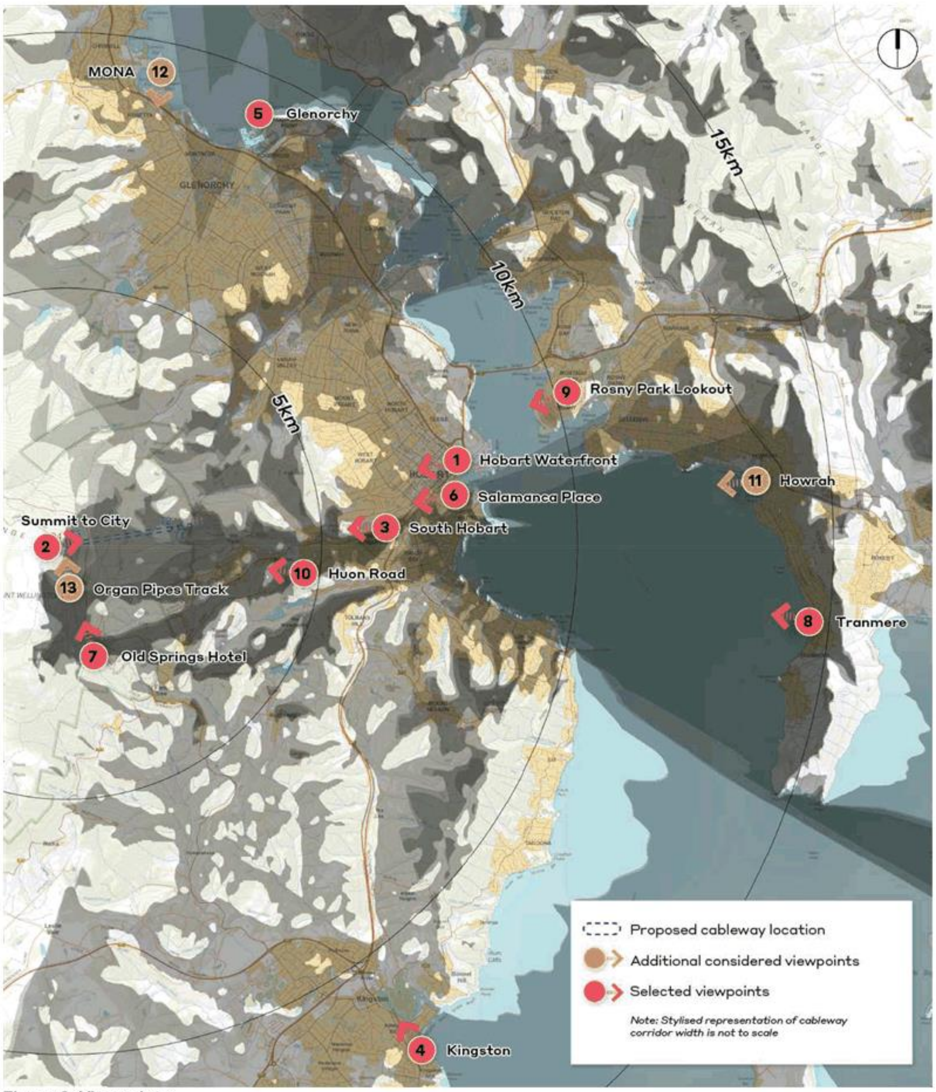



**Figure 8: Viewpoints**
Source: Another Perspective and Ethos Urban

It is considered that the selected viewpoints are representative of the current experience of the primary visual catchment, capturing:

- **Places of public accessibility:** in particular those that are highly visited
- **Visual values:** skyline, tree line, edge of settlement, variability, scale and geological features

- **Category:** representative, specific or illustrative
- **Pattern:** including distant views, mid distance from surrounding city, close from within reserve and off mountain
- **Range:** including close, medium and long
- **Direction:** including north, south, east and west
- **Value:** including natural, cultural or scenic
- **Place context:** including on the mountain; lower slopes, ridges or valleys; CBD and inner-city Hobart, suburban Hobart
- **Main visual receptors:** residents, workers, tourists, outdoor recreation, including both static or moving through the landscape.

Using this matrix to determine the appropriateness of the viewpoints, it was concluded that:

- the view from Howrah was similar to that of the view/angle from Rosny Park Lookout. It was therefore chosen that Rosny Park was representative of this region along the eastern shore.
- it was not necessary to select a viewpoint from the Organ Pipes Track as the Organ Pipes are heavily obstructed by vegetation where the proposal is overhead.

The view from MONA was similar to that of the view/angle from Glenorchy. It was therefore chosen that Glenorchy was representative of this region north of Hobart along the River Derwent.

This assessment confirmed the validity of the following viewpoints as contained in the original VIA:

- Viewpoint 1: Hobart Waterfront
- Viewpoint 2: Summit to City
- Viewpoint 3: From South Hobart
- Viewpoint 4: From Kingston
- Viewpoint 5: From Glenorchy
- Viewpoint 6: From Salamanca.

Based on the amended ZTV we have identified the following further viewpoints that would benefit from additional analysis:

- Viewpoint 7: Rosny Park Lookout
- Viewpoint 8: Tranmere
- Viewpoint 9: Huon Road
- Viewpoint 10: Old Springs Hotel.

The Rosny Park Lookout and Tranmere viewpoints are representative of views from the Eastern Shore. The Old Springs Hotel viewpoint is representative of views from the lower parts of the access route to the Mount Wellington summit. The Huon Road viewpoint has been taken at bus strop 22, and is representative of both views from South Hobart and the lower parts of the access route to the Mount Wellington summit.

For each viewpoint, three images are provided:

1. Original Photograph
2. Visualisation
3. Development highlighted in accordance with the RFI issued by the Hobart City Council (these images are provided in **Appendix A** of this report).

### 7.3.1 Viewpoint 1 – Hobart Waterfront

The Hobart Waterfront is an important visual receptor due to its reputation as a bustling market and maritime area, experiencing high volumes of visitors. Viewpoint 1 from the intersection of Hunter Street and Davey Street was selected as a representative viewpoint generally from the Hobart Waterfront.

The following table provides details for the original photograph.

| | |
|---|---|
| **Date** | 11th of November |
| **Day** | Monday |
| **Time** | 9:44am |
| **Weather conditions** | Partly cloudy |
| **Lens** | 70mm |

**Figure 9: Viewpoint 1 Original Photograph (source: Ethos Urban)**

**Visual Character**

This viewpoint represents a key view towards Mount Wellington that residents and visitors to Hobart all experience. Hobart waterfront is a popular destination for locals and tourists of Hobart, attracting a significant number of viewers for its markets and insight into Hobart's maritime activity. An abundance of restaurants, galleries and hotels complement the waterfront and accentuates the social and cultural amenity of the area. Mount Wellington is a prominent visual feature in the background of the waterfront and this viewpoint is a popular location for visitors.

Two views are typically associated with this viewpoint, short-range views towards the waterfront, and long-range views along the River Derwent and across Hobart to Mount Wellington\. This viewpoint is a full, stationary view approximately 6-8 kilometres away from the proposed cable car infrastructure and the viewing direction to the cable car is due west into the mountain. The view type is 'Mid-Distance from Surrounding City', and is composed of all the significant visual elements (as defined in section 6.1):

1. Skyline
2. Tree-line and change in texture
3. Edge of settlement
4. Variability (colour and 'mood')
5. Scale (height, bulk, mass)
6. Geological feature of the Organ Pipes.

As a result of the combination of these visual characteristics, high number of viewers and the social and cultural amenity of the viewpoint, it is considered that this viewpoint is of a high sensitivity.

**Figure 10: Viewpoint 1 Visualisation (source: Another Perspective)**

**Visual Effects/Impact**
The Pinnacle Centre at the summit of Mount Wellington is visible from this viewpoint, while the base station is not visible from this location. The cable and cable cars along the tramway are not perceptible. Considering the element of movement associated with the cable cars, there is potential for these elements to become perceptible at this zoomed level, however it is estimated that these will remain imperceptible to the human eye. The Pinnacle Centre at the summit is situated in a prominent location on the mountain with an unobstructed view from the Hobart Waterfront, while the tramway extends along the face of the mountain towards Hobart.

Although no screening vegetation is available, the distance between this viewpoint and the visible cable car infrastructure mitigates any impact on the view. Along with the reduced bulk of the demolished existing lookout, the visible components of the proposal will be a barely perceptible element in the context of a larger panoramic view and is therefore a restricted view of the cable car facilities from the Hobart Waterfront.

The proposed Base Station is not visible from this viewpoint due to its location at the base of the mountain. A significant number of existing buildings and vegetation as part of the Hobart town screen this element of the proposal from the viewpoint.

The proposal will alter the skyline of the Mountain as seen from this viewpoint, with the demolition of the lookout shelter roof and walls reducing the built elements within the skyline. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the tree-line of the Mountain, although the Pinnacle Centre will cause change to the texture of the rocky upper slopes. However, this change is minimal as perceived from this vantage point, as the façade design and materiality references the scale and texture of the landscape in this areas and succeeds in harmonising the built form with the surrounding landscape. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the distinction between the edge of the settlement and the slopes of the Mountain as seen from this viewpoint.

The proposal has the potential to alter the variability in lighting and weather of the upper rocky slopes, with early morning light and snowfall conditions likely to increase the perceived change to the landscape in this location. However, recessed and angled windows will avoid impacts caused by light reflection, and the façade design and materiality has been designed to reflect the scale and texture of the landscape and as such the effect of snowfall will be similar to that of the existing condition. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the scale of the Mountain as seen from this viewpoint.

The proposal's cable car will possibly be perceptible from this viewpoint as it moves across the Organ Pipes. This will barely be perceptible to the human eye, and the miniscule scale of the cable car against these features is likely to increase their sense of drama and scale. This is considered a minor change as perceived from this viewpoint.

**Assessment of Visual Impact**
Therefore, the proposed cable car is considered to be a Minor change over a restricted area given that the magnitude of change from this viewpoint is minimised due to the small scale of the development visible from this location. Moreover, the proposed development is an ongoing change that is able to be reversed as the associated infrastructure can be decommissioned and removed. This results in a Perceptible magnitude of change for the proposal. The significance of impact of the cable car on the Hobart Waterfront is therefore Low in accordance with Table 3.

Construction works pertaining to the development of the cable car infrastructure is expected to be more visible than the final constructed outcome. Equipment and works associated with the construction of new facilities will temporarily cause minor alteration to the skyline. Equipment and works will also cause greater change to the existing texture of the upper slopes, as unfinished buildings and equipment such as cranes will appear in contrast to the surroundings to the human eye from this viewpoint. This will substantially increase the presence of infrastructure visible on the Mountain. These changes are consider a major change to the view over a restricted portion of the view. Construction works, and the associated equipment are a change with a limited life of less than 5 years, as they will be removed once construction of the cable car is complete. The magnitude of change associated with the construction of the cable car is therefore Perceptible, with the significance of impact considered to be Low.

In the event that the cable car and associated infrastructure is decommissioned it is anticipated that remediation works would restore the landscape of the Pinnacle Centre back to a condition as close as possible to that of the original landscape. In this event, the resultant change would be Imperceptible from the existing condition from this viewpoint, and the significance of the impact considered to be Negligible.

The overall significance of impact from Viewpoint 1 is considered to be Low.

### 7.3.2 Viewpoint 2 – Summit to City

The summit of Mount Wellington is a popular tourist location and overlooks the Greater Hobart area and out across the River Derwent. Viewpoint 2 is from the summit of Mount Wellington at the Pinnacle Carpark and was selected as a specific viewpoint of a promoted location in the Greater Hobart landscape. The view type is 'From on the Mountain', and is composed of the following significant visual elements (as defined in section 6.1):

- Tree-line and change in texture

- Edge of settlement

**Figure 11: Viewpoint 2 Original Photograph (source: Ethos Urban)**

**Visual Character**
This viewpoint is a specific view from Mount Wellington towards the city of Hobart and is a key promoted view of Tasmania. The Pinnacle is a highly popular destination, predominantly for tourists, although local residents also visit as there are a number of high quality recreational trails on the mountain. The promoted view from this location overlooks Hobart and the surrounding suburbs, and is recognised as a highly significant view of Tasmania and contributes to a high social and cultural amenity at this location.

This viewpoint is located in a publicly accessible area and is a full, stationary view towards Hobart. It is approximately 100 metres from the proposed cable car infrastructure and is a built-up area within the wider Mount Wellington landscape. The primary viewing direction is eastwards, towards Hobart and over the proposed location for the Pinnacle Centre. Various geological features exist at the Pinnacle and contribute to the overall visual interest of the viewpoint.

It should be noted that currently the primary viewing location is from the existing lookout shelter, and not the summit where this viewpoint is taken from. It should also be noted that one of the proposal's main visual effects on the summit area is to shift the primary viewing to the Pinnacle Centre's lookout points. Given the high number of viewers at this location, importance as a promoted view and high social and cultural amenity, it is considered that this is a viewpoint of high sensitivity.

**Figure 12: Viewpoint 2 Visualisation (source: Another Perspective)**

**Visual Effects**

The Pinnacle Centre is the only part of the proposal that is visible from this viewpoint. It is located within close proximity to the viewpoint at the summit and is situated directly between the viewpoint and the views towards Hobart.

As the summit of Mount Wellington possesses a lack of vegetation due to the existing built forms at the Pinnacle, no screening vegetation is available to minimise or mitigate the visual effects of the Pinnacle Centre from this viewpoint. The close proximity between the viewpoint and the visible cable car infrastructure increases the magnitude of impact on the view. Part of the proposed changes involve the removal of the existing lookout shelter, which will have a positive impact on the views from the summit and carpark, increasing the area of the broader panorama beyond.

The proposal will not alter the tree-line, though represents significant change to the foreground view that takes in the rocky summit slopes. However, from this viewpoint the existing extent of road, parking and tourism infrastructure takes up a considerable portion of the foreground. In this sense while the extent of the change introduced to the foreground is sizeable, it does not introduce foreign elements into the character of the foreground, and is a restricted area of the view given the primary view is directed above the proposal toward the City centre, River Derwent, and landscape beyond. This is considered a Major change to the foreground as perceived from this viewpoint, though restricted to a part of the view that is not the primary focus and thus moderated in effect.

**Assessment of Visual Impact**

Therefore, the proposal is considered to be a moderate change over a restricted area.. The proposed development is an ongoing change that is able to be reversed as the associated infrastructure can be decommissioned and removed (see discussion below regarding permanent effects). This results in a noticeable magnitude of change for the proposal. The significance of impact of the cable car on the summit of Mount Wellington is therefore Moderate in accordance with Table 3.

Construction regarding the development of the cable car infrastructure is expected to be highly visible at the summit of the mountain. Equipment and works associated with the construction of new facilities is of a large scale at this viewpoint and disrupts the use and views from this location, as there is significant potential for construction equipment impeding the view from the summit. The scale of change is therefore considered to be a major change to an extended area of view. Works and equipment associated with construction are a change with a limited life of less than 5 years, as they will be removed once construction of the cable car is complete. The magnitude of change associated with the construction of the cable car is therefore Noticeable, with the significance of impact considered to be Moderate.

In the event that the cable car and associated infrastructure is decommissioned it is anticipated that remediation works would restore the landscape of the Pinnacle Centre back to a condition as close as possible to that of the original landscape. Whilst remediation of the landscape could be undertaken to a standard at which the average visitor may not notice or ever perceive of the change, the likelihood is that to the trained eye the change would be subtly perceptible and therefore permanent. The scale of change as viewed from the Pinnacle is therefore considered to be a minor change to a restricted area of view, with the resulting magnitude of change expected to be Perceptible at this highly sensitive location. In accordance with Table 3, the significance of impact is considered to be Low.

The overall significance of impact from Viewpoint 2 is considered to be Moderate.

#### 7.3.3 Viewpoint 3 – From South Hobart

South Hobart is a core residential area of Hobart and holds key roads that lead towards Mount Wellington. Viewpoint 3 is from the intersection of Elboden Street and Macquarie Street, South Hobart, and is a representative viewpoint generally from the South Hobart residential areas.

The following table provides details for the original photograph.

| | |
|---|---|
| **Date** | 12th of November |
| **Day** | Tuesday |
| **Time** | 10:54am |
| **Weather conditions** | Overcast |
| **Lens** | 70mm |


**Figure 13: Viewpoint 3 Original Photograph (source: Ethos Urban)**

**Visual Character**

This viewpoint is representative of a typical view from residential areas of South Hobart. The Hobart community makes up the population of expected viewers from this viewpoint, in addition to visitors passing through this location on their way to the Cascades Female Factory and Cascade Brewery approximately 1.5 and 2 kilometres away respectively. This group of viewers has high sensitivity as residents of this area enjoy views towards the mountain from their homes, as well as tourists who expect a clear view of the mountain. The proposal will also attract more tourists, as Macquarie Street will be a key connecting road to the new Base Station of the cable car.

The South Hobart visual receptor is a location of high social and cultural value, with this viewpoint located in a predominantly residential area. A number of parks, schools and community facilities are located in close proximity to this viewpoint, including the Hobart Rivulet and Jane Franklin Hall, indicating the presence of social values within this residential area. In addition, a number of important cultural sites are located within this visual receptor and generate a high cultural value for the area. These sites include the world heritage listed Cascades Female Factory and the iconic Cascade Brewery.

This viewpoint is a full, stationary view approximately 4 to 6 kilometres from the proposed elements, with a viewing direction due west into the mountain.

The view type is 'Mid-Distance from Surrounding City', and is composed of all the significant visual elements (as defined in section 6.1):

- Skyline
- Tree-line and change in texture
- Edge of settlement
- Variability (colour and 'mood')
- Scale (height, bulk, mass)

- Geological feature of the Organ Pipes

It is therefore considered that this viewpoint is of High sensitivity given the combination of high expected viewers, high social and cultural value and unobstructed visual characteristics.


**Figure 14: Viewpoint 3 Visualisation (source: Another Perspective)**

**Visual Effects**
The Pinnacle Centre at the summit of Mount Wellington is visible from this viewpoint. The cable and cable cars along the tramway are not perceptible, however, considering the element of movement associated with the cable cars, there is potential for these elements to become perceptible at this zoomed level, however it is estimated that these will remain imperceptible to the human eye. The Pinnacle Centre is located in a prominent location on the mountain with an unobstructed view from South Hobart, while the tramway extends along the slopes of the mountain towards the viewpoint.

The moderate distance between the Pinnacle Centre and this viewpoint minimises the magnitude of impact from the proposal on the view. The reduced bulk of the existing lookout will be a positive change to the skyline and the visible components of the proposal will be minor in the context of the wider panoramic view. This qualifies the proposal as a change over a restricted area of view.

The proposal will alter the skyline of the Mountain as seen from this viewpoint, with the demolition of the lookout shelter roof and walls reducing the built elements within the skyline, and a very slight altering of the skyline caused by the Pinnacle Centre roofline, imperceptible to the human eye. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the tree-line of the Mountain, although the Pinnacle Centre will cause change to the texture of the rocky upper slopes. The façade design and materiality references the scale and texture of the landscape in these areas, and while the scale of the built form is larger that the surrounding rock forms, these design considerations succeed in harmonising the built form with the surrounding landscape, minimising the visual effects. This is considered a moderate change as perceived from this viewpoint.

The proposal will not alter the distinction between the edge of the settlement and the slopes of the Mountain as seen from this viewpoint.

The proposal has the potential to alter the variability in lighting and weather of the upper rocky slopes, with early morning light and snowfall conditions likely to increase the perceived change to the landscape in this location. However, recessed and angled windows will avoid impacts caused by light reflection, and the façade design and materiality has been designed to reflect the scale and texture of the landscape and as such the effect of snowfall will be similar to that of the existing condition. This is considered a moderate change as perceived from this viewpoint.

The proposal will not alter the scale of the Mountain as seen from this viewpoint.

The proposal's cable car will possibly be perceptible from this viewpoint as it moves across the Organ Pipes. This will barely be perceptible to the human eye, and the miniscule scale of the cable car against these features is likely to increase their sense of drama and scale. This is considered a minor change as perceived from this viewpoint.

**Assessment of Visual Impact**
Therefore, the proposal is considered to be a Moderate change over a restricted area given that the magnitude of change from this viewpoint is minimised due to the small scale of the development visible from this location. The proposed development is an ongoing change that is able to be reversed as the cable car infrastructure can be decommissioned and removed. This results in an imperceptible magnitude of change for the proposal. The significance of impact of the cable car on South Hobart is therefore Moderate in accordance with Table 3.

Construction works pertaining to the development of the cable car infrastructure is expected to be more visible than the final constructed outcome. Equipment and works associated with the construction of new facilities is will temporarily cause minor alteration to the skyline. Equipment and works will also cause greater change to the existing texture of the upper slopes, as unfinished buildings and equipment such as cranes will appear in contrast to the surroundings to the human eye from this viewpoint. This will substantially increase the presence of infrastructure visible on the Mountain. These changes are consider a major change to the view over a restricted portion of the view. Construction works, and the associated equipment are a change with a limited life of less than 5 years, as they will be removed once construction of the cable car is complete. The magnitude of change associated with the construction of the cable car is therefore Perceptible, with the significance of impact considered to be Low.

In the event that the cable car and associated infrastructure is decommissioned it is anticipated that remediation works would restore the landscape of the Pinnacle Centre back to a condition as close as possible to that of the original landscape. In this event, the resultant change would be Imperceptible from the existing condition from this viewpoint, and the significance of the impact considered to be Negligible.

The overall significance of impact from Viewpoint 3 is considered to be Moderate.

### 7.3.4 Viewpoint 4 – From Kingston

Kingston is a predominantly quiet residential area with its own centre. Viewpoint 4 is from the southern end of Kingston Beach, close to the waterfront, by the intersection of Mount Royal Road / Osborne Esplanade and Kingston Heights track. It is a representative viewpoint generally from the Kingston open space and residential areas.

The following table provides details for the original photograph.

| | |
|---|---|
| **Date** | 11th of November |
| **Day** | Monday |
| **Time** | 2:33pm |
| **Weather conditions** | Sunny |
| **Lens** | 70mm |

**Figure 15: Viewpoint 4 Original Photograph (source: Ethos Urban)**

**Visual Character**

The Kingston visual receptor is a location that features a popular beach and golf course complementing the residential uses of the area, with varying social and cultural amenity. This viewpoint from Kingston is representative of a typical view from the residential areas of the suburb. Kingston is a recognised as a quiet and peaceful location, with important views towards Mount Wellington. Residents are expected to comprise many of the viewers from this viewpoint, as well as the users of the range of open space and community amenity. The sensitivity of the visual receptor of Kingston is moderated by significant distance separating viewers from the proposed development. Undulating hills make up the landscape between this viewpoint and Mount Wellington, however the mountain and its cliff faces remain an unobstructed visual feature in the Kingston skyline.

The viewpoint is a full, stationary view approximately 12 kilometres from the proposed cable car on Mount Wellington, with a viewing direction of north-west towards the mountain. The promoted view from Kingston is towards the waterfront and beach, with Mount Wellington a background feature in the area. Nevertheless, Mount Wellington remains a prominent visual feature in the landscape and views away from the beach will typically include the Mountain. The view type is 'Mid-Distance from Surrounding City', and is composed of all the significant visual elements (as defined in section 6.1):

- Skyline
- Tree-line and change in texture
- Edge of settlement
- Variability (colour and 'mood')
- Scale (height, bulk, mass)
- Geological feature of the Organ Pipes.

It is therefore considered that visual receptor of Kingston is of Medium sensitivity due to the moderate sensitivity of the receptor, high social value and unobstructed visual characteristics.

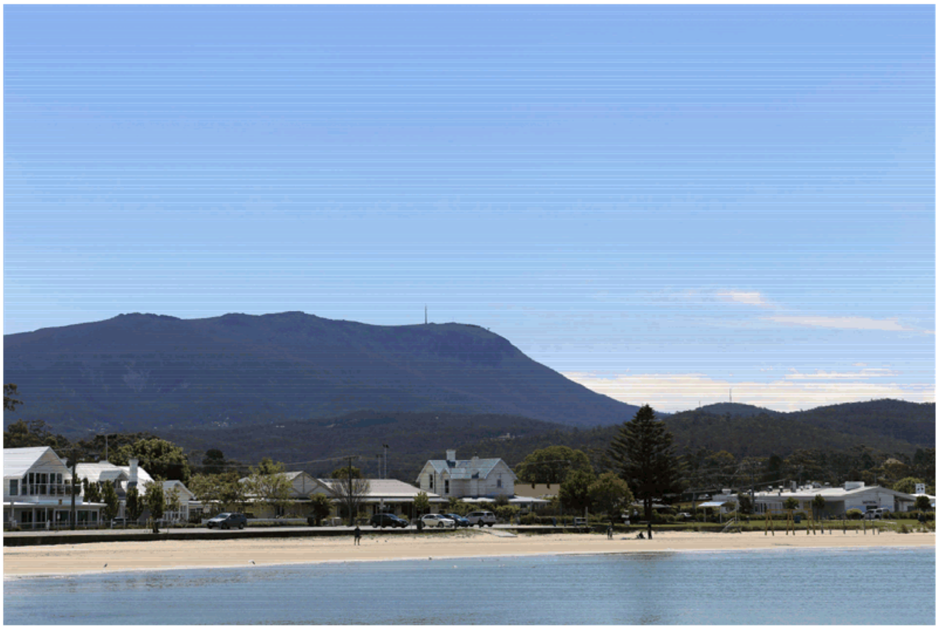


**Figure 16: Viewpoint 4 Visualisation (source: Another Perspective)**

**Visual Effects**
Primarily the tramway infrastructure is visible from this viewpoint. Although the Pinnacle Centre is located in a prominent location on the mountain, given the high distance between the cable car and viewpoint, it is not clearly visible to the human eye at this location. The remodelled lookout at the summit of the mountain helps to restore some of the natural ridgeline of the mountain, however a very small part of the Pinnacle Centre also projects above the skyline. The viewing direction from Kingston Beach creates the visual effect of the tramway cables and tower projecting above the existing skyline.

The proposal will alter the skyline of the Mountain as seen from this viewpoint, with the primary change being the introduction of the cable car tower and tramway into the skyline. This will increase the presence of visible infrastructure in the skyline from this viewpoint. The demolition of the lookout shelter roof and walls will reduce the built elements within the skyline, although there will also be a slight addition as well caused by the Pinnacle Centre roofline, though imperceptible to the human eye. Overall this is considered a moderate change as perceived from this viewpoint.

The proposal will not alter the tree-line of the Mountain, although the Pinnacle Centre will cause change to the texture of the rocky upper slopes. However, this change is minimal as perceived from this vantage point, as the façade design and materiality references the scale and texture of the landscape in this areas and succeeds in harmonising the built form with the surrounding landscape. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the distinction between the edge of the settlement and the slopes of the Mountain as seen from this viewpoint.

The proposal has the potential to alter the variability in lighting and weather of the upper rocky slopes, with early morning light and snowfall conditions likely to increase the perceived change to the landscape in this location. However, recessed and angled windows will avoid impacts caused by light reflection, and the façade design and materiality has been designed to reflect the scale and texture of the landscape and as such the effect of snowfall will be similar to that of the existing condition. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the scale of the Mountain as seen from this viewpoint.

The proposal's cable car will possibly be perceptible from this viewpoint as it moves across the Organ Pipes. This will barely be perceptible to the human eye, and the miniscule scale of the cable car against these features is likely to increase their sense of drama and scale. This is considered a minor change as perceived from this viewpoint.

**Assessment of Visual Impact**
Therefore the proposal is considered to be a Moderate change over a restricted area given the addition of infrastructure elements within the skyline. The proposed development is an ongoing change that is able to be reversed, since the cable car can be decommissioned and removed. This results in a Noticeable magnitude of change for the proposal. The resulting significance of impact is Low in accordance with Table 3.

Construction works pertaining to the development of the cable car infrastructure is expected to be more visible than the final constructed outcome. Equipment and works associated with the construction of new facilities is will temporarily cause minor alteration to the skyline. Equipment and works will also cause greater change to the existing texture of the upper slopes, as unfinished buildings and equipment such as cranes will appear in contrast to the surroundings to the human eye from this viewpoint. This will substantially increase the presence of infrastructure visible on the Mountain. These changes are consider a major change to the view over a restricted portion of the view. . Construction works, and the associated equipment are a change with a limited life of less than 5 years, as they will be removed once construction of the cable car is complete. The magnitude of change associated with the construction of the cable car is therefore Perceptible, with the significance of impact considered to be Low.

In the event that the cable car and associated infrastructure is decommissioned it is anticipated that remediation works would restore the landscape of the Pinnacle Centre back to a condition as close as possible to that of the original landscape. In this event, the resultant change would be Imperceptible from the existing condition from this viewpoint, and the significance of the impact considered to be Negligible.

The overall significance of impact from Viewpoint 4 is considered to be Low.

### 7.3.5 Viewpoint 5 – From Glenorchy

Glenorchy features a mix of commercial and residential uses and although it is a suburb of Greater Hobart, it features its own centre of activity with differing cultural and social amenities. Viewpoint 5 is from the Glenorchy Art and Sculpture Park, by the Glenorchy waterfront, and is a representative viewpoint generally from the Glenorchy area.

The following table provides details for the original photograph.

| | |
|---|---|
| **Date** | 11th of November |
| **Day** | Monday |
| **Time** | 4:03pm |
| **Weather conditions** | Mostly sunny with scattered clouds |
| **Lens** | 70mm |

**Figure 17: Viewpoint 5 Original Photograph (source: Ethos Urban)**

**Visual Character**
This viewpoint is representative of a typical view from the Glenorchy area toward the Mountain. Located on the foreshore at the Glenorchy Art & Sculpture Park it is a publicly accessible location with a high expected number of viewers. However, the viewpoint is generally representative of the kind of oblique mid-distance view from a number of residential, community, and commercial uses throughout the built-up area, in particular toward the River Derwent. Local residents and tourists are expected to be the majority of users of this viewpoint, with a largely unobstructed view of the summit of Mount Wellington. These users are considered to be highly sensitive given the views from homes and public spaces towards the mountain. The form of Mount Wellington is clearly visible from this viewpoint with the cliffs and other geological aspects as key visual features of the Glenorchy skyline. From this northerly angle, the Organ Pipes are a particular feature of the Mountain's skyline, protruding beyond the main ridge with the steep drop of the cliff face clearly evident.

The viewpoint is a full, stationary view approximately 8-9 kilometres away from the proposed cable car, with a viewing direction of south west towards the mountain. Mount Wellington is a prominent element in the Glenorchy skyline and is a core visual feature of the area. The view type is 'Mid-Distance from Surrounding City', and is composed of all the significant visual elements (as defined in section 6.1):

- Skyline
- Tree-line and change in texture
- Edge of settlement
- Variability (colour and 'mood')
- Scale (height, bulk, mass)
- Geological feature of the Organ Pipes

Therefore, it is considered that this is a viewpoint of high sensitivity given the combination of sensitive viewers, high social and cultural value and unobstructed views towards the mountain.

**Figure 18: Viewpoint 5 Visualisation (source: Another Perspective)**

**Visual Effects/Impact**
The primarily visible elements of the proposal from this location are the tramway and tower infrastructure. The Pinnacle Centre is located in a prominent location on the mountain but is not clearly visible from views at this location, given the high distance between the cable car and viewpoint. The viewing direction from Kingston Beach creates the visual effect of the tramway cables and tower projecting above the existing skyline.

The proposal will alter the skyline of the Mountain as seen from this viewpoint, with the primary change being the introduction of the cable car tower and tramway into the skyline. This will increase the presence of visible infrastructure in the skyline from this viewpoint. The demolition of the lookout shelter roof and walls will reduce the built elements within the skyline, although there will also be a slight addition as well caused by the Pinnacle Centre roofline, though imperceptible to the human eye. Overall this is considered a moderate change as perceived from this viewpoint.

The proposal will not alter the tree-line of the Mountain, although the Pinnacle Centre will cause change to the texture of the rocky upper slopes. However, this change is minimal as perceived from this vantage point, as the façade design and materiality references the scale and texture of the landscape in this areas and succeeds in harmonising the built form with the surrounding landscape. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the distinction between the edge of the settlement and the slopes of the Mountain as seen from this viewpoint.

The proposal has the potential to alter the variability in lighting and weather of the upper rocky slopes, with early morning light and snowfall conditions likely to increase the perceived change to the landscape in this location. However, recessed and angled windows will avoid impacts caused by light reflection, and the façade design and materiality has been designed to reflect the scale and texture of the landscape and as such the effect of snowfall will be similar to that of the existing condition. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the scale of the Mountain as seen from this viewpoint.

The cable car tower is located in close proximity to the Organ Pipes as seen from this viewpoint, and as such will impact on the geological feature. This effect is to expand the presence of infrastructure and built elements off the flatter part of the plateau, down on to the upper rocky slopes of the Mountain, expanding the perceivable built-footprint. From this distance the tower will only just be perceptible and as such will not significantly interfere with the ability to perceive and appreciate the feature of the Organ Pipes. The proposal's cable car will possibly be perceptible from this viewpoint as it moves across the Organ Pipes. This will barely be perceptible to the human eye, and the miniscule scale of the cable car against these features is likely to increase their sense of drama and scale. Cumulatively these are considered a moderate change as perceived from this viewpoint.

**Assessment of Visual Impact**
Therefore the proposal is considered to be a Moderate change over a restricted area given the addition of infrastructure elements within the skyline in close proximity to the Organ Pipes. The proposed development is an ongoing change that is able to be reversed, since the cable car can be decommissioned and removed. This results in a Noticeable magnitude of change for the proposal. The resulting significance of impact is Moderate in accordance with Table 3.

Construction works pertaining to the development of the cable car infrastructure is expected to be more visible than the final constructed outcome. Equipment and works associated with the construction of new facilities is will temporarily cause minor alteration to the skyline. Equipment and works will also cause greater change to the existing texture of the upper slopes, as unfinished buildings and equipment such as cranes will appear in contrast to the surroundings to the human eye from this viewpoint. This will substantially increase the presence of infrastructure visible on the Mountain. These changes are consider a major change to the view over a restricted portion of the view. Construction works, and the associated equipment are a change with a limited life of less than 5 years, as they will be removed once construction of the cable car is complete. The magnitude of change associated with the construction of the cable car is therefore Perceptible, with the significance of impact considered to be Low.

In the event that the cable car and associated infrastructure is decommissioned it is anticipated that remediation works would restore the landscape of the Pinnacle Centre back to a condition as close as possible to that of the original landscape. In this event, the resultant change would be Imperceptible from the existing condition from this viewpoint, and the significance of the impact considered to be Negligible.

The overall significance of impact from Viewpoint 5 is considered to be Moderate.

### 7.3.6 Viewpoint 6 – From Salamanca

Salamanca is an area with a heavy mix of residential, recreational and commercial uses in the heart of Hobart, and is a highly popular location in the city. Viewpoint 6 is from the Silo Apartments adjacent to the Salamanca Wharf by the Hobart waterfront. It is a representative viewpoint generally from the Salamanca area, though also a specific viewpoint that captures the 'Cove Wall' of built-form fronting Salamanca Place, with the Mountain prominently featuring above and behind, a highly documented view.

The following table provides details for the original photograph.

| | |
|---|---|
| **Date** | 11th of November |
| **Day** | Monday |
| **Time** | 10:39am |
| **Weather conditions** | Partly cloudy |
| **Lens** | 70mm |

**Figure 19: Viewpoint 6 Original Photograph (source: Ethos Urban)**

**Visual Character**

The viewpoint from this location represents a typical view from the Salamanca area, located in a heavily used place by locals and tourists alike. The Salamanca market is in close proximity to this viewpoint and is recognised as the most visited attraction in Tasmania, bringing a high number of viewers to this location in addition to the local residents. These users are considered to be highly sensitive as the location is known for its waterfront market and public spaces with views towards the mountain which contribute to the appeal of the area. Mount Wellington is clearly visible, and the landform of the mountain is an important visual feature of the views from this viewpoint.

This viewpoint is a full, stationary view of the mountain, located approximately 6-8 kilometres away from the proposed cable car infrastructure, with a viewing direction due west into the mountain. The view type is 'Mid-Distance from Surrounding City', and is composed of all the significant visual elements (as defined in section 6.1):

- Skyline
- Tree-line and change in texture
- Edge of settlement
- Variability (colour and 'mood')
- Scale (height, bulk, mass)
- Geological feature of the Organ Pipes

It is considered that this is a viewpoint of high sensitivity given the high expected number of sensitive viewers, high social and cultural value and unobstructed views of the mountain.

**Figure 20 Viewpoint 6 Visualisation (source: Another Perspective)**

**Visual Effects / Impact**

The Pinnacle Centre at the summit of Mount Wellington is visible from this viewpoint, while the base station is not visible from this location. The cable and cable cars along the tramway are not perceptible. Considering the element of movement associated with the cable cars, there is potential for these elements to become perceptible at this zoomed level, however it is estimated that these will remain imperceptible to the human eye. The Pinnacle Centre at the summit is situated in a prominent location on the mountain with an unobstructed view from the Hobart Waterfront, while the tramway extends along the face of the mountain towards Hobart.

The proposed Base Station is not visible from this viewpoint due to its location at the base of the mountain. A significant number of existing buildings and vegetation as part of the Hobart town screen this element of the proposal from the viewpoint.

The proposal will alter the skyline of the Mountain as seen from this viewpoint, with the demolition of the lookout shelter roof and walls reducing the built elements within the skyline. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the tree-line of the Mountain, although the Pinnacle Centre will cause change to the texture of the rocky upper slopes. However, this change is minimal as perceived from this vantage point, as the façade design and materiality references the scale and texture of the landscape in this areas and succeeds in harmonising the built form with the surrounding landscape. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the distinction between the edge of the settlement and the slopes of the Mountain as seen from this viewpoint.

The proposal has the potential to alter the variability in lighting and weather of the upper rocky slopes, with early morning light and snowfall conditions likely to increase the perceived change to the landscape in this location. However, recessed and angled windows will avoid impacts caused by light reflection, and the façade design and materiality has been designed to reflect the scale and texture of the landscape and as such the effect of snowfall will be similar to that of the existing condition. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the scale of the Mountain as seen from this viewpoint.

The proposal's cable car will possibly be perceptible from this viewpoint as it moves across the Organ Pipes. This will barely be perceptible to the human eye, and the miniscule scale of the cable car against these features is likely to increase their sense of drama and scale. This is considered a minor change as perceived from this viewpoint.

### 7.3.7 Viewpoint 7 – From Rosny Lookout

**Visual Character**
Rosny Hill is a popular vantage point for locals and tourists to view Hobart in its landscape setting. The scale of the city and mountain can be appreciated from this location. Notable features from this viewpoint include the River Derwent and working port of Hobart followed by varied low scale CBD and neighbourhood fabrics in a landscape. This is overarched by the dominate Mount Wellington backdrop.

The view is representative of the wider Rosny Park and Bellerive area and is approximately 8km from the proposal. The view type is 'distant view' and offers a broad overarching view of the mountain and is composed of the following significant visual elements (as defined in section 6.1):

- Skyline
- Tree-line and change in texture
- Edge of settlement
- Variability (colour and 'mood')
- Scale (height, bulk, mass)
- Geological features.

It is considered that this is a viewpoint of medium-high sensitivity given the high expected number of sensitive viewers, high social and cultural value and setting in which mountain is a focal and overarching element.

The following table provides details for the original photograph.

| | |
|---|---|
| **Date** | 11th of November |
| **Day** | Monday |
| **Time** | 11:54am |
| **Weather conditions** | Mostly sunny with scattered clouds |
| **Lens** | 70mm |

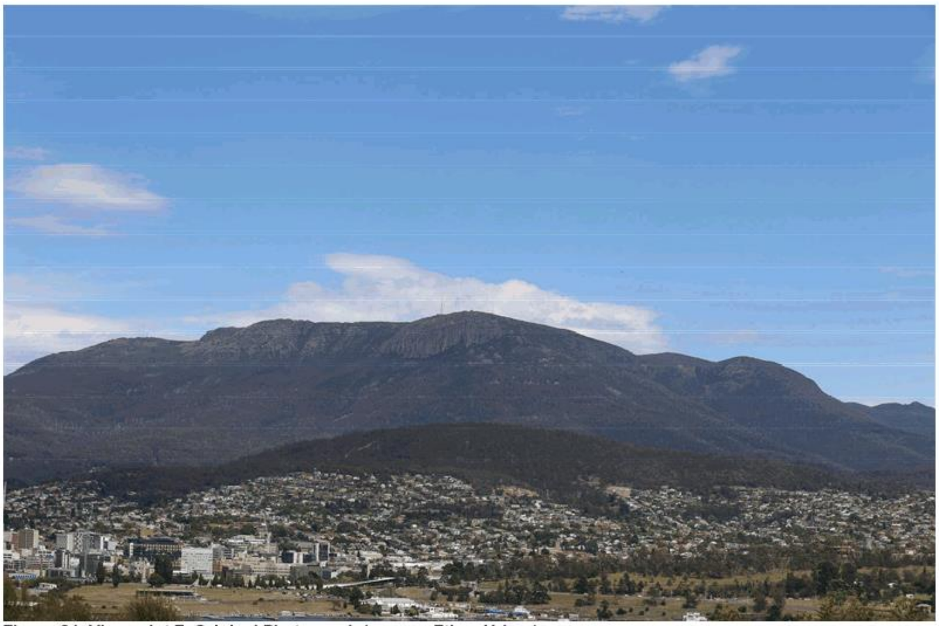


Figure 21: Viewpoint 7: Original Photograph (source: Ethos Urban)


Figure 22: Viewpoint 7 Visualisation (source: Another Perspective)

**Visual Effects / Impact**
When viewed from this location, the Pinnacle Centre will represent the addition of a new built feature in the landscape and the loss of part of the natural summit landscape summit above the Organ Pipes.

However, the visible scale of the change is insignificant given the:

- large distance of the Pinnacle Centre from this viewpoint
- direction of the view westwards into the mountain resulting in all elements having the mountain as a backdrop
- panoramic nature of the view that showcases the vast scale of the mountain
- presence of a number of other key landscape features, including the River Derwent and the Hobart townscape, that add layers and complexity to the view and as such provide a number of points of focus for the eye
- low, linear form and colours and textures that are compatible with the natural summit landscape
- proposal not breaking the existing mountain silhouette.

The proposal will alter the skyline of the Mountain as seen from this viewpoint, with the demolition of the lookout shelter roof and walls reducing the built elements within the skyline. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the tree-line of the Mountain, although the Pinnacle Centre will cause change to the texture of the rocky upper slopes. However, this change is minimal as perceived from this vantage point, as the façade design and materiality references the scale and texture of the landscape in this areas and succeeds in harmonising the built form with the surrounding landscape. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the distinction between the edge of the settlement and the slopes of the Mountain as seen from this viewpoint.

The proposal has the potential to alter the variability in lighting and weather of the upper rocky slopes, with early morning light and snowfall conditions likely to increase the perceived change to the landscape in this location. However, recessed and angled windows will avoid impacts caused by light reflection, and the façade design and materiality has been designed to reflect the scale and texture of the landscape and as such the effect of snowfall will be similar to that of the existing condition. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the scale of the Mountain as seen from this viewpoint.

The cable and cable cars along the tramway are not perceptible. While considering movement associated with the cable cars there is potential for these elements to become perceptible at a zoomed level, their large distance from the viewpoint indicates that this will remain imperceptible to the human eye.

This qualifies the proposal as an insignificant change.

**Assessment of Visual Impact**
Therefore, the proposal is considered to be an insignificant change given that the magnitude of change from this viewpoint is minimised due to the small scale of the development visible from this location. The proposed development is an ongoing change that is able to be reversed as the cable car infrastructure can be decommissioned and removed. This results in a Perceptible magnitude of change for the proposal. The significance of impact of the cable car on Rosny Lookout is therefore perceptible in accordance with Table 3. The significance of impact of a Perceptible change to a medium-high sensitivity viewpoint is Low.

Construction works pertaining to the development of the cable car infrastructure is expected to be more visible than the final constructed outcome. Equipment and works associated with the construction of new facilities will temporarily cause minor alteration to the skyline. Equipment and works will also cause greater change to the existing texture of the upper slopes, as unfinished buildings and equipment such as cranes will appear in contrast to the surroundings to the human eye from this viewpoint. This will substantially increase the presence of infrastructure visible on the Mountain. These changes are considered a moderate change to the view over a restricted portion of the view. Construction works, and the associated equipment are a change with a limited life of less than 5 years, as they will be removed once construction of the cable car is complete. The magnitude of change associated with the construction of the cable car is therefore Perceptible, with the significance of impact considered to be Low.

In the event that the cable car and associated infrastructure is decommissioned it is anticipated that remediation works would restore the landscape of the Pinnacle Centre back to a condition as close as possible to that of the original landscape. In this event, the resultant change would be Imperceptible from the existing condition from this viewpoint, and the significance of the impact considered to be Negligible.

The overall significance of impact from this viewpoint is considered to be Low.

### 7.3.8 Viewpoint 8 – From Tranmere

**Visual Character**

Tranmere is a mostly residential area that along the eastern shore of Hobart. The neighbourhood is characterised by single dwellings that have outlook to the River Derwent. The waterfront path along Tranmere Road is highly used by residence who walk or cycle this stretch of foreshore. Notable features include the River Derwent and cascading hills, both natural and with scattered dwellings.

The view is representative of the wider Tranmere and Howrah area and is approximately 12.5km from the proposal. The view type is 'distant view' and offers a broad overarching view of the mountain and is composed of the following significant visual elements (as defined in section 6.1):

- Skyline
- Tree-line and change in texture
- Edge of settlement
- Variability (colour and 'mood')
- Scale (height, bulk, mass)
- Geological features.

It is considered that this is a viewpoint is of medium-low sensitivity given the use and viewing distance from the mountain.

The following table provides details for the original photograph.

| | |
|---|---|
| **Date** | 11th of November |
| **Day** | Monday |
| **Time** | 12:52pm |
| **Weather conditions** | Mostly sunny with scattered clouds |
| **Lens** | 70mm |

Figure 23: Viewpoint 8 Original Photograph (source: Ethos Urban)

Figure 24: Viewpoint 8 Visualisation (source: Another Perspective)

**Visual Effects / Impact**
The following elements of the proposal are visible from this viewpoint:

- Pinnacle Centre
- Pylons 1, 2 and 3.

These elements will represent the addition of a new built feature in the landscape.

However, the visible scale of the change will be imperceptible given the:

- large distance of the all proposal elements from this viewpoint
- proposal does not breaking the existing mountain silhouette.

The proposal will alter the skyline of the Mountain as seen from this viewpoint, with the demolition of the lookout shelter roof and walls reducing the built elements within the skyline. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the tree-line of the Mountain, although the Pinnacle Centre will cause change to the texture of the rocky upper slopes. However, this change is minimal as perceived from this vantage point, as the façade design and materiality references the scale and texture of the landscape in this areas and succeeds in harmonising the built form with the surrounding landscape. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the distinction between the edge of the settlement and the slopes of the Mountain as seen from this viewpoint.

The proposal has the potential to alter the variability in lighting and weather of the upper rocky slopes, with early morning light and snowfall conditions likely to increase the perceived change to the landscape in this location. However, recessed and angled windows will avoid impacts caused by light reflection, and the façade design and materiality has been designed to reflect the scale and texture of the landscape and as such the effect of snowfall will be similar to that of the existing condition. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the scale of the Mountain as seen from this viewpoint.

The cable and cable cars along the tramway are not perceptible. While considering movement associated with the cable cars there is potential for these elements to become perceptible at a zoomed level, their large distance from the viewpoint indicates that this will remain imperceptible to the human eye.

This qualifies the proposal as an imperceptible change.

**Assessment of Visual Impact**
Therefore, the proposal is considered to be an imperceptible change given great distance to the viewpoint. The proposed development is an ongoing change that is able to be reversed as the cable car infrastructure can be decommissioned and removed. The significance of impact of the cable car on Tranmere is therefore Imperceptible in accordance with Table 3 with the significance of impact considered to be Negligible.

Construction works pertaining to the development of the cable car infrastructure is expected to be potentially visible to a very low degree from this viewpoint. Equipment and works associated with the construction of new facilities may temporarily cause minor alteration to the skyline. Equipment and works will also cause greater change to the existing texture of the upper slopes, as unfinished buildings and equipment such as cranes may just be perceptible in contrast to the surroundings to the human eye from this viewpoint. This will temporarily cause a minor increase to the presence of infrastructure visible on the Mountain. These changes are considered a minor change to the view over a restricted portion of the view. Construction works, and the associated equipment are a change with a limited life of less than 5 years, as they will be removed once construction of the cable car is complete. The magnitude of change associated with the construction of the cable car is therefore Imperceptible, with the significance of impact considered to be Negligible.

In the event that the cable car and associated infrastructure is decommissioned it is anticipated that remediation works would restore the landscape of the Pinnacle Centre back to a condition as close as possible to that of the original landscape. In this event, the resultant change would be Imperceptible from the existing condition from this viewpoint, and the significance of the impact considered to be Negligible.

The overall significance of impact from this viewpoint is considered to be Negligible.

### 7.3.9 Viewpoint 9 – From Huon Road

**Visual Character**
Huon Road is the main road leading to the Mount Wellington from South Hobart and the city centre. Many residences are located on and around Huon road scatted in the hillsides. Notable features of this view include the eucalypt forest hills with rooftops and street elements in foreground. There is a distinct view of organ pipes and of the pinnacle. This is a representative viewpoint generally from the East South Hobart and Cascades area.

The view type is both 'mid distance from surrounding city' and is composed of the following significant visual elements (as defined in section 6.1):

- Skyline
- Tree-line and change in texture
- Edge of settlement
- Variability (colour and 'mood')
- Scale (height, bulk, mass)
- Geological features.

It is considered that this is a viewpoint of high sensitivity given the high expected number of sensitive viewers, high social and cultural value and setting in which mountain is a focal and overarching element.

The following table provides details for the original photograph.

| | |
|---|---|
| **Date** | $12^{th}$ of November |
| **Day** | Tuesday |
| **Time** | 35mm at 11:40am, 70mm at 11:42am |
| **Weather conditions** | Mostly sunny with scattered clouds |
| **Lens** | 35mm and 70mm |

Figure 25: Viewpoint 9 Original Photograph: 35mm (source: Ethos Urban)

Figure 26: Viewpoint 9 Original Photograph: 70mm (source: Ethos Urban)

Figure 27: Viewpoint 9 Visualisation 35mm (source: Another Perspective)

Figure 28: Viewpoint 9 Visualisation 70mm (source: Another Perspective)

**Visual Effects / Impact**
This is the only viewpoint where the proposal in its entirety can be seen, as represented in the 35mm lens photograph. However, given the prominence of the Organ Pipes within this view, it is considered that the typical view 'narrows' upon this feature as represented in the photograph with zoom lens 70mm.

When viewed from this location, the Pinnacle Centre will represent the addition of a new built feature in the landscape and the loss of part of the natural summit landscape summit above the Organ Pipes.

The proposal will alter the skyline of the Mountain as seen from this viewpoint, with the demolition of the lookout shelter roof and walls reducing the built elements within the skyline, counteracted by the minor intrusion of the Pinnacle Centre into the skyline. This intrusion is moderated by the modulated form of the building which resembles the uneven form of the pinnacle skyline. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the tree-line of the Mountain, although the Pinnacle Centre will cause change to the texture of the rocky upper slopes. The façade design and materiality references the scale and texture of the landscape in these areas, and while the scale of the built form is larger that the surrounding rock forms, these design considerations succeed in harmonising the built form with the surrounding landscape, minimising the visual effects. This is considered a moderate change as perceived from this viewpoint.

The proposal will not alter the distinction between the edge of the settlement and the slopes of the Mountain as seen from this viewpoint.

The proposal has the potential to alter the variability in lighting and weather of the upper rocky slopes, with early morning light and snowfall conditions likely to increase the perceived change to the landscape in this location. However, recessed and angled windows will avoid impacts caused by light reflection, and the façade design and materiality has been designed to reflect the scale and texture of the landscape and as such the effect of snowfall will be similar to that of the existing condition. This is considered a moderate change as perceived from this viewpoint.

The proposal's cable car will be perceptible from this viewpoint as it moves across the Organ Pipes. Statically, this will only just be perceptible to the human eye, and the miniscule scale of the cable car against these features is likely to increase their sense of drama and scale. However, the moving car and associated interactions with light and reflection will make it noticeable and attract the eye. This will only happen for a brief moment during the journey of the car up (and down) the Mountain. This is considered a moderate change as perceived from this viewpoint.

This qualifies the proposal as a moderate change over a restricted area of view.

The cable and cable cars along the tramway are not perceptible. While considering movement associated with the cable cars there is potential for these elements to become perceptible at a zoomed level, their distance from the viewpoint indicates that this will remain imperceptible to the human eye. This is further evidenced by the presence of the overhead power lines and cables in the original 35mm photo. When these lines are appear against the sky, they are substantially more visible when seen against the near solid, dark green colour of the mountain.

**Assessment of Visual Impact**
Therefore, the proposal is considered to be a moderate change over a restricted area given that the magnitude of change from this viewpoint is minimised due to the small scale of the development visible from this location. The proposed development is an ongoing change that is able to be reversed as the cable car infrastructure can be decommissioned and removed. This results in a Noticeable magnitude of change for the proposal. The significance of impact of the cable car on Huon Road is therefore Moderate in accordance with Table 3.

Construction works pertaining to the development of the cable car infrastructure is expected to be more visible than the final constructed outcome. Equipment and works associated with the construction of new facilities will temporarily cause minor alteration to the skyline. Equipment and works will also cause greater change to the existing texture of the upper slopes, as unfinished buildings and equipment such as cranes will appear in contrast to the surroundings to the human eye from this viewpoint. This will substantially increase the presence of infrastructure visible on the Mountain. These changes are considered a major change to the view over a restricted portion of the view. Construction works, and the associated equipment are a change with a limited life of less than 5 years, as they will be removed once construction of the cable car is complete. The magnitude of change associated with the construction of the cable car is therefore Noticeable, with the significance of impact considered to be Moderate.

In the event that the cable car and associated infrastructure is decommissioned it is anticipated that remediation works would restore the landscape of the Pinnacle Centre back to a condition as close as possible to that of the original landscape. In this event, the resultant change would be Imperceptible from the existing condition from this viewpoint, and the significance of the impact considered to be Negligible.

The overall significance of impact from this viewpoint is considered to be Moderate.

#### 7.3.10 Viewpoint 10 – From Old Springs Hotel

**Visual Character**
The Springs Hotel site is a short walk west of the main parking and amenities area less visited due to it being elevated and secluded. The springs is a popular tourist and local visitor location that us approximately halfway up Mount Wellington and 15mins drive from the summit. Many walking tracks depart from this location including the Pinnacle track, Radfords track, North South track and Lookout circuit. The springs is most known for a popular place to stop where there is a café, picnic areas, gas barbeque facilities, lookouts and toilets.

The view is representative of the wider Springs area and is approximately 2km from the proposal. The viewpoint offers uninterrupted views of the summit and was selected due to its historical significance of the former Springs Hotel site (1907-1967) as well as for its recreational importance. The view type is 'From on the Mountain', and is composed of the following significant visual elements (as defined in section 6.1):

- Skyline
- Tree-line and change in texture
- Variability (colour and 'mood')
- Scale (height, bulk, mass)
- Geological features.

It is considered that this is a viewpoint of high sensitivity given the high expected number of sensitive viewers, high social and cultural value and unobstructed views of the mountain.

| | |
|---|---|
| **Date** | 12th of November |
| **Day** | Tuesday |
| **Time** | 1:06pm |
| **Weather conditions** | Overcast – Intermittent rain |
| **Lens** | 35mm |

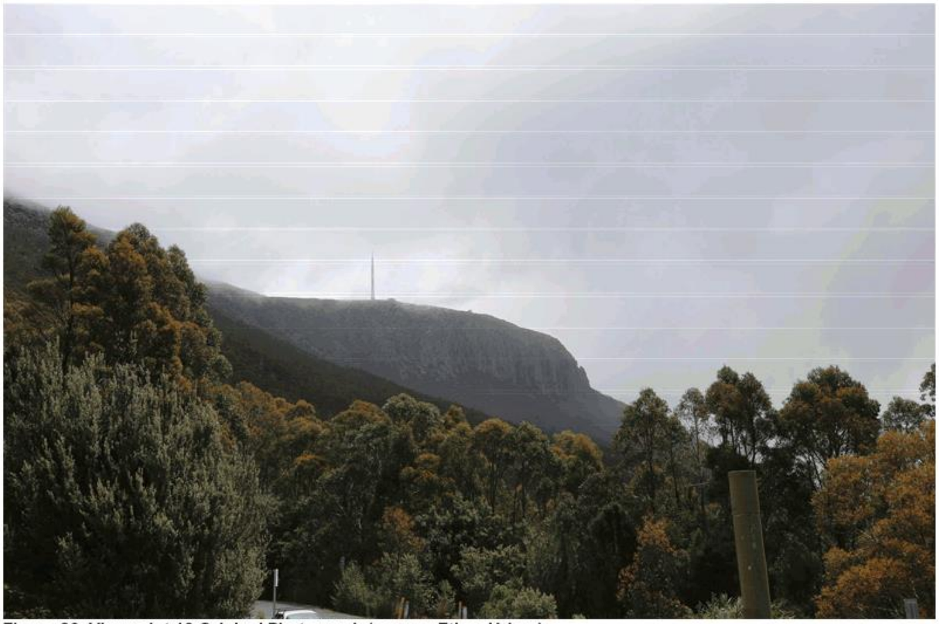


Figure 29: Viewpoint 10 Original Photograph (source: Ethos Urban)

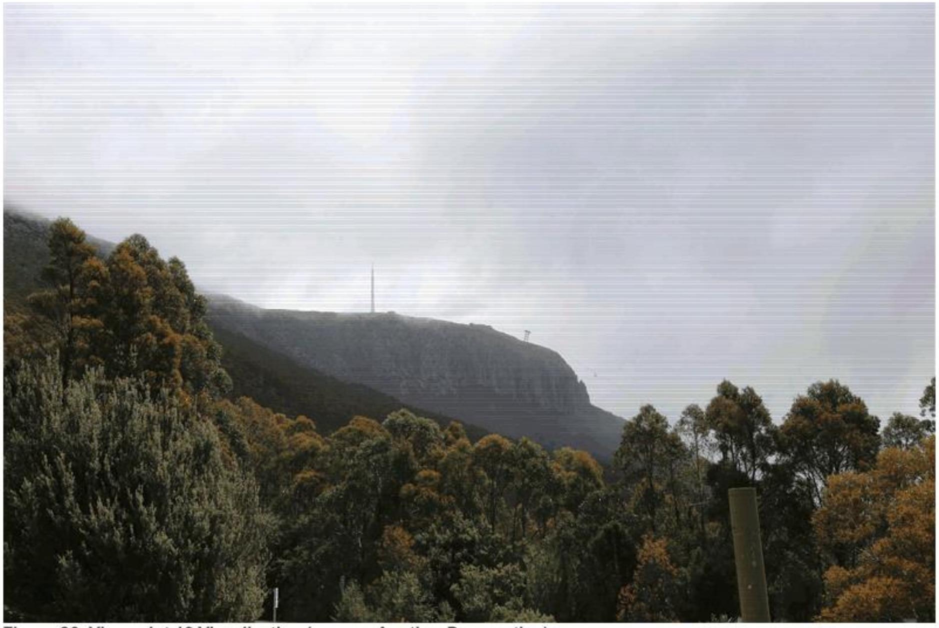


Figure 30: Viewpoint 10 Visualisation (source: Another Perspective)

**Visual Effects / Impact**
The foreground of this view, which represents between around one third of the height of the view and extends across its entire frame, is dominated by dense eucalypt bushland. Part of the foreground also comprises the Pinnacle Road and associated poles and signage. The mid ground can be considered to comprise the mid slopes of the mountain between South Wellington and the summit, with a noticeable, well defined ridgeline cutting through the view at an approximate angle of 45 degrees. The background comprises the mountain summit, which is a complex mix of its mid slopes (again cutting through the view at around 45 degrees), that part of the Organ Pipes that face generally south east and the NTA Tower.

The following elements of the proposal are visible in the background from this viewpoint:

- Pinnacle Centre
- Pylon 3
- Cableway and cable cars.

These elements will represent the addition of a new built feature in the landscape.

The visible scale of the change will be reduced due to:

- the distance of the Pinnacle Centre from this viewpoint
- the nature of the view that showcases the scale of the mountain
- it being contained to the background of the view.

The visibility of the Pinnacle Centre will be further reduced by its low, linear form and colours and textures that are compatible with the natural summit landscape.

The following will increase the proposal's visibility:

- elements will break the mountain silhouette.

The proposal will not alter the tree-line of the Mountain, although the Pinnacle Centre will cause change to the texture of the rocky upper slopes. However, this change is minimal as perceived from this vantage point, as the façade design and materiality references the scale and texture of the landscape in this areas and succeeds in harmonising the built form with the surrounding landscape. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the distinction between the edge of the settlement and the slopes of the Mountain as seen from this viewpoint.

The proposal has the potential to alter the variability in lighting and weather of the upper rocky slopes, with early morning light and snowfall conditions likely to increase the perceived change to the landscape in this location. However, recessed and angled windows will avoid impacts caused by light reflection, and the façade design and materiality has been designed to reflect the scale and texture of the landscape and as such the effect of snowfall will be similar to that of the existing condition. This is considered a minor change as perceived from this viewpoint.

The proposal will not alter the scale of the Mountain as seen from this viewpoint.

While the breaking of the mountain silhouette requires careful consideration, it is considered that the above factors qualifies the proposal as a Moderate change over a restricted area of view.

**Assessment of Visual Impact**
The proposed development is an ongoing change that is able to be reversed as the cable car infrastructure can be decommissioned and removed. This results in an Noticeable magnitude of change for the proposal. The significance of impact of the cable car on South Hobart is therefore Moderate in accordance with Table 3.

Construction works pertaining to the development of the cable car infrastructure is expected to be more visible than the final constructed outcome. Equipment and works associated with the construction of new facilities is will temporarily cause minor alteration to the skyline. Equipment and works will also cause greater change to the existing texture of the upper slopes, as unfinished buildings and equipment such as cranes will appear in contrast to the surroundings to the human eye from this viewpoint. This will substantially increase the presence of infrastructure visible on the Mountain. These changes are consider a major change to the view over a restricted portion of the view. Construction works, and the associated equipment are a change with a limited life of less than 5 years, as they will be removed once construction of the cable car is complete. The magnitude of change associated with the construction of the cable car is therefore Noticeable, with the significance of impact considered to be Moderate.

In the event that the cable car and associated infrastructure is decommissioned it is anticipated that remediation works would restore the landscape of the Pinnacle Centre back to a condition as close as possible to that of the original landscape. In this event, the resultant change would be Imperceptible from the existing condition from this viewpoint, and the significance of the impact considered to be Negligible.

The overall significance of impact from Viewpoint 3 is considered to be Moderate.

### 7.4 Summary of Visual Impact Significance

**Table 5 Significance of Impact Summary**

| Impact | | Viewpoint | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Magnitude of Change - Significant Visual Element | 1 | Minor | Negligible | Minor | Moderate | Moderate | Minor | Minor | Negligible | Moderate | Moderate |
| | 2 | Minor | Moderate | Moderate | Minor | Minor | Minor | Minor | Negligible | Moderate | Moderate |
| | 3 | Negligible | Moderate | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible |
| | 4 | Minor | Negligible | Moderate | Minor | Minor | Minor | Minor | Negligible | Moderate | Moderate |
| | 5 | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible | Negligible |
| | 6 | Minor | Negligible | Minor | Minor | Moderate | Minor | Minor | Negligible | Moderate | Moderate |
| Viewpoint Sensitivity | | **High** | **High** | **High** | **Medium** | **High** | **High** | **High** | **Medium** | **High** | **High** |
| **Total** | | **Low** | **Moderate** | **Moderate** | **Low** | **Moderate** | **Low** | **Low** | **Negligible** | **Moderate** | **Moderate** |

The viewpoint impact significance ratings range from Low to High, with three rated Low and three Moderate. The Moderate ratings reflects the particular visual effects in the foreground from the Pinnacle, the increased sensitivity from viewing locations closer to the mountain, and the effects created when a specific viewing angle positions the cable car upper tower such that it is associated with the significant visual element of the Organ Pipes. The viewpoints from the more populous and popular viewing areas of the Hobart city centre and waterfront are rated Low, largely owing to the distance from the proposal and the ability for the Pinnacle Centre and upper tower to harmonise with the landscape below the skyline from these perspectives.

The weighted significance of visual impact from these viewpoints is Moderate. Given the High sensitivity of all but one of the assessed viewpoints, and the lack of screening opportunities or further mitigation opportunities it is considered that this is a reasonable level of impact on the assessed landscape and visual values.

## 8.0 Additional assessment

In their RFI, Hobart City Council has requested the following additional assessment:

- extends the evaluation to views from nearby tracks where there is line of sight

- extends the evaluation to views from the moving components of the cable car (speed, frequency, size, material, glare and reflectivity, lighting, total number of cabin in operation on the cable lines and the relative spacing) and night time impacts
- provide further analysis of the base station and related infrastructure

This section provides this additional assessment.

### 8.1 Nearby tracks where there is line of sight

The following three tracks are nearest to the Organ Pipes and afford views to the Organ Pipes:

- Pinnacle Track
- Sawmill Track
- Zig Zag Track
- Organ Pipes Track.

While photomontages have not been prepared for points along these tracks, they have been walked in their entirety with photos being taken at relevant points along their routes.

The interaction of factors such a landform, track location, direction and width and vegetation influences the nature of views of the Organ Piper. Landform is a particularly important factor in appreciation of the Organ Pipes from these tracks. While forming a visually cohesive landscape feature when viewed from the distance, at closer locations on the mountain the Organ Pipes can be considered to have two component parts. The dividing line between these parts is in the vicinity of a feature termed the Central Buttress. South of this line the Organ Pipes are aligned generally in a general south-west to north-west direction. North of this line, the Organ Pipes are aligned in a general north north-east to south south-east direction. The location of this pivot point relative to the tracks and the alignment of the proposal over the Organ Pipes has implications for the typical viewing experience from these three nearby tracks.

People using these tracks are typically walkers. Due to the distance from carparks and the nature of the terrain, it is likely that most walkers are more serious nature or fitness enthusiasts than more casual walkers. The tracks are also used to access the certain rock-climbing routes that are better accessed from the base as opposed to their top.

**Pinnacle Track**
The Pinnacle Track commences from The Springs and heads in a general north north-west direction before terminating at its intersection with the Zig Zag Track and the Organ Pipes Track. Due to its alignment with the eastern face of the mountain south of the Organ Pipes, its narrow width and passage through dense vegetation, views to the Organ Pipes are limited.

**Sawmill Track**
The Sawmill Track commences from Pinnacle Road and heads in a general north north-west direction before terminating at its intersection with the Organ Pipes Track. Focal views of the southern part of the Organ Pipes can be obtained at certain points along the track towards its northern end.

**Zig Zag Track**
The Zig Zag track commences from its intersection with the Pinnacle Track and Sawmill Track and heads in a general north west direction (noting a number of direction changes due to gradient) before terminating at the Pinnacle Road loop at the mountain summit. The track crosses the eastern face of the mountain to the south-west of the Organ Pipes within a minor bowl or indentation in the mountain face.

The track ascends from approximately 960m to approximately 1210m (400m vertical rise). To manage this change in elevation, the track makes a number of hairpin turns. Descent of the track affords panoramic views east across the lower slopes of the mountain, the Hobart townscape, River Derwent to largely rural landscapes in the distance. ascent of the track provides constrained views within vegetation and the eastern face of the mountain.

This is the only track where the viewing experience is one of being within the steep upper parts of the mountains eastern face. When on the track, focus is typically drawn to panoramic views when descending and the mountain face when ascending.

**Organ Pipes Track**

The Organ Pipes track commences at the intersection of the Pinnacle Track and the Zig Zag Track before following the contour of the Mountain around the base of the Organ Pipes to terminate at the Chalet on Pinnacle Road. Due to the presence and interaction of landform and vegetation, the visual experience in walking this track comprises two distinct segments. Segment 1 comprises the southern part of the track, and affords panoramic views of that part of the Organ Pipes that generally face south-east.

From here, it gradually ascends the Pinnacle Track from The Springs, then follows the contour of the mountain around the base of the Organ Pipes.

Due largely to little or no vegetation and a large boulder field, there are moments along the track where panoramic views of the Organ Pipes can be obtained.

Travelling further north, views become highly obstructed due to a combination of dense vegetation and rising terrain while the track remains relatively level. To obtain expansive or uninterrupted views, a person would be required to venture off the main track via small, signposted tracks through steep terrain. This is unlikely to occur for most walkers. However, review of publicly available literature suggests that this is undertaken by rock climbers in accessing certain routes.

**Figure 31: View from Organ Pipes Track**
Source: Ethos Urban

**Figure 32: View from Organ Pipes track**
Source: Ethos Urban

### 8.2 Moving components of the cable car

The proposed cableway will have a horizontal length of approximately 2.4m (Planning Assessment Report, Ireneinc, 2019). The cableway will comprise three cables:

- two cables for stability
- one cable for propulsion.

A maximum of two separate cable cars will operate on the cableway at any one time. The cable cars will have dimensions of 6.9m x 3.9m.

As the cable cars are counterbalanced and synchronised, one cable car will ascend while the other descends. This means one cable car arrives at the Pinnacle Centre as the other arrives at the base-station. At top speed, the cable cars can complete one ascent or decent of the mountain in just under six minutes (5.7 minutes).

The cable cars will be rectangular in shape, and will include an outdoor balcony oriented eastwards to Hobart.

The externally visible parts of the cable cars will be constructed from metal and glass, with glass covering the greater proportion of the side elevations. The glass will be a semi-transparent, grey coloured glass which provides for a lower level of reflectivity than would otherwise be the case. The proposed colour scheme is predominantly grey, with a lighter grey, white and green used for accents.

It is expected that the cable cars will operate up to:

- 9 hours per weekday in the winter
- 13 hours per weekend in weekend in winter
- 12 hours per weekday in the summer

- 14 hours per weekend in summer.

The cable car will not operate in adverse wind conditions or when Wellington Park is closed due to extreme fire danger.

Within the Pinnacle Centre, the café is expected to operate during the cable car operational hours. The restaurant will be open for lunch and dinner.

### 8.3 Night time impacts

As can be seen by the above expected hours of operation compared with the length of daylight hours in Hobart, the Pinnacle Centre, base station and cable cars will be illuminated during a proportion of the evening.

During the evening, the purpose of lighting will be to optimise views from the cable cars and Pinnacle Centre to the distant Hobart townscape, while maintaining functional and safety standards. Consequently, the emphasis on internal lighting, will be for lower levels of illumination. This can be addressed by the area covered, strength, direction and other methods.

Lighting within the Pinnacle Centre will include:

- low intensity recessed light fixtures
- low intensity up lights
- wall mounted fittings facing away from windows and opening in the public areas.

Lighting within the Pinnacle Centre will not include:

- ceiling-mounted light fixtures (that provide direct light to windows)
- outdoor flood-lighting (as can be seen on the existing transmission facilities)

As can be seen from the elevations, the proportion of glazing to solid surfaces is relatively low. This will constrain both the amount and physical extent of visible lighting. Rooms requiring higher levels of lighting such as kitchens and bathrooms will be located internally or face west direct into the side of the mountain.

The purpose of external lighting will be to assist in orientation and access. As such they will be focussed towards the ground such as bollards.

Considering the pattern of viewing, it is considered highly unlikely that people will be using location on the mountain during evening hours. On this basis, it is considered that night lighting will potentially be visible from views from the summit and more distant locations (mainly within Hobart). When viewed from the summit, it is likely that the Pinnacle Centre and cable cars will form part of the broader 'human influenced' backdrop dominated by the night lights of Hobart. When viewed from more distant locations, it is likely that the immediate surrounds will be impacted from some form of light, including street, vehicle and building lighting. While it is possible that the Pinnacle Centre and cable cars may be discernible, it is unlikely that they will be prominent.

### 8.4 Base station and related infrastructure

As show in **Appendix A**, the base station will be theoretically visible from a number of locations in Hobart. Most of these locations are located in the valleys of the foothills, including parts of South Hobart. Other locations include Tranmere on the eastern shore, and parts of Otago to the north of the city.

Within this ZTV:

- the proposal will be exposed to a large number of people

- these people will include workers, residents and tourists. It is considered that the most sensitive of these groups is residents in South Hobart and environs. Included among the tourists will be those people expressly visiting the proposal to use the cable car
- while there is no direct line of sight from the closest dwelling (Old Farm Road) to the proposal, the straight line distance is 236m (approx.) and to the nearest large cluster of dwellings in and around Strickland Avenue is 1km (approx.). The largest cohort of people exposed to close range views will be tourists seeking to use the cable car
- while having high value due to it being part of the mountain, this location exhibits less of the Significant Visual Elements such as the skyline than locations further up the mountain
- the viewing direction of most people will be westwards towards the mountain
- from distant locations, the view is one of the thickly forested, gently folding lower slopes of the mountain. These views take in much of the mountain, and on this basis the scale of the mountain appears substantial. The view also includes built elements such as trees and power poles
- close range views from the access road will likely show a grassed clearing amongst a thickly forested eucalypt landscape.

On this basis, distant views can be considered to have a medium level of sensitivity and close range views and low – medium level of sensitivity.

Figure 26 shows the Base Station from the Huon Road viewpoint. While a photomontage was not prepared for close range views from the access road, given the known detail of the existing visual setting and the proposed Base Station, it is reasonable to infer the new visual environment without a photomontage.

From both distant and close range locations, the effects are:

- from distant views, the Base Station will be screened by vegetation. From close range views on the access road, it will appear as a new insertion into the landscape
- distant views are dominated by the substantial scale of the mountain, clad in dense eucalypt forest. The lower slopes comprise a pattern of relatively gentle folds created by hills, ridges and valleys
- from the close range, the Base Station, its access road and associated vehicle parking and manoeuvring areas will sit in a narrow, grassed clearing created as part of a fire trail west of Old Farm Road. This clearing is surrounded by dense eucalypt bushland including stringybark and blue gum which almost entirely screens the facility from all viewpoints
- the scale of change can be considered minor over a restricted area
- the change is ongoing that is able to be reversed.

On this basis, both from distant and close range viewpoints, the magnitude of change can be considered perceptible.

Combing the high and medium sensitivity with the perceptible magnitude of change, the overall significance of the visual impact can be considered low.

# 9.0 Response to Planning Scheme & Management Plan Provisions

## 9.1 Hobart Interim Planning Scheme 2015

### 9.1.1 29.0 Environmental Management Zone

**29.4.1 Building Height**

**Objective:**
To ensure that building height **contributes positively to the landscape** and does not result in unreasonable impact on residential amenity of adjoining land.

| **Acceptable Solution A1** | **Performance Criteria P1** |
|---|---|
| Building height comply with any of the following:<br><br>(a) as prescribed in an applicable reserve management plan;<br>(b) be no more than 7.5m. | Building height must satisfy all of the following:<br><br>(a) be consistent with any Desired Future Character Statements provided for the area or, if no such statements are provided, **have regard to the landscape of the area**;<br>(b) be sufficient to prevent unreasonable adverse impacts on residential amenity on adjoining lots by:<br>(c) overlooking and loss of privacy;<br>(d) visual impact when viewed from adjoining lots, due to bulk and height;<br>(e) be reasonably necessary due to the slope of the site or for the functional requirements of infrastructure. |

**A1:** The proposed buildings are taller than 7.5m, and as such do not meet the acceptable solution and must satisfy the Performance Criteria.

**P1**: No Desired Future Character Statement is provided for the area (nonetheless, consideration has been given to the Wellington Park Management Plan provisions for the Pinnacle Specific Area Plan which seeks to balance tourism with the natural, scenic and visual values of the area). On this basis, building height must have regard to the landscape of the area.

The landscape of the Pinnacle Area comprises natural and built elements, and provides a distinct mountain top visual experience with panoramic views to places and features such as Hobart, the Tasman Sea and South West Tasmania.

The natural landscape of the Pinnacle Specific Area is rugged, and is dominated by a complex interplay of low, shrubby vegetation and dolerite rock outcrops.

The height of the Pinnacle Centre is influenced by the steep topography of the site, the desire to minimise cut and fill and the functional requirements of the cableway and associated tourist uses.

From a visual perspective, the design achieves a balance between these considerations and having regard to the landscape by:

- being sited in a location setback from the edge of the Organ Pipes and beneath the skyline of the Mountain, reducing its visual impact on these key elements
- being sited in a part of the summit that is characterised by a series of natural pockets and depressions, providing greater scope to more sensitively accommodate built form that would otherwise be the case
- having a linear form that is responsive to the contours of the Mountain and sits close to that part of the Mountain located immediately above,

### 29.4.1 Building Height

- having a complex, fragmented form featuring substantial recesses and projections that draw from this complexity, and also serve to mitigate the perceived height and scale of the building
- having a colour scheme that is compatible with those of the surrounding natural landscape elements.

The Base Station is located in a modified natural landscape setting comprising a narrow, grassed clearing for fire purposes nestled in the lower parts of the Mountain.

Similar to the Pinnacle Centre, the height of the building is influenced by the steep topography of the site, and the desire to minimise cut and fill, and the functional requirements of the cableway. The height of the Base Station is informed by the surrounding trees, and as a consequence is screened form being seen in its entirely except from the close range on the access road and associated carpark.

The height of the cableway pylons allows for the cable cars to traverse the Mountain while avoiding the need to remove a liner line of vegetation that would be otherwise be the case with ground-based transportation. The lower cableway pylons are sited amongst tall, dense screening vegetation in locations that are not visually prominent. The upper tower must be taller than 7.5m for operational reasons, and careful siting has ensured that is able to visually disappear into the backdrop of the summit landscape from the majority and most sensitive viewpoints considered in this assessment.

For these reasons, it can be considered that the proposal has regard to the landscape of the area

In terms of criteria (b) – (e), building heights prevent unreasonable adverse impacts on residential amenity on adjoining lots as:

- overlooking and privacy – as it is not a visual impact consideration, this is a matter for the main planning report to address
- visual impact due to bulk and height – assessment of visual impact on the Huon Road viewpoint, which is broadly representative of views from South Hobart and the lower mountain valleys, shows that the proposal is not a prominent new addition to the overall mountain landscape. In particular, the scale of the overall mountain and even its components parts such as the lower ridges, hills and valley and the Organ Pipes, prevents unreasonable adverse impacts on residential amenity. In particular, the lattice-work nature of the pylons reduces their visual bulk
- slope of the site or for the functional requirements of infrastructure – the proposal has been designed to respond to the slope of the mountain, with minimal cut and fill, and to accommodate the functional requirements of the cableway and its plant. Importantly, the height of the pylons is necessary to enable a cable care experience that traverses above the existing tree canopy height, and manages the abrupt increase in elevation due to the Organ Pipes. Much of the height of these pylons is obscured by existing trees.

The proposal satisfies the performance criteria.

### 29.4.2 Setback

**Objective:**
To maintain **desirable characteristics of the landscape**, protect amenity of adjoining lots, avoid land use conflict and fettering of use on nearby rural land and protect environmental values on adjoining land zoned Environmental Living and adjoining land in the World Heritage Area.

| Acceptable Solution A1 | Performance Criteria P1 |
|---|---|
| Building setback from frontage must comply with any of the following:<br><br>(a) as prescribed in an applicable reserve management plan; | Building setback from frontage must satisfy all of the following:<br><br>(a) be consistent with any Desired Future Character Statements provided for the area or, |

| 29.4.2 Setback | |
|---|---|
| (b) be no less than 30m. | if no such statements are provided, **have regard to the landscape**;<br>(b) minimise adverse impact on the landscape as viewed from the road;<br>(c) be consistent with the prevailing setbacks of existing buildings on nearby lots;<br>(d) minimise loss of native vegetation within the front setback where such vegetation makes a significant contribution to the landscape as viewed from the road. |
| **A1:** The applicable management plan does not contain reference to building setbacks. No buildings are proposed within 30m of frontage, and as such the proposal complies with the Acceptable Solution | |
| **Acceptable Solution A2**<br>Building setback from side and rear boundaries must comply with any of the following:<br>(a) as prescribed in an applicable reserve management plan;<br>(b) be no less than 30 m. | **Performance Criteria P2**<br>Building setback from side and rear boundaries must satisfy all of the following:<br>(a) be consistent with any Desired Future Character Statements provided for the area or, if no such statements are provided, **have regard to the landscape;**<br>(b) be sufficient to prevent unreasonable adverse impacts on residential amenity on adjoining lots by:<br>i. overlooking and loss of privacy;<br>ii. visual impact, when viewed from adjoining lots, through building bulk and massing. |
| **A2:** The applicable management plan does not contain reference to building setbacks. The Pinnacle Centre building is proposed within 30m of a side boundary and as such does not comply with the acceptable solution and must respond to the performance criteria.<br><br>**P2:** (a) The siting of the Pinnacle Centre has been selected to allow the building 'fragments' to sit within existing depressions and 'pockets' of the terrain, in order to minimise landscape effects caused by building height. As such it has reference to the landscape.<br>(b) Adjoining lots are not residential.<br><br>The proposal satisfies the performance criteria. | |

| 29.4.3 Design | |
|---|---|
| **Objective:**<br>To ensure that the location and appearance of buildings and works **minimises adverse impact** on natural values and **on the landscape**. | |
| **Acceptable Solution A1**<br>The location of buildings and works must comply with any of the following:<br>(a) be located on a site that does not require the clearing of native vegetation and is not on a skyline or ridgeline;<br>(b) be located within a building area, if provided on the title; | **Performance Criteria P1**<br>The location of buildings and works must satisfy all of the following:<br>(a) be located in an area requiring the clearing of native vegetation only if:<br>i. there are no sites clear of native vegetation and clear of other significant |

| 29.4.3 Design | |
|---|---|
| (c) be an addition or alteration to an existing building;<br>(d) as prescribed in an applicable reserve management plan. | site constraints such as access difficulties or excessive slope;<br>ii. the extent of clearing is the minimum necessary to provide for buildings, associated works and associated bushfire protection measures;<br>iii. the location of clearing has the least environmental impact;<br>(b) be located on a skyline or ridgeline only if:<br>i. there are no sites clear of native vegetation and clear of other significant site constraints such as access difficulties or excessive slope;<br>ii. there is **no significant impact on the rural landscape**;<br>iii. building height is minimised;<br>iv. any screening vegetation is maintained.<br>(c) be consistent with any Desired Future Character Statements provided for the area or, if no such statements are provided, **have regard to the landscape**. |
| **A1:** The proposed buildings and works do not comply with any of the acceptable solutions and as such must satisfy the performance criteria.<br><br>**P1:** (b) ii. The Pinnacle Centre and upper cable car tower are located on the skyline of the Mountain as perceived from some of the assessed viewpoints. The interruptions to the skyline by the Pinnacle Centre are minimal and will not be perceptible to the human eye. The interruptions to the skyline caused by the upper tower are located in the context of the existing towers of the summit, and as such are do not change the character of this area, merely the extent of this character. This does not cause a significant impact on the character of the landscape.<br><br>(c) As noted in response to 29.4.1 P1 the siting of the buildings has regard to the landscape.<br><br>The proposal satisfies the performance criteria. | |
| **Acceptable Solution A2**<br>Exterior building surfaces must be coloured using colours with a light reflectance value not greater than 40 percent. | **Performance Criteria P2**<br>Exterior building surfaces must avoid adverse impacts on the visual amenity of neighbouring land and detracting from the contribution the site makes to the landscape, views and vistas. |
| **A1:** Light reflectance values of building surfaces have not been assessed as part of this assessment, as such the performance criteria is considered.<br><br>**P1:** Materials and finishes of exterior building surfaces are derived from the local context and to reduce the potential for reflection of light to ensure that the building harmonises with the surrounding landscape from lower views, and avoid detracting from views and vistas of the landscape.<br><br>The proposal satisfies the performance criteria. | |
| **Acceptable Solution A3**<br>Fill and excavation must comply with all of the following: | **Performance Criteria P3**<br>Fill and excavation must satisfy all of the following:<br>(a) there is no adverse impact on natural values; |

| 29.4.3 Design | |
|---|---|
| (a) height of fill and depth of excavation is no more than 1 m from natural ground level, except where required for building foundations;<br>(b) extent is limited to the area required for the construction of buildings and vehicular access. | (b) **does not detract from the landscape character of the area**;<br>(c) does not impact upon the privacy for adjoining properties;<br>(d) does not affect land stability on the lot or adjoining land.there is no adverse impact on natural values; |
| **A3:** No cut and fill is proposed beyond the extent required for the construction of buildings and vehicular access, and changes to ground level greater than 1m are only for the purpose of building foundations. As such the proposal complies with the acceptable solution. | |

### 9.1.2 F3.0 Wellington Park Specific Area Plan

The purpose for the Specific Area Plan is:

> 'The purpose of this specific area plan is to ensure that use and development in Wellington Park is undertaken in accordance with the Wellington Park Management Plan.'

Application of the Specific Area Plan

> This specific area plan applies to Wellington Park as defined (L1) in the Wellington Park Act 1993.
> Notwithstanding any other provision of this planning scheme, any use or development of land in Wellington Park must be undertaken in accordance with the provisions of the Wellington Park Management Plan (L2).
>
> Footnotes
> **L1**
> Wellington Park means:
> (a) the area of land indicated as bounded by a heavy black line on Plan No. 2789 in the Central Plan Register, a reduced copy of which is set out, by way of illustration only, in Schedule 1 (Wellington Park Act 1993); or
> (b) that area of land as varied pursuant to sections 6, 7 and 8 of the Wellington Park Act 1993.
> **L2**
> Management plan means any management plan approved under section 23 (Wellington Park Act 1993) and for the time being in force in respect of Wellington Park.

## 9.2 Wellington Park Management Plan Amended 2015

### 9.2.1 Recreation Zone & Natural Zone Provisions

| Issue 2: Flora, and Fauna Conservation, Geoconservation and Natural Process | |
|---|---|
| **Objective:**<br>To conserve flora, fauna, geological and geomorphological values, and to protect natural processes. | |
| **Acceptable Solution A2.3**<br>The proposal does not impact on any sites which are listed as significant in this Management Plan or in a trust endorsed scientific assessment, or listed on the Tasmanian Geoconservation Database. | **Performance Criteria P2.3**<br>Any adverse impacts on any geoheritage values must be avoided, remedied or mitigated. |
| **A2.3:** As the proposal is located within a geoheritage site, it automatically creates an impact and as such does not comply with the Acceptable Solution. It therefore must address the performance criteria. | |

| Issue 2: Flora, and Fauna Conservation, Geoconservation and Natural Process |
|---|
| **P2.3:** Tower 3 is located within the mapped extent of the District significance Organ Pipes Columnar Jointing. From the majority of viewpoints assessed the tower is a barely perceptible / imperceptible element within the view of the Mountain and specifically the Organ Pipes.<br><br>The cable car tower is located in close proximity to the Organ Pipes as seen from this viewpoint, and as such will impact on the geological feature. This effect is to expand the presence of infrastructure and built elements off the flatter part of the plateau, down on to the upper rocky slopes of the Mountain, expanding the perceivable built-footprint. From this distance the tower will only just be perceptible and as such will not significantly interfere with the ability to perceive and appreciate the feature of the Organ Pipe, however is considered a Moderate change to this viewpoint largely relating to the increased visual presence of infrastructure adjacent this significant feature. It is also considered that the visual effects will increase with greater proximity to the Organ Pipes and as such that the tower will have a Moderate significance of impact on the visual character relating to these geoheritage features.<br><br>However, the tower facilitates the cable car alignment that passes over the Organ Pipes which will increase the accessibility and ability to view these features from up close, a view that is currently limited to persons undertaking active recreation pursuits such as rock-climbing. The increased visual amenity provided by the cable car's potential views of these features is considered to counteract or remedy the impacts on them caused by the tower. As such it is considered that the proposal complies with the performance criteria.<br><br>It is recommended that the development provides the opportunity for interpretation and educational material to further assist in the understanding of these significant features from newly created viewing opportunities. |

| Issue 5: Landscape, visual quality and amenity | |
|---|---|
| **Objective:**<br>To protect and enhance the landscape and visual quality of Wellington Park. | |
| **Acceptable Solution A5.1**<br>Buildings and structures (other than park furniture or park signage) are not located within areas identified as High or Moderate Visual Sensitivity as shown in Map 4 of this Management Plan. | **Performance Criteria P5.1**<br>Buildings and structures (other than Park furniture or replacement of an existing building or structure of the same size and location) in prominent locations visible from within or outside of the Park, or identified as of High or Moderate Visual Sensitivity in accordance with the Wellington Park Management Plan, must be designed and sited to minimise or remedy any loss of visual values or adverse impacts on the visual character of the affected area. |
| **A5.1:** The proposal does not meet the acceptable solution as it involves new buildings and structures (Towers 1, 2 & 3, and the Base Station) within areas identified as High or Moderate Sensitivity, and as such must satisfy the performance criteria.<br><br>**P5.1:** Towers 1 & 2, and the Base Station are not located in areas of high prominence within in the Mountain, and utilise existing screening vegetation to minimise any loss of visual values or adverse impacts on the visual character of the area.<br><br>The upper cable car tower is located in a prominent area of the upper slopes of the Mountain, designated High sensitivity in the Management Plan. The siting of this structure has minimised the visual effects of this location to the greatest extent possible by locating the tower such that it appears below the skyline from the majority of viewpoints around the Hobart area, and designing the tower to appear as light and visually recessive as possible.<br><br>The siting of the tower means that it appears below the skyline from the majority of viewpoints. However, this siting also positions it closer to the significant features of the Organ Pipes. As the response to P2.1 details, this impact level is considered Moderate, though remedied by the enhanced visual amenity provided by the cable car which is facilitated by the tower's location. | |

| **Issue 5: Landscape, visual quality and amenity** |
|---|
| The design of the tower minimises visual impacts. The siting of the tower minimises the impact on the majority of views, and the creation of new views remedies the impact of its siting within proximity of the Organ Pipes. As such the performance criteria is considered satisfied. |

| **Issue 9: Building Design – (a) Building Height** | |
|---|---|
| **Objective:**<br>To ensure that buildings do not cause visual intrusion due to excessive height. | |
| **Acceptable Solution A9.1**<br>The maximum building height is 3.5m and any building is not more than 1 storey. | **Performance Criteria P9.1**<br>For any building greater than 3.5m in height, it must be shown that the building will not visually intrude into the landscape in relation to:<br>(a) Local natural and environmental features;<br>(b) Views from either the Pinnacle or elsewhere in the Park, and<br>(c) Views from settled areas of Hobart and suburbs through the preparation of a Visual Impact Analysis conducted by a suitably qualified person.<br>Any building design must give consideration to the Wellington Park Infrastructure and Design Guidelines. |
| **A9.1:** The proposed buildings are greater than 3.5m and as such do not comply with the acceptable solution and must satisfy the performance criteria.<br>**P9.1:** The upper cable car tower and Pinnacle Centre building are located in prominent areas of the upper slopes of the Mountain, designated High sensitivity in the Management Plan. The Pinnacle Centre is designed to harmonise with the surrounding landscape and the upper tower is located proximate to existing towers and similar infrastructure on the Mountain summit so that it does not introduce a new character on the Mountain. In this sense the proposed built form references existing patterns and forms on the Mountain summit and is not intruding into this landscape. Key views were considered to inform a building envelope that minimised interruption to the skyline.<br>The proposal satisfies the performance criteria. | |

| **Issue 9: Building Design – (b) Building Size** | |
|---|---|
| **Objective:**<br>To ensure that buildings are of a size and dimension that fits in with the overall nature of low key development of the Pinnacle. | |
| **Acceptable Solution A9.2**<br>Maximum floor area of any building is 100m2. | **Performance Criteria P9.2**<br>Any proposal for a building of more than 100m2 in floor area is to show that the building will not:<br>(a) Cause visual intrusion,<br>(b) Require infrastructure that cannot be provided in accordance with the infrastructure provision standards, or<br>(c) Be a dominant element in the landscape through the preparation of a Visual Impact Analysis conducted by a suitably qualified person. |
| **A9.2:** The floor area of the proposed Pinnacle Centre is greater than 100m2 and as such does not comply with the acceptable solution and must satisfy the performance criteria. | |

**Issue 9: Building Design – (b) Building Size**

**P9.2:** In siting the Pinnacle Centre key views were considered to inform a building envelope that minimised intrusion to the skyline and views of and from the summit. This Visual Impact Assessment finds that the visual impact caused by the proposal is reasonable given the sensitivity of viewpoints and lack of available mitigation measures. Regardless the Pinnacle Centre will not be a dominant element in the landscape, barely discernible from the majority of views, and when perceptible has been designed to ensure that it references the surrounding forms and patterns of the landscape and is read amongst the context of surrounding infrastructural elements.

The proposal satisfies the performance criteria.

**Issue 9: Building Design – (c) Appearance and Lighting**

**Objective:**
(i) To ensure that all buildings are of a high architectural design standard.
(ii) To ensure that buildings blend with the local environment and do not cause visual intrusion.
(iii) To ensure lighting minimises impact on the local environment.

| **Acceptable Solution A9.3** | **Performance Criteria P9.3** |
|---|---|
| Appearance and Lighting<br>The colour of external walls and roofs visible from off the site is to have a light reflectance value of less than 10%.<br>Roofs are to be clad with materials in non-reflective, muted natural colours and dark tones.<br>External lighting assists orientation only and is focused towards the ground. | Appearance and Lighting<br>The design of buildings and structures is to take into account the unique qualities of the pinnacle area while using innovative and high quality architectural solutions.<br>The colour and materials of external surfaces are to blend with the local environment and the dominant colours of the adjoining areas of the Park.<br>Lighting and reflection must be managed to adverse impacts on natural and cultural values. |

**A9.3:** Light reflectance values of building surfaces and impacts of lighting have not been assessed as part of this assessment, as such the performance criteria is considered.

**P9.3:** The Architectural Statement accompanying the development application details the innovative and high quality architectural solutions that reference and harmonise with the surrounding landscape. Colours and materials are selected to reference and harmonise with the surrounding landscape.
The effectiveness of these strategies is demonstrated in the visual impact assessment visualisations, which demonstrate that the Pinnacle Centre will not be perceptible to the human eye for the viewpoints assessed from below the Mountain.

Lighting impacts have not been assessed as part of the scope of this assessment, however the main planning report outlines the the methods employed by the building design to ensure that lighting does not impact on views to the Mountain or from the summit.

The proposal satisfies the performance criteria.

**Issue 10: Building Siting**

**Objective:**
To ensure that buildings are located in areas where they do not cause a reduction in the values associated with the Pinnacle.

| **Acceptable Solution A10.1** | **Performance Criteria P10.1** |
|---|---|
| There is no acceptable solution for this element. | Proposals for buildings facing on to or directly visible from the Pinnacle Road must show that there will be no diminution of values of the site either during the construction of the building or in its use and operation.<br>Buildings and structures (other than Park furniture or replacement of an existing building or structure of the |

| Issue 10: Building Siting | |
|---|---|
| | same size and location) in prominent locations visible from within or outside of the Park, or in areas identified as of High or Moderate Visual Sensitivity in accordance with the Wellington Park Management Plan, must be designed and sited to avoid, remedy or mitigate any loss of visual values through the inclusion of a Visual Impact Analysis conducted by a suitably qualified person. |

**P10.1:** The proposed buildings do not face on to Pinnacle Road. A viewshed analysis has been undertaken to assess the theoretical zone of visibility of the Pinnacle Centre. This assessment indicates that the building will be potentially visible from Pinnacle Road at the summit carpark, and also where the road passes by The Springs. Assessment of photography from the 6 points (Figure 33-20) on Pinnacle Road demonstrates that roadside vegetation screens views to the summit and site of proposed buildings. From the remaining area of visibility at the summit, the visual impact assessment of Viewpoint 2 demonstrates that the proposal will not significantly alter the existing character of the view from this area of the summit as the current view features foreground tourism and road infrastructure similar to that proposed.

The findings of this visual impact analysis are that the proposal is sited and designed to minimise, avoid and mitigate impact on visual values to the greatest extent possible.

Diminution means a reduction in size, importance, or value. Throughout the report we have referred to the Significant Visual Elements of the mountain. We consider these to constitute the visual values of the site (ie, the mountain). The likely impact of the Pinnacle Centre on these visual values is as follows:

- Skyline – the Pinnacle Centre will not result in a dominant break in the existing skyline silhouette
- Tree-line and change in texture – the proposal is located wholly above the tree line, and due to the form, materials and colours of the Pinnacle Centre, will not result in a readily perceptible change in texture
- Edge of settlement – the Pinnacle Centre is located remote from the dominant edge of settlement demarcated by the built up parts of Hobart and the mountain. It forms a cluster of human made elements at the summit of the mountain, and does not impact the other 'edge of settlement - views to wilderness areas to the south-west clearly visible form the summit of the mountain
- Variability (colour and 'mood') – the small scale of the Pinnacle Centre compared to the scale and complexity of the mountain will not result in any perceptible change in colour or 'mood'
- Scale (height, bulk, mass) – again, the small scale of the Pinnacle Centre compared to the scale of the mountain will not result in the diminution of this value
- Geological features – the Pinnacle Centre will be sited distant from the upper edge of the Organ Pipes, which is the dominant geological feature of the mountain, and will compared to the extent of the dolerite rock fields, will not result in a diminution of this geological feature.

In summary, it is considered that the Pinnacle Centre will not result in a diminution (as understood in terms of a reduction in size, importance, or value) of the visual values of the site.

With more specific regard to the Pinnacle itself, it is considered that the most important of these values is the skyline. As noted, the Pinnacle Centre will not result in a dominant break in the existing skyline silhouette. Furthermore, it is considered that the building is sited in an optimal location between the skyline and the edge of the Organ Pipes to not have a significant visual impact on either element.

The proposal satisfies the performance criteria.

#### 9.2.2 Pinnacle Specific Area Provisions

| **Pinnacle Specific Area**<br>**Issue 2: Flora, and Fauna Conservation, Geoconservation and Natural Process** | |
|---|---|
| **Objective:**<br>To conserve flora, fauna, geological and geomorphological values, and to protect natural processes. | |
| **Acceptable Solution A2.3**<br>The proposal does not impact on any sites which are listed as significant in this Management Plan or in a trust endorsed scientific assessment, or listed on the Tasmanian Geoconservation Database. | **Performance Criteria P2.3**<br>Any adverse impacts on any geoheritage values must be avoided, remedied or mitigated. |
| **A2.3:** The proposed Pinnacle Centre is located within the State significance Wellington Range Periglacial Terrain. This terrain operates on a landscape-wide scale and is significant as an extent rather than for specific features or areas. The Pinnacle Centre is confined to a specific footprint, and as such does not adversely impact the ability to view and appreciate the contribution that this feature makes to the landscape character of the area, and it is considered that the increased diversity of viewing experience provided by the proposal increases the ability to view and appreciate this terrain. As such it is considered that the proposal complies with the acceptable solution.<br><br>It is recommended that the development provides the opportunity for interpretation and educational material to further assist in the understanding of these significant features from newly created viewing opportunities. | |

| **Issue 5: Landscape, visual quality and amenity** | |
|---|---|
| **Objective:**<br>To protect and enhance the landscape and visual quality of Wellington Park. | |
| **Acceptable Solution A5.1**<br>The proposal does not involve a building or structure, apart from Park furniture or Park signs. | **Performance Criteria P5.1**<br>Buildings and structures (other than Park furniture or replacement of an existing building or structure of the same size and location) in prominent locations visible from within or outside of the Park, or identified as of High or Moderate Visual Sensitivity in accordance with the Wellington Park Management Plan, must be designed and sited to minimise or remedy any loss of visual values or adverse impacts on the visual character of the affected area. |
| **A5.1:** The proposal does not meet the acceptable solution as it involves a new building, and as such must satisfy the performance criteria.<br><br>**P5.1:** The upper Pinnacle Centre building is located in prominent areas of the upper slopes of the Mountain, designated High sensitivity in the Management Plan. The siting of the building has minimised the visual effects of this location to the greatest extent possible by:<br><br>• Siting the Pinnacle Centre within existing depressions and 'pockets' of the summit landscape to minimise visual effects and minimise interruption to the skyline below that perceivable, and<br>• 'Fragmenting' the façade of the Pinnacle Centre and using materials and finishes that reference the rocky slopes of the summit to harmonise the building with the surrounding landscape to mitigate the potential visual effect of new built form in this upper area of the Mountain.<br><br>The impact assessment demonstrates the effectiveness of these measures. A such the performance criteria is considered satisfied. | |


**Figure 33: Pinnacle Road Location 1 (source: Google Streetview)**

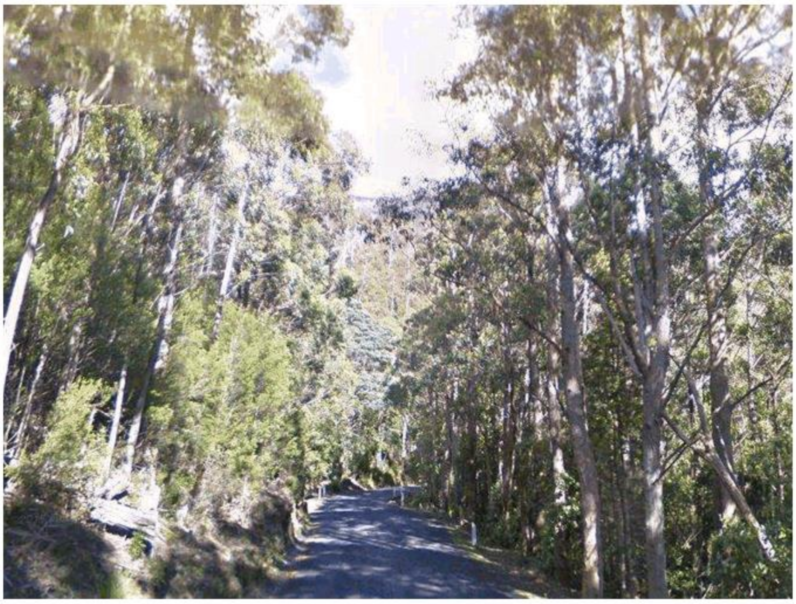


**Figure 34: Pinnacle Road Location 2 (source: Google Streetview)**

**Figure 35: Pinnacle Road Location 3 (source: Google Streetview)**

**Figure 36: Pinnacle Road Location 4 (source: Google Streetview)**

Figure 37: Pinnacle Road Location 5 (source: Google Streetview)

Figure 38: Pinnacle Road Location 6 (source: Google Streetview)

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## Appendix A. View Shed Mapping & 3D Photomontages

# Visual Amenity

## Statement of Methodology Report

Date: 31 Oct, 2018

## Project

| | |
|---|---|
| Address: | Mt Wellington, Hobart TAS 7054 |
| Prepared for: | Mount Wellington Cableway Company Pty Ltd |
| Instructed by: | Mount Wellington Cableway Company Pty Ltd |
| Prepared by: | Stan Zaslavsky |

To accompany documentation:

Visual Amenity Evidence (dated 1 November, 2018)

# Table of Contents:

# 1. Practice Note PNVCAT2: Qualifications and Practical Experience

### 1.1 Name and Professional Address of Expert

Stan Zaslavsky
Director
Eagle Vision
Lvl 2, 283 Normanby Rd,
Port Melbourne, VIC 3207

### 1.2 Qualifications

Bachelor of Engineering (Mech) Honours / Technology (Industrial Design)
Monash University, 2001

### 1.3 Membership

Victorian Planning Environmental Law Association (member 2012 - current)

### 1.4 Expertise to prepare this report

I have provided evidence to VCAT since 2010 in respect to Visual Amenity considerations.

My level of expertise developed over this period has produced a number of proprietary methods of visualisation techniques to improve the accuracy of amenity representations. I have published articles on our methods in industry publications, such as the VPELA monthly magazine.

I am familiar with planning requirements, expert witness reports and latest VCAT practice notes.

### 1.5 Project Team

The following staff at Eagle Vision worked on the photomontages
> Stan Zaslavsky, Director
> Chris Watt, Project Manager

### 1.6 Relationship

I have no relationship with the Applicant other than a business agreement for the preparation of my independent expert opinion with regard to this matter.

## 2. Initial Information

Eagle Vision was commissioned by Mount Wellington Cableway Pty Ltd to prepare the attached clay montages as VCAT evidence for the proposed development at Mount Wellington.

Review and verification of image compliance to architectural drawings was provided by Adrian Bold throughout the development of the View-align 3D photomontages.

**2.1** Client: Mount Wellington Cableway Pty Ltd

**2.2** Architect: JAWS Architects Pty Ltd

**2.3** Photographer: Ross Giblin

## 3. Process Methodology to View-Align 3D Photomontages

The methodology used to produce the photomontages was as following:

**3.1** Architectural drawings were supplied in CAD format by JAWS Architects and the 3D model of the project was supplied by Mount Wellington Cableway in Maya and other formats. The information contained in these drawings was used to complete the 3D model of the proposed architecture in Autodesk 3DS Max 2019. Please see Section 5.1 for a full list of supplied architectural drawings.

**3.2** Site Survey information was supplied in Excel spreadsheet and located on architectural and survey drawings. Leary & Cox Pty Ltd completed initial site survey, building and camera location coordinates. Photogrammetry mesh of the summit, existing shelter and cliffs surveyed by Aerial Vision Australia, which lines up with the super precision photogrammetry completed around the site by National Survey Solutions. This established location for existing buildings around the site.

Camera point locations were established based on Easting / Northings values which were converted from the Longitude and Latitude information supplied. Also supplied was highly accurate LIDAR scanned measurements of the existing shelter on site.

The AHD levels contained in the drawings were used to construct basic block models of existing hardscape shapes on and adjacent to the site to such a level that they could be used for 3D photo-matching purposes. Please see Section 5.2 for a full list of supplied site survey drawings.

**3.3** The photographs were taken using a Nikon D600 using a Nikon 80.0-200.0 mm f/2.8 lens and Panasonic Lumix DC-GH5 Full frame SLR Camera using a Panasonic .7x Sigma DC 18-35/1.8 HSM lens. Height above ground was 1.81m. The intention of the compositions was to provide sufficient contextual information to represent impact of the proposal in its wider context. Please see Section 5.4 for the full list of photographic data.

**3.4** Location of the photography points was established on the survey using longitude/latitude and altitude values provided by GPS module.

**3.5** To create an accurate alignment for the photo matching of the model and the photograph in Autodesk 3DS Max 2017, the 3D camera is moved to the correct location of the real world camera from the information provided.

**3.6** Within 3D Studio Max 2017, we utilise an align-view technology, a process where the system calculates the position of the view point and correlates this position with that of the camera settings used to take the photograph. Measured data points are entered and the software calculates the rendered image and positions it accurately within the surveyed photo context.

The position of the camera is determined within the software once the surveyed points of camera location and other feature survey points of the intermediate structures that can be viewed in the photo are entered. The interpolation of the data point coordinates provides the system with the correlated position (x, y, z coordinates) and the matched lens settings for the camera. When this occurs, the photo and 3D camera match exactly, thus giving a true representation of the proposed building within its existing environment.

**3.7** The proposed 3D model was then rendered to a digital 2D image file which is then merged into the photograph using Adobe Photoshop CC. Please see Section 5.5 for a full listing of software and equipment utilised.

**3.8** The proposed architecture depicted was reviewed progressively by Mount Wellington Cableway and JAWS Architects Pty Ltd during and at the end of the production for accuracy.

**3.9** All care and effort has been made to represent the development's scale and mass that would be evident if the proposal were to be built.

## 4. Statement of Compliance

I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance which I regard as relevant have to my knowledge been withheld from the Tribunal.

Stanislav S Zaslavsky

Director of Eagle Vision Property

Date: 31 Oct, 2018

## 5. Appendices

### 5.1 Architectural Drawings

The following drawings supplied by JAWS Architecture Pty Ltd were used to model the proposed architecture:

1. 1782_MWCC Pinnacle Centre - PRELIMINARY SEPTEMBER 2018.pdf (30 August, 2018)

### 5.2 Site Survey

Original survey file supplied by Leary & Cox Surveyors

1. 994907 Rev 1A M.G.A BLDGS ROADS TWRS lidar contours and Survey.pdf (3 October, 2018)

## 5.3 Photography Information

Photographer: Ross Giblin

| Photo | Date & Time | Camera & Lens Used | Focal Length | Aperture | ISO | Shutter Speed |
|---|---|---|---|---|---|---|
| via06_ highres | 19/06/2018 3:06:46PM | Panasonic DC-GH5 and .7x Sigma DC 18-35/1.8 HSM lens | 34mm | f/3.5 | 200 | 1/1600 |
| via17_ DSC8300 | 29/04/2018, 1:37:06 PM | NIKON D600 and Nikon 80.0-200.0 mm f/2.8 lens | 200mm | f/5.6 | 100 | 1/1250 |
| via19_ DSC8276 | 29/04/2018, 12:42:49 PM | NIKON D600 and Nikon 80.0-200.0 mm f/2.8 lens | 35mm | f/4.5 | 200 | 1/800 |
| via21_ DSC8890 | 25/05/2018, 11:43:20 AM | NIKON D600 and Nikon 80.0-200.0 mm f/2.8 lens | 200mm | f/2.8 | 200 | 1/1600 |
| via22_ DSC8876 | 25/05/2018, 11:34:20 AM | NIKON D600 and Nikon 80.0-200.0 mm f/2.8 lens | 200mm | f/5.0 | 200 | 1/1000 |
| via27_ DSC8928 | 25/05/2018, 12:23:09 PM | NIKON D600 and Nikon 80.0-200.0 mm f/2.8 lens | 200mm | f/5.6 | 160 | 1/2500 |
| via28_ DSC8899 | 25/05/2018, 12:03:01 PM | NIKON D600 and Nikon 80.0-200.0 mm f/2.8 lens | 200mm | f/5.0 | 200 | 1/2000 |
| via32_ DSC8518 | 14/05/2018, 10:39:08 AM | NIKON D600 and Nikon 80.0-200.0 mm f/2.8 lens | 200mm | f/5.6 | 100 | 1/640 |

Camera Height: 1810mm for all photographs

Camera Software: Adobe Photoshop CC

5. **Appendices (continued)**

### 5.4 Software Specifications

3D Modeling, Material, Lighting: 3D Studio Max 2017 / 2019

3D Rendering Engine: VRay 3.4 SP 2

Photomontage: Adobe Photoshop CC

## 5.5 Statement of Evidence Guidelines

The Tribunal in the Austcorp Group V Monash CC (red dot) [2006] VCAT 692 identified a list of items required to accompany photomontages or other computer generated images sought to be relied upon by parties before the Tribunal.

Information to accompany photomontages or other computer generated images:

> a written statement explaining the methodology used for the preparation of images, including:
> the identity and qualifications of persons involved in the preparation of the images including data collection;
> the name and version of the software programme/s used to prepare the images;
> the methodology used to collect relevant data (for example whether survey data has been obtained from topographical maps or fieldwork);
> the camera brand and model including whether digital or SLR;
> camera lens size and type and whether the camera was horizontal or tilted. If tilted the angle should be stated;
> time of day and date of all relevant data (including when photographs were taken, survey information obtained and the like);
> the height above ground level from which all images have been taken / would be viewed;
> details of any existing elements that have been reconstructed or modified (other than the proposal itself) such as modifications to existing vegetation, re-instatement of cross-overs and the like;
> any assumptions relied upon.
> a plan showing the location from which all images have been prepared / would be viewed and the angle of view;
> a photograph of the existing conditions;
> a photomontage of the proposal based on the same lens type/size and location as the existing conditions photograph
> (to enable direct comparisons) without the inclusion of any proposed landscaping;
> a second photomontage image showing the proposal with any proposed landscaping, including delineation of the proposed building outline in the background.

EAGLE VISION

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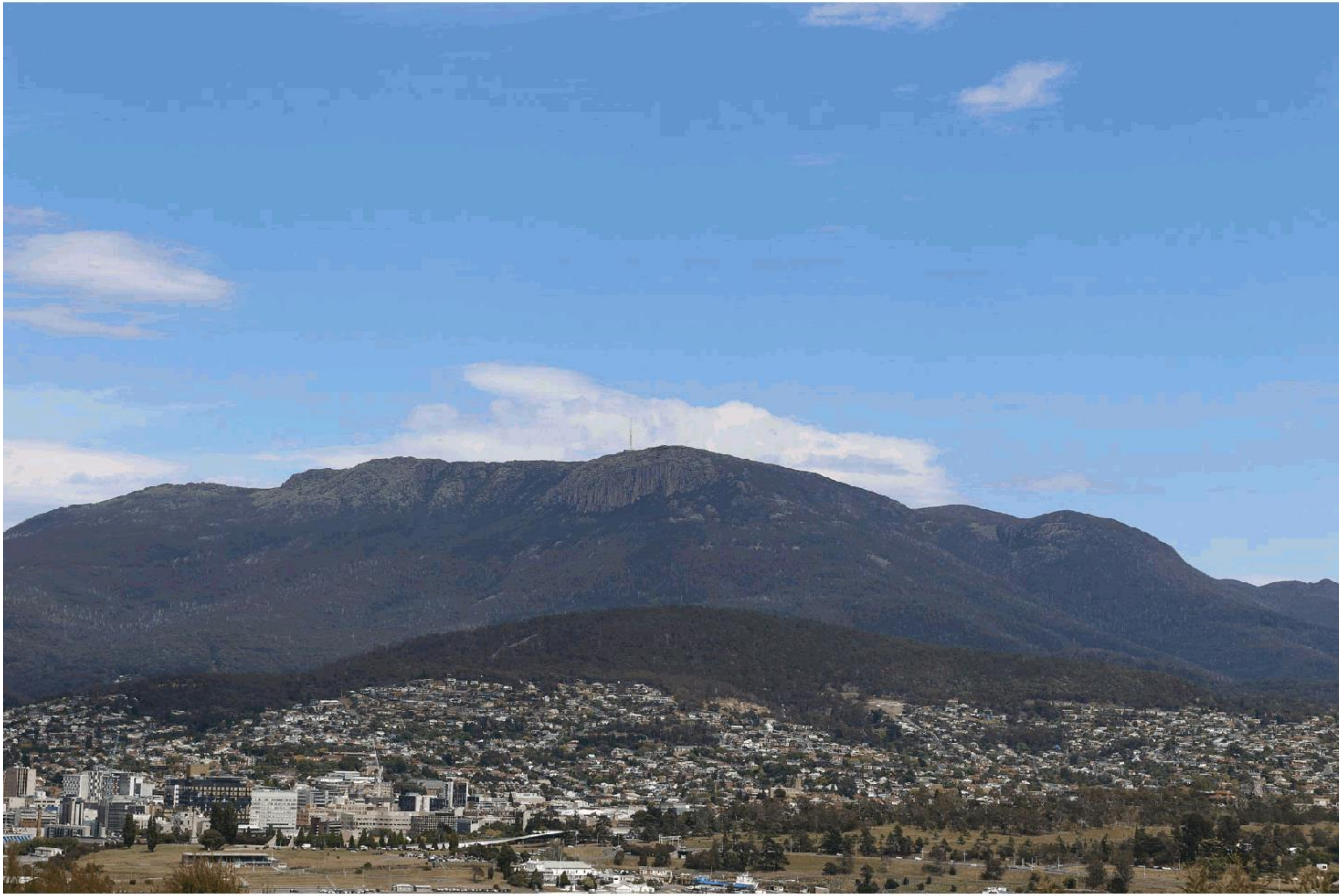


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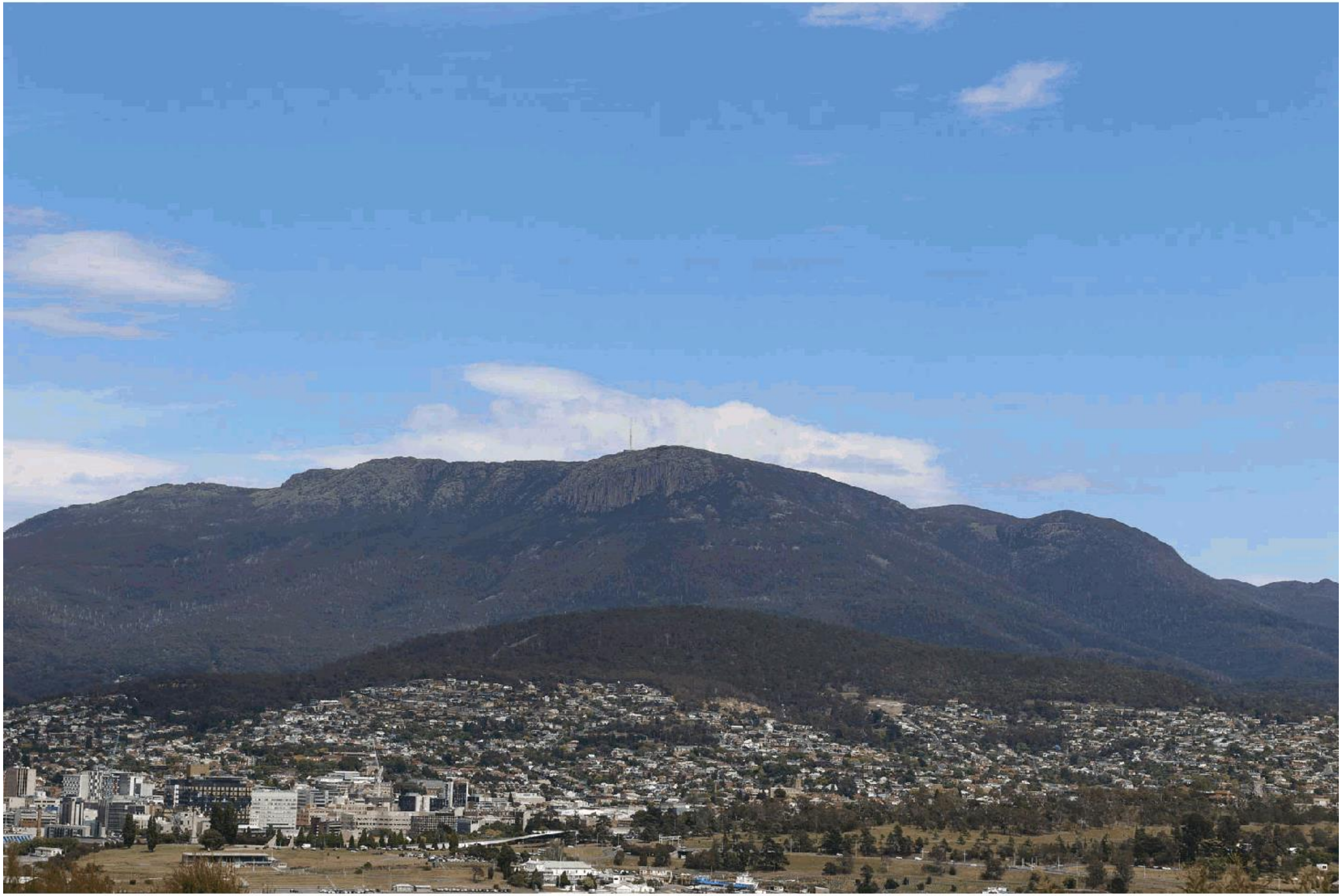
GIVE WAY
alad Bowl



northbarker
ECOSYSTEM SERVICES

Mt Wellington Cableway

**Mt Wellington / kunanyi**

# NATURAL VALUES IMPACTS ASSESSMENT

12 May 2021

For Mt Wellington Cableway Company (MWC001)

**Andrew North** anorth@northbarker.com.au **Philip Barker** pbarker@northbarker.com.au
163 Campbell Street Hobart TAS 7000 Telephone 03. 6231 9788 Facsimile 03. 6231 9877

# SUMMARY

This report provides an assessment of the likely impacts to natural values associated with the Mt Wellington Cableway project.

In summary:

- It is unlikely that the project will have a significant impact upon matters of national environmental significance that would trigger the Commonwealth *Environment Protection and Biodiversity Conservation Act 2002* (EPBCA).
- Impacts to flora and fauna listed under the *Threatened Species Protection Act 1995* (TSPA) are unlikely to be significant or to require major amendment to the design.
- The project will impact on threatened vegetation listed under the Tasmanian *Nature Conservation Act 2002*, in establishing an access road link from McRobie's Road.
- Likely and unavoidable impacts to threatened vegetation, significant vegetation and potential habitat for threatened fauna species require aspects of the project to be assessed against the Performance Criteria of the Biodiversity Code of the Hobart Interim Planning Scheme 2015 as 'high' and 'medium' priority values.
- Development within Wellington Park will include impacts to significant vegetation, threatened flora and threatened fauna habitat. These impacts are assessed through Standards for Use and Development outlined in the Wellington Park Management Plan 2013.

**Site Values**

The Project has been subdivided into separate sections – Access Road, Base Station including Towers 1 & 2, Temporary Installation Net site and Pinnacle Centre and Tower 3.

<u>The Access Road</u> section supports potentially suitable habitat for two listed orchid species, *Corunastylis nudiscapa* and *C. nuda*, although neither have been located in repeated searches conducted during the flowering period in 2019 and 2020. The dry open forest on mudstone supports threatened vegetation which is also represented at numerous other sites on the foothills of Mt Wellington elsewhere in Hobart. The operation of the road introduces a new threat of roadkill.

<u>The Base Station</u> is predominantly sited in cleared land requiring some localised vegetation clearance for the upper car park and part of the main building. The bushfire hazard management area requires vegetation removal downslope of the Base Station. This area and the lower tower sites are in forest supporting large trees which have potential habitat for hollow nesting birds. Footprints of towers are small and opportunity to microsite towers may avoid need to impact on large trees assuming dangerous trees in vicinity do not need to be removed for safety reasons. The operational impacts will result in ongoing disturbance which will reduce the suitability of nearby trees for nesting. It is possible the bushfire hazard management requirements can be met with selective retention of conservation significant trees.

<u>The Temporary Installation Net</u> site is only temporary and localised. Its placement may disturb rocky terrain that supports habitat for the rare silky snail although impact is considered very localised and not significant.

<u>The Pinnacle Centre and Tower 3</u> are located in subalpine scrub that characterises the uppermost crest of Mt Wellington. This vegetation is diverse and sensitive to disturbance due to the extreme weather conditions at this altitude. Mt Wellington is an outlier from other alpine areas in Tasmania and as such is notable for its distinctive alpine flora. Outside of the footprint of disturbance the impacts will be largely

dependent on the method of construction. The vicinity is however not pristine and has been impacted by numerous other activities in the Pinnacle area. The footprint of the developments equates to approximately 25-30 % of the total footprint of developments already on site. Some potential, albeit insignificant impact to silky snail and some impact to montane violet is also not likely to be significant.

**Vegetation**

Nine TASVEG vegetation units are known to within the study areas:

- DCO – *Eucalyptus coccifera* forest and woodland
- DGL – *Eucalyptus globulus* dry forest and woodland
- DOB – *Eucalyptus obliqua* dry forest
- DTO – *Eucalyptus tenuiramis* forest and woodland on sediments
- FPE – Permanent easements
- FUM – Extra-urban miscellaneous
- HHE – Eastern alpine heathland
- WGL – *Eucalyptus globulus* wet forest
- WOB – *Eucalyptus obliqua* forest with broad-leaf shrubs

Two of these vegetation communities (DGL and DTO) correspond to communities listed as threatened under the Tasmanian *Nature Conservation Act 2002*. Both are confined to the Access Road section of the project.

No threatened ecological communities under the EPBCA will be impacted.

Two impacted communities within Wellington Park (WGL and HHE) are considered significant vegetation under the Wellington Park Management Plan 2013.

**Threatened Flora**

At least two threatened flora species occur within the project area and there is potential for at least three others, albeit low. It is of low likelihood that any impacts to threatened flora will be of such significance as to require amendments to the layout.

Three species listed under the Tasmanian *Threatened Species Protection Act 1995* (TSPA) have been identified as potentially occurring at various locations:

- *Corunastylis nuda* tiny midge orchid – rare. Moderate probability of being impacted in the Access Road section.
- *Corunastylis nudiscapa* dense midge orchid – endangered. Low probability of being impacted in the Access Road section.
- *Viola curtisiae* montane violet - rare. Confirmed as present in the footprint of the Pinnacle Centre and close to Tower 3.

No nationally listed threatened flora (EPBCA) are likely to be impacted.

**Threatened Fauna**

Impacts to threatened fauna habitat are of moderate significance. The operation of the cable car is unlikely to adversely impact on threatened fauna directly. The risk of any direct impacts to threatened fauna during the construction phase can be minimised through appropriate procedures prior and during this period.

Habitat for several threatened fauna species is present in the vicinity of the project area.

- Tasmanian devil *Sarcophilus harrisii*
- spotted tailed quoll *Dasyurus maculatus*
- eastern quoll *Dasyurus viverrinus*

All three of the listed marsupial carnivores are wide ranging species that may have home ranges that extend into the project area. Tasmanian devils and eastern quolls were observed during camera trap surveys in the vicinity of the Access Road. The footprint of the development is unlikely to adversely impact on the carrying capacity of the habitat for these species which is currently at moderately low levels based on quality of habitat, scarcity of observation records, and evidence of scats or latrines.

Potential risks could arise from an increase in the incidences of roadkill. This risk can be mitigated through the development of a Roadkill Mitigation Plan.

- Tasmanian masked owl *Tyto novaehollandiae castanops*

The lower sections (Access Road and Base Station) occur in suitable habitat and support trees of such stature to potentially carry hollows that could be utilised for nesting. A detailed tree survey and subsequent assessment by an arborist quantified potential habitat trees that will be impacted.

The study area is outside core range although masked owls are known to utilise areas such as these and are recorded periodically on the fringes of the city, so it is still possible that they may use the surrounding areas.

- Swift parrot *Lathamus discolor*

Hollow bearing trees provide nesting habitat. These are notable in the vicinity of the Base Station and especially the lower two tower sites. They also occur on parts of the Access Road. Blue gums (*Eucalyptus globulus*) provide the primary native foraging resource. These occur in the vicinity of the Base Station and at the start of the Access Road.

A detailed tree survey supported by an arborist assessment was used to determine potential impacts to potential habitat trees, which includes 91 nesting trees and 37 foraging, of which 24 are both nesting and foraging habitat. Pruning to some trees is also anticipated at the departure corridor of the cable car.

A Bird Collision Risk Assessment concludes that the risk of collision is low.

- Tasmanian wedge-tailed eagle *Aquila audax* ssp. *fleayi*

There are no known nests in the vicinity that are likely to be disturbed. Potential nesting habitat is present in the upper catchment of McRobie's Gully. However, the existing levels of disturbance are likely to make this area unattractive for nesting purposes. The entire project area is likely to be within a foraging territory of at least one pair. The risk of collision with the cables is uncertain although the dimension and conformation of cable car cables suggest they would be significantly more visible than transmission line wires which already traverse many of the foothills of Mt Wellington including a site immediately adjacent to the Base Station.

A Bird Collision Risk Assessment identified a moderate level of collision risk in the vicinity of the Organ Pipes and low elsewhere on the project.

- Silky snail *Exquisitiropa agnewi*

The temporary installation net required during the construction phase of the project will be located close to high quality potential habitat. The Pinnacle Station and Tower Site 3 are also located within potential habitat. The extent of disturbance is small relative to the scale of habitat available. However, any direct impacts cannot be discounted. Significance of any possible impact is considered to be very low.

**Recommendations**

The proposed development meets the requirements of the Hobart Interim Planning scheme 2015 and the Wellington Park Management Plan 2013. Any approval should include conditions to ensure the natural values are mitigated and offset through the inclusion and / or implementation of:

- Weed and plant pathogen management plan;
- Fauna management protocols throughout the construction phase;
- Oversight from Arborist to ensure impacts to trees in close proximity are minimised
- Tree hollow reuse and replacement plan;
- Roadkill mitigation plan;
- Bird collision risk mitigation measures

A permit to take under the Tasmanian *Threatened Species Protection Act 1995* (TSPA) will be required for impacts to:

  - Montane violet
  - Silky snail

## ACKNOWLEDGMENTS

**Project management:** Andrew North, NBES.

**Field survey Wellington Park,** September, October and December 2018, April 2019, Feb-March 2020. **Hobart City Council Land,** Feb-April 2019, March 2020: Andrew North and staff of NBES.

**Report:** Andrew North, Karen Ziegler and various staff at NBES.

**Photographs:** Andrew North and Karen Ziegler.

**Client contact:** Adrian Bold, Mt Wellington Cableway Company

**Consultation:**

Mark Wapstra, Ecological Consulting Options Tasmania – *Corunastylis* species

Axel von Krusenstierna, Manager, Wellington Park Management Trust

**File Control**

| Version | Date | Author |
|---|---|---|
| First Draft V 0.1 | 19/10/2018 | K. Ziegler |
| Version 1 – Preliminary Documentation | 2/11/2018 | A. North |
| Version 2 – Report Draft | 18/12/2018 | A. North |
| Version 3 – 2nd Draft | 10/01/2019 | A. North |
| Version 4 – 3rd Draft | 01/02/2019 | A. North |
| Version 5 – 4th Draft | 15/05/2019 | A. North |
| Version 6 – Final for submission | 05/06/2019 | A. North |
| Version 7 – Draft responding to RFIs | 17/04/2020 | A North |
| Version 7.1- Further edits | 03/06/2020 | A North |
| Version 7.2 – Further edits | 03/07/2020 | A North |
| Version 7.3 – Final for lodgement to Council | 06/08/2020 | A North |
| Version 7.4 – Amended to capture minor changes to veg clearing at Base Station | 21/01/2021 | A. North |
| Version 7.5 – Amended to capture minor changes to veg clearing at Base Station in relation to fire hazard plan | 11/03/2021 | A. North and G. Daniels |
| Version 7.6 – Edits to area footprint impacts | 25/03/2021 | A. North |
| Version 7.7 – Figure updates for changes relating to BHMP | 12/5/2021 | A. North and G. Daniels |

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## List of Acronyms and abbreviations (excluding measurement units and abbreviations defined within figures or tables)

asl – Above sea level

BPA – Biodiversity Protection Area

DBH – Diameter ant Breast Height. Measurement of trunk diameter taken at 1.4m above the ground on the uphill side

DEWHA – Department of the Environment, Water, Heritage and the Arts

DFTD - Devil Facial Tumour Disease

DPIPWE – Department of Primary Industries, Parks, Water and the Environment, Tasmania

EPBCA – *Environment Protection and Biodiversity Conservation Act 1999*

FPA – Forest Practices Authority, Department of State Growth, Tasmania

HIPS – Hobart Interim Planning Scheme 2015

LUPAA – Land Use Planning and Approvals Act 1993

MNES – Matters of National Environmental Significance

MWC – Mount Wellington Cableway Company

NBES – North Barker Ecosystem Services

NCA – Tasmanian *Nature Conservation Act 2002*

NVA – Natural Values Atlas database (DPIPWE, Tasmania)

PCAB – Policy and Conservation Advice Branch, DPIPWE

PC – *Phytophthora cinnamomi*

RFA – *Tasmanian Regional Forest Agreement 1997*

SAP – Specific Area Plan

TASVEG – An integrated vegetation map for Tasmania

- DCO – *Eucalyptus coccifera* forest and woodland (TASVEG unit)
- DGL – *Eucalyptus globulus* dry forest (TASVEG unit)
- DOB – *Eucalyptus obliqua* dry forest (TASVEG unit)
- DTO – *Eucalyptus tenuiramis* dry forest on sediments (TASVEG unit)
- FPE – Permanent easements (TASVEG unit)
- FUM – extra-urban miscellaneous (TASVEG unit)
- HHE – Eastern alpine heathland TASVEG unit)
- WGL – *Eucalyptus globulus* wet forest (TASVEG unit)
- WOB – *Eucalyptus obliqua* forest with broad-leaf shrubs (TASVEG unit)

TSPA – Tasmanian *Threatened Species Protection Act 1995*

WMA – Tasmanian *Weed Management Act 1999*

WPMP – Wellington Park Management Plan 2013

# Table of Contents

## TABLE OF PLATES



## TABLE OF TABLES



## TABLE OF FIGURES

# 1 INTRODUCTION

## 1.1 Background

The Mt Wellington Cableway Company have developed a proposal to construct an aerial tramway to the summit of Mt Wellington, near Hobart in southeast Tasmania. The development will include the construction of a base station, carpark and a Pinnacle development set into the landscape with three levels including café, bar, amenities, indoor and outdoor viewing platforms. There will be two towers near the lower end of the proposed cable car development and one at the Pinnacle end. There will also be a temporary net located approximately mid-level on the mountain to ensure that the cable does not come into contact during construction with an existing powerline that services the top of the mountain. This will then be removed. The proposal is planned so that construction of the towers for the cable car will not require temporary roading as it is planned to fly in the towers by helicopter. Subsequent construction of the pinnacle development is planned to use the cable car to deliver materials and construction personnel.

An Access Road is proposed to be constructed from McRobie's Road in South Hobart to the Base Station located on an existing fire trail east of the end of Old Farm Road.

The proponents have engaged North Barker Ecosystem Services (NBES) to undertake botanical field surveys and fauna habitat assessments of the project area, and to make recommendations to minimise impacts to threatened natural values. The current study presents results from field surveys undertaken in early to mid-spring 2018 and late summer 2019, supplemented with further targeted surveys in the summer and autumn of 2020. Previous data and surveys have been referred to when applicable for context.

## 1.2 Study Area and Existing Environment

### 1.2.1 Survey/study area

The footprint of disturbance on the ground study area can be divided into discrete sections:

1. Access Road – from McRobie's Road, South Hobart to the boundary of Wellington Park at the Main Fire Trail – 2.2 km, 5.8 ha
2. Base Station, car park and lower towers (Towers 1 & 2) site – 1.2 ha
3. Temporary Installation Net - temporary 100 sqm
4. Pinnacle Centre including boardwalk access from existing Pinnacle carpark, temporary access ramp and upper tower (Tower 3) - 0.4 ha

The entire project spans over 1100m in altitude from start of the Access Road at 100m asl to the Pinnacle which is over 1200m asl.

Mean rainfall for the area varies considerably from 760 mm in South Hobart[1] to over 1350 mm at The Springs but down to 900 mm at the Summit.

[1] Bureau meteorology data. Hillborough Road, South Hobart (2008-present), the Springs (1891-present) and The Pinnacle (1961-present)

### 1.2.2 Location characteristics

| Location | Altitude | Aspect | Geology |
|---|---|---|---|
| Access Rd | 100-300 m | North east and north | Permian mudstone (Triassic sandstone first 50m) |
| Base Station and Towers 1 & 2 | 300-330 m | East southeast | Permian mudstone |
| Temporary Installation Net | 890-900 m | East southeast | Jurassic dolerite |
| Pinnacle Centre and Tower 3 | 1200-1230 m | East southeast | Jurassic dolerite |

*Plate 1: View from the upper tower site looking directly towards the base station*

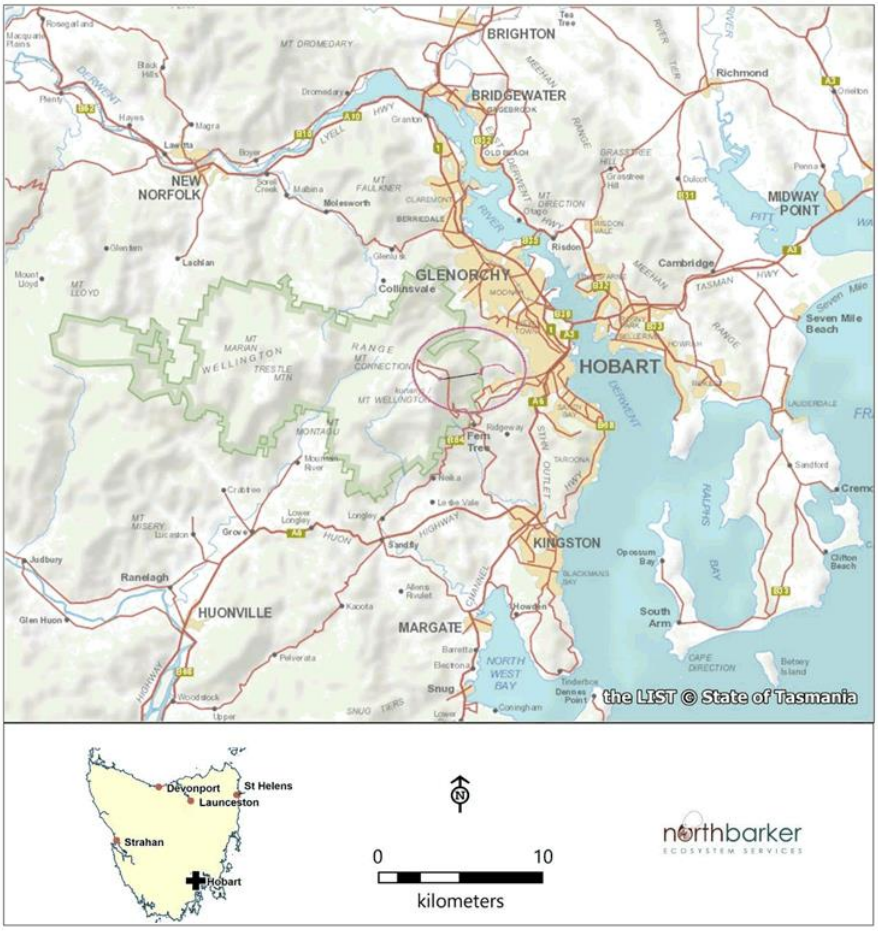


Figure 1: Location of the Mt Wellington Cableway Project

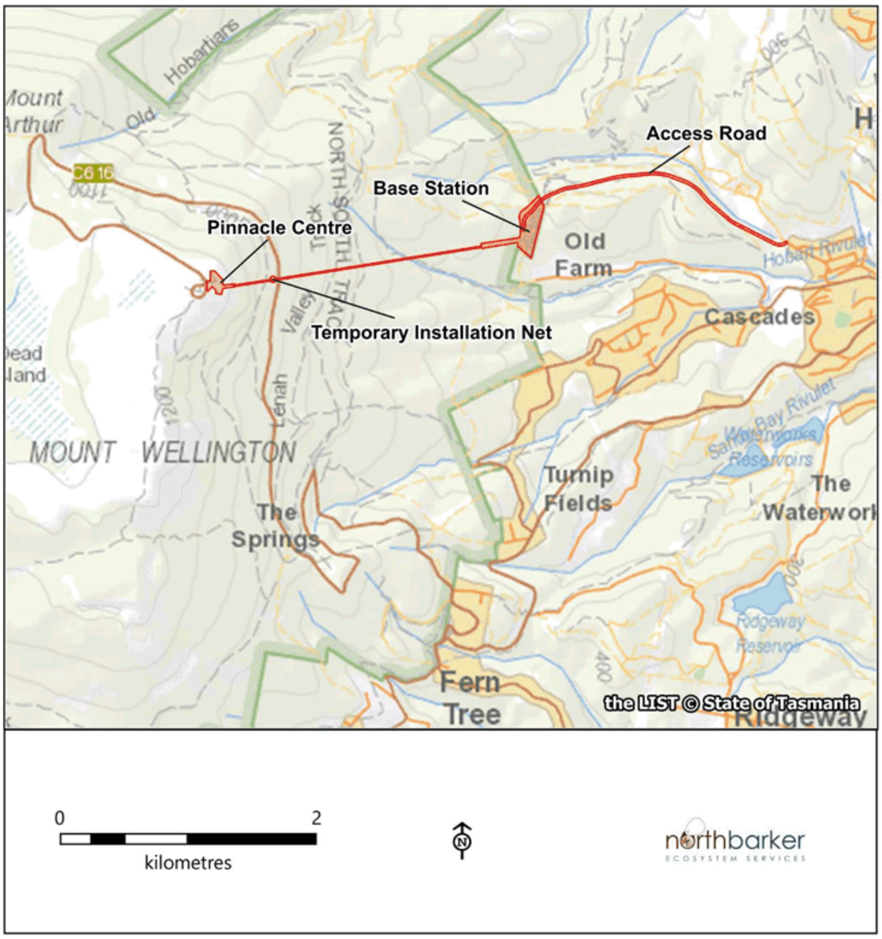


*Figure 2: Location of project sections*

## 1.3 Background information

Mt Wellington has one of Tasmania's driest alpine environments and lacks some alpine species common on other, wetter Tasmanian dolerite mountain tops. The Park supports more than 500 species (30%) of Tasmania's native vascular plant flora, with two local endemics not found elsewhere. The Park supports a range of fauna, including 55 species of birds, and an estimated 5000 – 6000 invertebrate species. There has been much research investigating the natural values of Wellington Park including plant ecology[2], fire ecology[3], animal ecology[4], avifauna[5], geomorphology[6], bryology[7], lichenology[8],

[2] Gilfedder (1988), Martin (1940), Pyrke and Kirkpatrick (1994)
[3] Ratkowsky (1976b), Ratkowsky (1982b), Kirkpatrick and Dickinson (1984)
[4] Melville (1999)
[5] Ratkowsky (1976a)
[6] Whinham and Kirkpatrick (1985)

mycology[9] and more. These provide a strong basis to our understanding of the natural values of the region.

The Park hosts a range of vegetation considered to be of conservation significance[10]. These include the rare Tasmanian endemic shrub *Centropappus brunonis* where it is localised in communities dominated by *Eucalyptus urnigera* or *E. delegatensis*, communities with localised distributions in the Park (e.g. *Gleichenia alpina – Empodisma minus* fernland occurring in the Fools Tarn area), as well as alpine peatlands, wetlands, and waterbodies, which are given significance by their fragile nature. It also supports four vegetation communities listed as threatened under schedule 3A of the *Nature Conservation Act 2002*.

A large proportion of the summit area of Mt Wellington is a listed geoconservation site due to its representativeness of an alpine area of Tasmania that has been largely unaffected by glaciation. This means it provides a location in which periglacial landforms can be studied and observed without the need to separate periglacial and glacial effects[11]. The Wellington Park Management Plan 2013[12] says of the geodiversity of the park:

*"The landforms and geomorphic processes which have shaped Wellington Range are well expressed, accessible and representative examples of landform systems which occur widely in eastern and central Tasmania. This representative geomorphology has geomorphological value and provides a foundation for the Park's ecosystem."*

Inappropriate fire regimes are one of the greatest risks to the flora and fauna of Wellington Park[13]. Severe fires are known to have occurred within parts of the Wellington Range in 1898, 1914, 1939, 1947, 1967 and 1983. Some of these, including 1967, burnt over most of the plateau[14].

---

[7] Ratkowsky (1982a)
[8] Kantvilas, James and Jarman (1985)
[9] Gates and Ratkowsky (2004)
[10] Wellington Park Management Trust (1996)
[11] Wellington Park Management Trust (1996)
[12] Wellington Park Management Trust (2015)
[13] Wellington Park Management Trust (2015)
[14] Wellington Park Management Trust (1996)

# 2 BOTANICAL SURVEY AND FAUNA HABITAT ASSESSMENT

## 2.1 Background Research – Supporting Data

The following sources were used for biological records from the region to supplement field data collected by NBES:

- Protected Matters database[15] – all matters of national environmental significance that may occur in the area or relate to the area in some way.
- Tasmanian Natural Values Atlas (NVA)[16] – this Department of Primary Industries, Parks, Water and the Environment, Tasmania (DPIPWE) database includes biological records.
- TASVEG 3.0 digital data.
- Mt Wellington Cableway Preliminary Ecological Assessment 2016[17]
- Previous assessments on natural values McRobie's Gully[18]

## 2.2 Vegetation Field Methods

The study area has been subject to a significant number of separate surveys and studies to best capture all potential values.

The Pinnacle Area was first surveyed by ecologists for GHD in 2016. Surveys were undertaken on foot by ecologists from NBES in September 2018 and April 2019. Tasks included vegetation mapping, floristic surveys (including threatened species searches), targeted fauna surveys (direct and indirect), and fauna habitat assessment. Targeted survey was undertaken in December 2018 specifically for the rare *Viola curtisiae* during the flowering period with a follow up survey in February 2020. The extent of these surveys is indicated graphically in Appendix G.

The Access Road area was surveyed between February and April 2019 to target threatened *Corunastylis* species and habitats for threatened flora and fauna. A follow up survey for *Corunastylis* species was conducted in March 2020 to capture the footprint of the amended road alignment but also to ensure the full corridor was searched to coincide with the known flowering of target species nearby in Hobart.

### 2.2.1 Vegetation mapping

In Tasmania the distribution of vegetation is accessed via TASVEG 3.0[19] (TASVEG) – the state-wide mapping database. The compilation of TASVEG has been an iterative process of improvement and refinement upon the original base layer, that was collated from several sources[20]. As a result, data within TASVEG do not completely represent vegetation extent and distribution at a single date. Indeed, some areas are still mapped at a coarser scale than the general 1: 25,000 or based on interpretation of imagery over ten years old[21]. Furthermore, vegetation mapping at any scale can be an exercise in

[15] EPBC Act Protected Matters report, (Commonwealth of Australia) – PMST_G3H7H0
[16] NVA reports_ nvr_08-Oct-2018 (DPIPWE)
[17] This was for a previous option but shared study area with current project at Tower Sections 2 & 3 and Pinnacle Zone GHD 2016
[18] McRobies Gully – Andrew North for Hobart City Council 1997
[19] DPIPWE (2013)
[20] Harris and Kitchener (2005)
[21] Kitchener and Harris (2013)

judgement, with an inherent potential for errors in interpretation. Subsequently, it is standard practice to truth TASVEG data using recent imagery and ground sampling[22].

Ground sampling was undertaken over the specified dates. On each occasion ground sampling involved either one or two ecologists traversing the study area on foot in a stratified fashion that ensured ground sampling of the complete range of image signatures. When a patch was ground sampled, the observer assessed the requisite traits of vegetation structure, floristics, geology and environment to discriminate the patch from any other possible TASVEG units using the descriptions and stepwise keys within the online versions of the current TASVEG companion manual[23]. Boundary discrimination was based on image interpretation and aided by point data collected on a hand-held GPS unit. All ground sampling was undertaken during the daytime mostly in fine weather due to the potential sampling constraints associated with reduced visibility from rain and/or low light.

This combination of image interpretation followed by stratified ground sampling and interpolation is consistent with the DPIPWE guidelines for natural values assessments (section 7, DPIPWE 2015[24]).

Following ground sampling and the collation of data, TASVEG units observed on site were cross-referenced against all vegetation communities listed as threatened under the Tasmanian *Nature Conservation Act 2002* (NCA) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA).

### 2.2.2 Floristic survey

To support the determination of TASVEG units in accordance with survey guidelines[25] and provide general floristic data within each native community, a full vascular plant species list was taken of each section with representative ¼ ha plots using a form of the Timed Meander Search Procedure[26]. Outside the ¼ ha plots, additional plant species were noted as encountered, with the survey effort applied disproportionately within locations considered likely to contain threatened species habitat or simply contain species not noted earlier.

Declared[27] and environmental weeds, as well as symptomatic evidence of plant pathogens, were recorded across the site during the ground survey.

Botanical nomenclature follows the current census of Tasmanian plants[28].

## 2.3 **Fauna Field Methods**

Observations of habitat suitability for fauna were made concurrently with the flora ground surveys across the entire site, with particular reference to suitability of habitat for dens (including natal dens) of the Tasmanian devil (*Sarcophilus harrisii*) and nesting habitat for hollow requiring species such as the Tasmanian masked owl (*Tyto novaehollandiae castanops*) and swift parrot (*Lathamus discolor*). Evidence of the presence of threatened fauna was sought and included scats, bones, feathers and diggings.

Targeted surveys of the potential habitat in the Access Road and Base Station was conducted with a 50 m buffer of the impact area and achieved coverage well in excess of the 30 % visual survey coverage specified in DPIPWE guidelines[29].

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[22] TVMMP (2013)
[23] Kitchener and Harris (2013)
[24] DPIPWE (2015)
[25] DPIPWE (2015)
[26] Goff et *al.* (1982)
[27] Tasmanian *Weed Management Act 1999*
[28] de Salas & Baker (2018)

Habitat features including large trees, potential dens and hollows were plotted by land survey providing sub-metre accuracy.

## 2.4 Limitations

Due to seasonal variations in detectability and accurate discrimination (*i.e.* identification of closely related species), there may be some herb, orchid and/or graminoid species present on the site that have been overlooked due to flowering at times of the year other than when the surveys were undertaken or being seasonally absent at the time of survey. The potential for this limitation to have impacted the detection probability of threatened species in particular has been considered in the interpretation of results.

To compensate for survey limitations to some degree, field data from the present study were supplemented with data from the Tasmanian Natural Values Atlas (Reports_08 &09-Oct-2018, DPIPWE, 2018) and the EPBCA Significant Matters database. All threatened species known from or with potential to occur in the local area (5 km) have thus been considered in terms of habitat suitability on site.

Locations of critical elements (e.g. specific survey points, weeds[30], threatened species habitat, *etc.*) were recorded with a handheld non-differential GPS with an average accuracy of 3-10 m.

[29] *Survey Guidelines and Management Advice for Development Proposals that may Impact on the Tasmanian Devil (Sarcophilus harrisii): A supplement to the Guidelines for Natural Values Surveys - Terrestrial Development Proposals"*
[30] Tasmanian *Weed Management Act 1999*

# 3 BIOLOGICAL VALUES

## 3.1 Vegetation

Nine TASVEG vegetation mapping units occur within the study area:

- DCO – *Eucalyptus coccifera* forest and woodland
- DGL – *Eucalyptus globulus* dry forest and woodland
- DOB – *Eucalyptus obliqua* dry forest
- DTO – *Eucalyptus tenuiramis* forest and woodland on sediments
- WGL – *Eucalyptus globulus* wet forest
- WOB – *Eucalyptus obliqua* forest with broad-leaf shrubs
- HHE – Eastern alpine heathland
- FPE – Permanent easements
- FUM – Extra-urban miscellaneous

The TASVEG 3.0 mapping is of varying reliability.

- The Access Road section is consistent with our findings with one exception. The small patch of DPU identified close to the start of the road is incorrect and has been reallocated to DGL.
- The Base Station site is incorrect. The DPU identified for the forest below the main fire trail is wet forest WOB. Upslope of the fire trail it is mapped as DOB although much of this is WOB and WGL.
- The location for the Temporary Location Net is correctly mapped as DCO.
- The vicinity of the Pinnacle Centre and Tower 3 is correctly mapped as HHE with DCO occurring close by.

None of these vegetation communities correspond to ecological communities listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 2002* (EPBCA). Two communities (DTO and DGL) are listed as threatened under the Tasmanian *Nature Conservation Act 2002*.

The native vegetation types are described below within groupings derived from similarities in floristics and structure. Vascular plant species lists from sampling points are given in Appendix A.

The distribution of TASVEG units recorded within the study area is illustrated in Figure 3, Figure 5, Figure 7 and Figure 8.

*Table 1: Distribution of vegetation communities*

| Community | Location | Extent |
|---|---|---|
| Threatened - *Nature Conservation Act 2002* | | |
| DGL | Access Rd | Localised near McRobie's Road |
| DTO | Access Rd | Widespread intergrading with DOB |
| Non-Threatened vegetation | | |
| DOB | Access Rd | Widespread intergrading with DTO |
| | Base Station | Vicinity of Access Road |

| | | |
|---|---|---|
| DOC | Temporary Installation Net | Also, in close proximity to Pinnacle Centre |
| WOB | Base station | Nearby forest extending to Tower 2 and downslope of the Base Station site |
| WGL | Base station | Vicinity of Tower 1 |
| HHE | Pinnacle Centre | Extensive across Pinnacle area above tree line |
| FPE | Access Rd | Within section of DTO |
| FUM | Access Rd | Start |
| | Base Station | Firetrail - main area of infrastructure |

### 3.1.1 Dry Eucalypt Forest

- DGL – *Eucalyptus globulus* dry forest and woodland

There is a localised area of this community at the start of the proposed Access Road on steep northeast facing slope visible from McRobie's Road; Plate 2.

*E. viminalis* and *E. obliqua* are subdominant. A tall shrub layer includes *Exocarpos cupressiformis, Acacia dealbata* and *Bursaria spinosa.* Low shrubs include *Astroloma humifusum*. The ground layer is dominated by *Lomandra longifolia* with various native grass species present in low numbers.

DGL is a listed threatened community under the NCA.

*Plate 2: Grassy* E. globulus *forest DGL at start of Access Road near McRobie's Road*

- DOB – *Eucalyptus obliqua* dry forest

*Eucalyptus obliqua* is present as a community with both *E. tenuiramis* and *E. viminalis* as co-dominant and sub-dominant trees. DOB is prominent on the slopes above McRobie's Gully extending to the saddle where the high voltage powerlines intersect with the Fire Trial; Plate 3.

This occurs over Permian mudstone from 120m to just above 300m. This area at the saddle, close to the Wellington Park boundary has been burnt within the last year, presumably for fire management purposes. Prominent species recorded from within the DOB include *Exocarpos cupressiformis, Daviesia ulicifolia, Pultenaea gunnii, and Pultenaea juniperina*. Due to the recent nature of the fire on this drier slope there is evidence of various species of orchid including *Caladenia sp., Chiloglottis sp., Pterostylis melagramma, Pterostylis parviflora and Thelymitra sp.*

DOB is not a listed threatened community.

- DTO – *Eucalyptus tenuiramis* forest and woodland on sediments

This community occurs relatively extensively within the study area on the section of proposed Access Road; Plate 4.

This community is comprised of a dominant canopy layer of *Eucalyptus tenuiramis* intergraded with DOB, with sections presenting co-dominance between the two eucalypts. Understorey tends to be consistent with the DOB community. Occasional tall shrubs include *Exocarpos cupressiformis, Acacia terminalis, Allocasuarina monilifera* and *Allocasuarina littoralis.* The ground layer is sparse with plenty of exposed open rocky terrain. A dense low shrub layer is dominated by *Pultenaea juniperina* with *Daviesia ulicifolia, Acacia myrtifolia, Pultenaea gunnii,* and *Tetratheca labillardierei* all prominent. Grasses and sedges are sparse.

As with the DOB the orchid flora is potentially diverse, with recent fires likely to have stimulated flowering peaks. Orchid species found during the current surveys include Chiloglottis reflexa and *Caladenia* sp.

DTO is a listed threatened community under the NCA.

There is a clearly defined transmission line easement that runs north to south that is crossed by the alignment of the Access Road. Although correctly mapped as FPE – Permanent Easement the impact of the management will have impacted little on the character of the community except for the periodic removal of trees and taller shrubs. Its ecological and thus conservation values are in line with the adjacent forest community - in this case DTO.

- DCO – *Eucalyptus coccifera* forest and woodland

DCO occurs in the area below the Organ Pipes extending to just above road in the vicinity of the Temporary Installation Net, upslope of Pinnacle Road. Plate 5

The site has Jurassic dolerite scree and is just above 900 m above sea level. The forest is approximately 50 years old, post 1967 bushfires. The site is moderately moist with an easterly aspect and shaded from the late afternoon sun. *Eucalyptus coccifera* is codominant with *E. urnigera.* Other prominent species are diverse and include *Nothofagus cunninghamii, Oxylobium ellipticum, Pittosporum bicolor, Telopea truncata, Aristotelia peduncularis, Coprosma nitida, Cyathodes glauca, Hakea lissosperma, Leptecophylla parvifolia, Lomatia polymorpha, Olearia phlogopappa, Olearia tasmanica, Ozothamnus antennaria, Ozothamnus ledifolius, Pimelea cinerea, Richea dracophylla, Tasmannia lanceolata* and *Veronica formosa.*

DCO is not a listed threatened community.

*Plate 3: Typical* E. obliqua *forest DOB on HCC Access Road section*

*Plate 4:* E. tenuiramis *forest DTO on Access Road section*


*Plate 5: DCO within study area in the vicinity of the Temporary Installation Net*

### 3.1.2 Wet eucalypt forests

- WGL – *Eucalyptus globulus* wet forest

Wet *Eucalyptus globulus* forest (Plate 6) occupies the slopes immediate adjacent to the fire trail concentrated around a shallow gully swale close to the alignment of the cableway route as it departs from the Base Station. It extends just past the location for the Tower 1.

*Eucalyptus globulus* is the dominant eucalypt with *Eucalyptus obliqua* also present. The vegetation is characterised by mature and overmature eucalypts with massive trunks up to 1.5m in diameter. All trees are in senescent stage with evident decay, fire scars and most trees support hollows of various dimensions.

Many of the trees appear stressed which is possibly due to the combined histories of fire damage and drought. The eucalypt canopy is open in form.

There is a continuous tall shrub layer including *Acacia dealbata*, *Bedfordia salicina*, *Beyeria viscosa*, *Olearia argophylla* and *Pomaderris apetala*. The understorey is relatively open with scattered *Coprosma quadrifida*. Ground herbs are infrequent but include *Hydrocotyle hirta* plus a few orchids typical of these habitats including *Corybas* sp., *Pterostylis pedunculata* and other *Pterostylis* spp.

WGL is not listed under the NCA or the EPBCA.

- WOB – *Eucalyptus obliqua* forest over broad-leaf shrubs

WOB is present and widespread on the lower slopes of Mt Wellington on Permian sediments with an easterly aspect. There is a gradual change in understorey from the lowest point to slightly drier facies upslope.

In the vicinity of the Base Station *Eucalyptus globulus* is present as a sub-dominant canopy tree and characterises many of the larger trees although *E. obliqua* dominate. *E. regnans* and *E. viminalis* are also occasional with prominent small trees and shrubs including *Acacia dealbata* subsp. *dealbata*, *Asterotrichion discolor*, *Bedfordia salicina*, *Exocarpos cupressiformis*, *Nematolepis squamea*, *Olearia argophylla*, *Beyeria viscosa*, *Pittosporum bicolor* and *Bursaria spinosa*. The ground layer is sparse with very few ferns and herbs. This is reflective of the fire history and density of regrowth stems. The site has a moderate number of large eucalypt logs on the ground. There are patches of rocks outcropping. While most trees show some fire damage, little useful hollow development was seen. There is a 20cm depth of litter over most areas of the ground. The forest community offers a variety of habitat niches.

Further upslope in the vicinity of the Tower 2 *Eucalyptus obliqua* is the sole dominant eucalypt with *Acacia leprosa* var. *graveolens*, *Pomaderris apetala*, *Zieria arborescens* *Bedfordia salicina* and *Pittosporum bicolor* as the dominant tall shrubs. The understorey is generally open with a sparse lower shrub layer. The cover of litter is generally high, though there are patches that have been burnt recently. There is a massive fallen tree close by (Plate 7).

The forest is generally free of weeds, apart from the corridor along the high voltage power line. Spanish heath and gorse are abundant here and pose a risk as a seed source.

WOB is not listed under the NCA or the EPBCA.


*Plate 6:* Eucalyptus globulus *wet forest near site for Tower 1*

*Plate 7:* Eucalyptus obliqua *wet forest over broad-leaf shrubs at near Tower 2*

*Plate 8:* **Eucalyptus obliqua** *wet forest below Base Station*

### 3.1.3 Alpine Heathlands

- HHE – Eastern alpine heathland

This community is the most widespread within the study area. HHE dominates the Pinnacle area of Mt Wellington on dolerite within the footprint of the proposed walkways, Pinnacle Centre (Plate 9) and Tower 3 (Plate 10). *Eucalyptus coccifera* is present as a minor component only as small wind pruned plants to 1 m. Downslope the vegetation transitions into true subalpine *E. coccifera* woodland (DCO). Boulders including some massive structures are a prominent component and create protected niches and sites where snow cover is able to persist. The shrubs are varied and diverse and include *Telopea truncata, Baeckea gunniana, Coprosma nitida, Epacris serpyllifolia, Exocarpos humifusus, Gaultheria hispida, Leptospermum rupestre, Monotoca empetrifolia, Olearia ledifolia, Olearia pinifolia, Orites acicularis, Orites revolutus, Ozothamnus ledifolius, Pimelea sericea, Planocarpa petiolaris, Richea scoparia, Richea sprengelioides, Tasmannia lanceolata* and *Trochocarpa thymifolia*. There are small patches of fjaeldmark-like bare ground subject to frost heave. Around Tower 3 pineapple grass *Astelia alpina* forms a prominent component of the ground cover.

HHE is not listed under the NCA or the EPBCA.

This vegetation is sensitive to disturbance and diverse due to the extreme weather conditions at this altitude. Mt Wellington is an outlier from other alpine areas in Tasmania and as such is notable for its distinctive alpine flora. Outside of the footprint of disturbance the impacts will be largely dependent on the method of construction. The vicinity is however not pristine and has been impacted by numerous other activities in the Pinnacle area. The footprint of the development includes 0.3 ha for the Pinnacle Centre and walkways plus 0.1 ha modification for bushfire (1m) and temporary disturbance (2m) during construction (total 0.4 ha). This equates to approximately <25% of the total footprint (1.7 ha) of developments already on site.

*Plate 9: HHE within Pinnacle Centre development area*

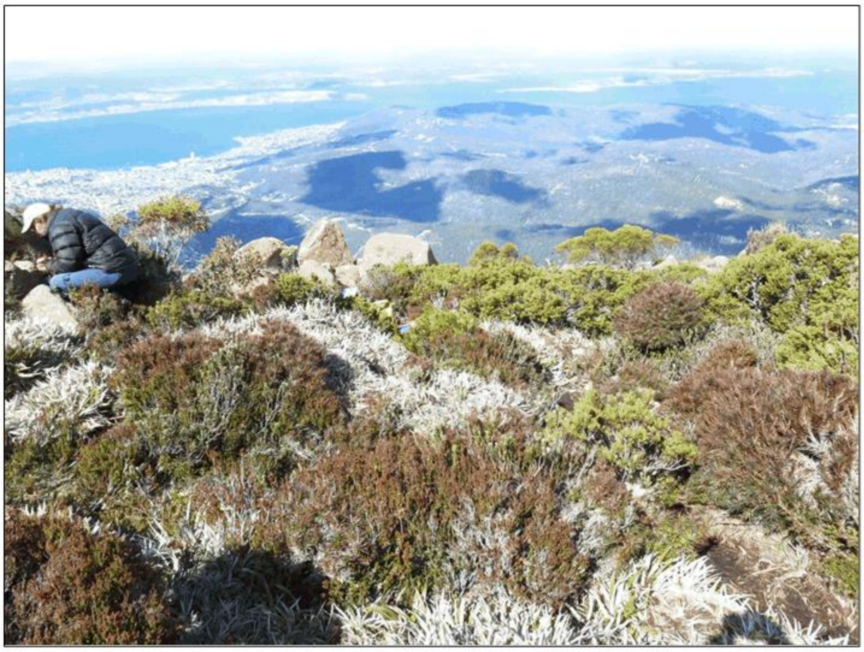

*Plate 10: HHE within Tower 3 platform site*

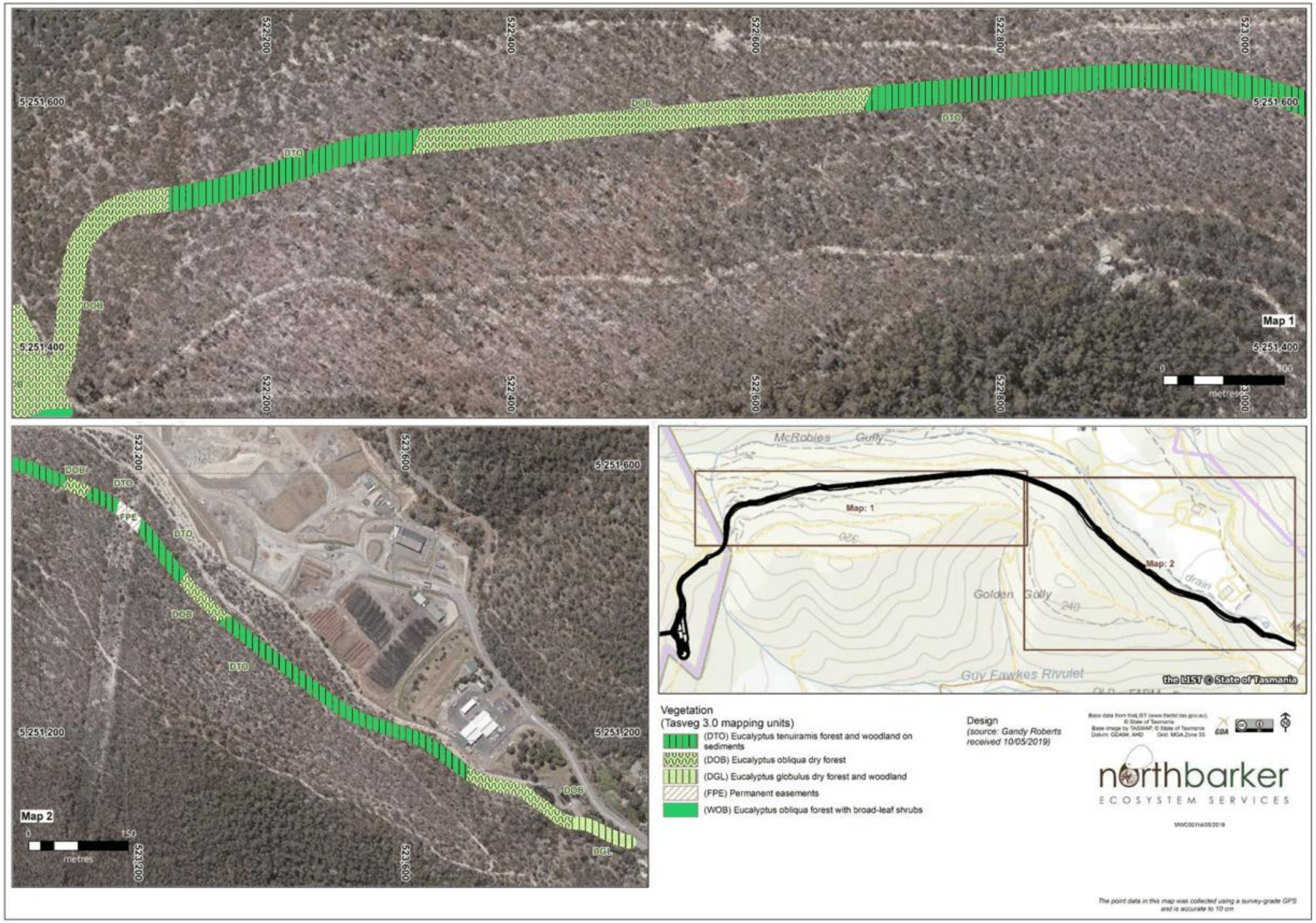


*Figure 3: Vegetation within the Access Road section*

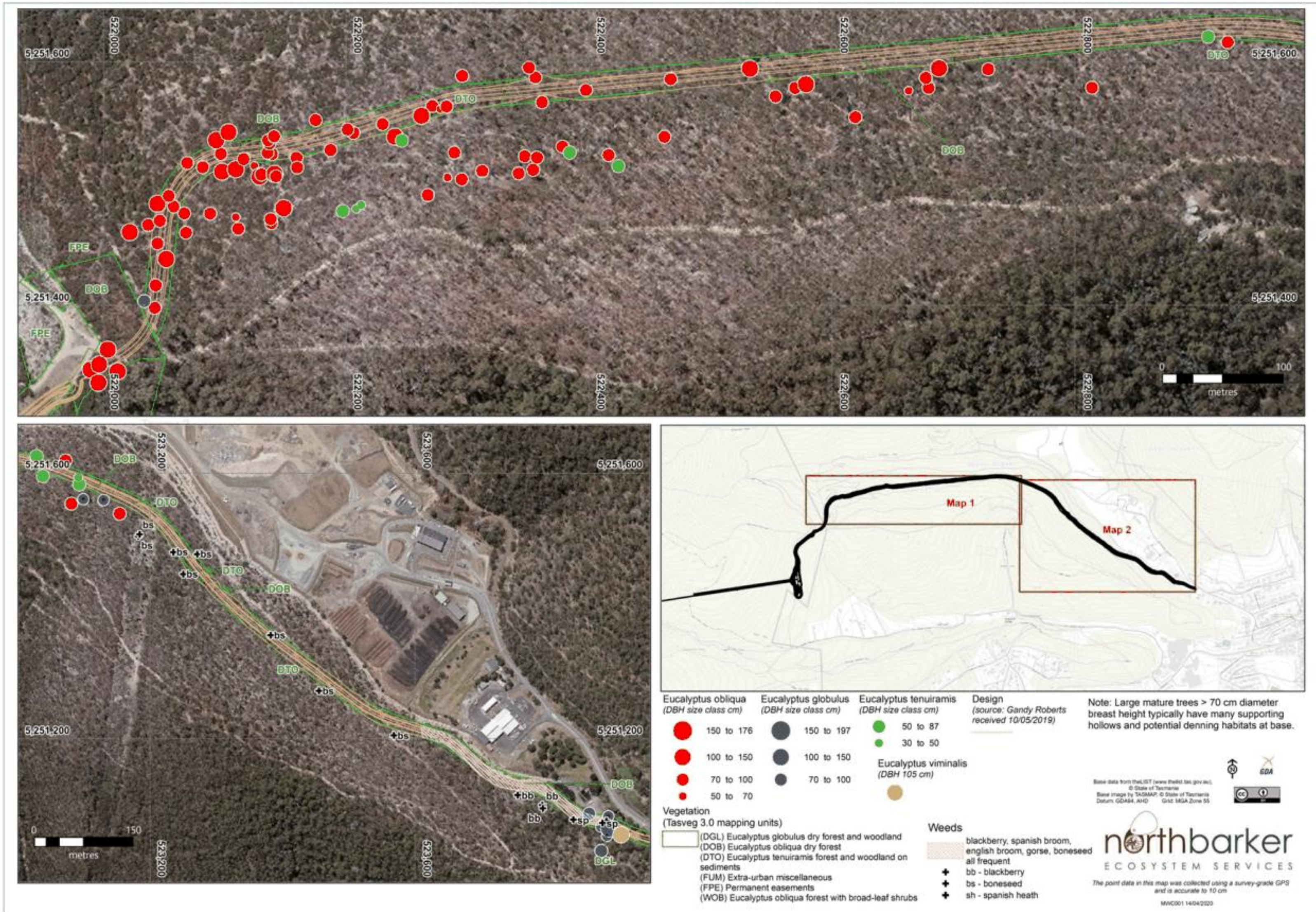


*Figure 4: Access road detail*

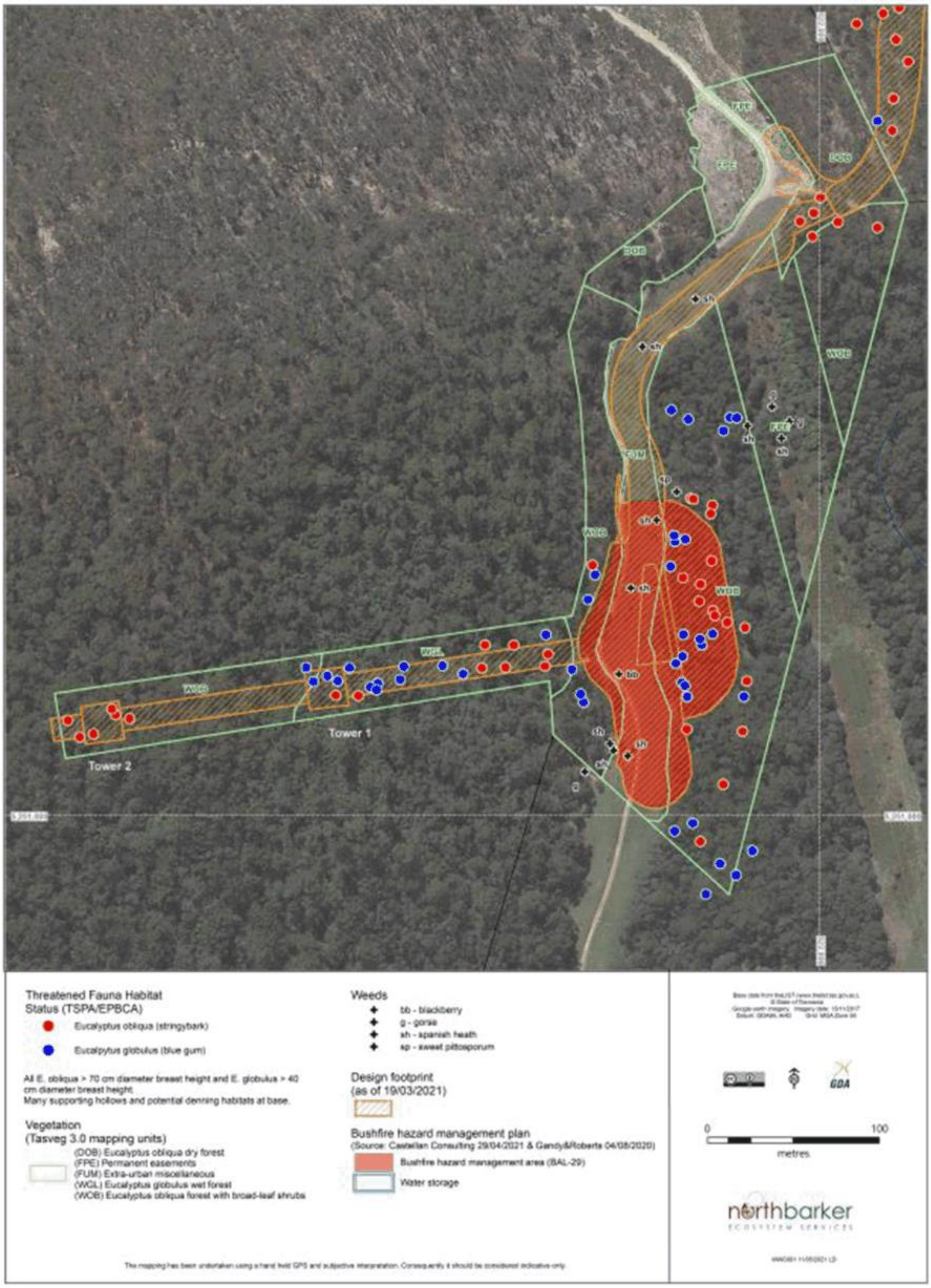


Figure 5: Base Station, Tower 1 and Tower 2 sites - Natural Values

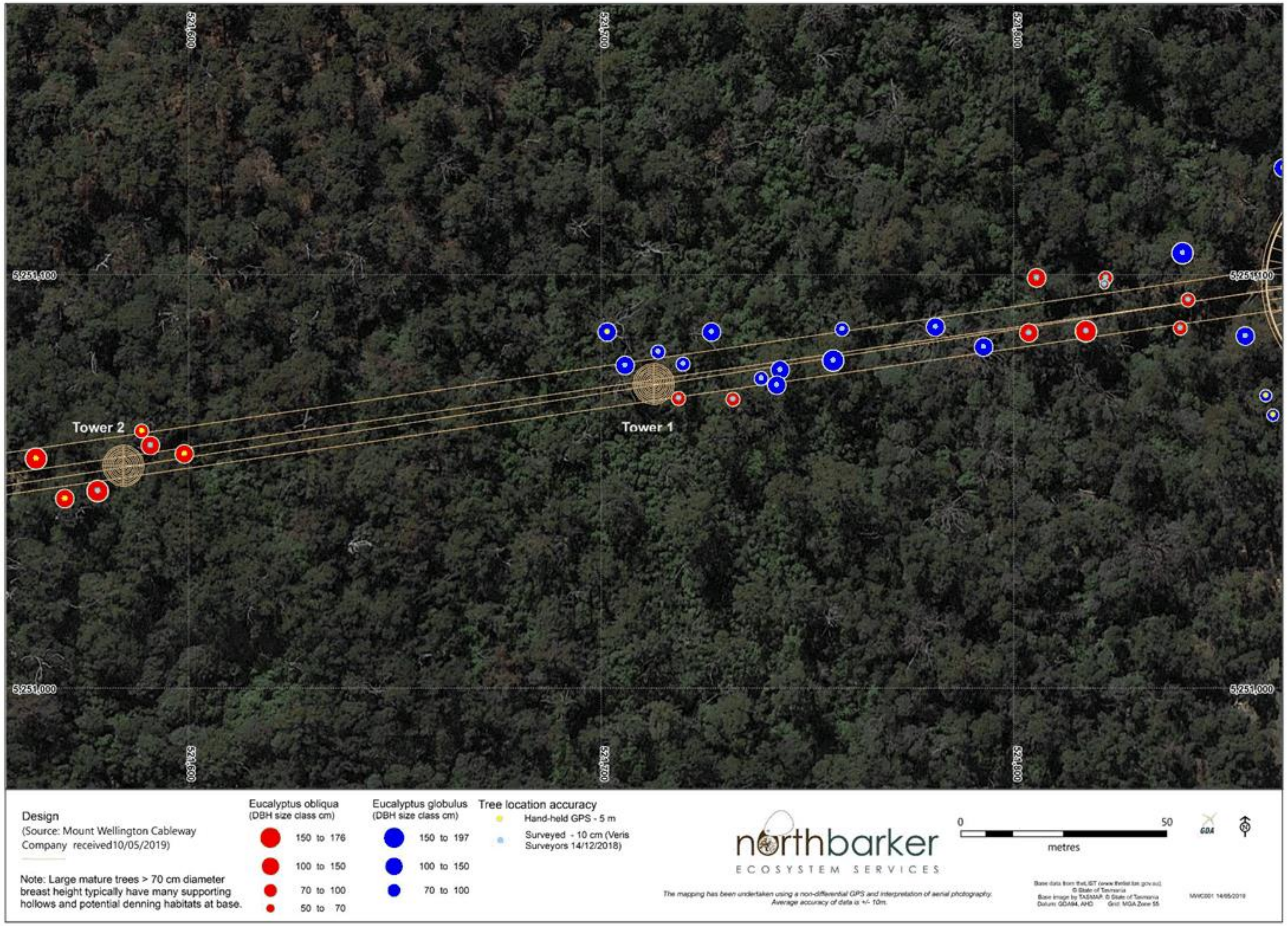


*Figure 6: Tower 1 and Tower 2 sites – Detail*

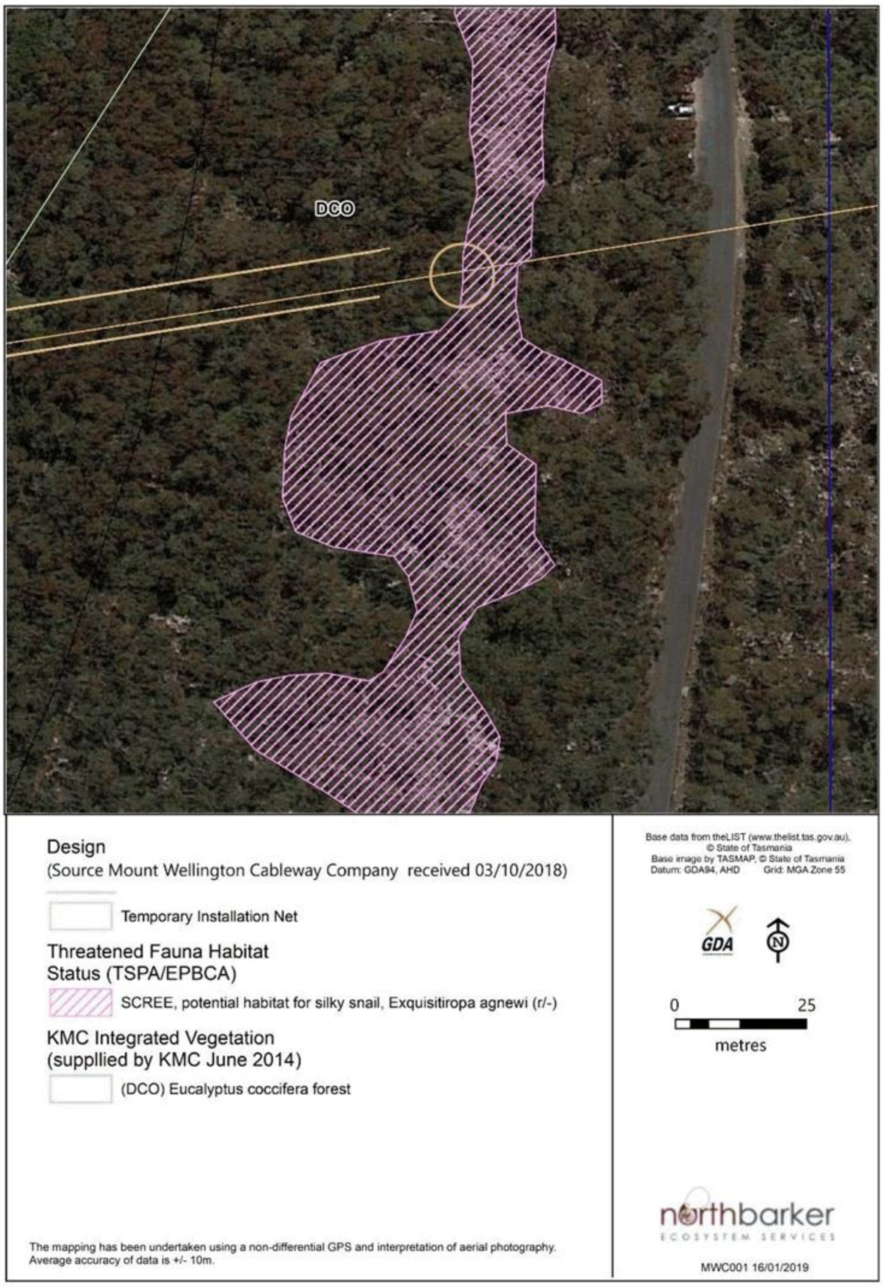


*Figure 7: Temporary Installation Net – Natural Values*

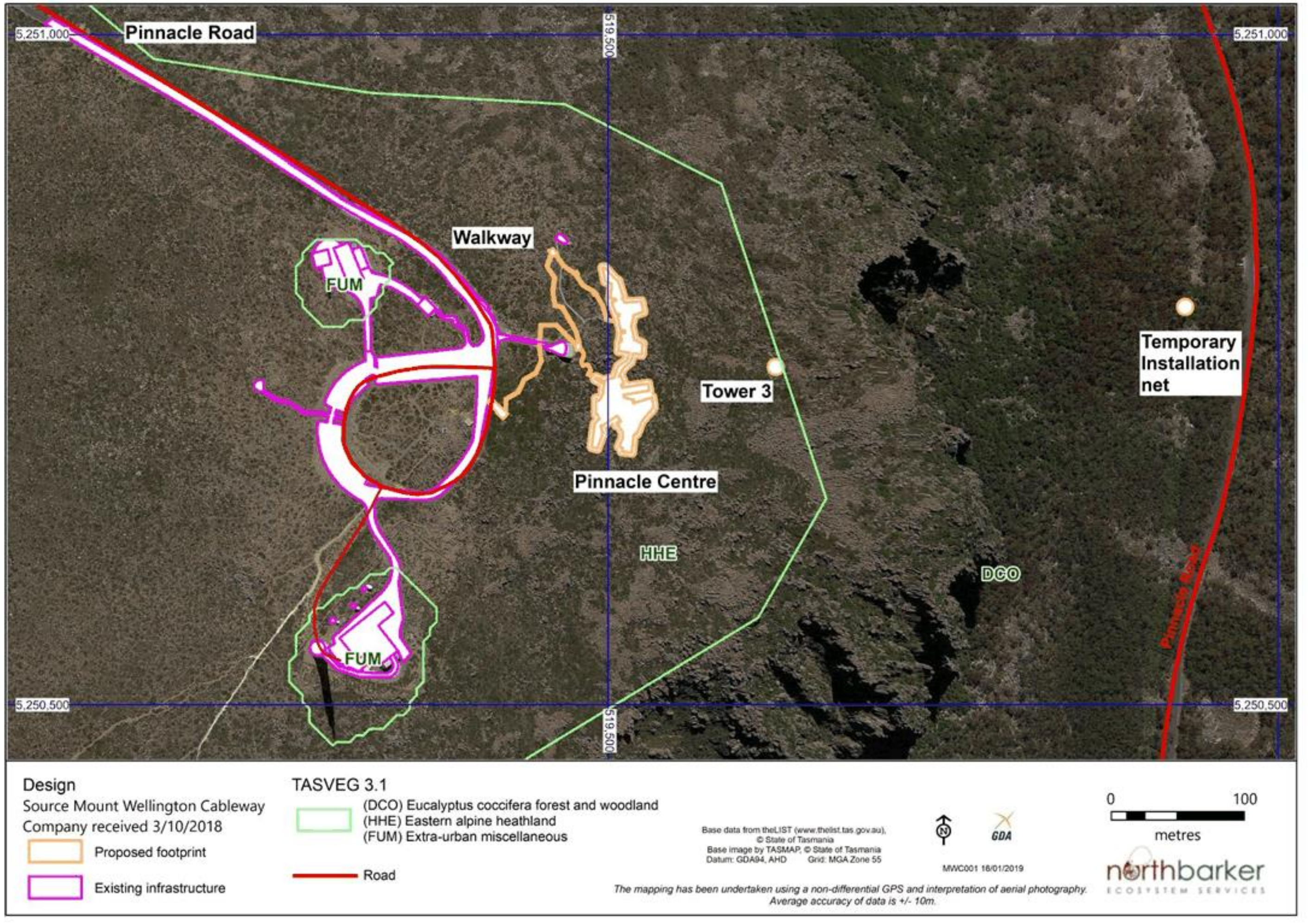


*Figure 8: Vegetation at the Pinnacle Centre and Tower 3*

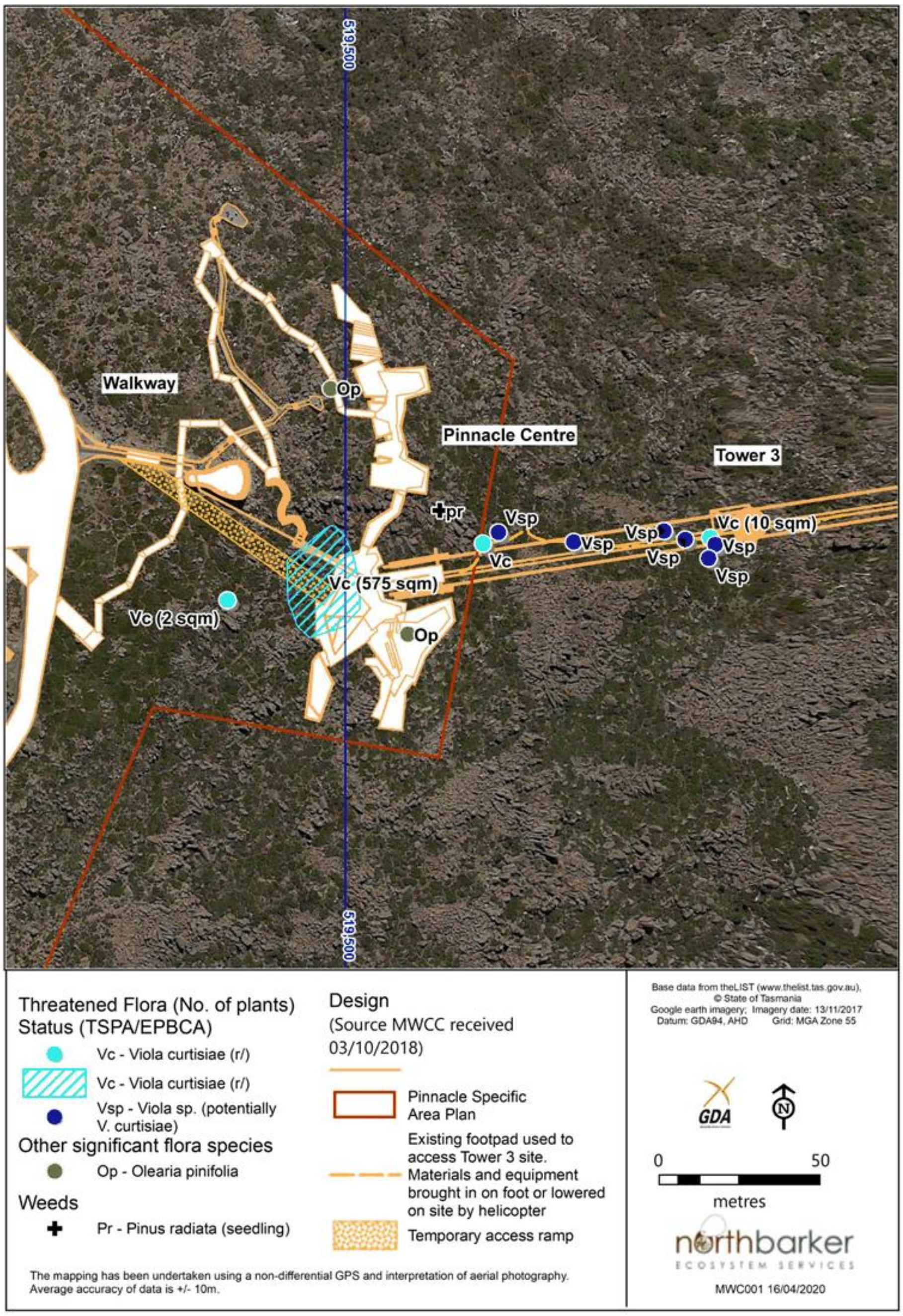


*Figure 9: Pinnacle Centre and Upper Tower - Natural Values*

## 3.2 Flora of Conservation Significance

The collective surveys include 213 native species within the study area (Appendix A). Further survey at targeted times would be expected to document additional ephemeral species including orchids, grasses, and other herbs. Surveys conducted in 2016[31] failed to locate any threatened flora species from the Pinnacle Zone or Tower Sections 2 and 3.

Table 2: Threatened flora species lists threatened species recorded within a 5 km radius of the study area and discusses potential occurrence within the study area based on habitat and the context of known records.

*Viola curtisiae* has been confirmed present at the Pinnacle Centre and close to Tower Site 3.

Several herbs are considered to have moderate to low potential of occurring in habitats corresponding to particular sections of the development footprint.

[31] GHD 2016

*Table 2: Threatened flora species*

**Verified observations (Tasmanian Natural Values Atlas) or predicted habitat (EPBCA Protected Matters database) from within a 5 km radius of the site [32]**

| Species | Status[33] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[34] |
|---|---|---|---|
| **Known from study area or within 500 m** | | | |
| *Australina pusilla* subsp. *muelleri* Shade nettle | Rare/ | None | From within 5 km there exists only a single historical record of very low spatial accuracy. Known from southern flanks of Mount Wellington in deeply-shaded gullies within wet eucalypt forest, and from King Island where it grows in association with *Australina pusilla* subsp. *pusilla* along stream flats in blackwood swamp forest. No suitably wet gullies are found on site. |
| *Centropappus (Brachyglottis) brunonis* Tasmanian daisytree | Rare/ - | Very Low | Known from scattered colonies on the Wellington Range and Mt Dromedary. It grows in shrubby woodland/forest dominated by *Eucalyptus delegatensis* (at mid altitudes) and by *E. coccifera* and *E. urnigera* (at higher altitudes). It typically occurs on dolerite talus but also occurs on poorly-drained sandstone shelves. Only known from a small number of locations closer to the peak of Mount Wellington, such as the Organ Pipes track, therefore it has potential to occur in the vicinity of the temporary Mid Tower site. However, it is unlikely to be overlooked as it is a large and distinctive shrub. |
| *Carex gunniana* Mountain sedge | Rare/ - | Very Low | Widespread records from a range of altitudes and habitats although generally in wetter locations than any of the study area.<br>The habitat of *Carex gunniana* is poorly understood and highly variable. It includes wet eucalypt forest, sandy heathlands, margins of streams, littoral sands, shingle with seepage, damp grasslands within dry forest and rough pasture.<br>Not likely to have been overlooked. |
| *Carex longebrachiata* Drooping sedge | Rare/ - | None | Associated with riverbanks, in rough grassland and pastures, in damp drainage depressions and on moist slopes amongst forest, often dominated by *Eucalyptus viminalis, E. ovata or E. rodwayi*.<br>Known from one historic record in vicinity. No suitable habitat is present. |
| *Corunastylis nuda* Tiny midge-orchid | Rare/ - | Moderate | Occurs in a wide range of habitats from near sea level to 1,000 m above sea level, on a range of different soil types and geologies. Vegetation types include scrub, subalpine grassland, open rock plates, heathy open forest, shrubby dry sclerophyll forest and wet sclerophyll forest.<br>Multiple records from a concentrated area on north facing slope on mudstone south of Old Farm Road. The habitat is analogous with some of the Access Road alignment in McRobie's Gully (500 m distant). |

[32] Natural Values Reports # 8 & 9 Oct-2018, DPIPWE, 2018; EPBC Act Protected Matters report PMST_WQTRMC
[33] Tasmanian *Threatened Species Protection Act 1995*, Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
[34] Threatened Species Section (2018)

| Species | Status[33] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[34] |
|---|---|---|---|
| | | | This is a tiny ephemeral species almost impossible to identify when not in flower. Confirmation of its occurrence requires a targeted survey during the flowering period. Peak flowering is given as the second half of January and all of February[35].<br>No plants were observed during two surveys conducted in 2019 and 2020, during the peak flowering period. There is an anecdotal report[36] of the species occurring in the vicinity of the mountain bike tracks that pass through the proposed road site, though no accurate spatial data is available.<br>Given the listing of this species as rare any occurrence that may occur in the footprint would not be significant for the species. |
| *Corunastylis nudiscapa*<br>Bare midge-orchid | Endangered/<br>- | Low | Restricted to a few sites in the area between Hobart and Kettering. It has been recorded from open forests and woodlands on mudstone, dominated by *Eucalyptus tenuiramis*, and occasionally *E. obliqua* or *E. amygdalina*, with a heathy or grassy ground layer of varying density.<br>Occupies dry open eucalypt forest on mudstone-derived soils. Known from 49 records from within 500 m from a concentrated area on north facing slope on mudstone south of Old Farm Road. There is a total of 145 from 5km from the proposed Access Road route, these others coming from similar habitats on slopes adjacent to Strickland Avenue and Huon Road. The habitat is analogous with some of the Access Road alignment in McRobie's Gully.<br>Peak flowering is given as the second half of February through to the first half of April[37], although refer note below.<br>No individuals were observed during the 2019 survey despite targeted searches. Targeted searches by orchid enthusiasts of this area in previous years failed to locate any plants[38]. Observations at known sites in South Hobart in the summer of 2018-19 were unseasonal being late December and early January, well outside the identified peak flowering period. Flowering in summer 2020 was more typical with observations at two known sites in South Hobart in mid-March. A resurvey of the entire road corridor conducted in mid-March also failed to locate any plants. |
| *Diuris palustris*<br>Swamp doubletail | Endangered/<br>- | None | Occurs in coastal areas in grassy open eucalypt forest, sedgy grassland and heathland with *Leptospermum* (teatree) and *Melaleuca* (paperbark) on poorly- to moderately-drained sandy peat and loams.<br>Known from single historical records from the area only. May be extinct in the Hobart area. No suitable habitat is present on site. |

[35] Wapstra, M. (2018). *Flowering Times of Tasmanian Orchids: A Practical Guide for Field Botanists. 4th edition July 2018*
[36] Mark Wapstra pers com.
[37] Wapstra (2018)
[38] Mark Wapstra pers com.

| Species | Status[33] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[34] |
|---|---|---|---|
| *Euphrasia gibbsiae* subsp. *wellingtonensis* Mt Wellington eyebright | Rare/ - | Very Low | Occurs in a variety of vegetation types on Mount Wellington, including sphagnum bogs, bolster heath and open montane shrubbery. The records from close proximity to the Pinnacle are of low accuracy and are historic.<br>Targeted surveys conducted by the TPT in 2015 added a further 225 observations all from a distinct microhabitat associated with margins of soaks and sites subject to periodic waterlogging.<br>The Pinnacle development site is consistently well drained. Two *Euphrasia* spp. are widespread throughout the footprint of both the walkways and the Pinnacle Centre site and in the vicinity of the Temporary Access Net site. These are the common and widespread alpine eyebrights, *E. striata* and *E. collina* subsp. *diemenica*. |
| *Isolepis habra* Wispy clubsedge | Rare/ - | Very Low | The habitat is poorly understood and variable as it occurs from lowland to highland sites in forest and non-forest habitats. Wet sclerophyll and riparian habitats may be preferred.<br>Not recorded from within 5 km of the study area since the 1970s. |
| *Ranunculus pumilio* var. *pumilio* Ferny buttercup | Rare/ - | None | Occurs mostly in wet places (e.g. broad floodplains of permanent creeks, "wet pastures") from sea level to altitudes of 800-900 m above sea level.<br>Known from only one record within 500m dating from the 1980's. Typically occurs in wetter habitats than those found on site. |
| *Viola curtisiae* Montane ivyleaf violet | Rare/ - | Present | Montane species that had long been thought to be confined to sub-alpine habitats on Mt Field where it is typically associated with *Eucalyptus coccifera* woodland. The underlying substrate is Jurassic dolerite, and the altitude range of known occurrences 1050 to 1200 metres above sea level. Recently published data has confirmed it from other sites including a record collected from a site near the Bend on Mt Wellington, 2km from the Pinnacle.<br>Surveys conducted by Threatened Plants Tasmania in Dec 2018 have shown it to be widespread in the Wellington Range.<br>Targeted surveys conducted for this project in Dec 2018 and Feb 2020 confirmed its presence at the Pinnacle Centre and close to Tower 3. |
| **Known within 5 km** | | | |
| *Allocasuarina duncanii* Conical sheoak | Rare/ - | None | A species known primarily from dolerite mountain-tops and outcrops. May have a wider distribution than presently documented, but is nonetheless unlikely to occur on site, nor likely to have been overlooked. |
| *Anogramma leptophylla* *Annual fern* | Vulnerable/ - | None | Only 2 records within 5 km, the last in 1985. Not recorded during survey. Fronds only present in late winter and early spring which corresponds to survey time. Occurs in dry to damp areas of cliff or rocky areas often just within a drip line. Known from altitudes varying from about 50 to 350 m on a |

| Species | Status[33] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[34] |
|---|---|---|---|
| | | | variety of rock substrates. Study area generally too dry at these preferred altitudinal range |
| *Asperula scoparia var. scoparia* Prickly woodruff | Rare/ - | Very Low | Occurs in grassy forest usually on moist sites. Known from 18 sites from within 5 km of the study area. Habitat is marginal, and the species is conspicuous and unlikely to have been overlooked. |
| *Atriplex suberecta* Sprawling saltbush | Vulnerable/ - | None | This is a species of coastal areas and is known only from 1 historical record. No suitable habitat is present on site. |
| *Austrostipa bigeniculata* Doublejointed speargrass | Rare/ - | Very Low | 57 records for this species within 5 km. Occurs in grassy habitats on fertile soils in low rainfall areas. A conspicuous species unlikely to have been overlooked, although at the time of survey spear grasses on site had not developed fertile material necessary for identification. Habitat not suitable. |
| *Austrostipa blackii* crested speargrass | Rare/ - | Very Low | A single record for this species within 5 km. Occurs in grassy habitats on fertile soils in low rainfall areas. Habitat not suitable. |
| *Bolboschoenus caldwellii* Sea clubsedge | Rare/ - | None | Occurs in shallow, standing, sometimes brackish water, rooted in heavy black mud. No suitable habitat occurs on site. |
| *Brachyscome perpusilla* Tiny daisy | Rare/ - | None | Found on rock plates in grassy woodland. It was recently recorded in a grassy herbfield on very shallow dolerite soils in the Midlands.<br>From within 5 km there exists only a single historical record of low spatial accuracy. |
| *Brachyscome radicata* Spreading daisy | Rare/ - | Very low | The habitat and distribution of *Brachyscome radicata* is poorly understood. It has been recorded from the foothills of Mt Wellington and from montane grassland near Cradle Mountain and the Central Plateau. Its habitat also extends to shrubby forest and wet sclerophyll forest in the east.<br>Three historic records of very low spatial accuracy are known from within 5 km of the study area. A conspicuous species unlikely to have been overlooked. |
| *Caladenia caudata* Tailed spider orchid | Rare / VULNERABLE | None | Varied range and habitat, in the central north: *Eucalyptus obliqua* heathy forest on low undulating hills; the north-east: *E. globulus* grassy/heathy coastal forest, *E. amygdalina* heathy woodland and forest, *Allocasuarina* woodland; and the south-east: *E. amygdalina* forest and woodland on sandstone, coastal *E. viminalis* forest on deep sands. Substrates vary from dolerite to sandstone to granite, with soils ranging from deep windblown sands, sands derived from sandstone and well-developed clay loams developed from dolerite. A high degree of insolation is typical of many sites.<br>Known from 8 records within 5km of the proposed impact area, but none from Hobart. Nearest confirmed populations are in Kingston, Waverley and Rosetta.<br>Very low likelihood of occurrence. |

| Species | Status[33] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[34] |
|---|---|---|---|
| *Caladenia filamentosa* Daddy longlegs | Rare/ - | Very Low | Occurs in heathy and sedgy open lowland forest. Highly fire responsive, most commonly seen in the two seasons following a fire. The most likely area to support this species is the Access Road section on mudstones. *Caladenia* recorded on site, by evidence of leaves, were not flowering during the time of our surveys.<br>Only a single recent record for the species within 5 km. |
| *Caladenia sylvicola* Forest fingers | Endangered/ CRITICALLY ENDANGERED | Very Low | Only recorded in dry forest adjacent to Huon Road, near Hobart. One site is on a highly insolated hillside on well-drained gravelly loam overlying mudstone in heathy/shrubby *Eucalyptus tenuiramis* forest at about 240 m above sea level. A second site is at slightly lower elevation (160 m asl) on a moist, sheltered slope (on a similar substrate), growing among leaf litter and dense shrubs in *E. obliqua* dry sclerophyll forest.<br>No plants have been confirmed in recent years from either site despite regular reinspections at the flowering period by orchid enthusiasts.<br>Occupies dry open eucalypt forest on mudstone-derived soils. 7 records within the 5km all derived from the two known locations. The Access Road may include habitat that corresponds to that favoured by this species but given the scarcity of the species the likelihood is considered to be remote. |
| *Comesperma defoliatum* leafless milkwort | rare/ - | None | Habitat includes wet heathland/sedgeland, buttongrass moorland, coastal low scrub and on the crests of dunes. It has also been recorded from flat alkaline pans. The predominant substrates include peat, quartzite and sand. There is a single historic record for this species.<br>The study area does not contain suitable habitat. |
| *Dianella amoena* Grassland flaxlily | Rare / ENDANGERED | None | Occurs in grasslands mainly on fertile soils in low rainfall areas. No suitable habitat is present. |
| *Epacris virgata* (Kettering) Pretty heath | Vulnerable/ ENDANGERED | None | Occurs among foothills in south-eastern Tasmania in dry sclerophyll forest on hilly terrain at elevations of 10-300 m above sea level, mainly on dolerite, though sometimes close to the geological boundary of dolerite and Permian mudstone. It is generally associated with grassy/heathy *Eucalyptus ovata* woodland and forest but is also occasionally found in grassy/heathy *E. pulchella* woodland and forest.<br>No suitable habitat is present on site and unlikely to have been overlooked. |
| *Eryngium ovinum* Blue Devil | Vulnerable/ - | None | 224 records within 5 km. Not recorded during survey. Known from grasslands and open grassy woodlands often with heavy clay soils.<br>Study area is unlikely to contain suitable habitat. |
| *Eucalyptus risdonii* | Rare/ | None | Restricted to the greater Hobart area (particularly the Meehan Range), with an outlying population |

| Species | Status[33] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[34] |
|---|---|---|---|
| Risdon peppermint | - | | at Mangalore and on South Arm. It occurs on mudstone, with an altitudinal range from near sea level to 150 m above sea level. It can occur as a dominant in low open forest with a sparse understorey on dry, insolated ridgelines and slopes (e.g. with a north-west aspect), and individuals can extend into other forest types typically dominated by *E. tenuiramis* or *E. amygdalina* (but occasionally by other species) on less exposed sites.<br>Although the section above McRobie's Gully is similar habitat to known sites there are no records from the Hobart side of the River Derwent. No plants were recorded in this habitat. This is a distinctive species unlikely to be overlooked.<br>A single specimen of *E. risdonii* is present close to the McRobie's Road entrance to the Access Road end of the site in an area where various native and non-native trees of planted origin occur. This tree is not of natural origin and has been planted. |
| *Euphrasia scabra*<br>Yellow eyebright | Endangered/<br>- | Very Low | Occurs in moist herb/sedge communities in grassy leads in marshes and in drier open grassy areas at the headwaters of creeks. Its habitat is associated with gaps created by grazing, flooding or other disturbance. It has been recorded from scattered sites throughout lowland areas of Tasmania, including the north-west coast, central north, Midlands, Eastern Tiers and around Hobart. However, it is considered to be extinct from many of these sites, and populations are low and transient in areas (Eastern Tiers and Hobart) with the greatest probability of still supporting the species.<br>Previously recorded from the Waterworks Reserve and from the Ridgeway area but now thought to be locally extinct at those sites. A total of 12 records within 5 km the most recent from 2009. The present survey was undertaken prior to the flowering period for this species and none were observed. |
| *Goodenia geniculata*<br>Bent native-primrose | Endangered/<br>- | None | No local records since 1805. Presumed extinct. |
| *Hovea tasmanica*<br>Rockfield purplepea | Rare/<br>- | None | Found on dry rock slopes of predominantly dolerite origin. It is unlikely to be overlooked when flowering which corresponds with the survey time.<br>No suitable habitat in study area |
| *Hyalosperma demissum*<br>Moss sunray | Endangered/<br>- | None | A species of rock plates in grasslands and grassy woodlands on fertile soils.<br>No local records since 1898. Presumed extinct. |
| *Hydrocotyle laxiflora*<br>Stinking pennywort | Endangered/<br>- | None | Historical records only from the area. Now thought to be restricted to sheoak woodlands on the Queen's Domain. |

| Species | Status[33] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[34] |
|---|---|---|---|
| *Isoetopsis graminifolia* Grass cushion | Vulnerable/ - | None | A species of fertile grasslands. Extinct in the local area. |
| *Juncus vaginatus* Clustered rush | Rare/ - | Very low | Typically occurs in marshes and wetlands. Occasional moist depressions within the study area would provide suboptimal habitat only. |
| *Lachnagrostis punicea* subsp. *filifolia* Narrowleaf blowngrass | Rare/ - | None | Associated with coastal environments and not recorded from within the local area since 1929. |
| *Lepidium hyssopifolium* Soft peppercress | Endangered/ ENDANGERED | Very Low | Occurs on fertile soils in dry habitats within the growth suppression zone of shade-bearing trees. Not recorded during the survey. A conspicuous species unlikely to have been overlooked. |
| *Olearia hookeri* Hooker's Daisy Bush | Rare/ - | Very Low | Not found during survey. Found on dry rocky slopes. The study area only provides marginal habitat. |
| *Pellaea calidirupium* Hotrock fern | Rare/ - | None | Known from a single record. Found in relatively arid environments in rock crevices, predominantly in the Midlands and eastern Tasmanian and on dry screes on the edge of the Central Plateau |
| *Pimelea flava* subsp. *flava* Yellow riceflower | Rare/ - | Very Low | A conspicuous shrub that is unlikely to have been overlooked. Most local records are associated with dry forests and woodlands on dolerite derived soils which differ from habitats at the preferred altitude which overly mudstone. |
| *Prasophyllum amoenum* Dainty leek-orchid | Endangered/ ENDANGERED | Very Low | Known from the Snug Tiers and the western summit of Mt Wellington. A high number of records occur on the west of Mt Wellington summit in and near cushion plants in alpine moorland. The rocky habitats associated with the Pinnacle development site are distinct from the cushion moorland and are unsuited to this species. There are no records from the immediate vicinity. |
| *Prasophyllum apoxychilum* Tapered leek-orchid | Endangered/ ENDANGERED | None | In the Hobart area this species is restricted to the Knocklofty Reserve in West Hobart in grassy and scrubby open forest on sandy and clay loams. No comparable habitat in study area. |
| *Prasophyllum castaneum* Chestnut leek-orchid | Endangered/ CRITICALLY ENDANGERED | None | Only known extant populations are on Bruny Island and the Tasman Peninsula. The known sites have highly variable site conditions, so it is difficult to extrapolate on the likely habitat requirements. |

| Species | Status[33] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[34] |
|---|---|---|---|
| *Prasophyllum perangustum* Knocklofty leek-orchid | Endangered/ CRITICALLY ENDANGERED | None | Restricted to the Knocklofty Reserve in West Hobart. The Mount Wellington area, including the Waterworks Reserve, has been extensively searched by orchid enthusiasts for further populations, but to no avail. |
| *Pterostylis squamata* Ruddy greenhood | Rare/ - | Very low | 3 records with low spatial accuracy exists within 5 km of the proposed impact zone. The Mount Wellington area is regularly searched by orchid enthusiasts, meaning that the lack of records in the immediate vicinity of the proposed route can be taken as a reliable indicator of its absence. |
| *Rhodanthe anthemoides* Chamomile sunray | Rare/ - | None | The only regional record for this species on the Tasmanian NVA is from 1898 and with a very low spatial accuracy.<br>Typically, the species occurs in montane grasslands and heathy habitats. Marginal habitat is present on the pinnacle site; however, such as showy species is unlikely to be overlooked in such a visited area. |
| *Rumex bidens* Mud dock | Vulnerable/ - | None | The only regional record for this species on the Tasmanian NVA is from 1891 and with a very low spatial accuracy.<br>It is a semi -aquatic / wetlands species. No suitable habitat occurs within the study area |
| *Scleranthus fasciculatus* Spreading knawel | Vulnerable/ - | Very Low | Only recorded from a few locations in the Midlands and south-east. The vegetation at most of the sites is *Poa* grassland/grassy woodland although in the Hobart area it occurs in lawns and other modified grassy habitats close to the city.<br>Very little suitable habitat within the study area with the most likely being associated with the fire trail area. |
| *Senecio squarrosus* Leafy fireweed | Rare/ - | Very Low | Occupies dry forest habitats and germinates in particularly large numbers in post-fire periods. Previously recorded 84 times within 5 km. A disturbance coloniser and can persist for many years as soil stored seed.<br>Habitat in vicinity typically associated with grassy fertile grasslands and grassy woodlands. Lower altitude habitats are too infertile and unlikely to be suitable. |
| *Thelymitra bracteata* Leafy sun-orchid | Endangered/ - | Very Low | Occurs in open grassy and heathy forest/woodland on mudstone and sandstone. At Rosny Hill site, *Thelymitra bracteata* is most abundant on the top of the hill on open ground with dense exotic grasses and sparse in a remnant patch of native grass close to *Allocasuarina verticillata* woodland. At Conningham, the species occurs in a canopy gap created by a rough track amongst heathy *Eucalyptus amygdalina* forest on Triassic sandstone.<br>A single record only from within 5 km from the 1970's. Typically occurs on sedimentary substrates. Some marginal habitat along the Access Road although skeletal mudstone derived soils not likely to be suited. |

| Species | Status[33] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[34] |
|---|---|---|---|
| *Thelymitra inflata* Inflated sun-orchid | Rare/ - | Very low | The species grows in areas of slightly impeded drainage in open forest and woodland on clay loam soils. The populations are of very restricted nature in the vicinity of Ridgeway. Despite survey at peak flowering during December no further populations have been found. |
| *Velleia paradoxa* Spur velleia | Vulnerable/ - | Very low | Occurs in stony grassland typically on fertile sites in low rainfall zones typically in *E. viminalis* woodland. In Hobart it is known form Mt Stuart. Lower altitude sites are on mudstone and considered sub optimal for the species. |
| *Veronica notabilis* Forest speedwell | X(Endangered) / - | None | The only regional record for this species on the Tasmanian NVA is from 1892 and with a very low spatial accuracy. This was recently rediscovered on the slopes of Mt Arthur in northern Tasmania at 900m altitude in *E. delegatensis* forest.<br>The most likely suitable habitat is at the mid tower site although unlikely to have been overlooked. |
| *Vittadinia burbidgeae* Smooth New Holland daisy | Rare/ - | Very Low | The species typically occurs on dry and fertile grassy sites. Unlikely to have been overlooked. The lower sections provide the most likely habitat although the mudstone soils are not typical habitat. |
| *Vittadinia cuneata* var. *cuneata* Fuzzy New Holland daisy | Rare/ - | None | From the region this species exists as two historic records from the Queens Domain. The species typically occurs on dry and fertile grassy sites. Unlikely to have been overlooked. The lower sections provide the most likely habitat although the mudstone soils are not typical habitat. |
| *Vittadinia gracilis* Woolly New Holland daisy | Rare/ - | Very Low | The species typically occurs on dry and fertile grassy sites. Unlikely to have been overlooked. The lower sections provide the most likely habitat although the mudstone soils are not typical habitat. |
| *Vittadinia muelleri* Narrowleaf New Holland daisy | Rare/ - | Very Low | The species typically occurs on dry and fertile grassy sites. Unlikely to have been overlooked. The lower sections provide the most likely habitat although the mudstone soils are not typical habitat. |
| *Westringia angustifolia* Narrowleaf westringia | Rare/ - | None | Occurs mainly in mid elevations, always on dolerite (but can be close to dolerite-sediment contact zones), in dry to wet sclerophyll forest on broad ridges, slopes and dense riparian shrubberies.<br>A distinctive species unlikely to have been overlooked. More likely to occur in riparian habitats. |
| **Additional species included in the EPBC Protected Matters Search Tool but not on the NVA 5km buffer** | | | |
| *Colobanthus curtisiae* Curtis's colobanth | Rare/ VULNERABLE | None | When first described, *Colobanthus curtisiae* was understood to occur in native grassland and grassy woodland (the type location is a grassy *E. pauciflora* woodland on a small basalt hill) but also extending to subalpine low vegetation (Ben Lomond area). This species is now known to occur in |

| Species | Status[33] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[34] |
|---|---|---|---|
| | | | lowland grasslands and grassy woodlands but is also prevalent on rocky outcrops and margins of forest on dolerite on the Central Highlands (including disturbed sites such as log landings and snig tracks).<br>There are no records form the Wellington Range which is 40 km south of the southern extent of the species range.<br>The status at the State level is inconsistent with the national listing. |
| *Glycine latrobeana* Clover glycine | Vulnerable/ VULNERABLE | None | Occurs in a range of habitats, geologies and vegetation types. Soils are usually fertile but can be sandy when adjacent to or overlaying fertile soils. The species mainly occurs on flats and undulating terrain over a wide geographical range, including near-coastal environments, the Midlands, and the Central Plateau. It mainly occurs in grassy/heathy forests and woodlands and native grasslands.<br>Subalpine records are few and there are none from the Wellington Range. The nearest confirmed record is more than 10 km to the northwest. |
| *Xerochrysum palustre* Swamp everlasting | Vulnerable/ VULNERABLE | None | Has a scattered distribution with populations in the north-east, east coast, Central Highlands and Midlands, all below about 700 m elevation. It occurs in wetlands, grassy to sedgy wet heathlands and extends to associated heathy Eucalyptus ovata woodlands. Sites are usually inundated for part of the year. This is distinct from Victoria where it also extends into subalpine areas.<br>There is no suitable habitat in the project area. The nearest known population is near the Hobart Airport more than 20 km to the east. |

### 3.2.1 Threatened species recorded on site

The present survey has recorded one species of threatened flora in the footprint.

*Viola curtisiae* montane ivyleaf violet – rare TSPA

A recent review of this species[39] has revealed that it is not, as had for long been understood, confined to the subalpine woodlands of Mt Field but also occurs in similar habitats on Mt Wellington and Mt Baw Baw in Victoria. In Tasmania it grows in subalpine *Eucalyptus coccifera* woodland on Jurassic dolerite, with an altitude range of known occurrences from 1050 to 1200 metres above sea level. It is reported from the Big Bend and The Lectern on Mt Wellington, approximately 2km north of the Pinnacle.

*Viola curtisiae* is distinguished from other *Viola* taxa in Tasmania by the following combination of characters: stoloniferous, anterior petal not spurred, petals emarginate to shortly bilobed, petals glabrous. *Viola hederacea* has flower scapes that are typically longer than the leaves, a markedly discolorous corolla (pale with darker violet blotches), and lateral petals that are entire and bearded. A third alpine species, *Viola fuscoviolacea*, generally has smaller leaves but is most easily distinguished by the tiny dark purple flowers. The three cannot be separated on leaf characters alone.

Leaves of *Viola* sp. were observed in suitable habitat for *V. curtisiae* on the Pinnacle site in the October survey. Follow up targeted survey conducted in December 2018 and February 2020 confirmed the presence of *V. curtisiae*. In open areas plants form dense mats occupying several square metres. Under shrubs plants are more dispersed and rarely in flower. Surveys conducted by Threatened Plants Tasmania in 2018 have confirmed the species to be widespread across a range of habitats on the Wellington Range including Collins Cap, Tom Thumb, Ice House Track, and Thark Ridge. In some instances, the species was coexisting with *Viola hederacea* and *V. fuscoviolacea*.

It is possible that more than one species occurs at the Pinnacle Centre site although only *V. curtisiae* has been confirmed.


*Plate 11: montane ivyleaf violet Viola curtisiae*

[39] Thiele et al 2018


*Plate 12: Habitat of Viola curtisiae*

### 3.2.2 Other threatened and significant species recorded from the area

Existing records indicate that the lowland dry eucalypt forest between McRobie's Road and the Main Fire Trail support some potential for two threatened orchid species. Neither of these species are listed nationally (EPBCA).

*Corunastylis nuda*, tiny midge-orchid – rare TSPA

This is a tiny ephemeral orchid that is only able to be identified during the summer flowering period, mid Jan-end Feb. There are records within 500 m of Access Road on forest slopes above Old Farm Road. There is also anecdotal report of it being recorded on the slopes above McRobie's Gully[40] and so is considered a moderate likelihood of occurring. Two surveys in consecutive seasons have been conducted for this project with no evidence of its occurrence.

*Corunastylis nudiscapa*, dense midge-orchid – endangered TSPA

This species has been subject to extensive searches since being rediscovered in 2008 after many years of absence. It is now well known from three locations in the South Hobart area, the nearest being 500m south of the Access Road on the south side of Old Farm Road in similar habitat. There are no records from the slopes above McRobie's Gully even though there have been repeated attempts searching for it during the flowering period Feb-April[41]. Two surveys in consecutive seasons have been conducted for this project with no evidence of its occurrence.

Several mature pine daisy bush *Olearia pinifolia* occur in sheltered locations amongst boulders in the vicinity of the Pinnacle Centre (Plate 13). These appear to have survived

[40] M Wapstra pers comm.
[41] M Wapstra pers comm.

fires and may be many decades old. This species is not listed as threatened but is only represented in Wellington Park by occasional individuals sheltered from the impacts of wildfire amongst boulders close to the Pinnacle area, near the Big Bend and from The Lectern. It is widespread in various other alpine environments in Tasmania. Five plants occur close to the edge of the Pinnacle Centre that may be impacted.

*Plate 13: Pine daisybush Olearia pinifolia*

*Table 3: Potential threatened species and risk of occurrence by section*

| Location | Potential species | Risk of occurrence |
|---|---|---|
| Access Road | *Corunastylis nuda*<br>*Corunastylis nudiscapa* | Moderate potential<br>Low potential |
| Base Station and Towers 1 & 2. | None | |
| Temporary Installation Net | None | |
| Summit Centre and Tower 3 | *Viola curtisiae* | Present |

## 3.3 Introduced Plants and Plant Pathogens

### 3.3.1 Weeds

Intact native vegetation in Wellington Park is predominantly weed-free.

A single pine seedling close to the Pinnacle is a notable exception. It was observed growing in a fissure amongst rocks but not expected to be capable of maturing into a tree at that altitude.

In total 39 non-native species were recorded throughout the various surveys, including 7 species of weeds declared under the *Tasmanian Weed Management Act 1999*. All declared species are located within the footprint of the Main Fire Trail in the vicinity of the Base Station or on the Access Road through McRobie's Gully. It is apparent that there is an active weed control program in this Base Station area as all the recorded plants were small and or seedlings.

The declared weeds observed in the Base Station section are mapped Figure 5:

- Blackberry *Rubus fruticosus*,
- Gorse *Ulex europaeus*, and
- Spanish heath *Erica lusitanica*.

Five declared weeds were observed in the road corridor Figure 4:

Boneseed (*Chrysanthemoides monilifera*), Montpellier broom (*Genista monspessulana*), English broom (*Cytisus scoparius*), gorse (*Ulex europaeus*), and blackberry (*Rubus fruticosus*). All sightings of declared weeds were restricted to the eastern 1 km of the proposed road that runs closest to the McRobie's Gully Waste Management Centre and McRobie's Road.

*Plate 14: Spanish heath seedling common on the Main Fire Trail clearing*

### 3.3.2 Cinnamon root-rot fungus (*Phytophthora cinnamomi*)

Commonly referred to as dieback or root rot fungus, *Phytophthora cinnamomi* (*PC*) is a soil-borne fungus exotic to Tasmania. The fungus is pathogenic, requiring plant tissue as a food source. High degrees of susceptibility to *PC* are known to occur within members of the Ericaceae and Proteaceae[42]. When infected susceptible species display a characteristic progression of morphological traits, beginning with leaf yellowing, progressing to substantive dieback (browning), and ending in death. Other potentially fatal processes, such as drought, can cause similar visual symptoms to *PC*, but the impact of drought at a given location tends to vary less within and between species. Thus, a mosaic of symptomatic and healthy plants can be a good indicator of the presence of *PC*, in particular if symptoms are concentrated in susceptible species and in moist locations. *PC* requires warm moist soils if it is to reproduce and spread. This limits its distribution in Tasmania to areas that are generally below approximately 700 m in altitude. These characteristics means that the susceptibility of the vegetation communities in the study area is generally low.

No signs of *Phytophthora* have been observed during the field surveys.

## 3.4 Fauna of Conservation Significance

### 3.4.1 Habitat assessment

Habitat quality in the survey area varies in relation to potential use by threatened species.

- The Pinnacle area includes massive boulder fields with numerous caves and shelters. Likely to be utilised by smaller vertebrates but as the location is exposed to extreme weather and unlikely to be used for larger vertebrate fauna for much of the year although Bennett's wallaby *Macropus rufogriseus* is resident in warmer months.
- The rock scree at the site for the Temporary Installation Net provides habitat features that are suited to a range of smaller vertebrates and invertebrates.
- The wet forests which retain mature and overmature eucalypts, e.g. upslope of the Base Station, support a diversity of hollow features and large fallen logs. There are obvious den-like hollows at the base of some of the largest trees. Collectively these are a rich resource for hollow nesting birds and mammals, denning animals and a diversity of invertebrates.
- The McRobie's Gully slopes support rocky outcrops (Plate 15) with evident fauna activity and several obvious hollows and small den like caves. There are multiple large trees near the upper sections any of these large enough to carry hollows in the upper branches. Some obvious trunk hollows can be seen from ground-based inspections. Collectively, these provide potentially significant habitat for vertebrates.
- No carnivore scats were located other than those of domestic dogs suggesting that if present they are in low densities.
- Camera traps confirmed the presence of a Tasmanian devil *Sarcophilus harrisii* and an eastern quoll *Dasyurus viverrinus* inspecting a small cave entrance in rocky outcrops in McRobie's Gully. This same entrance was also recorded being utilised by an owlet nightjar *Aegotheles chrisoptus*. An eastern quoll was also captured on a second camera close by. All observations are detailed in Appendix C – Targeted Fauna Survey.

[42] Podger and Brown (1989); Barker and Wardlaw (1995)

- Targeted song meter recording for masked owls *Tyto novaehollandiae castanops* (Appendix C) in the vicinity of the saddle at the top of the Access Road failed to provide any evidence.

### 3.4.2 Nearby records and habitat mapping

Several threatened and/or migratory fauna are identified as having the potential to occur in the study area based on broad scale habitat mapping presented within the EPBC Protected Matters database or have verified observations within 5 km according to the Tasmanian Natural Values Atlas. Table 4 provides a description of the preferred habitat of these species and an assessment of the likelihood of their occurrence[43].

*Plate 15: Rocky outcrops on upper slopes of McRobie's Gully*

[43] Note, obligate marine species are also excluded, as the proposal will have no conceivable impacts on such species.

*Plate 16: Likely tree hollows in* E. obliqua *McRobie's Gully section*

*Table 4: Fauna species of conservation significance known within a 5 km radius of the survey area, or with the potential to occur based on EPBC habitat mapping* [44]

| Species | Status[45] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[46] |
|---|---|---|---|
| **AMPHIBIANS** | | | |
| green and gold frog *Litoria raniformis* | Vulnerable/ VULNERABLE | None | In Tasmania, the species occurs in lowland areas in the south-east and north, breeding in permanent freshwater or slightly brackish habitats, generally with emergent vegetation. It has declined significantly (over 20 %) in range and abundance over the last 10 years, having disappeared from much of the southern range. The nearest confirmed records to Hobart are from Richmond.<br>The study areas are not within 5 km of any previous records of this species nor within 5 km of any core habitat patches according to the NVA. No suitable habitat was observed. |
| **BIRDS**<br>NB Coastal species included in EPBC Protected Matters Search are not considered due to absence of habitat | | | |
| Tasmanian masked owl *Tyto novaehollandiae castanops* | Endangered/ VULNERABLE | Moderate | Requires a mosaic of forest and open areas for foraging and large old-growth hollow-bearing trees for nests. Core range covers all habitat below 600 m a.s.l, but significant habitat is dry forest with mature habitat elements within that range[47].<br>There are two records on NVA of birds observed within 500m of the lower development area. There are old-growth trees with the potential of supporting nesting hollows in the vicinity of the Base Station, Towers 1 and 2 and along sections of the Access Road. |
| Tasmanian azure kingfisher *Ceyx azureus* subsp. *diemenensis* | Endangered/ ENDANGERED | None | A single record only from within 5 km. Species primarily utilises riverine environments, particularly in western Tasmania.<br>No suitable habitat on site. |

[44] NVA reports_ 8 & 9-Oct-2018 (DPIPWE), DPIPWE, 2018. EPBC Act Protected Matters Report, Commonwealth of Australia, 29/10/2018.
[45] Tasmanian *Threatened Species Protection Act 1995*, Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
[46] Threatened Species Section (2018)
[47] FPA (2014)

| Species | Status[45] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[46] |
|---|---|---|---|
| Swift parrot *Lathamus discolor* | Endangered/ ENDANGERED | Foraging: Moderate<br>Nesting: Moderate | The site is located within the core breeding and foraging range of the species. 2 records from within 500 m, but numerous records from within 5 km. Nesting habitat requires tree hollows, foraging habitat includes flowering blue gums (*Eucalyptus globulus*) and/or black gums (*E. ovata*).<br>Localised patch of foraging/nesting habitat at start of Access Road near McRobie's Rd. Large hollow bearing trees along the upper section of the Access Road, near the Base Station and Towers 1 and 2 provide both potential foraging (blue gums) and nesting habitat. |
| Forty-spotted pardalote *Pardalotus quadragintus* | Endangered/ ENDANGERED | Very Low | No records from within 500 m, 10 records within 5 km. Primarily restricted to 5 locations along the east coast: Flinders Island, Maria Island, Bruny Island, Howden and Tinderbox. Species occurs in dry grassy forest containing mature white gum (*E. viminalis*).<br>No likelihood of breeding colonies on site, White gums are occasional in forest along the route of the Access Road. These may provide foraging habitat for non-breeding birds. |
| grey goshawk<br>*Accipiter novaehollandiae* | Endangered/ - | Foraging: Low<br>Nesting: Low | In Tasmania, the grey goshawk is a large, pure white raptor. The species nests in mature wet forest, usually near a watercourse. Non-breeding birds can utilise open woodland and urban fringes for foraging. Most nests are in the north and west of the State, but smaller breeding populations also occur in the south-east including the North West Bay catchment of Wellington Park and potentially elsewhere.<br>Marginally suitable foraging habitat, nearest potentially suitable nesting habitat is in Myrtle Gully approx. 500 m SW of the Base Station below the route of the cableway. |
| Tasmanian wedge-tailed eagle *Aquila audax* ssp. *fleayi* | Endangered/ ENDANGERED | Foraging: Moderate<br>Nesting: Very Low | Pairs of the wedge-tailed eagle defend a large territory, nesting in patches of mature forests with sheltered aspects throughout Tasmania. The total adult population has been estimated at less than 1000 birds. While individual responses vary, disturbance occurring even many hundreds of metres away can cause breeding birds to temporarily leave eggs or chicks at risk, or even to desert their nest site for years. Disturbances involving helicopters can be particularly serious. Disturbances involving people tend to be more serious when the disturbance is atypical.<br>No nest for this species is known from the vicinity with the nearest nests on the north side of the Wellington Range.<br>Viable nesting habitat occurs in the wet eucalypt forest north of the Base Station area in the |

| Species | Status[45] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[46] |
|---|---|---|---|
| | | | upper catchment of McRobie's Gully on steep easterly facing slopes supporting large trees. The proximity of this habitat to the landfill site, recreational bike riders and walkers is likely to make the area unattractive to breeding birds. |
| white-bellied sea eagle<br>*Haliaeetus leucogaster* | Vulnerable/ | Very Low | A species largely of coastal environments or large inland waterbodies.<br>No nest for this species is known from the vicinity.<br>As for the previous species likelihood of nesting is area is very low. |
| Australasian bittern<br>*Botaurus poiciloptilus* | - /<br>ENDANGERED | None | The Australasian bittern occurs mainly in densely vegetated freshwater wetlands and, rarely, in estuaries or tidal wetlands.<br>No suitable habitat occurs within the study area. |
| **INVERTEBRATES** | | | |
| *Antipodia chaostola leucophaea*<br>Tasmanian chaostola skipper | Endangered/<br>ENDANGERED | None | No record from within 500 m of the proposal and 3 from within 5 km. It has been recorded from Knocklofty Reserve to the north of McRobie's gully. Key habitat is associated with the larval food plant, the thatch saw sedge *Gahnia radula* which grows in heathy woodland and open forest.<br>Only potential habitat for this species is in the Access Road section although no observations were made of the *Gahnia radula*. |
| *Discocharopa vigens*<br>Ammonite snail | Endangered/<br>CRITICALLY ENDANGERED | None | This is a tiny land snail that has been recorded from just seven locations around Hobart, of which it has only been confirmed in recent years from two despite numerous targeted surveys. It is typically located beneath dolerite rocks. The nearest known populations are close to the Access Road at Hillgrove and near Sandy Bay rivulet south of Huon Rd.<br>The rock type along the corridor of the Access Road is sedimentary and so not consistent with known habitat for this species. Dolerite is only present at higher elevations in the project area well outside the altitudinal range for the species. |
| *Lissotes menalcas*<br>Mount Mangana stag beetle | Vulnerable/<br>- | Low-moderate | A species associated with decaying logs in wet forests. There is one record within 500m from 1910 and 3 within 5 km. Suitable habitat is present on site within WOB and WGL near the lower towers in the form of large rotting logs. |

| Species | Status[45] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[46] |
|---|---|---|---|
| | | | It is possible that the quality of the habitat has been compromised due to 2 severe bushfires in the time since the last nearby record. |
| *Exquisitiropa agnewi* Silky snail | Rare/ - | Moderate-High at the Temporary Installation Net. Low-moderate Pinnacle Centre | This species is endemic to Mt Wellington where it has been collected in amongst leaf litter especially under dolerite scree. The NVA lists 6 records from within 500 m and 30 within 5 km. Restricted to dolerite talus on Mount Wellington between 550-1200 m. The site for the Temporary Installation Net has suitable habitat with dolerite scree being common and known records nearby. The Pinnacle Centre may also occur within suitable habitat considering recent records from the vicinity (Bonham 2018). |
| **FISH** | | | |
| Australian grayling *Prototroctes maraena* | Vulnerable/ VULNERABLE | None | A diadromous species (*i.e.* one that has both marine and freshwater stages of its lifecycle) that occurs in major rivers and unpolluted streams with large pools, particularly in low and mid-catchment areas where there are no barriers to the sea. Adults spawn in streams over gravel beds and the young migrate to sea for a period before moving back into rivers. No suitable breeding habitat occurs within the study area. The impact area is in the catchment of the Cascade Rivulet however urban development and channelization downstream has reduced water quality and structure of the waterway. |
| **MAMMALS** | | | |
| spotted-tailed quoll *Dasyurus maculatus* subsp. *maculatus* | Rare/ VULNERABLE | Foraging: low Denning: very low | This naturally rare forest-dweller occurs widely in Tasmania and most commonly inhabits rainforest, wet forest and blackwood swamp forest. It forages and hunts on farmland and pasture, travelling up to 20 km at night, and shelters in logs, rocks or thick vegetation. One observation on NVA is attributed to within 500 m of the of the proposal and a further 12 within 5 km. Parts of the study area may occur within the home range of resident spotted-tailed quolls; however, the location is outside the core range. No evidence of scats was observed. Denning habitat can include rocky outcrops, large logs and underground hollows. Potential denning habitat is widespread across the slopes of Mt Wellington including sections within the lower tower sites. |

| Species | Status[45] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[46] |
|---|---|---|---|
| eastern quoll *Dasyurus viverrinus* | / ENDANGERED | Foraging: Present<br>Denning: Moderate | The eastern quoll is widespread in Tasmania and was previously widespread in mainland south-eastern Australia but has been effectively extinct there since 1963 (some reintroductions have occurred). Not currently listed as threatened species within Tasmania under the TSPA.<br>The species' distribution is associated with areas of lower rainfall and cold winter minimum temperatures. It is found in a range of vegetation types including open grassland (including farmland), tussock grassland, grassy woodland, dry eucalypt forest, coastal scrub and alpine heathland, but is typically absent from large tracts of wet eucalypt forest and rainforest. This species will often be observed around dwellings in peri-urban locations. The lower section of the proposal is within core habitat for the species.<br>The species has 16 observation record attributed to within 500m and 66 within 5 km of the survey area, including very recent sightings.<br>Potential den sites are widespread in the area and may extend into the vicinity of the Base Station and Access Road. Activity near Access Road was recorded. |
| eastern-barred bandicoot *Perameles gunnii gunnii* | -/ VULNERABLE | Moderate | This species occurs in agricultural areas in the state's southeast, northeast and northwest. It favours a mosaic of open grassy areas for foraging and thick vegetation cover for shelter and nesting. Removal of plant cover in agricultural areas is seen as one of the main threats to the species.<br>A single observation records of this species is known within 500 m of the lower section of the proposed development from 2014. Core range habitat is present within the lower portion of the proposed development area. The most likely areas to support this species are the properties with pasture and gardens with forest interface. Bandicoots may forage in the grassy habitats of the Main Fire Trail near the Base Station site. |
| Tasmanian devil *Sarcophilus harrisii* | Endangered/ ENDANGERED | Foraging: Present<br>Denning: Low – restricted to fallen logs | The Tasmanian devil occupies a wide range of habitats across Tasmania and exploits landscapes with a mosaic of pasture and forest with elevated prey densities and is attracted to roadkill hotpots with concentrated scavenging resource. Populations have declined substantially since the first observations of the infectious cancer Devil Facial Tumour Disease (DFTD). DFTD has now spread across much of Tasmania. The reduced population is also likely to be more sensitive to additional threats such as death by roadkill, competition with cats and foxes, and loss or disturbance of areas surrounding traditional dens where young are raised. The protection of breeding opportunities is particularly important for the species due |

| Species | Status[45] TSPA / EPBCA | Potential to occur | Observations and preferred habitat[46] |
|---|---|---|---|
| | | | to the mortalities from demographic pressures.<br>There are no records on NVA within 500m of the proposed development area, however there are 49 within 5 km. No potential den locations were observed during ground searches.<br>Denning habitat can include rocky outcrops, large logs and underground hollows. Potential denning habitat is widespread across the slopes of Mt Wellington including sites in the vicinity of much of the project area. Activity near Access Road was recorded |
| **REPTILES** | | | |
| Tussock skink<br>*Pseudemoia pagenstecheri* | Vulnerable/<br>- | None | Occurs in *Poa* tussock grassland and *Themeda* grassland without trees. No suitable habitat is present within survey area. Nearest record from Queens Domain. |

# 4 ASSESSMENT OF IMPACT AND MITIGATION

## 4.1 The Impact

All vegetation clearance will be confined to the development footprint. The Construction Methods report included with the DA (VOS dated 2 Nov 2018) articulates how operations will be conducted. The following statements draw heavily from that document supplemented with verbal advice from the author (Mark Millhouse, VOS) over a number of specific matters.

### 4.1.1 Access Road

Figure 4 presents the footprint in relation to the ecological survey results.

The road design was used to inform the survey area and was buffered by 5m. This defines the 'disturbance footprint'. No disturbances outside this corridor are anticipated.

### 4.1.2 Base station

Figure 5 presents the footprint in relation to the ecological survey results.

All laydown areas and site offices will be located in the area of the future car park. Access will utilise the proposed access road. All of the disturbances are anticipated to fall within the footprint of the investigation area. Construction access will be via the newly constructed access road. Laydown and site office will utilise the newly constructed car park.

Disturbance (other than requirements for bushfire hazard management) will be confined to less than 4m buffer around the edge of the building design. This defines the 'disturbance footprint'.

The bushfire hazard management area[48] is defined separately as it will not result in conversion to impervious surfacing, but it will require the removal of trees and other woody vegetation within the requisite zone of management (Figure 5).

### 4.1.3 Towers 1 and 2

Figure 6 present the 'disturbance footprint' in relation to the ecological survey results.

Preliminary geotechnical investigations will utilise a small drilling rig that will be helicoptered in onto a temporary treated pine platform (2.4m x 2.4m). Materials for the platform will be carried in by hand or lowered in by helicopter.

The tower footprints are less than 10m x 10m, inside the survey area. No machinery access tracks are proposed to either tower. A walking track for maintenance purposes will be built by hand and will connect the Base Station to the tower sites (300m). This will follow a course beneath the cableway which has been included in the ecological surveys. This foot track can be used for personal access for construction work and for future maintenance. A small excavator and tower material will be lowered in by helicopter directly to the tower site footprints.

[48] Castellan Consulting 2021

Concrete for footings will be pumped from trucks parked in the newly constructed car park. The pipes will be laid along the foot track extending for 300m.

The proponents[49] indicate that the extent of clearance for the cableway is minimal with a 9m corridor of foliage needing to be cleared between the Base Station and Tower 1 as the cable car ascends through the canopy. From Tower 2 the route is understood to be well clear of the canopy for the remainder of the journey. The risk of tree fall threatening the stability of towers may need to be determined to understand whether surrounding trees would be considered a hazard. If this were the case, then the scale of impact could be significantly larger.

### 4.1.4 Tower 3

Figure 9 presents the development in relation to the ecological survey results.

Preliminary geotechnical investigations will utilise a small drilling rig that will be helicoptered in onto a temporary treated pine platform (2.4m x 2.4m). Materials for the platform will be carried in by hand or lowered in by helicopter. Route for foot traffic must be clearly defined and locations of sensitive vegetation identified to ensure their protection.

Access is via the Pinnacle Centre site. Access by foot can be achieved utilising an existing foot pad created by rock climbers. The extent of disturbance has been contained within the area surveyed.

Concrete footings will be pumped using a pipe combining rigid 3.6m sections of solid pipework. Flexible rubber houses can also be utilised if necessary. These will be laid over the vegetation. Where practical the foot pad can be followed. Considering the low-lying vegetation and exposed rocks this can be achieved with minimal impact to vegetation.

For all construction work a Helicopter Use Plan will be developed which specifies routes and includes procedures to minimise risk of interactions with wedge tailed eagles.

### 4.1.5 Pinnacle Centre

Figure 9 presents the Pinnacle centre design in relation to the ecological survey results. The 'disturbance footprint' for the Pinnacle Centre includes the new walkway, the Pinnacle Centre buffered by 2m and the area of the temporary ramp.

Preliminary geotechnical investigations will utilise a small drilling rig that will be helicoptered in onto a temporary treated pine platform (2.4m x 2.4m). The drill rig is a purpose built for remote area exploration drilling and is lightweight and able to be transported by helicopter (Appendix E). Materials for the platform will be carried in by hand or lowered by helicopter. Any sensitive habitats such as the patch of montane violet (*Viola curtisiae*) will be marked by an ecologist to avoid inadvertent impacts.

Laydown and Site Office will utilise the existing Pinnacle car park. Impacts to routine car parking are not known but should be managed to avoid overflow impacts.

[49] A Bold pers com

Disturbance outside the building will mostly be in the form of compaction arising from construction activities. The bushfire hazard management area is confined to 1m from the building edge [50]. Plate 1 in Appendix F shows the Maydena Eagles Eyrie main building in relation to surrounding vegetation. This is a comparable structure in a comparable mountain top location.

Access to the site of the main structure will be achieved using a temporary ramp that will extend on the south side of the existing viewing structure. A 4m by 75m ramp will be bolted to rocks. No excavations are required for the construction of this ramp. Plates 2 and 3 Appendix F identify a similar structure at Maydena. This will be in place for 14-15 months and removed at completion of construction. No lasting impact to vegetation is anticipated. However, short term impacts will be very much dependent on the height and gap above existing vegetation to allow space for light and moisture to maintain the flora. All site office, laydown etc will be contained within the existing car park.

## 4.2 Native Vegetation Communities

Table 5 summarises the anticipated extent of clearance associated with each aspect of the project.

- Disturbance along the Access Road is limited to the design corridor which includes the full extent of cuttings and embankments, plus a nominal buffer of 5m.
- The Base Station is largely confined to the existing fire trail. There appears to be some minor vegetation clearance required for the upper car park (Figure 5). Additional vegetation clearance for bushfire hazard management will involve clearance of WOB vegetation and conservation significant trees (Figure 5).
- The tower sites are limited to a 12 m diameter footprint – all infrastructure to be lowered in by helicopter.
- There will be no clearance associated with the cable infrastructure other than the section between the Base Station and first tower where canopy removal is anticipated.
- Vegetation disturbance for the summit infrastructure will not extend more than 2m from the design plan footprint.
- The new boardwalk will not disturb any more than the its own surface area cover.

The 'disturbance footprint' of the development on the Pinnacle has been identified as 4330 sqm (2120 sqm for the Pinnacle Centre, 1140 for the 2m buffer for BHM and construction impacts, 270 sqm for the temporary access ramp, 690 sqm for the boardwalk and access steps and 110sqm for the Tower site) (Figure 10). Note the existing walkway will be removed allowing the full recovery of HHE over 210 sqm. Following this and the removal of the temporary access ramp the Permanent footprint of impact will be able to be reduced to 3850 sqm.

[50] Castellan Consulting 2021

*Table 5: Vegetation impacts by section*

| Location | Vegetation Community | Area of impact | Comment |
|---|---|---|---|
| Access Rd (outside Wellington Park) | DOB<br>DTO<br>DGL | 2.29 ha<br>3.16 ha<br>0.20 ha | Footprint includes earthworks +5m disturbance buffer |
| Base Station incl Towers 1 and 2, car park, firefighting access and road in Wellington Park | WOB<br>WGL<br>DOB | 0.29 ha<br>0.15 ha<br>0.09 ha | Footprint includes design +2m disturbance buffer |
| Base Station Bushfire Hazard Management Area | WOB | 0.37 ha | Effective clearance of the vegetation |
| Temporary Installation Net | DCO | 0.01 ha | Temporary disturbance |
| Tower 3 | HHE | 0.01 ha | Localised disturbance |
| Summit infrastructure incl boardwalk, temporary access ramp | HHE | 0.42 ha | Footprint includes design +2m disturbance buffer Some vegetation will persist/recover beneath the boardwalk and around the boundaries of the summit station |

### 4.2.1 Impact to threatened vegetation

The project area does not contain any nationally threatened ecological communities listed under the EPBCA. It includes two communities listed as threatened on the Tasmanian NCA.

- DGL – *E. globulus* forest – 0.20 ha
- DTO – *E. tenuiramis* forest on sediments – 3.16 ha

The remaining communities are well reserved at the State level. One other community, HHE qualifies as rare at the Bioregional level due to there being approximately 300 ha present.

- HHE – Eastern alpine heathland – 0.43 ha

To further minimise net losses, revegetation could provide mitigation in areas where clearance of native vegetation is not required to be a permanent loss (e.g. construction disturbance footprints)[51]. Suitable revegetation can be selected from the species lists in Appendices A and B.

[51] This will be contingent upon detailed project specifics unavailable at this time

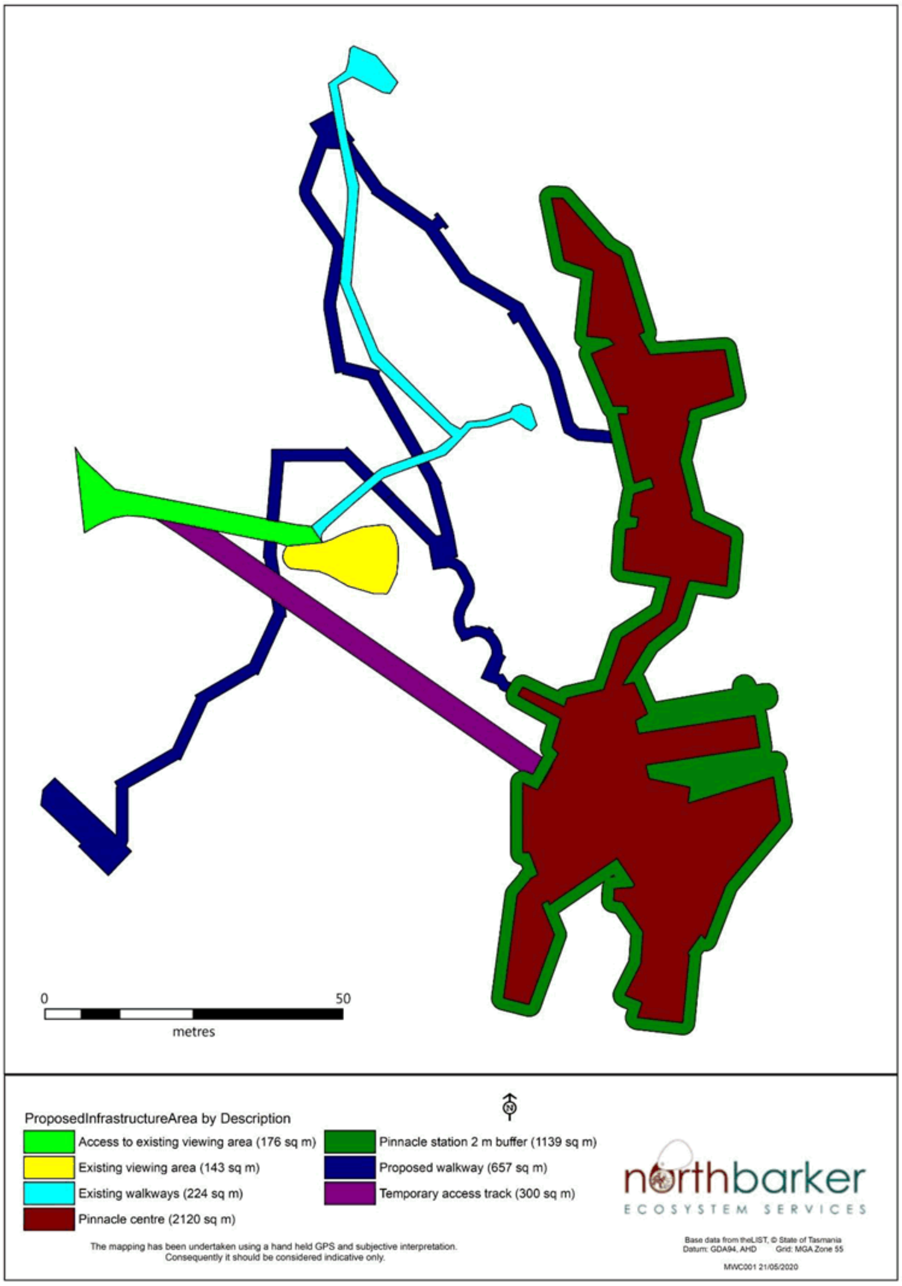


*Figure 10: Summit Infrastructure footprints*

## 4.3 Threatened and Conservation Significant Flora

Section 3.2.1 describes one threatened flora species (*Viola curtisiae*) as being impacted and identifies two others as having varying likelihood of being impacted.

No nationally listed (EPBCA) flora are at risk of being impacted.

*Viola curtisiae* is a tiny herb only recently confirmed from Mt Wellington, being previously thought to be confined to Mt Field. Recent surveys have shown it to be widespread across several widely dispersed locations across the Wellington Range. One patch plus scattered smaller patches are intersected by the Pinnacle Centre. It is likely that targeted surveys in the vicinity would identify many more patches in the Pinnacle area. The scale of impact is not significant in terms of the conservation of the species.

The provision of a Pinnacle Centre rooftop garden may create translocation opportunities for these plants. It is acknowledged however that the chances of success in such an endeavour are unknown.

A significant impact to a threatened flora would occur if a population of the endangered *Corunastylis nudiscapa* were confirmed within the corridor of the proposed Access Road. It is worth noting that previous targeted surveys for this species in the vicinity as well as surveys over two successive years for this project have not been successful, so the likelihood is low. A second less significant midge orchid, *Corunastylis nuda*, listed as rare, has been reported from the McRobie's Gully area although no data exists for the record on the Natural Values Atlas.

## 4.4 Threatened Fauna

### 4.4.1 Tasmanian devil, spotted-tailed quoll and eastern quoll

These species are wide-ranging carnivores, with foraging locations largely driven by prey occurrences rather than habitat types or conditions (more so for the devil than the quolls). Due to the more specific and critical nature of breeding sites (natal dens), these are treated with priority in impact assessments and mitigation measures.

No high-quality denning habitat for Tasmanian devils has been identified in the study area. Dens within the project area include small hollows and shelters. Rocky outcrops occur in the McRobie's Gully section of the Access road which may be utilised by eastern quolls. Rock shelters in the subalpine areas are unlikely to be suitable for denning purposes although they may act as temporary holdups.

Each of the species may use habitat in the vicinity of the Base Station. A Tasmanian devil and eastern quoll have both been observed during camera surveys of the Access Road, however no devil dens were located during extension surveys.

Denning sites of each species, especially natal dens, are located in well concealed locations to provide protection from predators. Habitats in the vicinity of the Base Station support the most favourable sites for these purposes.

Operational impacts arising from the project include the risk of roadkill to animals foraging in the McRobie's Gully area especially after dark. This also extends to prey mortalities resulting in scavenging within the road with consequent roadkill hazard to devils and quolls. Such risks can be mitigated by placing traffic calming devices on the road. Roadkill mitigation strategies for the Access Road are considered in detail in Section 4.6.

Incentives to encourage evening visitors to the Pinnacle Centre to use the cableway will help to offset risk of increased roadkill threat on the Pinnacle Road. Modelling suggests that traffic volume will be reduced on Pinnacle Road[52]. This should result in concomitant reduction in incidences of roadkill on Pinnacle Road itself.

[52] Midson 2018

### 4.4.2 Tasmanian masked owl

Potential habitat for the masked owl is defined as all areas that have trees with large hollows (≥ 15 cm entrance diameter); with trees over 100 cm DBH (diameter at breast height) having a higher probability of containing such hollows. Significant habitat includes native dry forest areas that contain trees with large hollows (≥ 15 cm entrance diameter). Remnants and paddock trees in agricultural areas may also constitute significant habitat if they include large old hollow-bearing trees. Threats to the masked owl include habitat clearing and fragmentation, loss of nesting habitat through tree dieback, competition for tree hollows, secondary poisoning and collision mortality.

Along the alignment of the Access Road there are a number of mature and larger sized trees including some blue gums close to McRobie's Road and stringybarks along the upper section. The placement in dry forest is potentially suitable for masked owls. Tree hollows are not easily discerned from the ground.

The Base Station area is surrounded by large hollow-bearing trees, many with trunk diameters (DBH) > 100 cm. It is likely that some hollows would be suitable for masked owls. These extend to the vicinity of both lower tower sites. This is wet forest which is suboptimal with drier habitats being preferred. No masked owls were recorded during a 3-week period of monitoring using a song meter placed at the saddle at the top of the Access Road which was considered the most likely habitat.

The project is unlikely to change prey densities (including introduced species) resulting in a change to foraging behaviour other than through a heightened risk of roadkill which could attract scavenging animals such as Tasmanian devils. The provision of traffic calming to reduce this risk is discussed in Section 4.6.

Nest trees in close proximity to the Access Road, Base Station and Towers 1 and 2 may be disrupted by the changes in activity resulting from the operations of the cableway.

The extent of likely impacts to potential nesting trees are included in Table 6. These include 24 in Wellington Park and 12 on the Access Road. A subset of these are likely to support hollows of required dimensions.

### 4.4.3 Swift parrot

Swift parrots are annual summer migrants to Tasmania. From August to March they feed primarily on the nectar of the Tasmanian blue gum (*Eucalyptus globulus*) and black gum (*E. ovata*). Breeding occurs in tree hollows in areas adjacent to abundant flowering.

The sections of WGL and WOB forest contain mature blue gums. Due to the stressed condition of the majority of these trees (historic fire damage, small crowns, low crown density and negligible flower capsules) they only constitute low quality swift parrot foraging habitat being unlikely to flower prolifically. A smaller patch of DGL closer to McRobie's Road does support trees that are likely to provide foraging habitat in mast years. Three blue gums were recorded along the remainder of the corridor of the Access Road. Blue gums are also located just upslope of the car park at the Base Station.

Nesting habitat is present in the slopes in the vicinity of the Base Station and may also occur in the vicinity of the Access Road. Nest trees in close proximity to the Access Road, Base Station and Towers 1 and 2 may be disrupted by the changes in activity resulting from the operations of the cableway.

There are blue gums downslope of the fire trail adjacent to the Base Station that may bring birds closer to ground level should they be foraging out of those trees. Any infrastructure provides a potential collision hazard should it be unseen by the birds. Of greatest risk are open fencing, wires and buildings with reflective glass or see through corners. There are standard building design features to minimise bird collision[53]. These should be incorporated into the building design.

Swift parrots are less likely occur at higher altitudes such as the Pinnacle Centre.

Habitat trees accord to accepted standards[54]. Potential foraging trees are *E. globulus* or *E. ovata* with DBH > 40cm. Nesting habitat trees are considered most typically associated with trees with DBH of 70 cm and above recognising that larger diameter trees have a greater potential for hollows. High quality mature habitat trees are those with a DBH > 150 cm in wet forest and >100 cm in dry forest, medium quality mature habitat is defined as trees with a DBH of 70-100 cm in dry forest and 100-150 cm in wet forest.

The extent of impacts to foraging and potential nesting trees are provided in Table 6.

Total numbers of impacted trees include:

- 37 potential foraging trees (*Eucalyptus globulus* with DBH > 40cm); 30 of which are in Wellington Park.
- 18 high quality nesting habitat trees; 6 in Wellington Park and 12 in HCC Access Road.
- 45 medium quality nesting trees; 9 in Wellington Park and 36 in HCC Access Road.
- 11 trees < 70cm but potentially hollow bearing in HCC Access Road.
- Total impact to potential habitat trees includes 91 nesting trees and 37 foraging of which 24 are both nesting and foraging habitat.

Confirmation of nesting habitat presence requires, in most instances, climbing of the tree to provide a high level of confidence, although even then not all hollows can be accessed e.g. spouts at ends of long branches. Some hollows are not observed from the ground and those that are apparent can often be determined to be inadequate on closer inspection. Quantification of tree hollow impacts for offset could be determined by inspecting trees after they have been felled.

#### 4.4.4 Wedge-tailed eagle

Wedge-tailed eagles require large trees capable of supporting the massive nests, usually eucalypts, in sheltered aspects typically high in a gully. The upper catchment of McRobie's Gully provides the necessary attributes suitable for nesting. However, the proximity to the noises and activities of the landfill site and periodic disturbances from cyclist and walkers in the fire trail suggest the area is unlikely to be favoured for establishing a nest. There is no record of nesting on the city side of Mt Wellington. The likelihood of disturbance to breeding is therefore considered to be remote.

The risk of flying into cableway infrastructure warrants consideration. Wedge-tailed eagles suffer mortality from electrocution by colliding with high voltage powerlines. They may also suffer broken wings by such impacts. The cableway cables will extend high above the ground, potentially within flight paths. Cableway cables diameters are significantly larger than transmission line wires and are bundled together. As such they are likely to be more easily seen and avoided. The utilisation of airspace by eagles on the upper slopes of Mt Wellington in front of the Organ Pipes is not known.

Collision risk is considered further in Section 4.5.

[53] Pfennigwerth 2008
[54] Forest Practices Authority 2014

#### 4.4.5 Silky snail

The silky snail habitat is typically associated with dolerite talus with recent records coming from "sparsely vegetated dolerite boulder fields, rocky subalpine woodlands and wet scrub, and rocky areas in alpine scrub and heathland"[55]. The Pinnacle Centre site and temporary tower include habitat for the silky snail.

The size of the footprint in the context of the extent of habitat (Figure 11) suggest impact to the species would be insignificant. A recent review of the silky snail notes that "land clearance within the species' habitat (for instance the proposed building of cable car infrastructure and a tower near the summit) is likely to eradicate the species from areas cleared or built over but will not necessarily affect it beyond that".

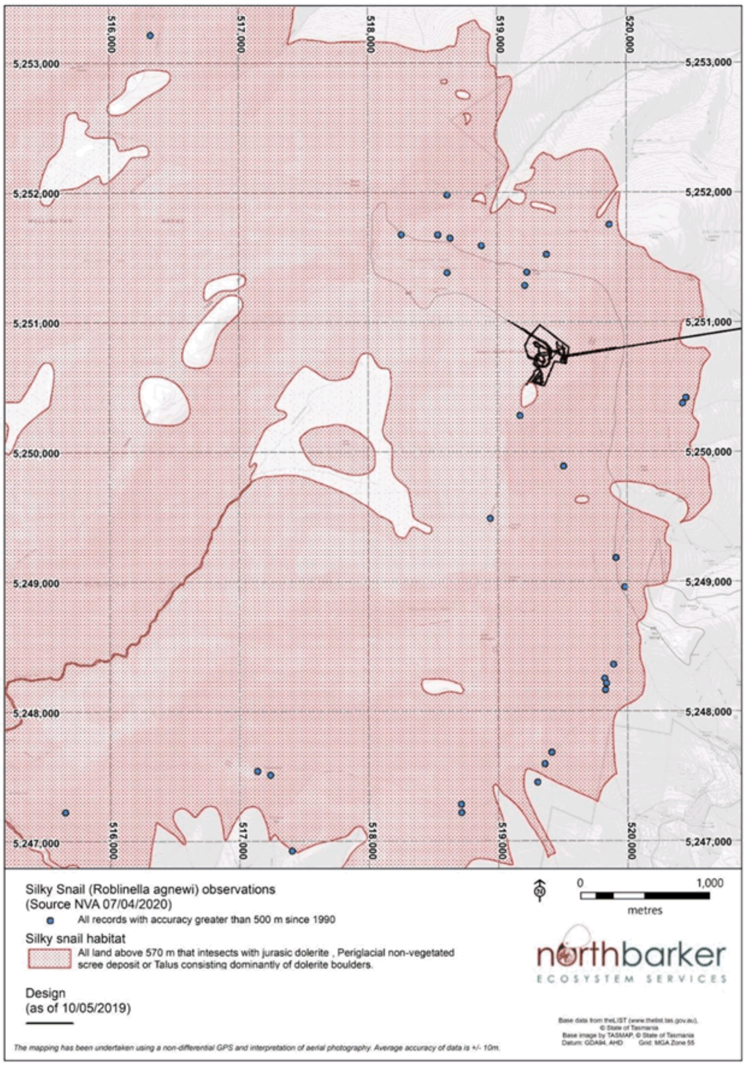


*Figure 11: Silky snail distribution and habitat*

[55] Bonham 2018

### 4.4.6 Habitat Trees

All potentially significant hollow bearing trees, have been surveyed and mapped (Appendix D – Fauna Habitat Tree Assessment). The total expected impact is summarised in Table 6. Trees with an impact >50% to their Tree Protection Zones (TPZ) are treated as being fatally impacted as the tree itself falls inside the footprint of the development. Trees with impact from 10-50% suffer potentially significant encroachment. An impact of <10% is not considered significant in accordance with the Australian standard.

*Table 6: Total predicted impact to habitat trees*

***Large trees (DBH > 70 cm) or ones carrying obvious hollows or hollow-bearing potential if <70cm***

***HCC = Hobart City Council, WPMT = Wellington Park Management Trust***

| Tenure | HCC | | | HCC Total | WPMT | | | WPMT Total | Total |
|---|---|---|---|---|---|---|---|---|---|
| Impacted | <70 | 70 - 100 | >100 | | <70 | 70-100 | >100 | | |
| *Eucalyptus globulus* | 0 | 2 | 1 | 3 | 0 | 0 | 10 | 10 | 13 |
| *Eucalyptus obliqua* | 16 | 34 | 11 | 61 | 0 | 0 | 14 | 14 | 75 |
| *Eucalyptus tenuiramis* | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 3 |
| **Total** | 16 | 39 | 12 | **67** | 0 | 0 | 24 | **24** | **91** |

An Arborist Assessment was conducted in July 2019 by Element Tree Services (Appendix H). This quantified the number of high conservation trees that could be impacted as **74**.

There may be opportunity to reuse tree hollow structures. Sections of branches and even trunks can be relocated and strapped onto nearby trees[56]. The provision of artificial nest boxes can also supplement any losses. This is discussed further in Section 5.5.2 Habitat Enhancement.

*Access Road (HCC & WPMT)*

**36** trees in the road corridor are expected to be critically damaged. It was noted that engineering solutions may be able to reduce this number. In particular, at the stage of detailed design for the road there will be opportunity to investigate further opportunities to reduce the total number of trees impacted, mainly through locally steepening of cuts and fills.

*Base Station and Towers 1 and 2 (WPMP)*

An additional **38** trees will be critically damaged (/removed) around the base station, towers and cable alignment. The major requirement for these losses are the conditions around compliant bushfire hazard management.

Additional trees that may require pruning were determined by the arborist to be unlikely to suffer any major health impacts.

[56] Central Coast Council 2016

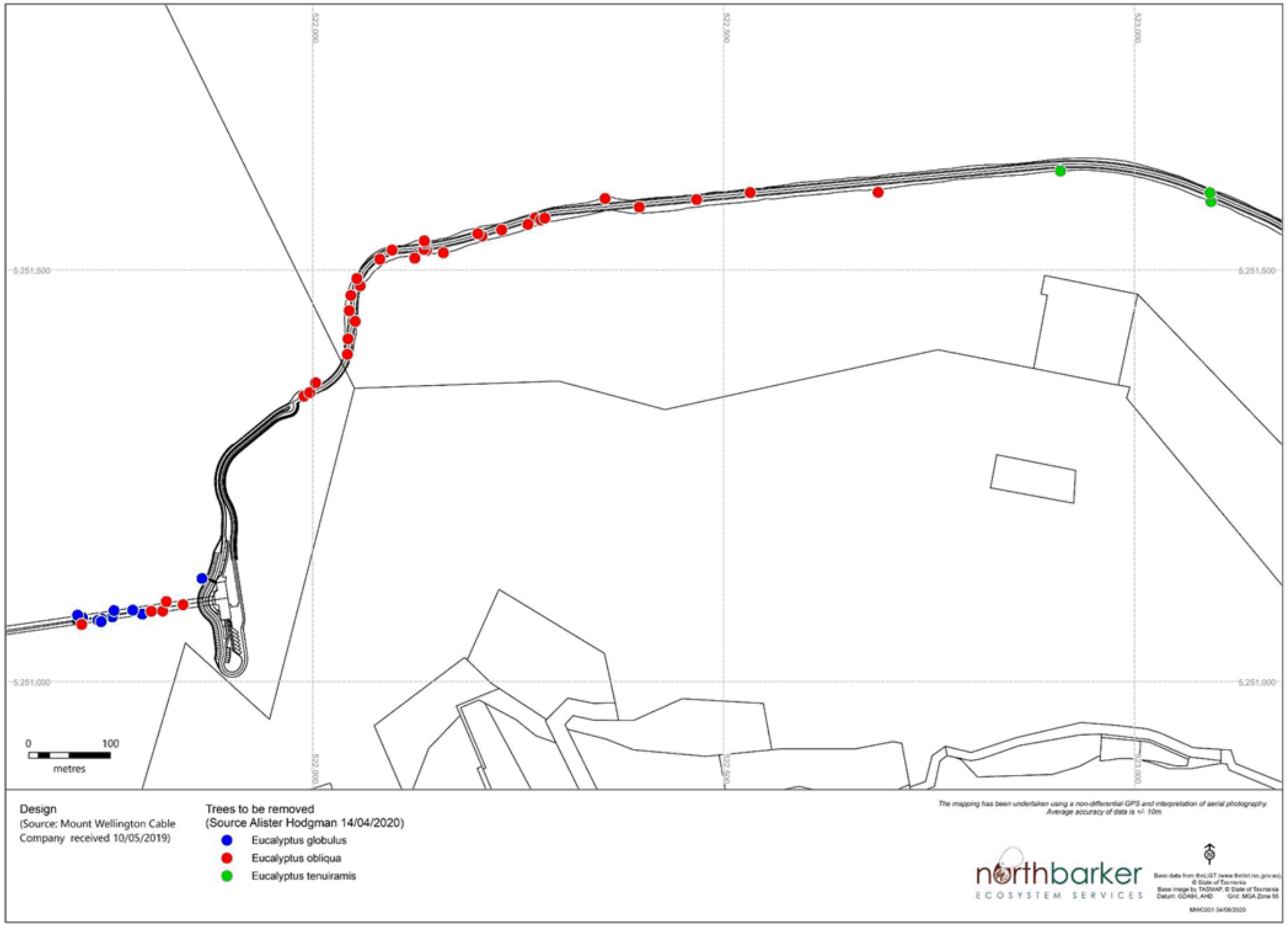


*Figure 12: Impacted Habitat Trees*

## 4.5 Bird collision risk

| ***Note since writing this section a separate stand-alone Collision Risk Report has been prepared in response to Council RFI[57]. Please refer to that.*** |
|---|

There is very little scientific literature relating to the effects of overhead lines on bird mortality in Australia, however some broad lessons can be extracted from existing international research. The rates of bird collision with overhead lines are generally thought to be influenced by several factors associated with engineering aspects of the infrastructure[58]. These include:

- Wire diameter
- Line placement
- Line configuration (vertical or horizontal, number of lines)
- Lighting
- Structure type

The risks associated with each factor are addressed below.

*Wire diameter*

There is a general lack of understanding of the relationship between bird mortalities and overhead line diameter because of the challenge of accurately estimating mortality. This is partially due to the difficulties of locating carcasses of birds that strike lines then survive for a short period ("crippling bias"[59]).

The majority of studies on bird collisions with lines focus specifically on power cables due to their abundance in the landscape. It is generally understood that shield/earth wires (1-1.3 cm) cause the majority of collisions, with the phase conductors (2.5 to 5 cm) posing less risk. Though this may be a combination of the fact that shield/earth wires are generally located above phase conductor lines (*i.e.* collisions occurring when trying to avoid the more obvious and larger lines) and are less visible. The current cableway cable design specifies two sets of a bundle of three (2 x 55 mm and 1 x 40 mm). This far exceeds above parameters. The presence of the cable cars may pose a risk of sudden disturbance to birds in the canopy, causing panic and flush, a contributing factor to incidences of cable collision[60].

It is worth noting that high voltage electricity transmission lines are already present in the vicinity.

*Line placement*

Lines placed in proximity to bird take-off and landing areas can pose a greater than normal risk to birds, in the case of the cableway line the vast majority of take-off and landing areas would be the forest canopy.

*Line configuration*

Line configuration is broadly focused on minimizing the vertical spread of lines, vertical placement of lines, as well as clustering lines that share the same right-of-way in order to increase their visibility. Where lines are placed level with, or below the canopy, there has been shown to be reduced risk of bird mortality[61]. Although it is not feasible in this instance to retain the cabling below the canopy the clustering of the cables in groups of three will increase their visibility.

[57] North Barker Ecosystem Services (2020a)
[58] Avian Power Line Interaction Committee (APLIC) (2012), Bernadino *et al* (2018)
[59] Bech *et al.* (2012)
[60] Avian Power Line Interaction Committee (APLIC) (2012)
[61] Avian Power Line Interaction Committee (APLIC) (2012)

*Lighting*

This refers to towers for lines that have white or red lights to increase visibility. They have been shown (particularly steady-burning lights) to disorientate migrating birds, especially in inclement weather[62], as well as cause birds to circle towers, causing exhaustion, injury, or death. The degree of risk is closely linked to the type and intensity of lights[63]. The extent of permanent lighting is not known but Is not anticipated to be significant in these terms.

*Structure type*

This generally applies to types of towers used and their structural effect on rates of mortality. The structural principles would also apply to any permanent structures aside from the cableway itself. The risk of bird collisions with buildings are closely related to the reflections and transparency of the windows. Glass can reflect the natural environment around it, and this effect increases when glass is viewed from an oblique angle. Birds cannot understand reflection, and they also cannot perceive the difference between clear glass and unobstructed airspace. This is a particularly prominent risk in glass lobbies, balconies, aligned windows, or windows and glass walls that meet at a corner. All these design factors need to be considered when assessing bird collision risk. The elevations in the architectural plans suggest the Pinnacle Centre is set low in the landscape wrapping around the contour. Windows are set back in rather than being proud with many tilted downwards which assists with limiting reflectivity of sky which is known to create the greatest risk of collision hazard.

## 4.6 Roadkill mitigation

***Note since writing this section a stand-alone Roadkill Risk Report and Draft Mitigation Plan has been prepared in response to Council RFI[64]. Please refer to that.***

Several measures can be used to reduce wildlife roadkill. These can be incorporated into a Roadkill Mitigation Plan (before construction. The following methods are considered for the McRobie's Gully access road.

### 4.6.1 Traffic calming

The camera survey confirmed the presence of threatened fauna but did not identify specific areas of increased usage. Speed bumps or chicanes be implemented on the road. The McRobie's Gully Waste Management Centre will attract wildlife as well as the rocky outcrops identified as potential fauna habitat (Appendix C – Targeted Fauna Survey). These areas should be priorities for traffic calming measures, however as a precaution they ought to be spread throughout the full extent of the road.

### 4.6.2 Wildlife signage

Wildlife signs portraying the risk to wildlife and human safety/provide a useful way of alerting drivers to the hazards. As most of the Tasmanian wildlife are nocturnal these signs can also include a regulatory or advisory speed limit from dusk to dawn. A sign can be placed at the start of the Access Road at the halfway point, and at the Base Station for returning visitors. Any signs should follow recommendations for wildlife signs in *Reducing the Incidence of Wildlife Roadkill: Improving the Visitor Experience in Tasmania*[65].

[62] Manville 2009, Gehring et al 2009
[63] Avian Power Line Interaction Committee (APLIC) (2012
[64] North Barker Ecosystem Services (2020b)
[65] Z. Magnus, L.K. Kriwoken, N. Mooney, & M. Jones. *Reducing the Incidence of Wildlife Roadkill: Improving the Visitor Experience in Tasmania,* pp. 8-9.

### 4.6.3 Table drain management

Wildlife can be attracted to the road by water in roadside drains and/or herbaceous vegetation growing by the roadside as a result of run-off from roads. Reducing these resources could reduce the amount of wildlife attracted to the road. To reduce vegetation growth of herbaceous vegetation on the roadside, the affected areas could be sprayed regularly with a biodegradable herbicide. Herbaceous roadside vegetation should not be slashed or mown, as this creates new growth which is attractive to herbivores. To reduce water, drains could be lined with concrete so that the water could drain away quickly rather than pooling in the drains or fill the drains with boulders to prevent access to water while allowing water to flow.

### 4.6.4 Virtual fencing

Given that the camera survey showed devils and quolls using the site, virtual fencing may be effective as an additional roadkill mitigation method. Virtual fencing devices are mounted on a pole and are solar powered. The device is activated by approaching headlights, which cause it to emit sound and light stimuli which alerts, startles and prevents animals from entering the road.

A virtual fence was tested at a site in Arthur River, on Tasmania's north west coast. Devices were installed on both sides of the road, but staggered, so that there was a 50m distance between devices on the same side of the road, and a 25m distance between devices on the opposite side of the road. This creates a virtual fence of noise and light when the devices are triggered by the car headlights. The results of this study showed a reduction in total roadkill, and that of the common species (pademelons and Bennett's wallabies), by 50 percent[66]. As well as reducing direct deaths of animals hit by vehicles, there was a reduction in Tasmanian devils killed while scavenging on roadkill.

### 4.6.5 Underpasses

Underpasses such as a 300-450 mm diameter culvert, could be installed to facilitate wildlife safely crossing the road. They are more likely to be useful for the smaller Tasmanian mammals and those that use burrows (Tasmanian devils, quolls, bandicoots, wombats etc). Likely locations could include a site near the McRobie's Gully Waste Management Centre and adjacent to the potential denning habitat on the upper slopes.

### 4.6.6 Canopy crossings

Canopy crossings are used to ensure that roads do not restrict movement of animals and to reduce roadkill. They have been used in Queensland and at a site in Tasmania for ringtail possums. No ringtail possums were detected during our camera survey of the McRobie's access road and no ringtail possum scats were observed whilst conducting the ground survey, therefore the ecological benefit of installing a canopy crossing is not guaranteed. However, where there are large trees near to the road, some crossings may be pertinent to provide an opportunistic crossing mechanism should any arboreal animals use the area. It is suggested that brushtail possums are more likely to cross at ground level.

### 4.6.7 Escape routes

Banks, cuttings and fences that trap animals on the road are associated with roadkill. In order to increase the likelihood of escape from the road, escape routes could be constructed along the access road. If deep gutters and steep embankments occur along the access road, a ramp connecting the road verge to the top of the

[66] S. Fox, J.M. Potts, D. Pemberton, & D. Crosswell. (2018) *Roadkill mitigation: trialling virtual fence devices on the west coast of Tasmania.* Australian Mammalogy.

embankment could be installed. A drainage pipe incorporated under the ramp will provide temporarily shelter right next to the road. Example designs for effective escape routes for wildlife are detailed in *Reducing the Incidence of Wildlife Roadkill: Improving the Visitor Experience in Tasmania*[67].

## 4.7 Weeds

Earthworks associated with clearance and infrastructure construction present a risk of spreading weeds, both onsite and offsite. Development activities for this proposal may result in the spread of the seven declared weeds present at the lower section of the Access Road and in the vicinity of the Base Station.

The major area of weed infestation is confined to the first section of the Access Road adjacent to McRobie's Road. Any works in this area will risk spreading weed propagules elsewhere along the Access Road. Earthworks in this area will stimulate further weed growth.

Three declared weeds recorded in the fire trail close to the Base Station are mostly localised although spanish heath seedlings are common. Disturbances will stimulate germination of soil borne seed.

The risk of introducing or spreading weeds near the summit is low.

Control of declared and environmental weeds during and following construction will minimise the risk of their spread and the introduction of new weeds. Weed control should include preliminary weed removal prior to civil works and be supplemented by follow-up measures to target any regenerating plants post-construction. During construction, weed management should include wash-down of earth-moving machinery before leaving the site in order to prevent the transport of fertile material[68]. These methods can assist in significantly reducing the chance of weeds being spread on and off site. Project specific measures can be incorporated into a weed and hygiene protocol under a Construction Environmental Management Plan.

The ongoing risk of future introductions will be a consequence of a new Access Road. Management of this threat will necessitate ongoing monitoring and response during the operational phase of the project.

## 4.8 Phytophthora cinnamomi

The movement of soil and machinery during the earthworks process poses a risk of introducing and/or spreading *Phytophthora cinnamomi* (PC). However, given the habitats the risks are confined to the section between McRobie's Road and the Base Station.

Best practice hygiene measures[69] during construction will minimise the risk of introducing and spreading PC.

[67] Z. Magnus, L.K. Kriwoken, N. Mooney, & M. Jones. *Reducing the Incidence of Wildlife Roadkill: Improving the Visitor Experience in Tasmania*, pp. 14-15.
[68] DPIPWE (2015b)
[69] DPIPWE (2015b)

# 5 LEGISLATIVE IMPLICATIONS

## 5.1 Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBCA)

The project will require consideration of the potential for significant impacts on any Matters of National Environmental Significance (MNES), which could trigger the need for assessment as a controlled action under this legislation. The proponent will undertake this with a referral to the federal Department of Agriculture, Water and the Environment, which will include the context of our survey results and discussion.

## 5.2 Tasmanian Threatened Species Protection Act 1995 (TSPA)

Under the TSPA, a person cannot knowingly, without a permit, 'take' a listed species. With the definition of 'take' encompassing actions that kill, injure, catch, damage, destroy and/or collect threatened species or vegetation elements that support threatened species, e.g. nests and dens.

A permit to take a threatened species (*Viola curtisiae*) will likely be required where the project cannot directly avoid known (or future discovered) occurrences of threatened flora.

## 5.3 Tasmanian Nature Conservation Act 1995 (NCA)

Under Wildlife (General) Regulations 2010 Tasmania a permit to take wildlife or product of wildlife will be required for this project if during works any unanticipated discoveries of dens or nests need to be decommissioned or individual threatened fauna are to be impacted or captured.

## 5.4 Tasmanian Weed Management Act 1999 (WMA)

Seven species of declared weeds have been observed in the survey area. The relevant statutory weed management plans define the Hobart City Council as a Zone B municipality for gorse, blackberry, English broom, Montpelier broom, boneseed, Spanish heath and willow.

According to the provisions of the *Weed Management Act 1999*, Zone B municipalities are those which host moderate or large infestations of the declared weed that are not deemed eradicable because the feasibility of effective management is low at this time. Therefore, the objective is containment of infestations. This includes preventing spread of the declared weed from the municipality or into properties currently free of the weed or which have developed or are implementing a locally integrated weed management plan for that species. As well there is a requirement to prevent spread of the weeds to properties containing sites with significant flora, fauna and vegetation communities.

Management of declared weeds is being undertaken in Wellington Park. Weed management will need to be followed to ensure the objectives of the Weed Management Act are met.

## 5.5 Tasmanian Land Use Planning and Approvals Act 1993 (LUPAA)

LUPAA states that 'in determining an application for a permit, a planning authority must (amongst other things) seek out the objectives set out in Schedule 1'[70].

Schedule 1 includes 'The objectives of the Resource Management and Planning System of Tasmania' which are (amongst other things):

[70] Section 51(2)(b) – Part 4 Enforcement of Planning Control – Division 2 Development Control (*LUPPA 1993*)

'To promote sustainable development of natural and physical resources and the maintenance of ecological processes and genetic diversity'.

Sustainable development includes 'avoiding, remedying or mitigating any adverse effects of activities on the environment'[71].

The intent of LUPAA is addressed through relevant provisions in the Hobart Interim Planning Scheme 2015 and the Wellington Park Management Plan 2013.

## 5.6 Hobart Interim Planning Scheme 2015 (HIPS)

The first 900m of the Access Road is within the Utilities Zone (D28), the rest is within the Environmental Management Zone (D29); Figure 13. The Biodiversity Protection Area overlay accords with the Environmental Management Zone and does not extend into the Utilities Zone. The Biodiversity Code (E10) applies to the part of the project within the overlay.

The Pinnacle Centre is located within the Pinnacle Specific Area and as such planning assessment for this area follows the Pinnacle Specific Area Plan (refer Section 5.7.3), although still needs to be assessed under the Environmental Management Zone (5.6.2).

### 5.6.1 Utilities Zone (D29)

There are no provisions relating to the regulation of vegetation clearance. The Development Standards for Buildings and Works (D28.4 do not include any provisions applicable to the access road other than potentially landscaping 28.4.3. The most effective visual break from land in the residential zone would be achieved by retaining as many canopy trees as possible. Some planting around the intersection with McRobies Road would contribute to fulfilling the Performance Criteria P1

### 5.6.2 Environmental Management Zone (D29)

29.1.1 Zone Purpose Statements

1. To provide for the protection, conservation and management of areas with significant ecological, scientific, cultural or aesthetic value, or with a significant likelihood of risk from a natural hazard.
2. To only allow for complementary use or development where consistent with any strategies for protection and management.
3. To facilitate passive recreational opportunities which are consistent with the protection of natural values in bushland and foreshore areas.
4. To recognise and protect highly significant natural values on private land.
5. To protect natural values in un-developed areas of the coast.

Clauses 1 and 2 are relevant to this project and need to be met with appropriate controls on development and mitigation. The development area includes some significant ecological values (notably the alpine habitats near the summit of Mt Wellington, threatened vegetation, and threatened species habitat). Opinions on what constitutes significant aesthetic value is outside the scope of a natural values assessment but is broadly acknowledged as being pertinent to the summit area and slopes of Mt Wellington visible from many parts of Greater Hobart.

[71] page 56 – *LUPPA 1993*

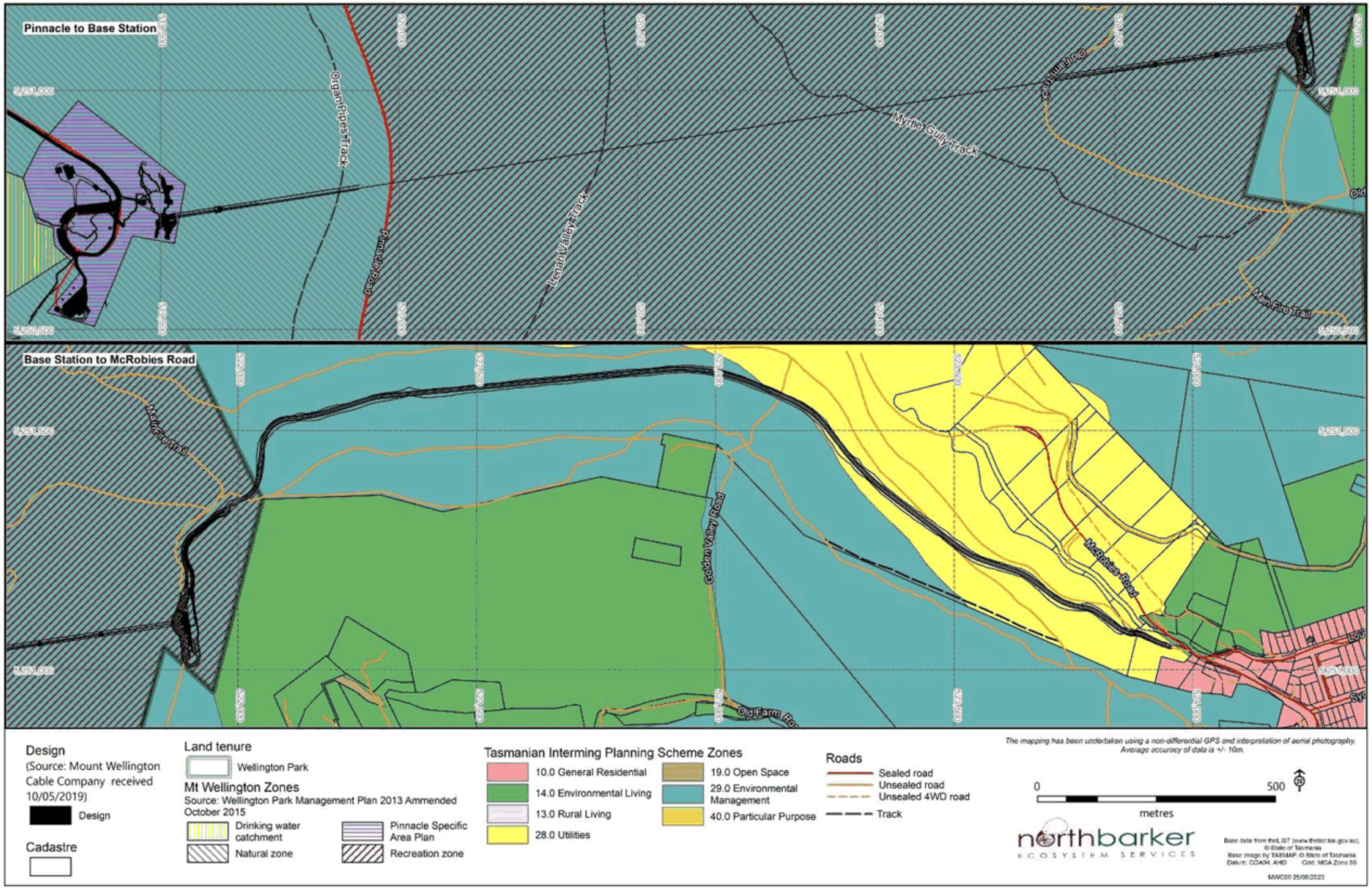


Figure 13: Planning Zones

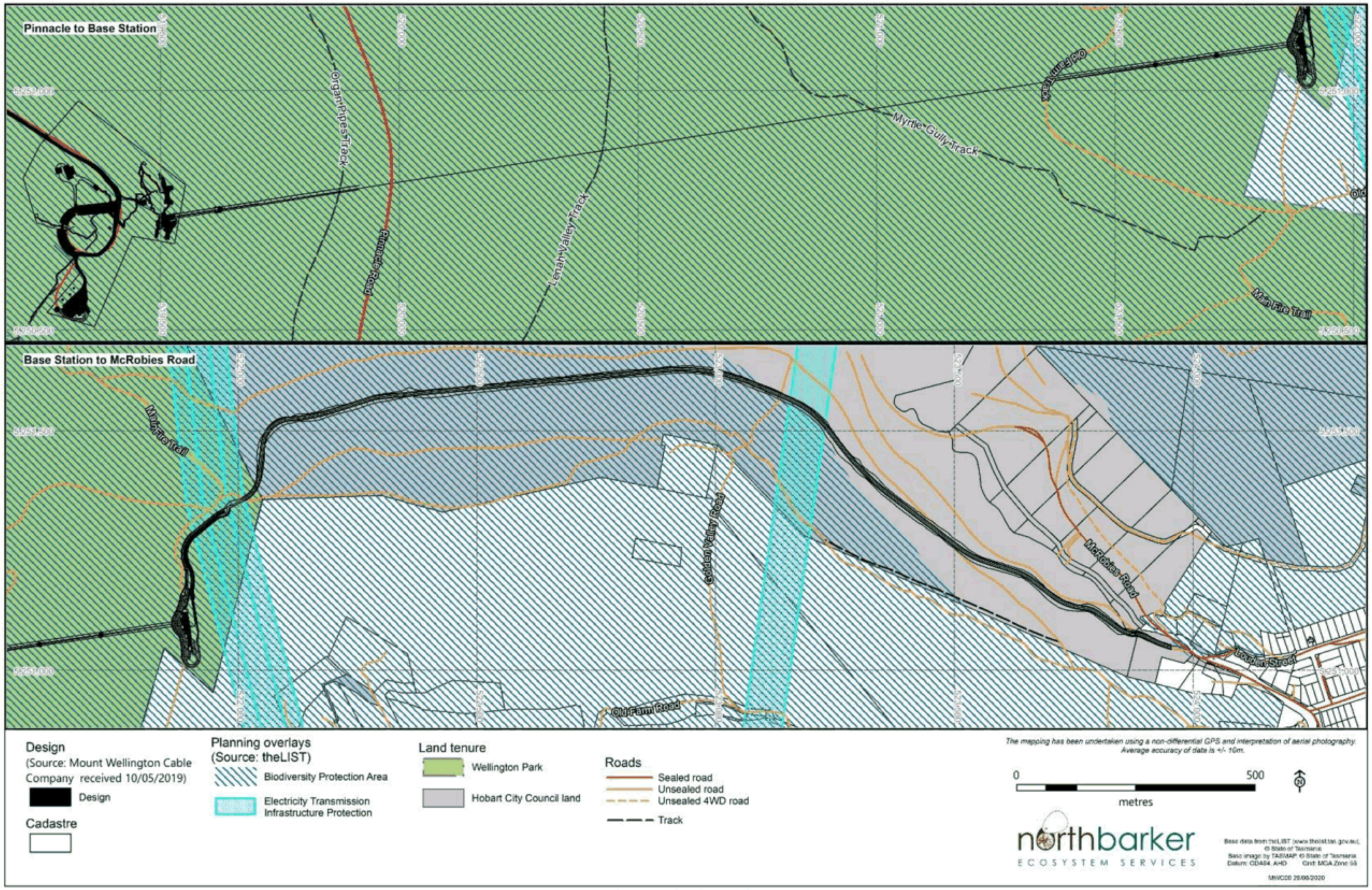


Figure 14: Planning Overlays

29.4 Development standards for Building and works.

29.4.1 (Building height) and 29.4.2 (Setback) are not considered here but it is understood that the cableway and associated infrastructure development is a permitted use as it is included in the Wellington Park Management Plan 2013.

29.4.3 Design may need to be assessed against Performance criteria P1

The location of buildings and works must satisfy all of the following:

(a) be located in an area requiring the clearing of native vegetation only if:
  (i) there are no sites clear of native vegetation and clear of other significant site constraints such as access difficulties or excessive slope;
  (ii) the extent of clearing is the minimum necessary to provide for buildings, associated works and associated bushfire protection measures;
  (iii) the location of clearing has the least environmental impact;

Each of the elements of the project are considered against these criteria below:

| Location | 29.4.3 | Comment |
|---|---|---|
| Access Road | (i) | No alternative option that avoids vegetation is available. |
| | (ii) | This can be achieved for the access road by incorporating the need to minimise vegetation loss into the final design. |
| | (iii) | No alternative alignment linking start and end can avoid the high priority vegetation.<br>The Access Road alignment has been modified to avoid direct impact to rocky habitat features that support potential threatened fauna habitat (devils and quolls).<br>Constraints for maintaining adequate road grade limits the opportunity to avoid all large habitat trees. However, their locations have been accurately surveyed so that, where possible local steepening of cuts and fills will limit impacts to nearby trees. |
| Base Station | (i) | The existing fire break is used for the access road section through Wellington Park as much as is practical. Opportunity has been taken to utilise a cleared corridor for the Base Station limiting the need for tree clearance. |
| | (ii) | Repeated consultation with the Tasmanian Fire Service over requirements for bushfire hazard management has resulted in a requirement to modify the specified amount of vegetation around the base station, with the subsequent losses of wet forest habitat and constituent habitat trees discussed in our assessment and the arborist report. Nonetheless the proposal still meets this criteria on the basis that the clearing is the minimum necessary to have a compliant hazard management plan and accommodate the necessary infrastructure components. |
| | (iii) | Clearing likely to avoid high conservation values. |
| Towers 1 and 2 | (i) | Impossible to avoid some impact, especially between Base Station and Tower 1. Actual extent of clearance subject to detailed design. |
| | (ii) | Towers to be lowered in by helicopter minimising the extent of clearance. |
| | (iii) | Minor adjustment to Tower 2 placement may ensure largest habitat tree (2m DBH blue gum) can be retained. |

| | | |
|---|---|---|
| Temporary Installation Net | (i) (ii) (iii) | Unlikely to require any vegetation clearing. |
| Tower 3 | (i) | Impossible to avoid some impact. |
| | (ii) | Tower to be lowered in by helicopter minimising the extent of clearance. |
| | (iii) | Use of alternate location that is practicable to the project would not reduce impact. |
| Pinnacle Centre | (i) | Impossible to avoid some impact. |
| | (ii) | Building to be lowered in by helicopter in sections. Access to utilise cableway limiting need to disturb surrounding vegetation in construction. |
| | (iii) | No alternate locations assessed. Limited scope of adjusting placement of infrastructure. Use of existing walkway would limit need for further impacts. |

### 5.6.3 Biodiversity Code (E10)

Figure 14 present the Biodiversity Protection Area overlay. The Biodiversity Code applies 'to development involving clearance and conversion or disturbance of native vegetation within a Biodiversity Protection Area (E10.2.1)". E10.7.1 Buildings and Works Acceptable Solution cannot be met as clearance is not confined to low priority biodiversity values (c i) and the clearance will exceed 1000m$^2$ (cii). The total area of vegetation within the BPA outside Wellington Park is 3.08 ha. The development therefore needs to be considered against Performance Criteria (P1). These build on the priority status of vegetation proposed for clearance and conversion as follows:

| Performance Criteria | Priority value |
|---|---|
| (i) development is designed and located to minimise impacts, having regard to constraints such as topography or land hazard and the particular requirements of the development; | High, moderate, low |
| (ii) impacts resulting from bushfire hazard management measures are minimised as far as reasonably practicable through siting and fire-resistant design of habitable buildings; | High, moderate, low |
| (iii) remaining high priority biodiversity values on the site are retained and improved through implementation of current best practice mitigation strategies and ongoing management measures designed to protect the integrity of these values; | High, moderate |
| (iv) special circumstances exist; | High |

The priority values identified for each section are listed below:

| Location | Priority value | Comment |
|---|---|---|
| Access Road<br>(outside Wellington Park) | High | Sections of DTO - 1.60 ha<br>Potential denning habitat eastern quoll.<br>Potential threatened fauna habitat trees. |
| Base Station | High | Native vegetation WOB<br>Potential threatened fauna habitat trees. |
| Towers 1 & 2 | Moderate | WGL – Tower 1 |

| | | |
|---|---|---|
| | | Potential nesting habitat for swift parrot – both Tower 1 and 2 |
| Temporary Installation Net | Low | Native vegetation DCO |
| Pinnacle Centre | Low | Native vegetation HHE |

DGL, a threatened vegetation community, is not included in the Priority table as its only occurrence in the project area is located outside the Biodiversity Protection Area overlay and so is excluded from the provisions of the Biodiversity Code.

Other fauna habitats may exist, but these are unlikely to be 'highly significant' as defined in the E10.1A for rare species and so will not apply to the Pinnacle Centre or Temporary Installation Net.

Each portion of the development is considered against the Performance Criteria (E10.7.1 P1) in line with the priority value being impacted.

| Location | E10.7.1 P1 | Comment |
|---|---|---|
| Access Road<br>(High) | (i) | Road alignment has been modified to avoid denning habitat and to avoid large trees wherever possible. Local steepening of cuts and fills will limit impacts to nearby trees. |
| | (ii) | No fire hazard management is required through this section as the development is a road only. |
| | (iii) | A detailed Construction Environmental Management Plan can include specific measures to ensure any impacts are contained within the immediate footprint. Opportunities can be sought to improve the current standard of management to tackle existing threats such as weeds which will potentially improve the condition of retained vegetation. Further details of Mitigation Strategy are provided below. |
| | (iv) | *Special circumstances are considered to exist if one or more of the following*<br>*(a) the use or development will result in significant long term social or economic community benefits and there is no feasible alternate location.* – Not considered as outside the remit of this report.<br>*(b) ongoing management cannot ensure the survival of the high priority biodiversity values on the site and there is little potential for recruitment or for long term persistence*. – No. We take this to mean that even with dedicated management the priority biodiversity values are not viable and will not survive in the long term and so their presence should not preclude development. This clause would typically apply to small and highly degraded patches of priority vegetation.<br>*(c) the development is located on an existing lot within the Low Density Residential, Rural Living or Environmental Living Zone and is for a single dwelling and/or associated residential outbuildings or works.* – No. |
| Base Station<br>(High) | (i) | The placement of the Base Station is largely within an existing fire break thus minimising impact. Minor clearance for a road on the east side of the Base Station; the upper car park and bushfire hazard minimisation requirements extend into low priority vegetation but potential habitat trees for threatened fauna will be required to be removed. |

| Location | E10.7.1 P1 | Comment |
|---|---|---|
| | (ii) | Building standard has minimised extent of vegetation clearing necessary for fire hazard management[72]. Requisite clearance impacts low priority vegetation only in terms of the community, but includes high priority values in the form of potential habitat trees for threatened fauna. |
| | (iii) | A detailed Construction Environmental Management Plan can include specific measures to ensure any impacts are contained within the requisite direct impact footprint (including the BHMA). Mitigation options have been proposed to offset the loss of potential foraging habitat trees with replacement plantings, and loss of potential nesting cavities with artificial replacement. |
| | (iv) | *Special circumstances are considered to exist if one or more of the following*<br><br>*(a) the use or development will result in significant long term social or economic community benefits and there is no feasible alternate location.* – Not considered as outside the remit of this report.<br><br>*(b) ongoing management cannot ensure the survival of the high priority biodiversity values on the site and there is little potential for recruitment or for long term persistence.* – No. We take this to mean that even with dedicated management the priority biodiversity values are not viable and will not survive in the long term and so their presence should not preclude development. This clause would typically apply to small and highly degraded patches of priority vegetation.<br><br>*(c) the development is located on an existing lot within the Low Density Residential, Rural Living or Environmental Living Zone and is for a single dwelling and/or associated residential outbuildings or works.* – No. |
| Towers 1 and 2<br><br>(Moderate) | (i) | Impossible to avoid some impact, especially between Base Station and Tower 1. The use of two towers ensures cable car rises more steeply from Base Station so reducing the extent of canopy clearance. Towers to be lowered in by helicopter minimising the extent of clearance. Minor adjustment to Tower 2 may ensure largest habitat tree (*E. obliqua* with 2m DBH) can be retained. |
| | (ii) | No fire management required here. |
| | (iii) | All vegetation outside the site of impact can be retained. Opportunity to improve through ongoing site management. |
| Temporary Installation Net<br><br>(Low) | (i) (ii) | Not applicable as unlikely to require any vegetation clearing. |
| Pinnacle Centre Tower 3<br><br>(Low) | (i) | Impossible to avoid some impact. Tower to be lowered in by helicopter minimising the extent of clearance. Opportunity to utilise existing boardwalk rather than constructing a new walkway would potentially reduce footprint further although relative to main footprint benefit is proportionately low. |

[72] Castellan Consulting 2021

| Location | E10.7.1 P1 | Comment |
|---|---|---|
| | (ii) | The Bushfire report[73] provides for 1m vegetation to be cleared around perimeter of building. |

Outside Wellington Park

The Access Road is predominantly outside Wellington Park. *The Guidelines for the Use of Biodiversity Offsets in the local planning approvals process* [74] discuss mitigation and the relationship to offsets.

> "The Biodiversity offsets refer to measures that compensate for the residual impact of an action on a biodiversity value(s), such as clearance of native vegetation. Offsets provide environmental benefits to counterbalance the impacts that remain after avoidance and mitigation measures are exhausted" pg15

Offsets are considered "the final component of a mitigation hierarchy".

Mitigation hierarchy (Principle 1 from STCA 2013)

1. Avoid – Not possible
2. Minimise impact – Realignment of the road has avoided localised rocky outcrop fauna habitat. Tightening of batters reduces the footprint size.
3. Rehabilitate. The new batters will be subject to revegetation works incorporating methods such as: use of slashed material for the cleared vegetation, which will help stabilise the ground and capture organic material and locally sourced seed; replanting at the junction with McRobie's Road; and landscaping throughout the road corridor to restore ground cover plants.
4. Offset the residual impacts – the key component of this will be the Habitat Enhancement which will offset any tree hollow impacts. There is also opportunity to consider the contribution towards an offsite offset for loss of vegetation community through existing conservation programs such as the Private Land Conservation Program (PLCP) overseen by the Tasmanian Land Conservancy obo DPIPWE. However, with appropriate mitigation the extent of residual impact does not justify an offsite offset.

Habitat Enhancement

Tree hollows that are lost to vegetation clearance can be replaced with artificial structures such as nest boxes and constructed hollows. The re-use of natural hollows however has been shown to have a higher level of utilisation. This seems particularly the case with large birds such as owls and cockatoos [75]. Methods that have been successfully applied include the reuse of hollow sections and even entire trunk sections.

Hollow augmentation can be achieved through the removal of rotten branch base in the hollow and by fixing an artificial floor in the hollow. Cavities can be cut into upright branches and trunks that are then covered with a faceplate with a bored-out entrance. Branch stubs can be bored to create hollows and left open for large entrances or covered with a face plate and then new access drilled. Applying these techniques, it is

[73] Castellan Consulting 2021
[74] Southern Tasmanian Councils Authority 2013
[75] Guidelines for the Relocation of Large Tree Hollows, NSW Central Coast Council, Wyong, 2016

possible to replace any lost hollows (with any offset multiplier) to effectively create an increased hollow availability in the vicinity.

Once the extent of tree removal is finalised, then the affected trees can be assessed, and material from the trees repurposed for the project. Some trees that are deemed at risk from the works can be effectively retained in situ by pruning of main trunk and branches to reduce wind drag such that they are no longer are at risk of blowing over. Multiple hollows can be created within these trees. These techniques are explained further in *Pruning for Habitat* [76]. Graphic examples of practical habitat enhancement techniques to create artificial hollows are provided in Appendix J.

## 5.7 Wellington Park Management Plan 2013

The *Wellington Park Act 1993* provides authority to the Wellington Trust to take legislative responsibility for determining the nature of development in accordance with the *Wellington Park Management Plan 2013*. This is articulated in Section 8.2 – *Objectives for Assessing and Managing, Use and Development;* relevant to the subject of this report involves "protecting the Park's natural, cultural and use values by requiring environmentally sustainable development, behaviour and practices".

The Park is divided into Management Zones, several of which are relevant to this proposal.

| Location | Wellington Park Management Zone | Comment |
|---|---|---|
| Access Road | n/a | Outside Wellington Park |
| Base Station | Recreation Zone | Including Towers 1 & 2 |
| Temporary Installation Net | Natural Zone | |
| Tower 3 | Natural Zone | |
| Pinnacle Centre | Recreation Zone | Pinnacle Specific Area |

One of the management objectives of the Natural Zone is to "protect plant and animal species and communities" Impacts to the Tower Site 3 should therefore be undertaken with considerable care to minimise the extent of any such impacts.

### 5.7.1 Recreation Zone – Base Station only

Standards for Use and Development pertaining to flora and fauna for the Recreation Zone (Base Station). Pinnacle Centre is assessed against the Pinnacle Specific Area Plan in 5.7.3.

A2.1 Native Vegetation

(a) WGL, WOB, DOB are the impacted vegetation communities. None of these are listed as threatened under the NCA. "Significant vegetation" is not defined in the WPMP although the plan refers to significance being contributed to by "poorly reserved' plant communities (p 21). WGL is a poorly reserved community[77]. This

[76] Victorian Tree Industry Organisation 2010
[77] Adequate reservation levels for non-threatened vegetation are broadly recognised as less than 15% of pre-European extent (Commonwealth of Australia 1997). Although the pre-1750 extent of WGL has not been assessed, TASVEG 3 (DPIPWE 2014) identifies there to be 1700 ha in reserves, 26 % of a total area of 6800 ha mapped state-wide. The loss of WGL is likely to exceed 50 % qualifying this community as being poorly reserved.

occupies the corridor between the Base Station and Tower 1 where some vegetation clearing will be required. There are no Trust endorsed scientific assessments that deal with flora and fauna[78].

(b) Vegetation along the corridor between the Base Station and Tower 2 includes some large hollow bearing trees that may provide nesting habitat for threatened fauna such as swift parrot and (less likely) masked owl. The footprint of the development (within Wellington Park) is expected to result in the loss of 30 potential foraging trees for the swift parrot and 24 trees with hollow-bearing potential.

P2.1. Native Vegetation

Native vegetation supporting WGL, WOB, DOB TASVEG forest communities will be impacted through localised clearance. WOB and DOB communities are widespread and abundant in the area, and the proportionate loss is small. WGL is not uncommon (but considerably less extensive in area than WOB and DOB - although it is potentially under-mapped due to limitations on discriminating between wet forest units where aerial imagery is relied on) and the proportionate impact is low given there is more than 94 ha mapped in Wellington Park. The clearance footprint is the minimum required to complete the development and achieve compliance with matters such as bushfire hazard management. Measures to protect retained vegetation from inadvertent damage during construction will minimise long term impacts beyond the necessary footprint.

The design and construction techniques have utilised opportunities to minimise the scale of disturbance through placement of main building and access road in an already cleared area. The tower construction will incorporate techniques obviating the need to build construction tracks, instead relying on the assembly on site with major infrastructure being lowered in by helicopter (refer to the Construction Methods - VOS Nov 2018).

P2.2 Threatened Species

No threatened flora species have been recorded and the likelihood of any occurring is considered low.

Impacts to threatened fauna habitat, particularly potential habitat trees for swift parrot and potentially masked owl, cannot be avoided.

Remedying Adverse Impacts

The risk of any impact to vegetation outside the development footprint will be minimised through strict exclusion areas being defined in the works contract. These will be translated into the use of temporary exclusion fencing to define the limitation to any operations on site.

The provision of best practice stormwater runoff control through sediment fencing inside the footprint of development will be provided. All of the above can be developed in a Construction Environmental Management Plan which should be approved prior to the commencement of any works.

Approximately 1000 sqm of already cleared land located upslope of the Access Road (Figure 15) can be replanted with eucalypts, ultimately replacing the losses of potential swift parrot foraging trees in particular. There is scope to plant 50 trees at 5m spacing, which would provide an offset of approximately 1.7:1 for potential foraging trees if *Eucalyptus globulus* are planted.

[78] A von Krusenstierna pers com

A habitat replacement plan is outlined in section 5.6.3 which provides a mechanism to offset loses of hollows through provision of artificial structures.

Although there will be a net loss of vegetation and mature habitat trees in the short term, the recommended measures will ensure these impacts are avoided in the long term.

**Issue 2: Flora and Fauna Conservation, Geoconservation and Natural Processes**

**Objective:** To conserve flora, fauna, geological and geomorphological values, and to protect natural processes.

| Acceptable Solutions | Performance Criteria |
|---|---|
| **A2.1** Native vegetation<br>The proposal does not impact upon terrestrial or aquatic native vegetation which:<br>(a) is listed as significant in this Management Plan or any planning strategy or Trust endorsed scientific assessment, prepared in accordance with this Management Plan; or is a Threatened Vegetation Community under the *Nature Conservation Act 2002*.<br>(b) supports, or forms habitat for any species of fauna listed in the *Threatened Species Protection Act 1995* or the *Environment Protection and Biodiversity Conservation Act 1999*. | **P2.1** Native vegetation<br>Any adverse affects on terrestrial or aquatic native vegetation or habitat values must be avoided, or remedied to ensure no long term impact on vegetation values. |
| **A2.2** Threatened Species<br>The proposal does not impact upon any threatened species listed under the *Threatened Species Protection Act 1995* or the *Environment Protection and Biodiversity Conservation Act 1999*. | **P2.2** Threatened Species<br>Any adverse affects on nationally or State listed rare, threatened or endangered species, communities or habitats must be avoided or remedied to ensure no long term impact on vegetation values. |

### 5.7.2 Natural Zone

The Standards for Use and Development pertaining to flora and fauna are the same in the Natural Zone (Temporary Installation Net and Tower 3) as they are for the Recreation Zone (5.7.1).

A2.1 Native Vegetation

(a) HHE is the impacted vegetation community (Tower site 3). This is not listed as significant in the Management Plan and there are no Trust endorsed scientific assessments that deal with flora and fauna. HHE is not listed as threatened under the NCA. The term "significant vegetation" is not defined in the WPMP although the plan makes reference to sensitive vegetation in the alpine area. The Park Activity Assessment form (Appendix 3C of the WPMP) makes reference to "natural values" including "vegetation that is known to have a slow recovery rate after disturbance". HHE being an alpine community would fall into this category.
(b) Rocky habitats at both the Temporary Installation Net and Tower 3 provide potential habitat for the silky snail (rare TSPA).

P2.1. Native Vegetation

A small footprint (100sqm) of native vegetation supporting Eastern Alpine Heathland (HHE) TASVEG community will be cleared for the concrete base for the Tower. This community is widespread with nearly 350 ha mapped in Wellington Park, so the proportionate loss is insignificant even taking not account the 0.4 ha impacted in the Pinnacle Zone. Management of the surrounding vegetation outside the immediate footprint should be controlled and prescribed in any approval conditions to ensure that there will be no peripheral impacts.

A2.2 Threatened Species

One threatened flora species, montane ivy leaf violet *Viola curtisiae*, is present close to the tower site and one threatened fauna, the silky snail, may be impacted at least at the habitat level.

P2.2 Threatened Species

The adverse impact on montane ivy leaf violet *Viola curtisiae* (listed rare in TSPA) may be avoided with careful sighting of the tower infrastructure. Any loss will not have an adverse long-term impact upon the species which has recently been found to be widespread across the Wellington Range. Reanalysis of the novel data may justify a case for having the species delisted as threatened from the TSPA. The species is also likely to be easy to propagate and cultivate in ornamental plantings on site, including roof-top gardens.

Impact to the silky snail is not known in relation to the presence of the species within the available habitat. The localised potential impacts however when considered against the extensive habitat availability suggest that potential losses would be negligible.


*Figure 15: Replanting Area*

### 5.7.3 The Pinnacle Specific Area Plan

Relevant to the biological values the purpose of the Pinnacle Specific Area Plan (SAP) is to maintain and enhance: "the environmental values associated with natural vegetation, habitats, avian, aquatic and terrestrial fauna" S2.1.2 and to "facilitate environmentally and economically sustainable development at the Pinnacle in the following ways" (specific to biological values) (S2.1.3):

- Recognise the special environmental status and fragile nature of the Pinnacle while providing for development and use that does not adversely impact upon the site's natural, biological and physical processes.
- Ensure that there is no adverse effect on geoheritage, and native flora and fauna habitat values.

The Standards for Use and Development pertaining to flora and fauna are the same in the Pinnacle SAP as they are for the Recreation Zone (5.7.1).

<u>A2.1 Native Vegetation</u>

(a) HHE is the impacted community. HHE is not listed as significant in the Management Plan and there are no Trust endorsed scientific assessments that deal with flora and fauna. HHE is not listed as threatened under the NCA. The term "significant vegetation" is not defined in the WPMP although the plan makes reference to sensitive vegetation in the alpine area. The Park Activity Assessment form (Appendix 3C of the WPMP) makes reference to "natural values" including "vegetation that is known to have a slow recovery rate after disturbance". HHE being an alpine community would fall into this category.
(b) Rocky habitats within the Pinnacle Centre may provide potential habitat for the silky snail (rare TSPA).

<u>P2.1. Native Vegetation</u>

Some native vegetation supporting Eastern Alpine Heathland (HHE) TASVEG community will be impacted by the development. 0.43 ha of HHE will be impacted, 6.5 % of the full extent in the SAP. Other than a tiny patch of DCO (0.05 ha) The SAP is dominated by 6.6 ha of HHE, the rest of the SAP (1.7 ha, 18 %) is existing infrastructure (roads, carparks, transmission towers etc); Figure 16. This community is widespread with nearly 350 ha mapped in Wellington Park, so the proportionate loss is small. Given the SAP covers this area of heath and is specifically in place to regulate vegetation clearance for developments, the intent of the SAP is not to preclude any loss of vegetation with its boundaries but to ensure there is "no long-term impact on vegetation values". Management of the surrounding vegetation outside the immediate footprint should be controlled and prescribed in any approval conditions to ensure that there will be no peripheral impacts through runoff or construction damage. The Fire Management Plan requires bushfire hazard management area of 1m around the building[79].

[79] Castellan Consulting 2021

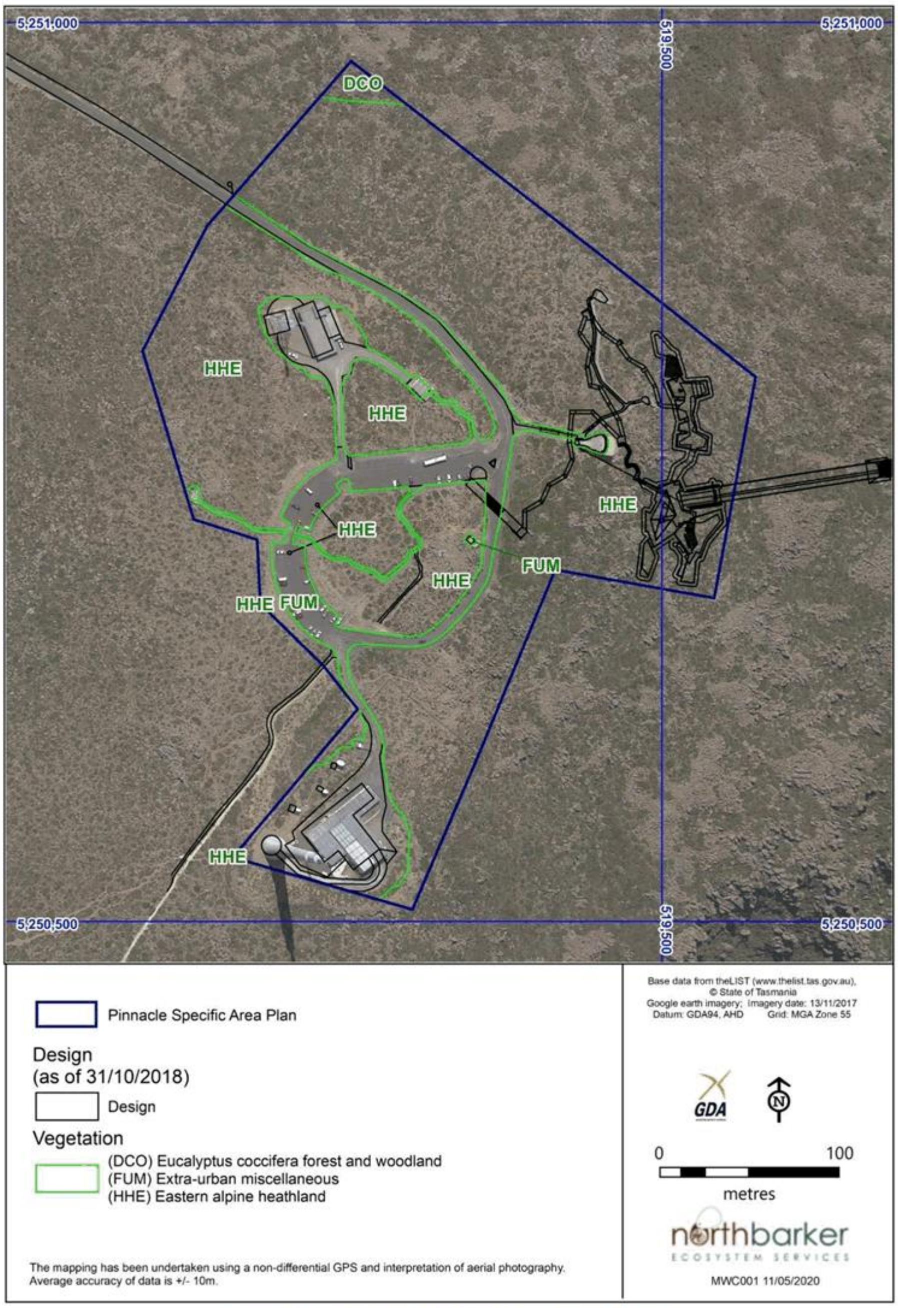


*Figure 16: Vegetation in the Pinnacle Specific Area*

## A2.2 Threatened Species

One threatened flora species, montane ivy leaf violet *Viola curtisiae*, is present close to the Tower Site and one threatened fauna, the silky snail, may be impacted upon.

P2.2 Threatened Species

The adverse impact on montane ivy leaf violet *Viola curtisiae* (listed rare in TSPA) cannot be entirely avoided with the current nominated location of the Pinnacle Centre. However, the loss will not have an adverse long-term impact upon the species. This is because the species has recently been found to be widespread across the Wellington Range. Reanalysis of the novel data may justify a case for having the species delisted as threatened from the TSPA.

Impact to the silky snail is not known. The localised impacts when considered against the extensive habitat availability suggest that it would not be significant.

Remedying Adverse Impacts

The risk of any impact to vegetation outside the development footprint will be minimised through strict exclusion areas being defined in the works contract. These will be translated into the use of temporary exclusion fencing to define the limitation to any operations on site.

The provision of best practice stormwater runoff control through sediment fencing inside the footprint of development will be provided. All of the above can be developed in a Construction Environmental Management Plan which should be approved prior to the commencement of any works.

Approximately 50% of the walkway will be an elevated boardwalk. These will shade low vegetation to some degree but are not expected to be a detrimental impact resulting in vegetation loss. It is clearly apparent that vegetation persists beneath the existing boardwalk, probably due to ample light reaching the plants due to the angle of the sun in this location and the height of the boardwalk (Plate 17). It is also possible some of the plants benefit from a degree of shading during the heat of the day and the boardwalk to some degree buffers some plants from extremes of the weather. Ultimately the area beneath the boardwalk will remain vegetated and so can be excluded from any area impact calculations. The existing boardwalk will be removed along with the associated viewing platforms. Any non-elevated sections or sites where the vegetation cover is compromised will be subject to rehabilitation to regenerate native vegetation comparable to the adjacent habitats.

The architectural plans for the Pinnacle Centre include rooftop gardens (Plate 18). Material can be sourced from the footprint of the site as a growing medium. Plant material can also be salvaged capturing a range of some of the smaller and longer-lived ground covers. There could also be opportunity to propagate the listed rare montane violet *Viola curtisiae*. These could then be included in the rooftop plantings. This could ensure any losses are offset and so better securing its conservation.

Successful outcome with the rooftop garden will be dependent on the standard of the work. This has a high likelihood of success if it is directed by a well-considered revegetation plan that considers adequate soil depth and quality, watering, wind protection and plant selection. Substantial lead times (preferably >12 months) are required for the plant material that needs to be collected and propagated offsite by a specialist horticulturist. Planting densities need to be high to counter expected mortalities and the need to establish cover in a reasonable timeframe.

The architectural design allows much of the roof areas to be visible from elsewhere in the building providing opportunity for this showcased and included in interpretation.


*Plate 17: Vegetation growing under existing raised boardwalk*

*Plate 18: Rooftop gardens*

*Table 7 - Natural Values Impact Summary*

The following table lists the impacts by section as they are addressed through the planning process

| Value | Significance Status NCA/TSPA | Impact | Context (Area Reserved in HCC) | % Impact | Comment<br>Impact and Mitigation |
|---|---|---|---|---|---|
| **Access Road (outside Wellington Park)** | | | | | |
| DTO<br>*Eucalyptus tenuiramis* dry forest on sediments | Threatened | 3.16 ha<br>(1.60 within BPA overlay) | 141 ha | 2.2% | Not possible to bypass threatened vegetation.<br>Include measures to minimise width of corridor including steepening batter, especially around large trees close to embankments, controls to limit runoff during construction and to restrict construction machinery.<br>Include a weed control and revegetation plan. |
| DGL<br>*Eucalyptus globulus* dry forest | Threatened | 0.20 ha<br>(Entirely outside BPA overlay) | 64 ha | <0.01% | |
| DOB<br>*Eucalyptus obliqua* dry forest | - | 2.29 ha<br>(1.46 within BPA overlay) | 342 ha | <0.01% | |
| tiny midge orchid<br>*Corunastylis nuda* | Rare | Potential habitat | 11 records in 500m, 29 in 5km | Unlikely but <10% at worst | Anecdotal records from vicinity in previous years. Not located in targeted surveys in flowering period 2019 and 2020.<br>If located nearby in close vicinity, then plants will be actively protected during construction.<br>If impacted, then consultation with PCAB to determine appropriate response. Unlikely to be a significant impact. |
| dense midge orchid<br>*Corunastylis nudiscapa* | Endangered | Potential habitat | 48 records in 500m, 145 in 5km | Unlikely but <10% at worst | Only known from South Hobart in recent times. Likelihood of occurrence considered low.<br>If located nearby in close vicinity, then plants will be actively protected during construction. |

| Value | Significance Status NCA/TSPA | Impact | Context (Area Reserved in HCC) | % Impact | Comment Impact and Mitigation |
|---|---|---|---|---|---|
| **Access Road (outside Wellington Park)** | | | | | |
| | | | | | If impacted, then consultation with PCAB to determine appropriate response. |
| Tasmanian devil *Sarcophilus harrisii*<br><br>spotted-tail quoll *Dasyurus maculatus* | Endangered<br><br>Rare | Loss of 5.7 ha potential foraging habitat<br><br>Potential disturbance to 50m buffer<br><br>Roadkill risk | Significant areas of breeding habitat throughout Park | <0.1% | Footprint (including 50 m buffer) supports suboptimal denning habitat. No obvious features identified.<br><br>Prior to any disturbance, apply den management protocol to mitigate potential for disturbance of denning activities of devils or quolls.<br><br>Implement traffic calming measures to minimise risk of roadkill. |
| swift parrot *Lathamus discolor* | Endangered | Loss of 7 potential foraging trees<br><br>Loss of 67 potential nesting trees.<br><br>Estimate of 2 ha direct habitat loss. Potential disturbance to 13 ha nesting [80] | 286 ha foraging habitat[81] in Hobart<br><br>725 ha nesting habitat[82] in Hobart | <1% foraging<br><br><1% nesting habitat loss<br><br>1-2% disturbance | No scope to avoid all large trees of which some may support nesting habitat.<br><br>Undertake arboriculture assessment to inform measures to retain as many trees as is practical.<br><br>Design measures to minimise width of corridor including steepening batter, especially around large trees close to embankments.<br><br>Include controls to restrict construction machinery.<br><br>Include replacement plan for tree hollow losses.<br><br>Develop revegetation plan that identifies replacement of |

[80] Assuming noise disturbance from road 50m on either side
[81] Habitat based on mapped WGL, DGL, DOV and additional areas shown on GlobMap layer.
[82] Habitat based on high availability of mature habitat (FPA Fauna Technical Note 1.2 (2012)

| Value | Significance Status NCA/TSPA | Impact | Context (Area Reserved in HCC) | % Impact | Comment Impact and Mitigation |
|---|---|---|---|---|---|
| **Access Road (outside Wellington Park)** | | | | | |
| | | | | | losses. |
| Tasmanian masked owl *Tyto novaehollandiae castanops* | Endangered | Loss of 12 potential nesting trees (DBH>100cm)<br><br>Estimate of 2 ha direct habitat loss. Potential disturbance to 13 ha nesting [83] | 725 ha habitat[84] in Hobart | <1% direct impact<br><br>1-2% disturbance | Many hollow bearing trees, although no obvious large hollows >15cm observed from ground surveys.<br><br>Some direct loss of potential current and future nesting habitat.<br><br>Undertake arboriculture assessment to inform measures to retain as many trees as is practical.<br><br>Include replacement plan for tree hollow losses. |

[83] Assuming noise disturbance from road 50m on either side
[84] Habitat based on high availability of mature habitat (FPA Fauna Technical Note 1.2 (2012)

| Value | Significance Status NCA/TSPA | Impact | Context (Area Reserved in HCC) | % Impact | Comment<br>Impact and Mitigation |
|---|---|---|---|---|---|
| **Base Station including top end of Access Road and Towers 1 & 2 (inside Wellington Park)** | | | | | |
| WOB<br>*Eucalyptus obliqua* forest with broad-leaf shrubs | - | 0.29 ha direct conversion and 0.17 ha modified to meet bushfire hazard management) | 121 ha | <0.01% | Minimal impact on threatened vegetation.<br>Ensure high priority vegetation is identified during construction to limit extent of clearance.<br>Prescribe management for bushfire hazard management to ensure method of control is controlled by hand tools such as brushcutters to limit disturbance to native vegetation.<br>Design measures to minimise width of corridor including steepening batter, especially around large trees close to embankments, controls to limit runoff during construction and to restrict construction machinery. Weed control and revegetation plan. |
| WGL<br>*Eucalyptus globulus* wet forest | poorly reserved (significant in WPMP) | 0.15 ha | 94 ha | 0.01% | |
| DOB<br>*Eucalyptus obliqua* dry forest | - | 0.09 ha | 1330 ha | <0.01% | |
| Tasmanian devil<br>*Sarcophilus harrisii*<br><br>spotted-tail quoll<br>*Dasyurus maculatus* | Endangered<br><br>Rare | Loss of 0.51 ha foraging habitat<br>Potential disturbance to 50m buffer (5 ha) during construction.<br>Roadkill risk. | Significant areas of breeding habitat throughout Park | <0.1% | Footprint (including 50 m buffer) may contain burrows with undetermined occupancy/activity status. Prior to any disturbance, apply den management protocol to mitigate potential for disturbance of denning activities of devils or quolls.<br>Implement traffic calming measures to minimise risk of roadkill. |

| Value | Significance Status NCA/TSPA | Impact | Context (Area Reserved in HCC) | % Impact | Comment Impact and Mitigation |
|---|---|---|---|---|---|
| **Base Station including top end of Access Road and Towers 1 & 2 (inside Wellington Park)** | | | | | |
| swift parrot *Lathamus discolor* | Endangered | Foraging trees<br>*Eucalyptus globulus*<br>Estimated 10 trees may require pruning of branches [85]<br>18 trees within footprint (TPZ>10%) and 12 in BHMA.<br><br>Potential nesting trees DBH>70cm<br>Loss of 20 trees in the footprint (TPZ>10%), 4 in BHMA<br>Direct loss to <1 ha habitat.<br>Potential disturbance to 7 ha[86] | 172 ha foraging habitat[87] in Wellington Park<br><br>1455 ha habitat[88] in Wellington Park | foraging habitat <1%<br><br>nesting habitat <0.1% direct, 0.5% disturbance | Large habitat trees present between Base Station, Tower 1 and Tower 2.<br><br>All recorded habitat trees within the BHMA on lower side of Base Station are required to be removed, including potential foraging trees and trees potentially suitable for nesting.<br><br>Undertake arboricultural assessment to inform measures to retain as many trees as is practical.<br><br>Micro-siting of Tower to ensure sufficient longitudinal (up or down slope) distance from trees.<br><br>Include *E. globulus* in any landscape planting of car park and within potential offset planting. Implement hollow-replacement program for loss of potential nesting habitat trees. |
| Tasmanian masked owl *Tyto novaehollandiae castanops* | Endangered | Loss of 20 trees in the footprint (TPZ>10%), 4 in BHMA<br>Potential disturbance to 7 ha<br><br>Potential noise | 1455 ha habitat in Wellington Park | <0.1%habitat loss, 0.5% disturbance | Potential disturbance through construction and operation should trees be used in local area.<br><br>All recorded habitat trees within the BHMA on lower side of Base Station are required to be removed, including trees of sufficient size to potentially support viable nesting hollows. |

[85] Proponents have advised that no trees will require removal along the corridor between the base station and Tower 2
[86] Assuming noise disturbance from road 50m on either side
[87] Habitat based on mapped WGL, DGL, DOV and additional areas shown on GlobMap layer.
[88] Habitat based on High availability of mature habitat (FPA Fauna Technical Note 1.2 (2012)

| Value | Significance Status NCA/TSPA | Impact | Context (Area Reserved in HCC) | % Impact | Comment Impact and Mitigation |
|---|---|---|---|---|---|
| | | disturbance to 5 ha habitat | | | Undertake arboricultural assessment to inform measures to retain as many trees as is practical.<br>Implement hollow-replacement program for loss of potential nesting habitat trees. |
| **Pinnacle Centre** | | | | | |
| HHE<br>Eastern alpine heathland | - | 0.42 ha | 350 ha | 0.001% | Localised impact.<br>Use of exclusion fencing to ensure no disturbance outside footprint of development |
| montane violet<br>*Viola curtisiae* | Rare | 370 sqm<br>Of a patch totalling 570sqm | Multiple sites | <10% | Multiple populations identified in 2018 throughout alpine areas in Wellington Park, suggesting the species has previously been under-surveyed and the loss associated with this development is insignificant.<br>Fence off area of population (200 sqm) outside footprint for duration of works.<br>Investigate potential to incorporate species in rooftop garden. |
| Silky snail<br>*Exquisitiropa agnewi* | Rare | Estimate <0.1 ha | 100s ha | <0.01% | Potential habitat amongst boulders. Habitat loss is insignificant in context of extent of habitat throughout Wellington Park. |
| **Tower 3** | | | | | |
| HHE<br>Eastern alpine | - | 0.01 ha | 350 ha | <0.0001% | Localised impact. |

| Value | Significance Status NCA/TSPA | Impact | Context (Area Reserved in HCC) | % Impact | Comment Impact and Mitigation |
|---|---|---|---|---|---|
| heathland | | | | | Use of exclusion fencing to ensure no disturbance outside footprint of development |
| montane violet *Viola curtisiae* | Rare | 0 | Multiple sites | <1% | Plants in close vicinity of Tower site able to be avoided with care.<br>Multiple populations identified in 2018 throughout alpine areas in Wellington Park.<br>Fence off plants in vicinity of site for duration of works.<br>Investigate potential to incorporate species in rooftop garden. |
| Silky snail *Exquisitiropa agnewi* | Rare | 0.01ha | 100s ha | <0.01% | Potential habitat amongst boulders. Habitat loss is insignificant in context of extent of habitat throughout Wellington Park.<br>Use of exclusion fencing to ensure no disturbance outside footprint of development. |
| **Temporary Installation Net** | | | | | |
| DCO *Eucalyptus coccifera* forest and woodland | - | 0.01 ha | 3957 ha | <0.001% | No or very minimal impact.<br>Use of exclusion fencing to ensure no disturbance outside footprint of development. |
| Silky snail *Exquisitiropa agnewi* | Rare | 0.01ha | 100s ha | <0.01% | Potential habitat amongst boulders. No habitat loss anticipated with structure to be bolted to rocks without them being disturbed.<br>Use of exclusion fencing to ensure no disturbance outside footprint of development. |

# 6 CONCLUSION AND RECOMMENDATIONS

No impacts are anticipated to ecological communities listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA). Some impacts are likely to threatened vegetation communities listed under the Tasmanian *Nature Conservation Act 2002*. These include two communities present along the proposed Access Road alignment:

- *Eucalyptus globulus* dry forest – DGL
- *Eucalyptus tenuiramis* forest on sediments - DTO

The development will impact on two vegetation communities within Wellington Park that could be considered to be significant vegetation according to the Wellington Park Management Plan 2013:

- *Eucalyptus globulus* wet forest – WGL – Base Station-Tower Site 2
- Eastern alpine heathland - HHE – Tower site 3 and Pinnacle Centre

At least two threatened flora species occur within the project area and there is potential for at least three others, albeit low. It is of low likelihood that any impacts to threatened flora are of such significance as to require amendments to the proposal.

Impacts to threatened fauna habitat are of moderate significance. Redesign of the Access Road alignment has avoided direct impact to localised rocky habitat supporting small hollows and dens. There are some unavoidable losses of large habitat trees which will affect the availability of nesting habitat for hollow dependent species.

The risk of any direct impacts to threatened fauna during the construction phase can be minimised through appropriate procedures prior and during this period. Replacement of any unavoidable losses of tree hollows through reuse of hollow structures and provision of nest boxes can mitigate any losses. Tree losses in Wellington Park can be offset through new plantings.

A Roadkill Risk Report and Roadkill Mitigation Plan have been prepared. A suite of monitoring and mitigation measures are proposed for the new Access Road. In contrast, the roadkill risk on Pinnacle Road is not expected to significantly increase based on an expectation of less than a 10% change to traffic volumes. Recommended measures for that road are focussed on monitoring, with scope for future mitigation in the event of increases in levels of roadkill. Future mitigation to Pinnacle Road (independent of traffic monitoring results) provides an alternate offset to any residual roadkill impacts occurring along the access road following recommended mitigation for that road.

A Bird Collision Risk Assessment identified elevated risk in the vicinity of the Organ Pipes for wedge-tailed eagles and the vicinity of Base Station to Tower 2 for the swift parrot. This concludes that the risk is low to moderate overall and proposes a suite of mitigation measures to reduce this risk to acceptable levels.

**Recommendations**

The proposed development meets the requirements of the Hobart Interim Planning scheme 2015 and the Wellington Park Management Plan 2013. Any approval should include conditions to ensure the natural values are mitigated and offset through the inclusion and / or implementation of

- Weed and plant pathogen management plan;
- Fauna management protocols throughout the construction phase; and
- Oversight from Arborist to ensure impacts to trees in close proximity are minimised
- Tree hollow reuse and replacement plan;
- Roadkill mitigation plan;

- Bird collision risk mitigation measures

A permit to take under the Tasmanian *Threatened Species Protection Act 1995* (TSPA) will be required for impacts to

  - Montane violet
  - Silky snail

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# APPENDIX A – VASCULAR PLANT SPECIES LISTS WITHIN PLANT COMMUNITIES (TASVEG) AND PROJECT SITES

## HHE - Pinnacle Centre

| | |
|---|---|
| Grid Reference: | 519520E, 5250740N |
| Accuracy: | GPS (within 10 metres) |
| Recorder: | Andrew J. North |
| Date of Survey: | 27 Sep 2018 |
| Trees: | *Eucalyptus coccifera* |
| Tall Shrubs: | *Telopea truncata* |
| Shrubs: | *Baeckea gunniana, Coprosma nitida, Epacris serpyllifolia, Exocarpos humifusus, Gaultheria hispida, Leptospermum rupestre, Monotoca empetrifolia, Olearia ledifolia, Olearia pinifolia, Orites acicularis, Orites revolutus, Ozothamnus ledifolius, Pimelea sericea, Planocarpa petiolaris, Richea scoparia, Richea sprengelioides, Tasmannia lanceolata, Trochocarpa thymifolia* |
| Low Shrubs: | *Acrothamnus* sp., *Bellendena montana* |
| Herbs: | *Astelia alpina var. alpina, Brachyscome spathulata, Celmisia asteliifolia, Colobanthus apetalus var. apetalus, Cotula alpina, Gonocarpus montanus, Viola* sp. *Helichrysum luteoalbum, Oreomyrrhis sp., Pappochroma bellidioides, Pappochroma tasmanicum, Rubus gunnianus, Schizacme montana* |
| Grasses: | *Deyeuxia monticola, Hierochloe fraseri, Poa gunnii, Rytidosperma sp.* |
| Ferns: | *Lycopodium fastigiatum, Lycopodium scariosum* |
| Weeds: | *Euphrasia* sp., *Holcus lanatus, Leontodon saxatilis, Pinus radiata* |

## HHE - Tower 3

| | |
|---|---|
| Grid Reference: | 519625E, 5250750N |
| Accuracy: | GPS (within 10 metres) |
| Recorder: | Andrew J. North |
| Date of Survey: | 27 Sep 2018 |
| Trees: | *Eucalyptus coccifera* |
| Tall Shrubs: | *Leptospermum lanigerum, Telopea truncata* |
| Shrubs: | *Coprosma nitida, Epacris serpyllifolia, Exocarpos humifusus, Gaultheria hispida, Monotoca empetrifolia, Olearia ledifolia, Orites acicularis, Orites revolutus, Ozothamnus ledifolius, Pimelea sericea, Richea scoparia, Richea sprengelioides, Tasmannia lanceolata* |
| Low Shrubs: | *Acrothamnus* sp. |
| Herbs: | *Acaena sp., Astelia alpina var. alpina, Brachyscome spathulata, Celmisia asteliifolia, Cotula australis, Geranium brevicaule, Gonocarpus montanus, Gonocarpus teucrioides, Helichrysum luteoalbum, Ranunculus scapiger, Senecio gunnii, Viola hederacea* |
| Graminoids: | *Gahnia grandis, Luzula sp.* |
| Grasses: | *Deyeuxia monticola, Poa gunnii, Rytidosperma sp.* |
| Ferns: | *Huperzia australiana, Lycopodium scariosum, Polystichum proliferum* |
| Weeds: | *Euphrasia* sp. |

## DCO - Temporary Installation Net

| | |
|---|---|
| Grid Reference: | 519935E, 5250795N |
| Accuracy: | GPS (within 10 metres) |
| Recorder: | Karen Ziegler |
| Date of Survey: | 1 Oct 2018 |
| Trees: | *Eucalyptus coccifera, Eucalyptus urnigera, Nothofagus cunninghamii* |
| Tall Shrubs: | *Oxylobium ellipticum, Pittosporum bicolor, Telopea truncata* |
| Shrubs: | *Aristotelia peduncularis, Coprosma nitida, Cyathodes glauca, Hakea lissosperma, Leptecophylla parvifolia, Lomatia polymorpha, Olearia phlogopappa, Olearia tasmanica,* |

| | |
|---|---|
| | *Ozothamnus antennaria, Ozothamnus ledifolius, Pimelea cinerea, Richea dracophylla, Tasmannia lanceolata, Veronica formosa* |
| Herbs: | *Acaena sp., Cardamine sp., Correa lawrenceana var. lawrenceana, Galium australe, Geranium potentilloides var. potentilloides, Gonocarpus tetragynus, Gonocarpus teucrioides, Hydrocotyle hirta, Oxalis sp., Poranthera microphylla, Pterostylis sp., Ranunculus sp., Senecio gunnii, Senecio pectinatus var. pectinatus* |
| Graminoids: | *Luzula sp., Uncinia sp.* |
| Grasses: | *Poa sp.* |
| Ferns: | *Asplenium flabellifolium, Blechnum wattsii, Dicksonia antarctica, Polystichum proliferum* |
| Weeds: | *Euphorbia sp.* |

### HHE - Pinnacle walkways

| | |
|---|---|
| Grid Reference: | 519498E, 5250742N |
| Accuracy: | within 50 metres |
| Recorder: | Karen Ziegler |
| Date of Survey: | 1 Oct 2018 |
| Trees: | *Eucalyptus coccifera* |
| Shrubs: | *Epacris serpyllifolia, Exocarpos humifusus, Leptospermum rupestre, Monotoca empetrifolia, Olearia ledifolia, Olearia pinifolia, Orites acicularis, Orites revolutus, Ozothamnus ledifolius, Pimelea sericea, Planocarpa petiolaris, Richea scoparia, Richea sprengelioides, Tasmannia lanceolata, Trochocarpa thymifolia* |
| Low Shrubs: | *Acrothamnus* sp., *Bellendena montana* |
| Herbs: | *Acaena montana, Astelia alpina var. alpina, Brachyscome spathulata, Celmisia asteliifolia, Colobanthus apetalus var. apetalus, Cotula alpina, Geranium potentilloides var. potentilloides, Gonocarpus montanus, Helichrysum luteoalbum, Oreomyrrhis sp., Pappochroma bellidioides, Pappochroma tasmanicum, Ranunculus scapiger, Senecio gunnii, Viola hederacea* |
| Graminoids: | *Luzula sp.* |
| Grasses: | *Poa gunnii, Rytidosperma sp.* |
| Ferns: | *Lycopodium scariosum, Polystichum proliferum* |
| Weeds: | *Cerastium vulgare, Euphrasia* sp. |

### FUM – Main Fire Trail

| | |
|---|---|
| Grid Reference: | 521890E, 5251090N |
| Accuracy: | within 100 metres |
| Recorder: | Karen Ziegler |
| Date of Survey: | 4 Oct 2018 |
| Trees: | *Eucalyptus globulus subsp. globulus, Eucalyptus obliqua, Eucalyptus viminalis subsp. viminalis* |
| Tall Shrubs: | *Leptospermum scoparium* |
| Shrubs: | *Cassinia aculeata subsp. aculeata, Coprosma quadrifida* |
| Herbs: | *Acaena novae-zelandiae, Cardamine sp., Drosera peltata, Drosera pygmaea, Euchiton japonicus, Galium australe, Geranium potentilloides var. potentilloides, Oxalis sp., Poranthera microphylla, Senecio linearifolius var. linearifolius, Thelymitra sp., Urtica incisa, Wahlenbergia sp.* |
| Graminoids: | *Carex appressa, Gahnia grandis, Juncus sp.* |
| Grasses: | *Ehrharta sp., Rytidosperma sp.* |
| Ferns: | *Blechnum nudum, Dicksonia antarctica, Histiopteris incisa, Hypolepis rugosula, Pteridium esculentum subsp. esculentum* |
| Weeds: | *Cirsium vulgare, Erica lusitanica, Linum catharticum, Plantago lanceolata, Rubus fruticosus, Ulex europaeus* |

### WOB – Vicinity of Base Station

| | |
|---|---|
| Grid Reference: | 521917E, 5251997N |
| Accuracy: | within 50 metres |
| Recorder: | Karen Ziegler |
| Date of Survey: | 4 Oct 2018 |
| Trees: | *Eucalyptus globulus subsp. globulus, Eucalyptus obliqua* |

| | |
|---|---|
| Tall Shrubs: | *Acacia dealbata subsp. dealbata, Asterotrichion discolor, Bedfordia salicina, Beyeria viscosa, Exocarpos cupressiformis, Olearia argophylla, Pittosporum bicolor, Pittosporum bicolor X Pittosporum undulatum* |
| Shrubs: | *Cassinia aculeata subsp. aculeata, Coprosma quadrifida, Pimelea drupacea* |
| Herbs: | *Acaena sp., Galium australe, Geranium potentilloides var. potentilloides, Hydrocotyle hirta, Pterostylis pedunculata* |
| Grasses: | *Ehrharta sp.* |
| Ferns: | *Blechnum wattsii, Dicksonia antarctica, Polystichum proliferum, Pteridium esculentum subsp. esculentum* |
| Climbers: | *Clematis aristata* |
| Weeds: | *Erica lusitanica* |

### FUM- -Main Fire Trail

| | |
|---|---|
| Grid Reference: | 521927E, 5251294N |
| Accuracy: | within 50 metres |
| Recorder: | Karen Ziegler |
| Date of Survey: | 4 Oct 2018 |
| Tall Shrubs: | *Acacia leprosa var. graveolens* |
| Shrubs: | *Coprosma quadrifida, Pultenaea juniperina* |
| Herbs: | *Acaena sp., Caladenia sp., Chiloglottis triceratops, Coronidium scorpioides, Dianella tasmanica, Geranium potentilloides var. potentilloides, Helichrysum luteoalbum, Hydrocotyle hirta, Oxalis sp., Poranthera microphylla, Thelymitra sp.* |
| Graminoids: | *Juncus sp., Luzula sp.* |
| Grasses: | *Ehrharta sp., Rytidosperma sp.* |
| Ferns: | *Blechnum nudum, Blechnum wattsii, Dicksonia antarctica, Polystichum proliferum, Pteridium esculentum subsp. esculentum* |
| Climbers: | *Clematis aristata* |
| Weeds: | *Anthoxanthum odoratum, Cirsium vulgare, Erica lusitanica, Hypochaeris radicata, Linum catharticum, Prunella vulgaris* |

### DOB – Vicinity of Main Fire Trail near ridge

| | |
|---|---|
| Grid Reference: | 522011E, 5251375N |
| Accuracy: | GPS (within 10 metres) |
| Recorder: | Karen Ziegler |
| Date of Survey: | 4 Oct 2018 |
| Trees: | *Eucalyptus obliqua, Eucalyptus tenuiramis, Eucalyptus viminalis subsp. viminalis* |
| Tall Shrubs: | *Exocarpos cupressiformis, Ozothamnus thyrsoideus* |
| Shrubs: | *Daviesia ulicifolia, Pultenaea gunnii, Pultenaea juniperina* |
| Herbs: | *Caladenia sp., Chiloglottis sp., Drosera peltata, Poranthera microphylla, Pterostylis melagramma, Pterostylis parviflora, Thelymitra sp.* |
| Grasses: | *Ehrharta sp.* |

### WGL – Tower 1

| | |
|---|---|
| Grid Reference: | 521697E, 5251078N |
| Accuracy: | GPS (within 10 metres) |
| Recorder: | Karen Ziegler |
| Date of Survey: | 4 Oct 2018 |
| Trees: | *Eucalyptus globulus subsp. globulus, Eucalyptus obliqua* |
| Tall Shrubs: | *Acacia dealbata subsp. dealbata, Bedfordia salicina, Beyeria viscosa, Olearia argophylla, Pomaderris apetala* |
| Shrubs: | *Coprosma quadrifida* |
| Herbs: | *Corybas sp., Hydrocotyle hirta, Pterostylis pedunculata, Pterostylis sp.* |
| Graminoids: | *Luzula sp.* |
| Climbers: | *Clematis aristata* |

### WOB - Tower 2

| | |
|---|---|
| Grid Reference: | 521587E, 5251055N |
| Accuracy: | GPS (within 10 metres) |

| | |
|---|---|
| Recorder: | Karen Ziegler |
| Date of Survey: | 4 Oct 2018 |
| Trees: | *Eucalyptus obliqua* |
| Tall Shrubs: | *Acacia leprosa var. graveolens, Bedfordia salicina, Nematolepis squamea, Olearia argophylla, Pittosporum bicolor, Pomaderris apetala, Zieria arborescens* |
| Shrubs: | *Coprosma quadrifida, Cyathodes glauca, Pimelea cinerea* |
| Herbs: | *Cardamine sp., Chiloglottis sp., Dianella tasmanica, Drymophila cyanocarpa, Geranium potentilloides var. potentilloides, Pterostylis melagramma* |
| Ferns: | *Notogrammitis billardierei, Polystichum proliferum, Pteridium esculentum subsp. esculentum* |

### DTO - E. tenuiramis forest and woodland on sediments – Access Road HCC land

| | |
|---|---|
| Grid Reference: | 522949E, 5251599N |
| Accuracy: | within 50 metres |
| Recorder: | Andrew J. North |
| Date of Survey: | 21 Feb 2019 |
| Trees: | *Bursaria spinosa subsp. spinosa, Eucalyptus pulchella, Eucalyptus tenuiramis, Eucalyptus viminalis subsp. viminalis* |
| Tall Shrubs: | *Allocasuarina monilifera, Exocarpos cupressiformis, Leptospermum scoparium* |
| Shrubs: | *Daviesia ulicifolia, Epacris impressa, Leptomeria drupacea, Ozothamnus obcordatus, Pomaderris pilifera, Pultenaea gunnii subsp. gunnii, Pultenaea juniperina* |
| Low Shrubs: | *Acacia myrtifolia, Pultenaea pedunculata, Tetratheca pilosa* |
| Herbs: | *Gonocarpus tetragynus, Opercularia ovata, Senecio prenanthoides* |
| Graminoids: | *Diplarrena moraea, Juncus pallidus, Lepidosperma laterale* |
| Grasses: | *Deyeuxia densa, Deyeuxia monticola, Microlaena stipoides, Poa labillardierei, Rytidosperma indutum, Rytidosperma setaceum* |
| Weeds: | *Chrysanthemoides monilifera subsp. monilifera, Conium maculatum* |

### DOB – E. obliqua dry forest – Access Road

| | |
|---|---|
| Grid Reference: | 522343E, 5251502N |
| Accuracy: | within 50 metres |
| Recorder: | Andrew J. North |
| Date of Survey: | 21 Feb 2019 |
| Trees: | *Eucalyptus globulus subsp. globulus, Eucalyptus obliqua, Eucalyptus tenuiramis, Eucalyptus viminalis subsp. viminalis* |
| Tall Shrubs: | *Acacia dealbata subsp. dealbata, Bedfordia salicina, Dodonaea viscosa subsp. spatulata, Exocarpos cupressiformis, Leptospermum scoparium, Pultenaea daphnoides* |
| Shrubs: | *Amperea xiphoclada var. xiphoclada, Coprosma quadrifida, Daviesia ulicifolia, Epacris impressa, Exocarpos strictus, Leptomeria drupacea, Lomatia tinctoria, Olearia stellulata, Olearia viscosa, Pomaderris pilifera, Pultenaea gunnii subsp. gunnii, Pultenaea juniperina* |
| Low Shrubs: | *Acacia myrtifolia, Astroloma humifusum, Lissanthe strigosa subsp. subulata, Tetratheca labillardierei* |
| Herbs: | *Caladenia sp., Coronidium scorpioides, Gonocarpus tetragynus, Hypericum gramineum, Opercularia ovata, Poranthera microphylla, Senecio linearifolius var. linearifolius, Senecio minimus, Wahlenbergia sp.* |
| Graminoids: | *Juncus sarophorus, Lomandra longifolia* |
| Grasses: | *Anthosachne scabra, Austrostipa pubinodis, Deyeuxia monticola, Dichelachne rara, Microlaena stipoides, Poa gunnii, Poa labillardierei, Rytidosperma racemosum var. racemosum* |
| Ferns: | *Pteridium esculentum subsp. esculentum* |
| Climbers: | *Cassytha pubescens* |
| Weeds: | *Centaurium erythraea, Chrysanthemoides monilifera subsp. monilifera, Rubus fruticosus* |

# APPENDIX B – VASCULAR PLANT SPECIES LIST

**Status codes:**

| ORIGIN | NATIONAL SCHEDULE | STATE SCHEDULE |
|---|---|---|
| | EPBC Act 1999 | TSP Act 1995 |
| i - introduced | CR - critically endangered | e - endangered |
| d - declared weed WM Act | EN - endangered | v - vulnerable |
| en - endemic to Tasmania | VU - vulnerable | r - rare |
| t - within Australia, occurs only in Tas. | | |

**Sites:**

| | | | |
|---|---|---|---|
| 1 | SHS - Pinnacle Centre - E519520, N5250740 | 27/09/2018 | Andrew J. North |
| 2 | SHS - Tower C3 - E519625, N5250750 | 27/09/2018 | Andrew J. North |
| 3 | DCO - Temporary tower mid slope - E519935, N5250795 | 1/10/2018 | Karen Ziegler |
| 4 | SHS - Pinnacle walkways - E519498, N5250742 | 1/10/2018 | Karen Ziegler |
| 5 | FUM - Base Station - E521890, N5251090 | 4/10/2018 | Karen Ziegler |
| 6 | WOB – Near base station - E521917, N5251997 | 4/10/2018 | Karen Ziegler |
| 7 | FUM – Base Station Access Rd - E521927, N5251294 | 4/10/2018 | Karen Ziegler |
| 8 | DOB – Access Rd Wellington Park section E522011, N5251375 | 4/10/2018 | Karen Ziegler |
| 9 | WGL – Tower 1 - E521697, N5251078 | 4/10/2018 | Karen Ziegler |
| 10 | WOB – Tower2 - E521587, N5251055 | 4/10/2018 | Karen Ziegler |
| 11 | FUM – Access Point off McRobie's Rd E523916, N5251082 | 18/10/2018 | Karen Ziegler |
| 12 | DGL - Access Rd Degraded E. globulus forest - E523873, N5251061 | 18/10/2018 | Andrew J. North |
| 13 | DGL - Access Rd Grassy E. globulus forest - E523800, N5251050 | 23/01/1997 | Andrew J. North |
| 14 | DOB - Access Rd Eucalyptus obliqua dry forest - E523670, N5251130 | 23/01/1997 | Andrew J. North |
| 15 | DTO - Access Rd Heathy E. tenuiramis forest - E523460, N5251220 | 23/01/1997 | Andrew J. North |
| 16 | DOB - Access Rd Dry shrubby E. obliqua forest - E522110, N5251500 | 23/01/1997 | Andrew J. North |
| 17 | DTO – Access Rd Dry shrubby E. tenuiramis forest - E522949, N5251599 | 21/02/2019 | Andrew J. North |
| 18 | DOB - Access Rd Dry shrubby E. obliqua forest - E522343, N5251502 | 21/02/2019 | Andrew J. North |
| 19 | Pinnacle centre - summer ephemerals - E519500, N5250750 | 6/02/2020 | Andrew J. North |
| 20 | WOB – FMBZ near Base Station - E521950, N5251050 | 14/03/2020 | Karen Ziegler |
| 21 | Access Road - additional species - E522050, N5251382 | 13/03/2020 | Karen Ziegler |

| Site | Name | Common name | Status |
|---|---|---|---|
| | DICOTYLEDONAE | | |
| | **APIACEAE** | | |
| 11 12 17 | *Conium maculatum* | hemlock | i |
| 3 6 7 9 12 | *Hydrocotyle hirta* | hairy pennywort | |
| 19 | *Oreomyrrhis eriopoda* | australian caraway | |
| 1 4 | *Oreomyrrhis sp.* | carraway | |
| | **APOCYNACEAE** | | |
| 11 | *Vinca major* | blue periwinkle | i |
| | **ASTERACEAE** | | |
| 6 9 10 18 20 | *Bedfordia salicina* | tasmanian blanketleaf | en |
| 1 2 4 19 | *Brachyscome spathulata* | spoonleaf daisy | |
| 5 6 20 | *Cassinia aculeata subsp. aculeata* | dollybush | |
| 1 2 4 | *Celmisia asteliifolia* | silver snowdaisy | en |
| 17 18 | *Chrysanthemoides monilifera subsp. monilifera* | boneseed | d |
| 5 7 12 19 20 | *Cirsium vulgare* | spear thistle | i |
| 7 14 18 | *Coronidium scorpioides* | curling everlasting | |
| 1 4 19 | *Cotula alpina* | alpine buttons | |
| 2 | *Cotula australis* | southern buttons | |
| 5 19 | *Euchiton japonicus* | common cottonleaf | |
| 1 2 4 7 | *Helichrysum luteoalbum* | jersey cudweed | |
| 7 19 | *Hypochaeris radicata* | rough catsear | i |
| 1 19 | *Leontodon saxatilis* | hairy hawkbit | i |
| 6 9 10 20 | *Olearia argophylla* | musk daisybush | |
| 1 2 4 | *Olearia ledifolia* | rock daisybush | en |
| 3 16 | *Olearia phlogopappa* | dusty daisy bush | |
| 1 4 | *Olearia pinifolia* | prickly daisybush | en |
| 13 | *Olearia ramulosa* | twiggy daisybush | |
| 16 18 | *Olearia stellulata* | sawleaf daisybush | |
| 3 | *Olearia tasmanica* | tasmanian daisybush | en |
| 18 | *Olearia viscosa* | viscid daisybush | |
| 3 | *Ozothamnus antennaria* | sticky everlastingbush | en |

| | | | |
|---|---|---|---|
| 1 2 3 4 | *Ozothamnus ledifolius* | mountain everlastingbush | en |
| 15 17 | *Ozothamnus obcordatus* | yellow everlastingbush | |
| 8 | *Ozothamnus thyrsoideus* | arching everlastingbush | |
| 1 4 | *Pappochroma bellidioides* | hairy mountaindaisy | |
| 1 4 | *Pappochroma tasmanicum* | tasmanian mountaindaisy | |
| 2 3 4 | *Senecio gunnii* | mountain fireweed | |
| 5 18 | *Senecio linearifolius var. linearifolius* | common fireweed groundsel | |
| 18 | *Senecio minimus* | shrubby fireweed | |
| 3 | *Senecio pectinatus var. pectinatus* | yellow alpine groundsel | |
| 17 | *Senecio prenanthoides* | common fireweed | |
| 13 | *Senecio quadridentatus* | cotton fireweed | |
| 12 15 | *Senecio sp.* | groundsel | |
| 19 | *Taraxacum officinale* | common dandelion | i |
| | **BORAGINACEAE** | | |
| 11 | *Echium candicans* | pride of madeira | i |
| 12 | *Myosotis arvensis* | field forgetmenot | i |
| 19 | *Myosotis australis* | southern forgetmenot | |
| | **BRASSICACEAE** | | |
| 11 12 | *Cardamine hirsuta* | hairy bittercress | i |
| 19 | *Cardamine lilacina* | lilac bittercress | |
| 3 5 10 | *Cardamine sp.* | bittercress | |
| | **CAMPANULACEAE** | | |
| 19 | *Wahlenbergia saxicola* | mountain bluebell | en |
| 5 12 18 20 | *Wahlenbergia sp.* | bluebell | |
| | **CARYOPHYLLACEAE** | | |
| 4 | *Cerastium vulgare* | common mouse-ear | i |
| 1 4 | *Colobanthus apetalus var. apetalus* | coast cupflower | |
| | **CASUARINACEAE** | | |
| 15 | *Allocasuarina littoralis* | black sheoak | |
| 15 17 | *Allocasuarina monilifera* | necklace sheoak | en |
| | **CLUSIACEAE** | | |
| 18 20 | *Hypericum gramineum* | small st johns-wort | |
| | **CONVOLVULACEAE** | | |
| 14 | *Dichondra repens* | kidneyweed | |
| | **CRASSULACEAE** | | |
| 12 | *Crassula sieberiana* | stone-crop | |
| | **DROSERACEAE** | | |
| 16 | *Drosera auriculata* | tall sundew | |
| 5 8 | *Drosera peltata* | pale sundew | |
| 5 | *Drosera pygmaea* | dwarf sundew | |
| | **ELAEOCARPACEAE** | | |
| 3 | *Aristotelia peduncularis* | heartberry | en |
| | **ERICACEAE** | | |
| 1 2 4 | *Acrothamnus hookeri* | mountain beardheath | |
| 12 13 18 | *Astroloma humifusum* | native cranberry | |
| 3 10 20 | *Cyathodes glauca* | purple cheeseberry | en |
| 14 16 17 18 | *Epacris impressa* | common heath | |
| 1 2 4 | *Epacris serpyllifolia* | alpine heath | en |
| 5 6 7 20 | *Erica lusitanica* | spanish heath | d |
| 1 2 | *Gaultheria hispida* | copperleaf snowberry | en |
| 3 | *Leptecophylla parvifolia* | mountain pinkberry | en |
| 14 18 | *Lissanthe strigosa subsp. subulata* | peachberry heath | |
| 1 2 4 | *Monotoca empetrifolia* | mat broomheath | en |
| 1 4 | *Planocarpa petiolaris* | alpine cheeseberry | en |
| 3 | *Richea dracophylla* | pineapple candleheath | en |
| 1 2 4 | *Richea scoparia* | scoparia | en |

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|---|---|---|---|
| 1 2 4 | *Richea sprengelioides* | rigid candleheath | en |
| 1 4 | *Trochocarpa thymifolia* | thymeleaf purpleberry | en |
| | **EUPHORBIACEAE** | | |
| 15 18 | *Amperea xiphoclada var. xiphoclada* | broom spurge | |
| 6 9 20 | *Beyeria viscosa* | pinkwood | |
| 1 2 3 4 | *Euphorbia sp.* | spurge | i |
| 3 5 7 8 18 | *Poranthera microphylla* | small poranthera | |
| | **FABACEAE** | | |
| 6 9 12 13 14 18 20 | *Acacia dealbata subsp. dealbata* | silver wattle | |
| 7 10 14 | *Acacia leprosa var. graveolens* | varnish wattle | |
| 12 | *Acacia longifolia subsp. longifolia* | sydney coast wattle | i |
| 12 | *Acacia melanoxylon* | blackwood | |
| 14 15 1718 | *Acacia myrtifolia* | redstem wattle | |
| 11 | *Acacia pravissima* | oven's wattle | i |
| 16 | *Acacia terminalis* | sunshine wattle | |
| 12 | *Bossiaea prostrata* | creeping bossiaea | |
| 12 | *Cytisus scoparius* | english broom | d |
| 8 12 14 15 16 17 18 20 | *Daviesia ulicifolia* | spiky bitterpea | |
| 11 12 | *Genista monspessulana* | canary broom | d |
| 12 | *Indigofera australis subsp. australis* | native indigo | |
| 3 | *Oxylobium ellipticum* | golden shaggypea | |
| 12 14 18 20 | *Pultenaea daphnoides* | heartleaf bushpea | |
| 8 15 16 17 18 | *Pultenaea gunnii subsp. gunnii* | delicate golden bushpea | en |
| 7 8 14 15 16 17 18 | *Pultenaea juniperina* | prickly beauty | |
| 14 15 17 | *Pultenaea pedunculata* | matted bushpea | |
| 5 12 20 | *Ulex europaeus* | gorse | d |
| | **FAGACEAE** | | |
| 3 | *Nothofagus cunninghamii* | myrtle beech | |
| | **FUMARIACEAE** | | |
| 12 | *Fumaria sp.* | fumitory | i |
| | **GENTIANACEAE** | | |
| 13 18 20 | *Centaurium erythraea* | common centaury | i |
| | **GERANIACEAE** | | |
| 2 | *Geranium brevicaule* | alpine cranesbill | |
| 3 4 5 6 7 10 12 19 20 | *Geranium potentilloides var. potentilloides* | mountain cranesbill | |
| | **GOODENIACEAE** | | |
| 12 15 | *Goodenia lanata* | trailing native-primrose | |
| 20 | *Goodenia ovata* | hop native-primrose | |
| | **HALORAGACEAE** | | |
| 1 2 4 | *Gonocarpus montanus* | mountain raspwort | |
| 3 12 13 14 15 17 18 | *Gonocarpus tetragynus* | common raspwort | |
| 2 3 | *Gonocarpus teucrioides* | forest raspwort | |
| | **LAMIACEAE** | | |
| 7 | *Prunella vulgaris* | selfheal | i |
| | **LAURACEAE** | | |
| 15 16 18 | *Cassytha pubescens* | downy dodderlaurel | |
| | **LINACEAE** | | |
| 5 7 | *Linum catharticum* | white flax | i |
| | **LOGANIACEAE** | | |
| 1 | *Schizacme montana* | mountain mitrewort | |

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|---|---|---|---|
| | **MALVACEAE** | | |
| 6 20 | *Asterotrichion discolor* | tasmanian currajong | en |
| | **MYRTACEAE** | | |
| 1 | *Baeckea gunniana* | alpine heathmyrtle | |
| 13 | *Eucalyptus amygdalina* | black peppermint | en |
| 1 2 3 4 | *Eucalyptus coccifera* | snow peppermint | en |
| 5 6 9 12 13 18 20 | *Eucalyptus globulus subsp. globulus* | tasmanian blue gum | |
| 5 6 8 9 10 12 13 14 15 16 18 20 | *Eucalyptus obliqua* | stringybark | |
| 17 | *Eucalyptus pulchella* | white peppermint | en |
| 20 | *Eucalyptus regnans* | giant ash | |
| 11 | *Eucalyptus risdonii* | risdon peppermint | planted |
| 8 14 15 16 17 18 | *Eucalyptus tenuiramis* | silver peppermint | en |
| 3 | *Eucalyptus urnigera* | urn gum | en |
| 5 8 12 13 14 17 18 20 | *Eucalyptus viminalis subsp. viminalis* | white gum | |
| 2 20 | *Leptospermum lanigerum* | woolly teatree | |
| 1 4 | *Leptospermum rupestre* | mountain teatree | en |
| 5 14 17 18 | *Leptospermum scoparium* | common tea-tree | |
| | **ONAGRACEAE** | | |
| 19 | *Epilobium sp.* | willowherb | |
| | **OROBANCHACEAE** | | |
| 19 | *Euphrasia collina subsp. diemenica* | plain tufted-eyebright | en |
| 19 | *Euphrasia striata* | shiny striped eyebright | en |
| | **OXALIDACEAE** | | |
| 13 | *Oxalis perennans* | grassland woodsorrel | |
| 3 5 7 12 20 | *Oxalis sp.* | woodsorrel | |
| | **PITTOSPORACEAE** | | |
| 12 13 14 17 20 | *Bursaria spinosa subsp. spinosa* | prickly box | |
| 3 6 10 20 | *Pittosporum bicolor* | cheesewood | |
| 6 | *Pittosporum bicolor X Pittosporum undulatum* | hybrid pittosporum | |
| 12 20 | *Pittosporum undulatum* | sweet pittosporum | i |
| 15 | *Rhytidosporum procumbens* | starry appleberry | |
| | **PLANTAGINACEAE** | | |
| 5 | *Plantago lanceolata* | ribwort plantain | i |
| 19 | *Plantago tasmanica* | tasman plantain | en |
| 3 | *Veronica formosa* | common speedwellbush | en |
| | **PROTEACEAE** | | |
| 1 4 | *Bellendena montana* | mountain rocket | en |
| 12 | *Grevillea rosmarinifolia* | grevillea | i |
| 3 | *Hakea lissosperma* | mountain needlebush | |
| 3 | *Lomatia polymorpha* | mountain guitarplant | en |
| 18 | *Lomatia tinctoria* | guitarplant | en |
| 1 2 4 | *Orites acicularis* | yellow orites | en |
| 1 2 4 | *Orites revolutus* | revolute orites | en |
| 1 2 3 | *Telopea truncata* | tasmanian waratah | en |
| | **RANUNCULACEAE** | | |
| 6 7 9 | *Clematis aristata* | mountain clematis | |
| 20 | *Clematis sp.* | clematis | |
| 2 4 19 | *Ranunculus scapiger* | gully buttercup | |
| 3 | *Ranunculus sp.* | buttercup | |
| | **RESEDACEAE** | | |
| 12 | *Reseda lutea* | cutleaf mignonette | i |

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|---|---|---|---|
| | **RHAMNACEAE** | | |
| 9 10 20 | *Pomaderris apetala* | common dogwood | |
| 17 18 | *Pomaderris pilifera* | hairy dogwood | |
| | **ROSACEAE** | | |
| 4 | *Acaena montana* | mountain buzzy | en |
| 5 | *Acaena novae-zelandiae* | common buzzy | |
| 2 3 6 7 20 | *Acaena sp.* | sheep's burr | |
| 11 | *Cotoneaster glaucophyllus var. serotinus* | largeleaf cotoneaster | i |
| 11 | *Cotoneaster pannosus* | velvet cotoneaster | i |
| 11 | *Prunus sp.* | | i |
| 5 11 12 18 | *Rubus fruticosus* | blackberry | d |
| 1 | *Rubus gunnianus* | alpine raspberry | en |
| | **RUBIACEAE** | | |
| 1 2 3 | *Coprosma nitida* | mountain currant | |
| 5 6 7 9 10 18 20 | *Coprosma quadrifida* | native currant | |
| 11 12 | *Galium aparine* | cleavers | i |
| 3 5 6 20 | *Galium australe* | tangled bedstraw | |
| 17 18 | *Opercularia ovata* | broadleaf stinkweed | |
| 16 | *Opercularia varia* | variable stinkweed | |
| | **RUTACEAE** | | |
| 3 | *Correa lawrenceana var. lawrenceana* | mountain correa | en |
| 10 | *Nematolepis squamea* | satinwood | |
| 10 | *Zieria arborescens* | stinkwood | |
| | **SALICACEAE** | | |
| 11 | *Populus nigra* | lombardy poplar, italica | i |
| 11 | *Salix sp.* | willow | d |
| | **SANTALACEAE** | | |
| 6 8 12 13 14 15 16 17 18 20 | *Exocarpos cupressiformis* | common native-cherry | |
| 1 2 4 19 | *Exocarpos humifusus* | mountain native-cherry | en |
| 18 | *Exocarpos strictus* | pearly native-cherry | |
| 15 16 17 18 | *Leptomeria drupacea* | erect currantbush | |
| | **SAPINDACEAE** | | |
| 12 18 | *Dodonaea viscosa subsp. spatulata* | broadleaf hopbush | |
| | **SOLANACEAE** | | |
| 12 | *Solanum laciniatum* | kangaroo apple | |
| | **THYMELAEACEAE** | | |
| 3 10 | *Pimelea cinerea* | grey riceflower | en |
| 6 20 | *Pimelea drupacea* | cherry riceflower | |
| 12 | *Pimelea humilis* | dwarf riceflower | |
| 1 2 4 | *Pimelea sericea* | mountain riceflower | en |
| | **TREMANDRACEAE** | | |
| 15 18 | *Tetratheca labillardierei* | glandular pinkbells | |
| 17 | *Tetratheca pilosa* | hairy pinkbells | |
| | **URTICACEAE** | | |
| 5 | *Urtica incisa* | scrub nettle | |
| | **VIOLACEAE** | | |
| 19 | *Viola curtisiae* | Curtis's violet | r |
| 2 4 | *Viola hederacea* | ivyleaf violet | |
| | **WINTERACEAE** | | |
| 1 2 3 4 | *Tasmannia lanceolata* | mountain pepper | |

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|---|---|---|---|
| | GYMNOSPERMAE | | |
| | **PINACEAE** | | |
| 1 20 | *Pinus radiata* | radiata pine | i |
| | MONOCOTYLEDONAE | | |
| | **AGAPANTHACEAE** | | |
| 11 12 | *Agapanthus sp.* | agapanthus | i |
| | **ASPARAGACEAE** | | |
| 12 13 15 18 | *Lomandra longifolia* | sagg | |
| | **ASTELIACEAE** | | |
| 1 2 4 | *Astelia alpina var. alpina* | pineapple grass | en |
| | **CYPERACEAE** | | |
| 5 | *Carex appressa* | tall sedge | |
| 2 5 | *Gahnia grandis* | cutting grass | |
| 12 | *Lepidosperma elatius* | tall swordsedge | |
| 17 | *Lepidosperma laterale* | variable swordsedge | |
| 19 | *Uncinia flaccida* | mountain hooksedge | |
| 3 | *Uncinia sp.* | hooksedge | en |
| | **HEMEROCALLIDACEAE** | | |
| 12 13 14 15 | *Dianella revoluta* | spreading flaxlily | |
| 7 10 20 | *Dianella tasmanica* | forest flaxlily | |
| | **IRIDACEAE** | | |
| 17 | *Diplarrena moraea* | white flag-iris | |
| | **JUNCACEAE** | | |
| 12 17 | *Juncus pallidus* | pale rush | |
| 18 | *Juncus sarophorus* | broom rush | |
| 5 7 | *Juncus sp.* | Rush | |
| 19 | *Luzula australasica subsp. australasica* | australian woodrush | en |
| 2 3 4 7 9 | *Luzula sp.* | luzula | |
| | **LUZURIAGACEAE** | | |
| 10 | *Drymophila cyanocarpa* | turquoise berry | |
| | **ORCHIDACEAE** | | |
| 7 8 18 | *Caladenia sp.* | spider-orchid | |
| 21 | *Chiloglottis reflexa* | autumn bird-orchid | |
| 8 10 | *Chiloglottis sp.* | bird orchid | |
| 7 | *Chiloglottis triceratops* | threehorned bird-orchid | |
| 9 | *Corybas sp.* | helmet orchid | |
| 13 | *Microtis sp.* | onion orchid | |
| 8 10 | *Pterostylis melagramma* | blackstripe greenhood | |
| 8 | *Pterostylis parviflora* | tiny greenhood | |
| 6 9 | *Pterostylis pedunculata* | maroonhood | |
| 3 9 19 | *Pterostylis sp.* | greenhood | |
| 5 7 8 | *Thelymitra sp.* | sun-orchid | |
| | **POACEAE** | | |
| 19 | *Agrostis venusta* | graceful bent | |
| 13 | *Aira caryophyllea* | silvery hairgrass | i |
| 13 14 18 | *Anthosachne scabra* | rough wheatgrass | |
| 7 | *Anthoxanthum odoratum* | sweet vernalgrass | i |
| 18 | *Austrostipa pubinodis* | tall speargrass | |
| 13 | *Austrostipa rudis subsp. australis* | southern speargrass | |
| 17 | *Deyeuxia densa* | heath bentgrass | |
| 1 2 14 15 16 17 18 19 | *Deyeuxia monticola* | mountain bentgrass | |
| 15 16 18 | *Dichelachne rara* | common plumegrass | |
| 12 | *Ehrharta erecta* | panic veldtgrass | i |
| 5 6 7 8 20 | *Ehrharta sp.* | ricegrass | |
| 19 | *Festuca plebeia* | tasmanian fescue | en |

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|---|---|---|---|
| 1 19 | *Hierochloe fraseri* | alpine holygrass | en |
| 19 | *Hierochloe redolens* | sweet holygrass | |
| 1 | *Holcus lanatus* | yorkshire fog | i |
| 14 17 18 | *Microlaena stipoides* | weeping grass | |
| 1 2 4 18 | *Poa gunnii* | gunns snowgrass | en |
| 12 17 18 | *Poa labillardierei* | silver tussockgrass | |
| 3 | *Poa sp.* | poa | |
| 19 | *Rytidosperma fortunae-hibernae* | luck-of-the-irish wallabygrass | en |
| 14 17 | *Rytidosperma indutum* | tall wallabygrass | r |
| 13 | *Rytidosperma pilosum* | velvet wallabygrass | |
| 18 | *Rytidosperma racemosum var.* | stiped wallabygrass | |
| 13 14 15 17 | *Rytidosperma setaceum* | bristly wallabygrass | |
| 1 2 4 5 7 12 | *Rytidosperma sp.* | wallabygrass | |
| 19 | *Saxipoa saxicola* | rock snowgrass | |
| | PTERIDOPHYTA | | |
| | **ASPIDIACEAE** | | |
| 2 3 4 6 7 10 20 | *Polystichum proliferum* | mother shieldfern | |
| 20 | *Rumohra adiantiformis* | leathery shieldfern | |
| | **ASPLENIACEAE** | | |
| 3 | *Asplenium flabellifolium* | necklace fern | |
| | **BLECHNACEAE** | | |
| 5 7 | *Blechnum nudum* | fishbone waterfern | |
| 3 6 7 | *Blechnum wattsii* | hard waterfern | |
| | **DENNSTAEDTIACEAE** | | |
| 5 20 | *Histiopteris incisa* | batswing fern | |
| 5 | *Hypolepis rugosula* | ruddy groundfern | |
| 5 6 7 10 12 14 18 20 | *Pteridium esculentum subsp. esculentum* | bracken | |
| | **DICKSONIACEAE** | | |
| 3 5 6 7 20 | *Dicksonia antarctica* | soft treefern | |
| | **GRAMMITIDACEAE** | | |
| 10 | *Notogrammitis billardierei* | common fingerfern | |
| | **LYCOPODIACEAE** | | |
| 2 | *Huperzia australiana* | mother clubmoss | |
| 1 | *Lycopodium fastigiatum* | mountain clubmoss | |
| 1 2 4 | *Lycopodium scariosum* | spreading clubmoss | |

# APPENDIX C – TARGETED FAUNA SURVEY

Five motion response cameras were installed on the 7th of March around rocky outcrops that were deemed as potentially significant denning habitat and left for 3 weeks, as well as a song meter near a concentration of potential masked owl habitat adjacent to the top of the Access Road over the same period (Figure A). Results from camera trap survey confirmed the use of the area by threatened fauna.

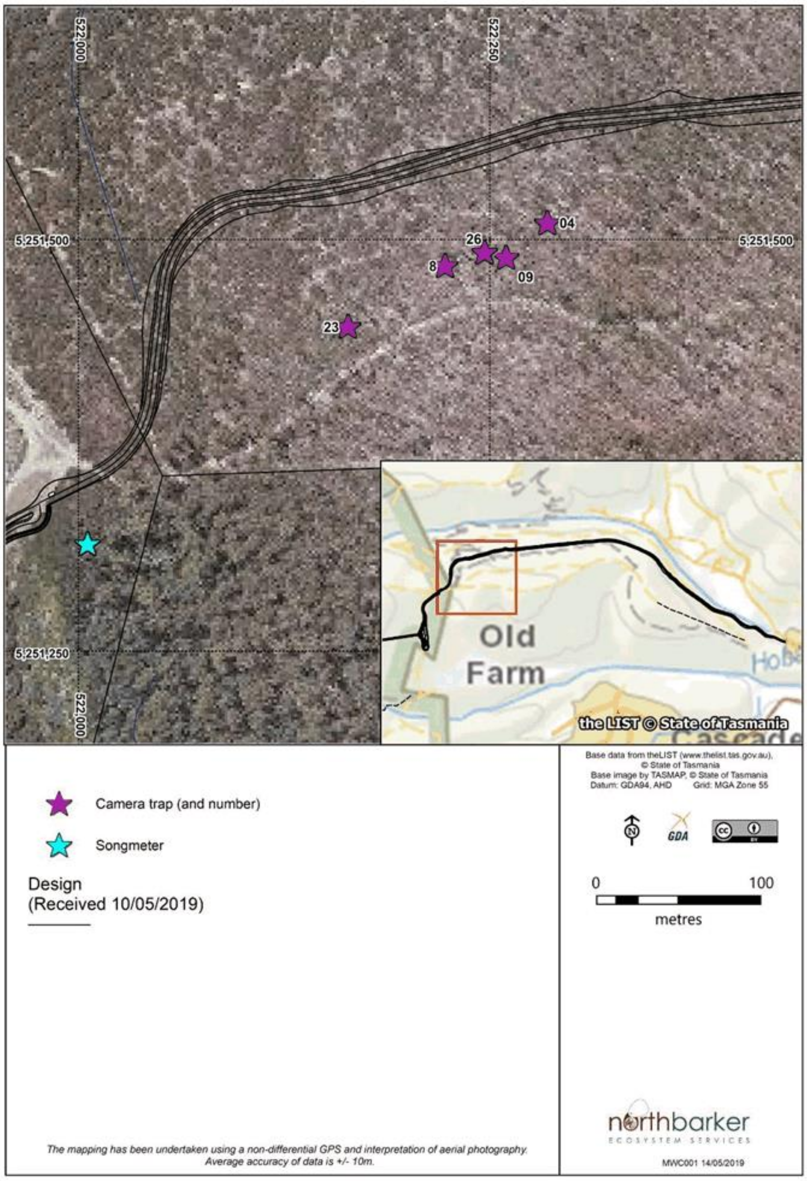


Figure A: Location of the Access Road cameras and song meter

## Methods

*Tasmanian masked owl Tyto novaehollandiae castanops*

Survey guidelines have been developed for Australia's threatened birds listed under the EPBCA[89]. Although the Tasmanian masked owl is not included in these guidelines, its Species Profile and Threats Database (SPRAT) profile[90] suggests that the recommendations for the northern Australian subspecies, *T. n. kimberli*, may be relevant. Guidelines for the northern subspecies suggest that broadcast (playback) surveys are effective in suitable habitat, especially in the lead up to breeding season. Detection occurs with solicited responses. Area and transect searches are unlikely to be useful due to the nocturnal habits and cryptic nature of the species [91].

Whilst the Department of the Environment, Water, Heritage and the Arts (DEWHA) guidelines suggest that playback surveys are most likely to be effective in the lead up to the breeding season[92], in Tasmania there is no peak survey period recommended[93], with the entire year considered viable for surveying[94]. This is supported by the complete lack of seasonality in the effectiveness of the playback method in Tasmania[95], which is consistent with the limited effect of season on owl calling or response to playback noted in other Australian large forest owls, including other subspecies of *T. novaehollandiae*[96]. The limited breeding records for the Tasmanian masked owl are concentrated between spring and early summer[97]. However, observations of chicks at other times[98] have led to the understanding that breeding may be broadly seasonal but possible at any time of the year, with opportunistic events most likely relating to spikes in prey density, consistent with closely related species elsewhere[99].

The DEWHA survey effort guide for the northern subspecies recommends eight hours of surveys over four days[100]. However, the Threatened Species Section of DPIPWE[101] acknowledges that extensive survey effort may be required to obtain clear results (from broadcasts) and that it is common for broadcasts to go unanswered in locations where owls are known to be present some of the time, leading to very low rates of detection. In our experience this is further exacerbated in western Tasmania where population density of this species is lower[102]. The broadcast method also suffers in relation to impact assessments as it may attract non-resident birds onto a site. As such, our primary survey method for this species was automated audio-recording, which is passive (non-attractant) and highly efficient in relation to required physical survey effort.

For the audio survey, an automatic audio-recording device (a Song Meter SM3 Bioacoustics Recorder) was placed on site for almost three weeks (20 nights). The device was placed in a stand of dry forest with mature habitat elements, which is n be high quality potential habitat[103]. The audio-recording device was programmed to record from half an hour before

[89] DEWHA (2010)
[90] Department of the Environment (2018)
[91] DEWHA (2010)
[92] DEWHA (2010)
[93] Threatened Species Section (2018)
[94] Threatened Species Section (2018)
[95] Todd (2012)
[96] Kavanagh and Peake (1993); Debus (1995); Kavanagh (1997)
[97] Mooney (1997)
[98] e.g. Bell (2008) cited in Threatened Species Scientific Committee (2010)
[99] Lenton (1984); Taylor (1994)
[100] DEWHA (2010)
[101] Threatened Species Section (2018)
[102] Threatened Species Section (2018)
[103] FPA (2014)

sunset and continue for two and half hours after sunset, and then to record again for half an hour each side of sunrise[104] – *i.e.* a total of four hours of recording were completed each night. The recordings were wave files using a 48 kHz sampling rate to cover the maximum frequency of the call of the Tasmanian masked owl.

The audio-recordings from the survey were analysed using Song Scope software and a call recogniser compiled from calls collected across Tasmania[105]. This process identifies sounds that correspond to the call signature of the Tasmanian masked owl only.

In conjunction with the audio survey, our ground survey included examination of approximately 4.12 ha of dry forest habitat for suitability in accordance with the Forest Practices Authority (FPA) guidelines[106], and examination of hollow-bearing trees for evidence of occupation (including pellets, scratchings, white-wash, prey remains, *etc.*).

With the combination of these survey methods, the total survey effort for the Tasmanian masked owl was in excess of 80 hours over 20 nights, which well exceeds the DEWHA recommended survey effort (8 hours over 4 days).

*Tasmanian devil (and quolls)*

The former Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC, now named the Department of Environment and Energy) published guidelines for surveying Tasmanian devils and quolls; these have been largely superseded in relevancy and currency by DPIPWE guidelines relating specifically to surveying with respect to assessing the impacts of development proposals[107]. The major difference is the focus of the DPIPWE guidelines on potential denning opportunities, due to the importance of limiting demographic pressures on the devil in particular in an era of increased mortality because of Devil Facial Tumour Disease (DFTD). In contrast, the DSEWPaC guidelines were developed to detect presence of a species only[108], which has less utility in determining meaningful impacts from a proposal. As such, our survey for these species used a combination of techniques from both guidelines to establish presence/absence and determine the suitability of habitat for denning.

For presence/absence[109], diurnal searching was undertaken for scats and prints throughout the entire ground survey, with particular attention to potential dispersal routes (e.g. tracks) and soft substrate. Scats in particular are often detectable in latrine sites such as at track junctions and creek crossings[110] and can be differentiated using morphometric traits including colour, shape, size and contents[111]. Remote motion-operated cameras were placed at five locations near rocky outcrops at the Access Road for the same period as the song meter above. The cameras were placed at ground level at locations in which passive evidence of animal activity (well-worn tracks) and potential dens that had signs of use (i.e. tracks, fresh digging).

Characteristics of natal dens for these species include a dry, structurally stable inner chamber, a chamber that is sufficient size for the mother and litter but is not so large as to be un-defendable (which includes an entrance that is a tight fit for the mother), and the

104 Todd (2012)
105 Todd (2012)
106 FPA (2014)
107 Natural and Cultural Heritage Division (2015)
108 DSEWPaC (2011)
109 DSEWPaC (2011); Natural and Cultural Heritage Division (2015)
110 DSEWPaC (2011)
111 Triggs (1996)

presence of nooks and crannies for imps to hide in[112]. Preferable habit characteristics are considered to include: direct sun near the den entrance, shelter from predators around the den mouth, a dearth of predators in the area (excluding other devils), an adequate prey base, habitat heterogeneity, complex shelter elements (such as cliffs, caves, earth banks and log piles), and friable soil for the burrows[113]. Some of these traits are fine scale habitat attributes, whereas others are landscape scale (or have plausible proxies at the landscape scale).

A systematic search for possible den locations (reaching well in excess of 30 % visual coverage specified by DPIPWE guidelines[114]) has been conducted within areas of potential denning habitat (the extent of the Access Road).

### Results

#### Song meter survey

The song meter survey did not record any threatened fauna. The large number of recordings made over the period were analysed to specifically target masked owl calls. Some similar screeches were infrequently recorded, however were deemed only to be the alarm calls of brush-tailed possums.

#### Camera trap survey

Camera traps confirmed the presence of a single Tasmanian devil and one Eastern quoll over the survey period. Additional species recorded include brushtail possums and an owlet nightjar. All observations are detailed below:

| | Fauna observations |
|---|---|
| **Camera 9** | Tasmanian devil on 9/3. Eastern quoll 10/03. Brushtail possum 22/03 Owlet nightjar 27/03. |
| **Camera 18** | Tasmanian devil observed on 9/3. No other fauna observations. |
| **Camera 23** | Brushtail possum on 7/03. No other fauna observations. |
| **Camera 24** | No fauna observations. |
| **Camera 26** | Eastern quoll observed on the 10/03. No other fauna observations. |

112 Mooney (2011)
113 Mooney (2011); Natural and Cultural Heritage Division (2015)
114 Natural and Cultural Heritage Division (2015)


Tasmanian devil on camera 9


Eastern quoll on camera 9


Owlet nightjar on camera 9


Tasmanian devil on camera 18


Eastern quoll on camera 26


Brushtail possum on camera 9

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# APPENDIX D – FAUNA HABITAT TREE ASSESSMENT

## Significant trees

A number of large trees, many hollow-bearing, were identified in the survey area. These are comprised of *Eucalyptus tenuiramis*, *E. obliqua*, and *E. globulus*. These were mapped and classed by the proportion of the overlap of each trees Tree Protection Zone (TPZ) with the road corridor (Figures A & B).

A total of 92 trees will be impacted to varying degrees by the current Access Road design. Of these, 31 will be impacted to a fatal degree (i.e. greater than 50% of their TPZ will be impacted - basically the tree is located within the footprint). 61 trees be impacted between 10-50% of their TPZs, and these trees will require assessment by an arborist to determine their likelihood of survival. Opportunity will be sought to modify road cuttings and embankments where possible to reduce the impact where practical. TPZs impacted by less than 10% are not considered significant[115].

Details of all impacted trees with additional details and coordinates can be found in Table 1, including the aforementioned impacts broken down by tree species.

[115] Australian Standard AS 4970-2009

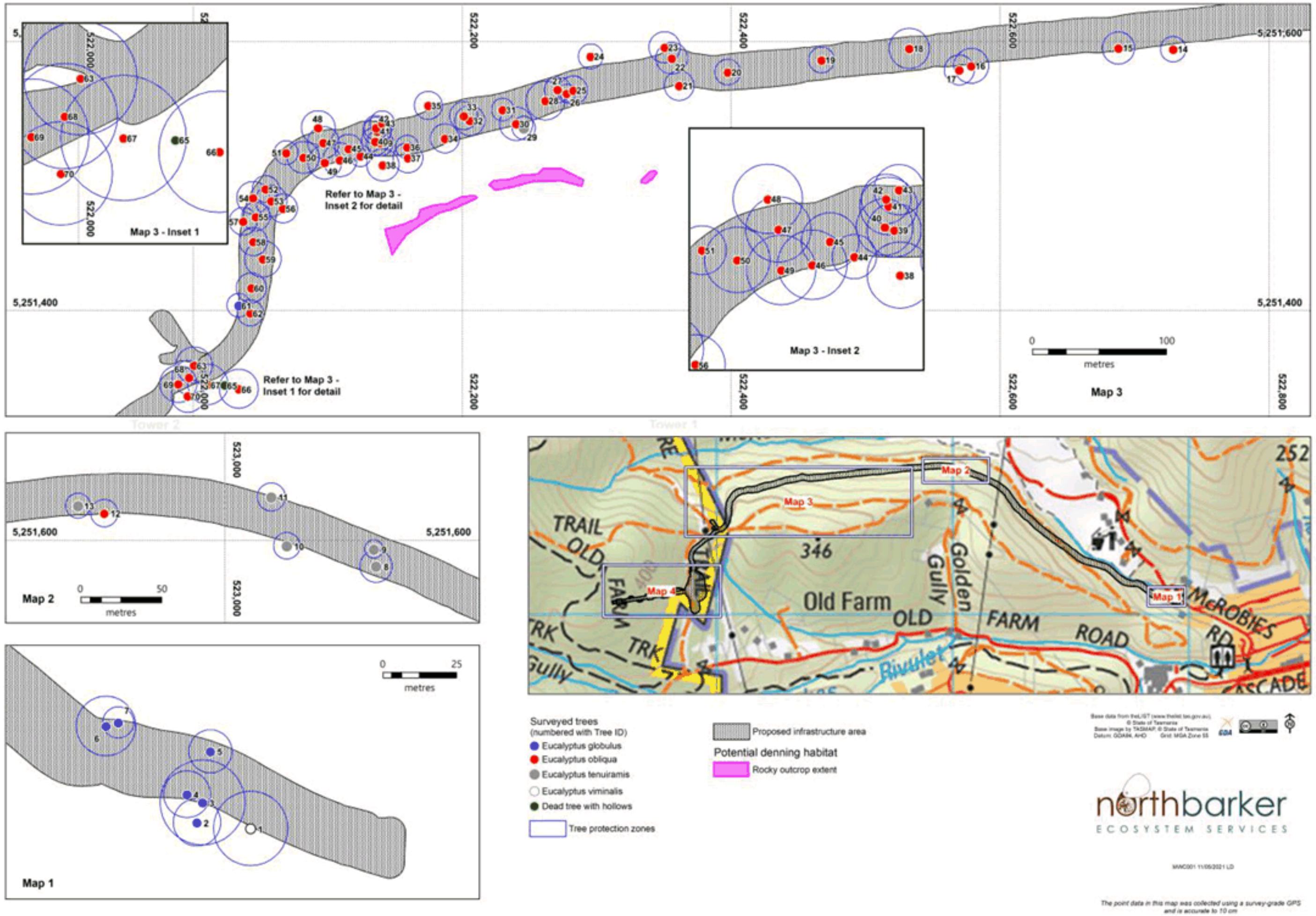


Figure A: Potential threatened fauna habitat across the Access Road

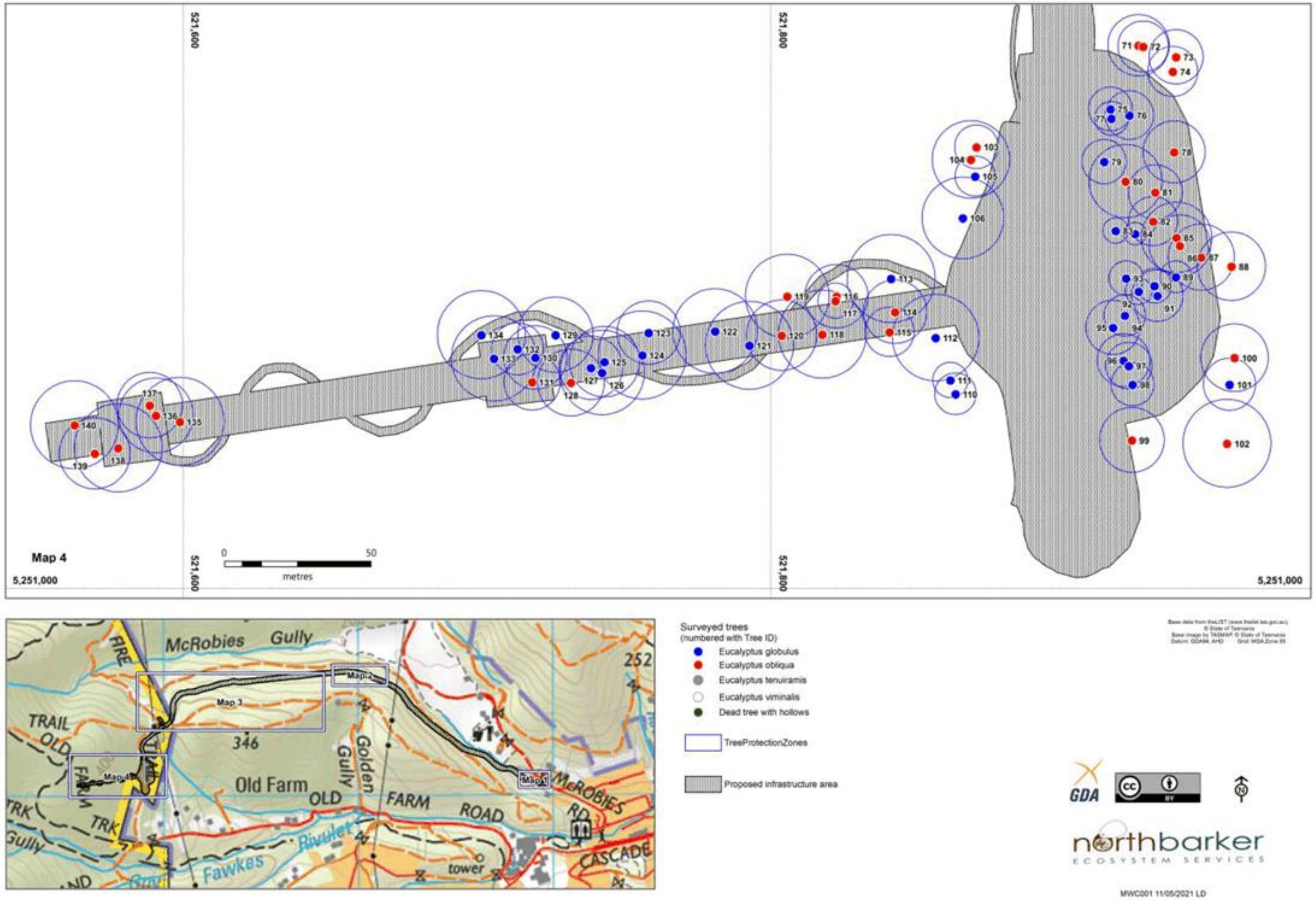


**Figure B: Potential threatened fauna habitat (trees only) in vicinity of Base Station**

**Table 1: Habitat Tree data**

All numbered trees are those within close proximity to design

Impacts scores indicate the extent of overlap with the Tree protection Zone g: 1 = >50%, 2 = 10-50, 3 <10%. HCC = Hobart City Council, WPMT = Wellington Park Management Trust

| TreeID | Fauna_Scientific | dbh_cm | Easting | Northing | Impact | Land tenure |
|---|---|---|---|---|---|---|
| 1 | Eucalyptus viminalis | 105 | 523906 | 5251055 | 2 | HCC |
| 2 | Eucalyptus globulus | 67 | 523888 | 5251057 | 3 | HCC |
| 3 | Eucalyptus globulus | 120 | 523890 | 5251064 | 1 | HCC |
| 4 | Eucalyptus globulus | 66 | 523885 | 5251067 | 1 | HCC |
| 5 | Eucalyptus globulus | 61 | 523893 | 5251081 | 1 | HCC |
| 6 | Eucalyptus globulus | 84 | 523857 | 5251090 | 1 | HCC |
| 7 | Eucalyptus globulus | 44 | 523862 | 5251091 | 1 | HCC |
| 8 | Eucalyptus tenuiramis | 83 | 523093 | 5251584 | 1 | HCC |
| 9 | Eucalyptus tenuiramis | 47 | 523092 | 5251595 | 1 | HCC |
| 10 | Eucalyptus tenuiramis | 68 | 523038 | 5251597 | 2 | HCC |
| 11 | Eucalyptus tenuiramis | 72 | 523029 | 5251627 | 1 | HCC |
| 12 | Eucalyptus obliqua | 70 | 522926 | 5251617 | 1 | HCC |
| 13 | Eucalyptus tenuiramis | 64 | 522910 | 5251621 | 1 | HCC |
| 14 | Eucalyptus obliqua | 79 | 522729 | 5251594 | 2 | HCC |
| 15 | Eucalyptus obliqua | 100 | 522688 | 5251595 | 1 | HCC |
| 16 | Eucalyptus obliqua | 108 | 522578 | 5251582 | 2 | HCC |
| 17 | Eucalyptus obliqua | 93 | 522570 | 5251579 | 2 | HCC |
| 18 | Eucalyptus obliqua | 135 | 522532 | 5251595 | 1 | HCC |
| 19 | Eucalyptus obliqua | 80 | 522467 | 5251586 | 1 | HCC |
| 20 | Eucalyptus obliqua | 80 | 522397 | 5251577 | 1 | HCC |
| 21 | Eucalyptus obliqua | 92 | 522361 | 5251567 | 1 | HCC |
| 22 | Eucalyptus obliqua | 98 | 522356 | 5251588 | 1 | HCC |
| 23 | Eucalyptus obliqua | 97 | 522350 | 5251596 | 2 | HCC |
| 24 | Eucalyptus obliqua | 77 | 522295 | 5251589 | 3 | HCC |
| 25 | Eucalyptus obliqua | 88 | 522282 | 5251564 | 1 | HCC |
| 26 | Eucalyptus obliqua | 56 | 522278 | 5251562 | 1 | HCC |
| 27 | Eucalyptus obliqua | 82 | 522271 | 5251564 | 1 | HCC |
| 28 | Eucalyptus obliqua | 120 | 522262 | 5251556 | 1 | HCC |
| 29 | Eucalyptus tenuiramis | 72 | 522246 | 5251536 | 2 | HCC |
| 30 | Eucalyptus obliqua | 103 | 522240 | 5251539 | 1 | HCC |
| 31 | Eucalyptus obliqua | 70 | 522230 | 5251550 | 1 | HCC |
| 32 | Eucalyptus obliqua | 93 | 522206 | 5251541 | 1 | HCC |
| 33 | Eucalyptus obliqua | 87 | 522201 | 5251545 | 1 | HCC |
| 34 | Eucalyptus obliqua | 90 | 522187 | 5251528 | 1 | HCC |
| 35 | Eucalyptus obliqua | 87 | 522175 | 5251553 | 2 | HCC |
| 36 | Eucalyptus obliqua | 72 | 522159 | 5251522 | 1 | HCC |
| 37 | Eucalyptus obliqua | 93 | 522160 | 5251514 | 2 | HCC |
| 38 | Eucalyptus obliqua | 100 | 522141 | 5251509 | 2 | HCC |
| 39 | Eucalyptus obliqua | 82 | 522139 | 5251525 | 1 | HCC |
| 40 | Eucalyptus obliqua | 86 | 522135 | 5251526 | 1 | HCC |
| 41 | Eucalyptus obliqua | 87 | 522137 | 5251534 | 1 | HCC |
| 42 | Eucalyptus obliqua | 75 | 522136 | 5251536 | 1 | HCC |
| 43 | Eucalyptus obliqua | 76 | 522140 | 5251539 | 1 | HCC |
| 44 | Eucalyptus obliqua | 67 | 522124 | 5251515 | 1 | HCC |
| 45 | Eucalyptus obliqua | 87 | 522115 | 5251521 | 1 | HCC |
| 46 | Eucalyptus obliqua | 105 | 522109 | 5251512 | 1 | HCC |
| 47 | Eucalyptus obliqua | 99 | 522097 | 5251525 | 1 | HCC |

| | | | | | | |
|---|---|---|---|---|---|---|
| 48 | Eucalyptus obliqua | 105 | 522093 | 5251536 | 1 | HCC |
| 49 | Eucalyptus obliqua | 105 | 522098 | 5251510 | 1 | HCC |
| 50 | Eucalyptus obliqua | 99 | 522082 | 5251514 | 1 | HCC |
| 51 | Eucalyptus obliqua | 74 | 522069 | 5251518 | 1 | HCC |
| 52 | Eucalyptus obliqua | 83 | 522054 | 5251491 | 1 | HCC |
| 53 | Eucalyptus obliqua | 98 | 522058 | 5251482 | 1 | HCC |
| 54 | Eucalyptus obliqua | 101 | 522044 | 5251484 | 1 | HCC |
| 55 | Eucalyptus obliqua | 88 | 522046 | 5251470 | 1 | HCC |
| 56 | Eucalyptus obliqua | 90 | 522067 | 5251476 | 1 | HCC |
| 57 | Eucalyptus obliqua | 86 | 522037 | 5251467 | 1 | HCC |
| 58 | Eucalyptus obliqua | 87 | 522045 | 5251451 | 1 | HCC |
| 59 | Eucalyptus obliqua | 113 | 522052 | 5251439 | 1 | HCC |
| 60 | Eucalyptus obliqua | 93 | 522043 | 5251417 | 1 | HCC |
| 61 | Eucalyptus globulus | 73 | 522034 | 5251404 | 1 | HCC |
| 62 | Eucalyptus obliqua | 81 | 522042 | 5251398 | 1 | HCC |
| 63 | Eucalyptus obliqua | 113 | 522000 | 5251360 | 1 | WPMT |
| 66 | Eucalyptus obliqua | 121 | 522034 | 5251342 | 1 | WPMT |
| 67 | Eucalyptus obliqua | 130 | 522011 | 5251345 | 2 | WPMT |
| 68 | Eucalyptus obliqua | 105 | 521997 | 5251351 | 1 | WPMT |
| 69 | Eucalyptus obliqua | 115 | 521989 | 5251346 | 1 | WPMT |
| 70 | Eucalyptus obliqua | 103 | 521996 | 5251337 | 2 | WPMT |
| 71 | Eucalyptus obliqua | 87 | 521925 | 5251185 | 2 | WPMT |
| 72 | Eucalyptus obliqua | 72 | 521927 | 5251184 | 3 | WPMT |
| 73 | Eucalyptus obliqua | 77 | 521938 | 5251181 | 1 | WPMT |
| 74 | Eucalyptus obliqua | 71 | 521937 | 5251176 | 3 | WPMT |
| 75 | Eucalyptus globulus | 62 | 521916 | 5251163 | 3 | WPMT |
| 76 | Eucalyptus globulus | 69 | 521922 | 5251161 | 1 | WPMT |
| 77 | Eucalyptus globulus | 48 | 521916 | 5251160 | 1 | WPMT |
| 78 | Eucalyptus obliqua | 88 | 521937 | 5251148 | 1 | WPMT |
| 79 | Eucalyptus globulus | 63 | 521913 | 5251145 | 1 | WPMT |
| 80 | Eucalyptus obliqua | 104 | 521921 | 5251139 | 3 | WPMT |
| 81 | Eucalyptus obliqua | 77 | 521931 | 5251135 | 1 | WPMT |
| 82 | Eucalyptus obliqua | 70 | 521930 | 5251125 | 1 | WPMT |
| 83 | Eucalyptus globulus | 36 | 521917 | 5251122 | 3 | WPMT |
| 84 | Eucalyptus globulus | 32 | 521924 | 5251121 | 1 | WPMT |
| 85 | Eucalyptus obliqua | 100 | 521938 | 5251119 | 1 | WPMT |
| 86 | Eucalyptus obliqua | 87 | 521939 | 5251117 | 3 | WPMT |
| 86 | Eucalyptus obliqua | 87 | 521939 | 5251117 | 1 | WPMT |
| 87 | Eucalyptus obliqua | 94 | 521946 | 5251113 | 1 | WPMT |
| 88 | Eucalyptus obliqua | 97 | 521957 | 5251110 | 2 | WPMT |
| 89 | Eucalyptus globulus | 45 | 521938 | 5251106 | 1 | WPMT |
| 90 | Eucalyptus globulus | 49 | 521931 | 5251103 | 1 | WPMT |
| 91 | Eucalyptus globulus | 73 | 521931 | 5251100 | 1 | WPMT |
| 92 | Eucalyptus globulus | 38 | 521925 | 5251101 | 1 | WPMT |
| 93 | Eucalyptus globulus | 49 | 521921 | 5251106 | 1 | WPMT |
| 93 | Eucalyptus globulus | 49 | 521921 | 5251106 | 3 | WPMT |
| 94 | Eucalyptus globulus | 59 | 521920 | 5251093 | 2 | WPMT |
| 95 | Eucalyptus globulus | 77 | 521916 | 5251089 | 1 | WPMT |
| 96 | Eucalyptus globulus | 75 | 521920 | 5251078 | 2 | WPMT |
| 96 | Eucalyptus globulus | 75 | 521920 | 5251078 | 1 | WPMT |
| 97 | Eucalyptus globulus | 66 | 521922 | 5251076 | 2 | WPMT |
| 98 | Eucalyptus globulus | 61 | 521923 | 5251069 | 1 | WPMT |
| 98 | Eucalyptus globulus | 61 | 521923 | 5251069 | 2 | WPMT |
| 99 | Eucalyptus obliqua | 92 | 521923 | 5251051 | 2 | WPMT |
| 100 | Eucalyptus obliqua | 96 | 521958 | 5251078 | 2 | WPMT |

| | | | | | | |
|---|---|---|---|---|---|---|
| 101 | Eucalyptus globulus | 74 | 521956 | 5251069 | 1 | WPMT |
| 102 | Eucalyptus obliqua | 150 | 521955 | 5251049 | 1 | WPMT |
| 103 | Eucalyptus obliqua | 62 | 521870 | 5251150 | 1 | WPMT |
| 103 | Eucalyptus obliqua | 62 | 521870 | 5251150 | 3 | WPMT |
| 104 | Eucalyptus obliqua | 110 | 521868 | 5251146 | 2 | WPMT |
| 105 | Eucalyptus globulus | 57 | 521869 | 5251140 | 2 | WPMT |
| 106 | Eucalyptus globulus | 116 | 521865 | 5251126 | 2 | WPMT |
| 110 | Eucalyptus globulus | 59 | 521863 | 5251066 | 1 | WPMT |
| 111 | Eucalyptus globulus | 50 | 521861 | 5251071 | 1 | WPMT |
| 112 | Eucalyptus globulus | 123 | 521856 | 5251085 | 2 | WPMT |
| 113 | Eucalyptus globulus | 197 | 521841 | 5251105 | 2 | WPMT |
| 114 | Eucalyptus obliqua | 90 | 521842 | 5251094 | 1 | WPMT |
| 115 | Eucalyptus obliqua | 70 | 521840 | 5251087 | 1 | WPMT |
| 116 | Eucalyptus obliqua | 90 | 521822 | 5251099 | 1 | WPMT |
| 117 | Eucalyptus obliqua | 50 | 521822 | 5251098 | 2 | WPMT |
| 118 | Eucalyptus obliqua | 160 | 521817 | 5251086 | 1 | WPMT |
| 119 | Eucalyptus obliqua | 119 | 521806 | 5251099 | 2 | WPMT |
| 120 | Eucalyptus obliqua | 100 | 521804 | 5251086 | 1 | WPMT |
| 121 | Eucalyptus globulus | 139 | 521793 | 5251083 | 1 | WPMT |
| 122 | Eucalyptus globulus | 120 | 521781 | 5251088 | 1 | WPMT |
| 123 | Eucalyptus globulus | 90 | 521758 | 5251087 | 1 | WPMT |
| 124 | Eucalyptus globulus | 158 | 521756 | 5251079 | 1 | WPMT |
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| 126 | Eucalyptus globulus | 120 | 521743 | 5251073 | 1 | WPMT |
| 127 | Eucalyptus globulus | 90 | 521739 | 5251075 | 1 | WPMT |
| 128 | Eucalyptus obliqua | 95 | 521732 | 5251070 | 1 | WPMT |
| 129 | Eucalyptus globulus | 107 | 521727 | 5251086 | 1 | WPMT |
| 130 | Eucalyptus globulus | 90 | 521720 | 5251079 | 1 | WPMT |
| 131 | Eucalyptus obliqua | 80 | 521719 | 5251070 | 1 | WPMT |
| 132 | Eucalyptus globulus | 74 | 521714 | 5251081 | 1 | WPMT |
| 133 | Eucalyptus globulus | 121 | 521706 | 5251078 | 1 | WPMT |
| 134 | Eucalyptus globulus | 127 | 521701 | 5251086 | 2 | WPMT |
| 135 | Eucalyptus obliqua | 145 | 521599 | 5251057 | 1 | WPMT |
| 136 | Eucalyptus obliqua | 106 | 521591 | 5251059 | 1 | WPMT |
| 137 | Eucalyptus obliqua | 93 | 521589 | 5251062 | 1 | WPMT |
| 138 | Eucalyptus obliqua | 176 | 521578 | 5251048 | 1 | WPMT |
| 139 | Eucalyptus obliqua | 101 | 521570 | 5251046 | 1 | WPMT |
| 140 | Eucalyptus obliqua | 176 | 521563 | 5251056 | 2 | WPMT |

# APPENDIX E - PORTABLE LIGHTWEIGHT CORE/ ROTARY DRILLING RIG

**KMR DRILLING**
Tasmania's leader in drilling services
"a hole lot better"

**RIG 9**

## UDR-KL10

*Description*

The UDR-KL10 Heli - Portable lightweight core / rotary drilling rig. This rig is ideally suited for very remote area "green fields" exploration drilling.

*Standard Design Features:*

Diesel Motor
- Deutz F4L2011 Air - Oil cooled with integrated cooling system
- 61.0 HP @ 2800 rpm
- Electric start

*Drill Mast:*
- Light steel channel section (perforated for reduced weight)
- Hydraulic tilting with locking pins
- Mast overall length ( 4710 mm)
- 3 meter rod pull capacity

*Drill Base:*
- Fully welded structure fabricated from light weight RHS and angle sections
- Base width 1800mm x base length 2200mm

*Rotation Head:*
- KL50W Multi Purpose Drive Head
- Hollow spindle direct drive
- Floating Head Plate
- Hydraulic Head Slide

*Weight:*

Total = 2000kg
Mast Assembly: 550kg
Base Frame: 835kg
Engine Frame: 620kg

*Depth Capacities:*

Diamond Drilling
- 80 metres HQ / • 125 metres NQ / • 165 metres BQ

RC Drilling • 26 metres x 76 mm rod

*Safety Features:*
- Guards on all rotating equipment
- Emergency Stop in the Control Cabinet

**Postal Address:** P.O. Box 156, Richmond Tasmania 7025
**Phone:** 03 6260 4122 **Mobile:** 0419 588 375
**Web:** www.kmrdrilling.com.au | **Email:** kmr_drilling@bigpond.com

Supplied by MWC Co Pty Ltd email 5/7/2019

# APPENDIX F - EAGLES EYRIE MAYDENA CONSTRUCTION EXAMPLES

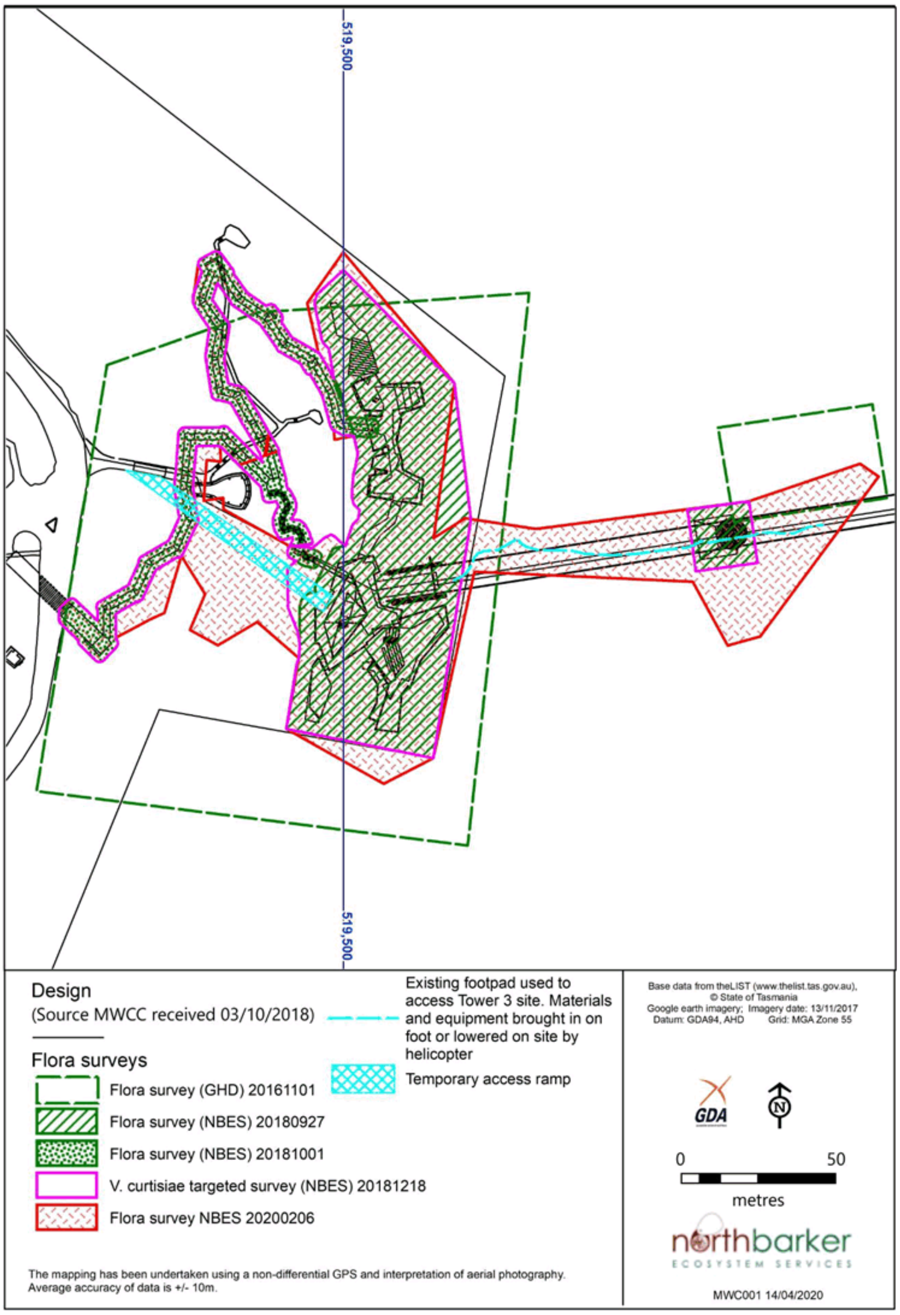
Supplied by VOS Constructions email 5 September 2019

Plate 1: Eagles Eyrie, Maydena (VOS)


Plate 2: Eagles Eyrie Access Ramp (VOS)


Plate 3: Access Ramp support detail (VOS)

# APPENDIX G - SURVEY COVERAGE




Pinnacle Centre

## APPENDIX H - ARBORIST REPORT

ELEMENT
TREE SERVICES

# DEVELOPMENT IMPACT ASSESSMENT

Mount Wellington Cableway
Mount Wellington/Kunyani

08/05/2021

**Alister Hodgman**
Diploma (Hort/Arb)
QTRA Register User: 3743

Element Tree Services
Ph.: 0417144192

alister@elementtree.com.au

**Summary**

This report focuses on the impacts to the significant trees as a result of the proposed development of the Mount Wellington Cableway. The inspections were limited to the potential habitat trees identified in the North Barker Natural Values Assessment (NBES 2019).

- It is expected that 36 individual high conservation value trees within the access road will be critically damaged.
    - Some more advanced engineering solutions may reduce this number further, but this will require ongoing consultation.

- An additional 38 high conservation value trees around the base station, cables and towers will be critically damaged.
    - The major loss here results from the requirement to address the bushfire management plan.
    - If the opportunity to microsite the final location of the tower is possible, root investigation will be required to ascertain the impacts on the selected trees. If this is not possible, and structural roots are damaged, some additional individuals may require removal.

- To gain adequate clearances from the built environment, some individuals may require pruning. If completed to *AS4373-2007 Pruning of amenity trees,* I do not expect there will be a major impact on the health or risk that these trees will pose.

- To offset the loss of potential nesting hollows, arboricultural practitioners could be engaged to create artificial hollows in some of the existing trees that are in poor condition or have died.

## Table of Contents

## 1. Terms of Reference

This report was requested by Mount Wellington Cableway Company, to assess the impacts of the Mount Wellington Cableway on the significant trees growing on the lower slopes of Mount Wellington/Kunyani. An assessment of the site was undertaken on the 15th and 16th of July 2019, and the 4th of May 2021. The report relies heavily on the data captured in the Natural Values Assessment (NBES 2019) supplied by the client[1].

Data collected for the trees includes a comment of their health and structure, the size of the tree protection zone (TPZ) and the likely outcome as a result of the works.

## 2. Study Area

There are two main areas which are subject to this report:

- ***Access Road***

  The access road starts at McRobies Road and continues to the north-west where it meets the proposed base station. This road will pass through predominately undeveloped land, although it does bisect a fire trail and mixed use track.

- ***Base Station***

  The base station is located on the eastern side of the Main Fire Trail which is accessed off Old Farm Road. From here, the cable way will pass through mature trees to the west. This area also includes two towers which will allow the cable to access the summit.

The scope of the assessment was wholly limited to these two locations and has not considered impacts elsewhere.

[1] At this stage there is no detailed road design so some assumptions will be made on how the works will be completed.

## 3. Site Findings

- ***Access Road***

The subject trees in this location are of varying health and structure. The majority have been damaged by fire which has resulted in the formation of decay and hollows. Some individuals had experienced some storm damage which is expected for trees of this condition.

The topography varies but does fall to the north where it meets McRobies Gully.

In their current situation, given the usage of the area, all of the trees would pose a broadly acceptable level of risk. Risks of this level are considered as low as reasonably practicable and require no management. Due to this outcome no work is currently for this population.

- ***Base Station***

The proposed base station will be developed on open ground to the east of the Main Fire Trail. It appears that this area has been devoid of trees for many years.

To the east of the proposed building, there is a stand of large eucalypts which may be impacted through the development of the base station and the associated fire management. These trees are of fair to good health and in their current situation will contribute to the setting for many years to come.

The trees to the west of the site, where the cables are to pass through, are of greater maturity and include some more significant defects. Some individuals present and elevated likelihood of failure and risk rating may increase if infrastructure is installed. Presently, in their current setting, I do not feel that any of the trees in this location present an unacceptable level of risk.

Like the access road, no maintenance or tree removal is currently required in this location.

## 4. Development Impacts

The road to the base station will potentially result in the loss of 36 high conservation value trees. The majority of these losses result from the trees being within the road footprint.

To limit the impact on some trees to be retained, design changes could include; the development of walls to avoid the dispersal of fill and increasing the batter angles to reduce the incursion on the TPZ. Additional to this is the introduction of larger aggregates as fill to allow adequate water and oxygen exchange with the roots below.

The road to the base station will potentially result in the loss of 38 high conservation value trees[2]. The biggest impact in this zone is the trees east of the base station for bushfire management. If their removal for bushfire management was not necessary, there would be no requirement to remove these trees as their risk is acceptable and they remain of good to fair health.

It is unclear how the construction of the towers will occur and what is required to get machinery onsite. Additional assessment of the impacts will have to be completed to ensure the trees to the west of the base station can be retained. To reduce damage, small machinery is recommended along with ground protection to reduce soil compaction.

It was indicated in the Natural Values Assessment that there was potential to microsite the towers to avoid the impacts on trees. If this is decided, then I recommend further investigation to identify structural root zones. This work may include ground penetrating radar or other root investigation methods.

To obtain adequate clearance from the infrastructure, pruning may be required on tree 113, 115, 119, 128, 129, 133, 135, 136, 137 and 140. I expect this can be done without compromising the trees if completed to the Australian Standard 4373-2007 *Pruning of amenity trees.*

[2] Some of these trees do not meet the size requirement for high conservation status but are included as they may reach this size range in the near future.

## 5. Tree Protection Measures

During development of this site, it is important that the tree protection zones are fenced, and signs installed to delineate the area. Where the tree is situated on the edge of the works, fencing should be installed along this alignment. Activities to avoid in this area include:

- Machine excavation including trenching;
- Excavation for silt fencing;
- Cultivation;
- Storage;
- Preparation of chemicals, including preparation of cement products;
- Parking of vehicles and plant;
- Refuelling;
- Dumping of waste;
- Wash down and cleaning of equipment;
- Placement of fill;
- Lighting of fires;
- Soil level changes;
- Temporary or permanent installation of utilities and signs, and
- Physical damage to the tree(s).

During excavation it is important to limit damage to any of the larger woody roots. To reduce the impact associated with traditional excavation, I recommend that any roots larger than 50mm diameter are not torn out with machinery but pruned off with a sharp tool. If the excavation is be left open for a prolonged period, the exposed edge should be covered with mulch or soil and kept moist to reduce the chances of the roots drying out.

## 6. Habitat Creation

If the loss of these trees is considered to be a significant impact on habitat value, there is the opportunity to offset through the creation of nesting hollows. These nesting hollows can be created on trees that are in advanced stages of decline or have expired.

Where the trees can be retained as an acceptable risk, these hollows can be formed to mimic natural features that can take in excess of 100 years to form. In this situation, there is significant scope to create a large number, potentially increasing the nesting habitat in the immediate vicinity.

Opposed to man made nesting boxes, these hollows are formed using the existing tree, and once weathered, have a low visual impact.

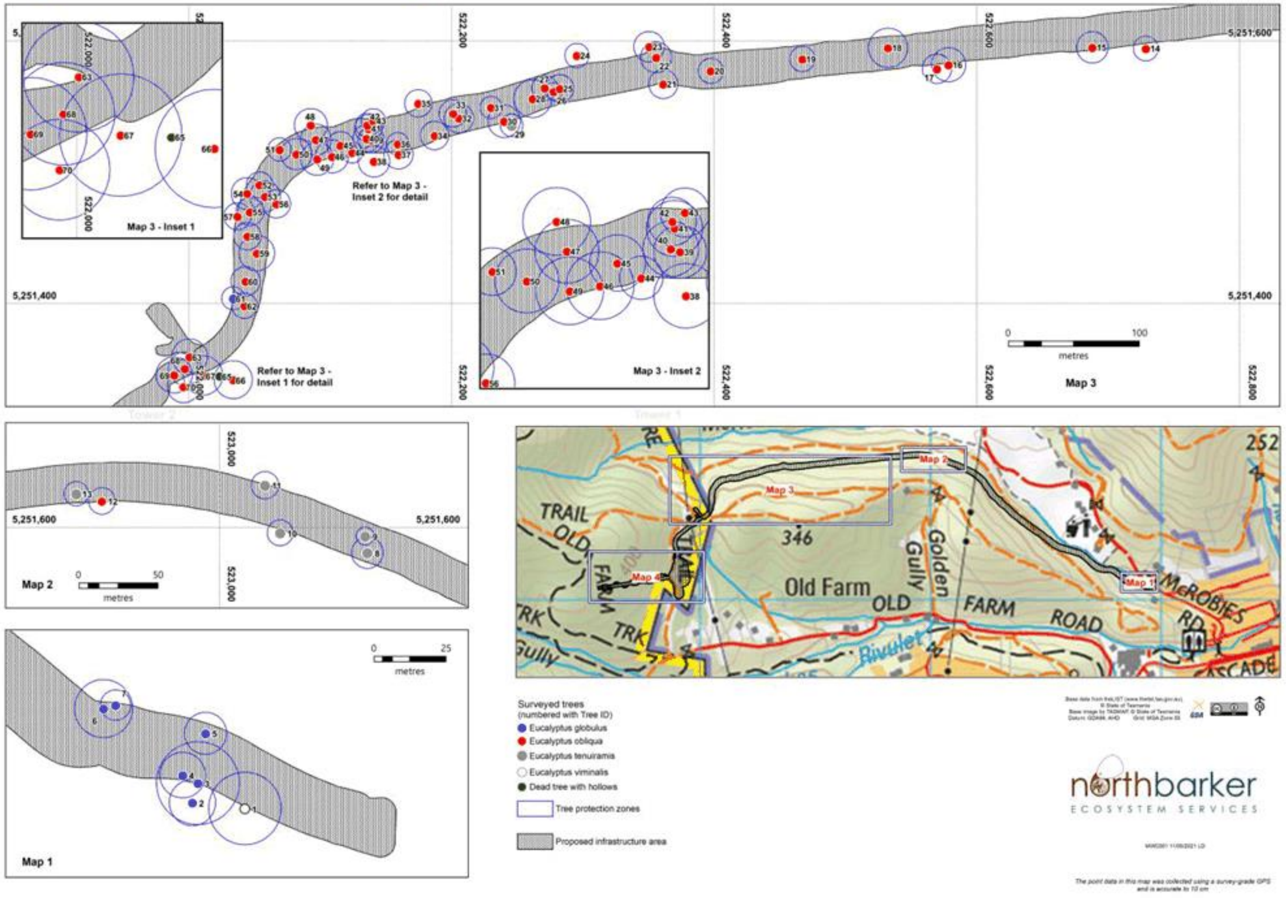
These artificial hollows have been created throughout Australia with very good results. The Victorian Tree Industry Organisation have been one of the leaders in this area and have produced some valuable information on how this work can be completed[3].

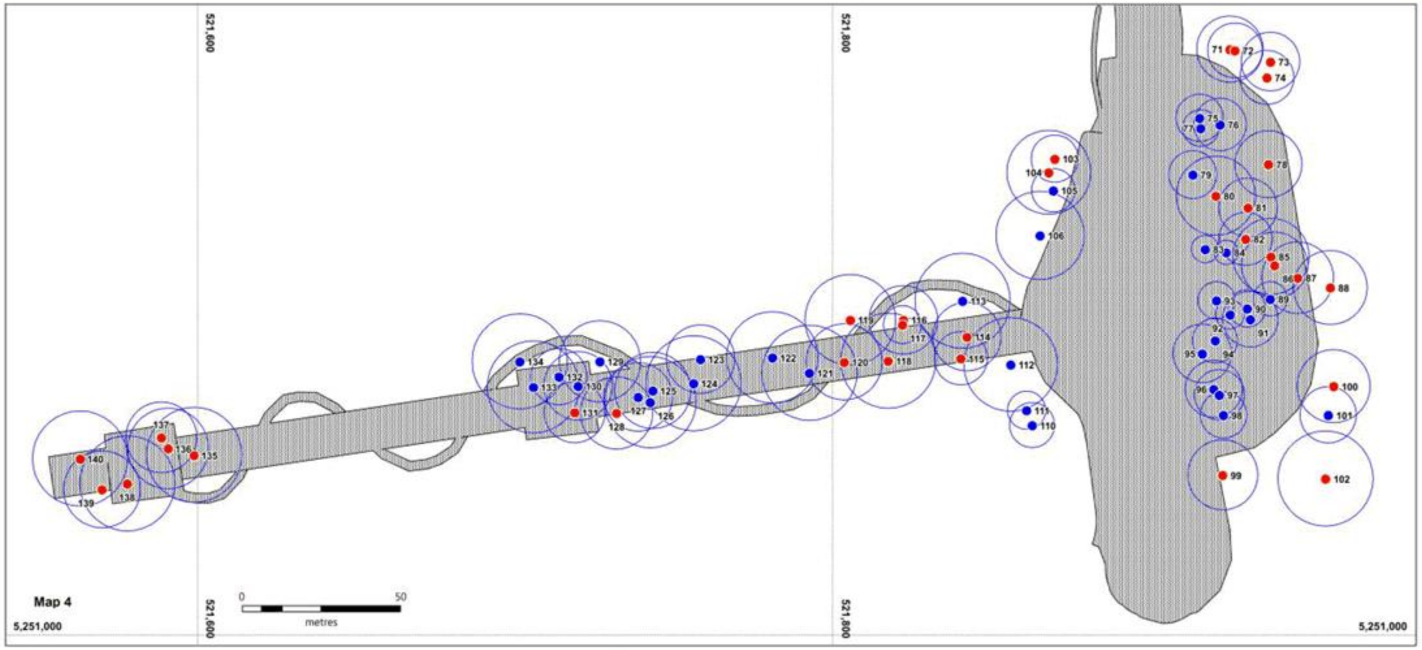
## 7. Conclusion

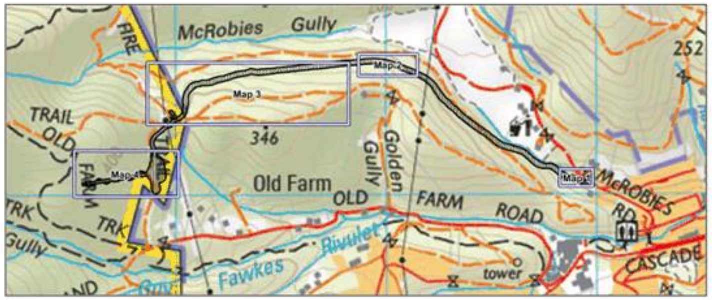
- I expect that the works will require the removal of 74 significant trees within the subject area.
- Some of the trees that will require removal have features which may provide suitable nesting opportunities for native fauna. To fully quantify the number impacted, the trees would need to be aerially assessed as many of these features may not be visible from the ground.
- To offset the potential loss of these nesting hollows, works could be completed to introduce arborist made features that will provide protection for native fauna.

[3] VTIO, Pruning for habitat http://vtio.org.au/wp-content/uploads/2010/09/Vtio_Habitat_Paper_SEPT_2010.pdf September 2010

## Appendix 1 – Tree Locations supplied by North Barker






Surveyed trees
(numbered with Tree ID)
- Eucalyptus globulus
- Eucalyptus obliqua
- Eucalyptus tenuiramis
- Eucalyptus viminalis
- Dead tree with hollows

TreeProtectionZones

Proposed infrastructure area

GDA

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## Appendix 2 – Findings Data

| ID | Species | DBH(m) | Health | Structure | Notes | TPZ | Retain | Reason |
|---|---|---|---|---|---|---|---|---|
| 1 | Eucalyptus viminalis | 1.05 | Fair | Good | Recent dieback to south | 12.6 | Yes | Ground already compacted where road is proposed |
| 2 | Eucalyptus globulus | 0.67 | Good | Good | Healthy tree | 8.04 | Yes | Minimal incursion - adequate space for future root |
| 3 | Eucalyptus globulus | 1.2 | Good | Good | Decay in base -drawn over road to north | 14.4 | Yes | Tolerable incursion |
| 4 | Eucalyptus globulus | 0.66 | Good | Good | Healthy tree | 7.92 | Yes | Tolerable incursion |
| 5 | Eucalyptus globulus | 0.61 | Good | Good | Healthy tree | 7.32 | Yes | Design to go no closer than existing seal – 3m from trunk |
| 6 | Eucalyptus globulus | 0.84 | Good | Good | Healthy tree | 10.08 | No | Significant incursion |
| 7 | Eucalyptus globulus | 0.44 | | | | 5.28 | No | Within proposed road |
| 8 | Eucalyptus tenuiramis | 0.83 | Fair | Good | Upper crown dying back. Epicormic crown | 9.96 | No | Works likely to cause major decline. Leans towards road |
| 9 | Eucalyptus tenuiramis | 0.47 | Good | Good | Healthy tree | 5.64 | No | Within proposed road |
| 10 | Eucalyptus tenuiramis | 0.68 | Good | Good | Healthy tree – some potential hollowing (future hollows) noted | 8.16 | Yes | Tolerable incursion |
| 11 | Eucalyptus tenuiramis | 0.72 | Fair | Good | Moderate foliage coverage. Leans away from road | 8.64 | Yes | Fill with large aggregate where works overlap TPZ |
| 12 | Eucalyptus obliqua | 0.7 | Fair | Good | Upper crown dying back – lower crown comprised of epicormic regrowth | 8.4 | Yes | Redesign to reduce cut – retain as far back as possible |
| 13 | Eucalyptus tenuiramis | 0.64 | Fair | Fair | Upper crown dead, only low epicormics remain. Leans towards proposed road | 7.68 | No | Excavation likely to cause decline |
| 14 | Eucalyptus obliqua | 0.79 | Fair | Good | crown thinning – may continue to decline | 9.48 | Yes | Minimal disturbance |
| 15 | Eucalyptus obliqua | 1 | Fair | Fair | Burnt base – large cavity. Crown dieback to north | 12 | No | Cut at base likely to lead to windthrow over road |
| 16 | Eucalyptus obliqua | 1.08 | Good | Good | Burnt tree – moderate to good foliage coverage | 12.96 | Yes | Topography already sloping away, works not expected to have major impact |
| 17 | Eucalyptus obliqua | 0.93 | Fair | Good | Burnt tree. Moderate foliage coverage | 11.16 | Yes | Likely to tolerate works |
| 18 | Eucalyptus obliqua | 1.35 | Fair | Fair | Veteran tree comprised of epicormic regrowth | 16.2 | No | Within proposed road |
| 19 | Eucalyptus obliqua | 0.8 | Fair | Fair | Burnt tree. Moderate foliage coverage | 9.6 | No | Within proposed road |
| 20 | Eucalyptus obliqua | 0.8 | Dead | Fair | Dead tree | 9.6 | No | Within proposed road |

| ID | Species | DBH(m) | Health | Structure | Notes | TPZ | Retain | Reason |
|---|---|---|---|---|---|---|---|---|
| 21 | Eucalyptus obliqua | 0.92 | Fair | Poor | Base significantly burnt – increased probability of failure | 11.04 | Yes | May decline but risk could be tolerated – leaning away from road |
| 22 | Eucalyptus obliqua | 0.98 | Fair | Fair | Fire damaged tree, cavity in stem, central leader broken | 11.76 | No | Fill over roots and trunk may likely result in its decline |
| 23 | Eucalyptus obliqua | 0.97 | Fair | Fair | Fire damage to base, cavity in stem | 11.64 | Yes | Where works overlap TPZ, fill should be large aggregate |
| 24 | Eucalyptus obliqua | 0.77 | | | | 9.24 | Yes | Outside works footprint |
| 25 | Eucalyptus obliqua | 0.88 | Poor | Fair | Minimal foliage – nearly expired | 10.56 | No | Major incursion |
| 26 | Eucalyptus obliqua | 0.56 | Good | Good | Sound tree | 6.72 | No | Major incursion |
| 27 | Eucalyptus obliqua | 0.82 | Fair | Fair | Crown thinning | 9.84 | No | Within road |
| 28 | Eucalyptus obliqua | 1.2 | Good | Good | Sound tree | 14.4 | No | Major incursion |
| 29 | Eucalyptus tenuiramis | 0.72 | Fair | Fair | Heavily decayed, burnt base | 8.64 | Yes | Minimal incursion |
| 30 | Eucalyptus obliqua | 1.03 | Good | Good | Healthy tree | 12.36 | Yes | Design changes have accommodated tree |
| 31 | Eucalyptus obliqua | 0.7 | Good | Good | Healthy tree | 8.4 | No | Within proposed road |
| 32 | Eucalyptus obliqua | 0.93 | Good | Good | Sound tree | 11.16 | No | Within proposed road |
| 33 | Eucalyptus obliqua | 0.87 | Good | Good | Sound tree | 10.44 | No | Within proposed road |
| 34 | Eucalyptus obliqua | 0.9 | Good | Good | Sound tree | 10.8 | Yes | Design changes have accommodated tree |
| 35 | Eucalyptus obliqua | 0.87 | Dead | Fair | Dead tree | 10.44 | Yes | Minimal incursion |
| 36 | Eucalyptus obliqua | 0.72 | Poor | Fair | Thinning crown – stressed, nearly dead | 8.64 | No | Design changes have accommodated tree |
| 37 | Eucalyptus obliqua | 0.93 | Fair | Fair | Declining tree | 11.16 | Yes | Minor incursion may continue to decline |
| 38 | Eucalyptus obliqua | 1 | Good | Good | Drawn over road | 12 | Yes | Minor incursion. May require pruning over road. |
| 39 | Eucalyptus obliqua | 0.82 | Good | Good | Healthy tree | 9.84 | No | Within proposed road |
| 40 | Eucalyptus obliqua | 0.86 | Poor | Poor | Nearly expired | 10.32 | No | Within proposed road |
| 41 | Eucalyptus obliqua | 0.87 | Good | Good | Cavity in base | 10.44 | No | Will be covered with fill |
| 42 | Eucalyptus obliqua | 0.75 | Dead | Poor | Dead tree | 9 | No | Unsuitable for retention |
| 43 | Eucalyptus obliqua | 0.76 | Poor | Fair | Over 50 percent dead | 9.12 | Yes | Retain as broadly acceptable risk |
| 44 | Eucalyptus obliqua | 0.67 | Dead | Poor | Dead tree | 8.04 | No | Risk will be unacceptable |
| 45 | Eucalyptus obliqua | 0.87 | | | | 10.44 | No | On edge of cut |
| 46 | Eucalyptus obliqua | 1.05 | Good | Good | Sound tree | 12.6 | Yes | Cut will sever roots – will possibly die but could be retained as a tolerable risk |
| 47 | Eucalyptus obliqua | 0.99 | Good | Good | sound tree | 11.88 | No | Within proposed road |
| 48 | Eucalyptus obliqua | 1.05 | Dead | Poor | Dead tree | 12.6 | Yes | Could be retained as a decaying stump |

| ID | Species | DBH(m) | Health | Structure | Notes | TPZ | Retain | Reason |
|---|---|---|---|---|---|---|---|---|
| 49 | Eucalyptus obliqua | 1.05 | Poor | Fair | Twin leader from 1.4m. Short life expectancy | 12.6 | Yes | Cut will sever roots – will possibly die but could be retained as a tolerable risk |
| 50 | Eucalyptus obliqua | 0.99 | Fair | Fair | Long extensions to north | 11.88 | No | Within proposed road |
| 51 | Eucalyptus obliqua | 0.74 | Good | Good | Healthy tree | 8.88 | Yes | Fill will bury roots, will probably decline but could be retained and given a chance |
| 52 | Eucalyptus obliqua | 0.83 | Poor | Poor | Heavily decayed, burnt base – short life expectancy | 9.96 | No | Within proposed road |
| 53 | Eucalyptus obliqua | 0.98 | Fair | Fair | Fire damaged, decayed, will lean over road | 11.76 | No | Within proposed road – unsuitable for retention |
| 54 | Eucalyptus obliqua | 1.01 | Fair | Fair | Burnt decayed base, leans away from road | 12.12 | Yes | Will possibly die but could be retained as a tolerable risk |
| 55 | Eucalyptus obliqua | 0.88 | Fair | Good | Thinning crown – stressed | 10.56 | No | On edge of road to be covered with fill |
| 56 | Eucalyptus obliqua | 0.9 | Fair | Good | Fire damaged base, fair health | 10.8 | Yes | Taper cut away |
| 57 | Eucalyptus obliqua | 0.86 | Fair | Good | Upper crown storm damage | 10.32 | Yes | Where fill covers tpz use large aggregate |
| 58 | Eucalyptus obliqua | 0.87 | Fair | Good | Fire damaged base, fair health | 10.44 | No | On edge of road to be covered with fill |
| 59 | Eucalyptus obliqua | 1.13 | Good | Good | Sound healthy tree | 13.56 | No | Within proposed road |
| 60 | Eucalyptus obliqua | 0.93 | Fair | Fair | Fire and storm damaged tree | 11.16 | No | Within proposed road |
| 61 | Eucalyptus globulus | 0.73 | Fair | Good | Sound tree of fair health | 8.76 | Yes | Taper fill away from base |
| 62 | Eucalyptus obliqua | 0.81 | Poor | Good | Minimal crown mass. Stressed tree | 9.72 | No | Within proposed road |
| 63 | Eucalyptus obliqua | 1.13 | Fair | Fair | Heavily decayed, burnt base | 13.56 | No | Major incursion - may lead to windthrow |
| 65 | Eucalyptus obliqua | | Dead | | Dead tree with hollows | | Yes | |
| 66 | Eucalyptus obliqua | 1.21 | | | | 14.52 | Yes | |
| 67 | Eucalyptus obliqua | 1.3 | Fair | Fair | Burnt tree. Large failure to west. | 15 | Yes | May tolerate disturbance |
| 68 | Eucalyptus obliqua | 1.05 | Good | Good | Healthy tree | 12.6 | No | Within proposed road |
| 69 | Eucalyptus obliqua | 1.15 | Good | Good | Fire damaged tree, hollow at 6m to NE | 13.8 | No | Within proposed road |
| 70 | Eucalyptus obliqua | 1.03 | Fair | Fair | Burnt base, leans away from road | 12.36 | Yes | Minimal incursion |
| 71 | Eucalyptus obliqua | 0.87 | Good | Good | Hollow in trunk to W at 8m and further potential hollows noted | 10.44 | Yes | |
| 72 | Eucalyptus obliqua | 0.72 | Good | Good | fire damaged base with good response growth | 8.64 | Yes | |
| 73 | Eucalyptus obliqua | 0.77 | Good | Good | Potential hollow to N. | 9.24 | Yes | |

| ID | Species | DBH(m) | Health | Structure | Notes | TPZ | Retain | Reason |
|---|---|---|---|---|---|---|---|---|
| 74 | Eucalyptus obliqua | 0.71 | Poor | Fair | Twin leader from ground. Significant decay in base of trunk. | 8.52 | Yes | |
| 75 | Eucalyptus globulus | 0.62 | Fair | Good | Potentially stressed | 7.44 | No | Bush fire management |
| 76 | Eucalyptus globulus | 0.69 | Good | Good | Healthy well-formed tree | 8.28 | No | Bush fire management |
| 77 | Eucalyptus globulus | 0.48 | Good | Good | | 5.76 | No | Bush fire management |
| 78 | Eucalyptus obliqua | 0.88 | Fair | Good | Significant volume of epicormics, fire damage at base | 10.56 | No | Bush fire management |
| 79 | Eucalyptus globulus | 0.63 | Good | Good | Well-formed tree | 7.56 | No | Bush fire management |
| 80 | Eucalyptus obliqua | 1.04 | Fair | Fair | Significant fire damage at base - increased probability of failure | 12.48 | No | Bush fire management |
| 81 | Eucalyptus obliqua | 0.77 | Fair | Good | Slight health decline | 9.24 | No | Bush fire management |
| 82 | Eucalyptus obliqua | 0.7 | Fair | Good | Significant volume of epicormics | 8.4 | No | Bush fire management |
| 83 | Eucalyptus globulus | 0.36 | Good | Good | | 4.32 | No | Bush fire management |
| 84 | Eucalyptus globulus | 0.32 | Good | Good | | 3.84 | No | Bush fire management |
| 85 | Eucalyptus obliqua | 1 | Good | Fair | Decaying tree with potential hollows | 12 | No | Bush fire management |
| 86 | Eucalyptus obliqua | 0.87 | Fair | Good | Significant volume of epicormics | 10.44 | No | Bush fire management |
| 87 | Eucalyptus obliqua | 0.94 | Fair | Fair | Fire damaged base | 11.28 | No | Bush fire management |
| 88 | Eucalyptus obliqua | 0.97 | Good | Fair | Located in an area of blown down trees, may experience altered wind patterns. | 11.64 | Yes | |
| 89 | Eucalyptus globulus | 0.45 | Good | Good | | 5.4 | No | Bush fire management |
| 90 | Eucalyptus globulus | 0.49 | Good | Good | | 5.88 | No | Bush fire management |
| 91 | Eucalyptus globulus | 0.73 | Good | Good | | 8.76 | No | Bush fire management |
| 92 | Eucalyptus globulus | 0.38 | Good | Good | | 4.56 | No | Bush fire management |
| 93 | Eucalyptus globulus | 0.49 | Good | Good | | 5.88 | No | Bush fire management |
| 94 | Eucalyptus globulus | 0.59 | Good | Good | | 7.08 | No | Bush fire management |
| 95 | Eucalyptus globulus | 0.77 | Good | Good | Well-formed tree | 9.24 | No | Bush fire management |
| 96 | Eucalyptus globulus | 0.75 | Good | Good | Well-formed tree | 9 | No | Bush fire management |
| 97 | Eucalyptus globulus | 0.66 | Poor | Fair | Upper crown dying back, cambium damage mid to upper trunk (in advanced decline May 2021) | 7.92 | No | Bush fire management |
| 98 | Eucalyptus globulus | 0.61 | Good | Good | | 7.32 | No | Bush fire management |
| 99 | Eucalyptus obliqua | 0.92 | Good | Good | | 11.04 | Yes | |
| 100 | Eucalyptus obliqua | 0.96 | Good | Good | | 11.52 | Yes | |
| 101 | Eucalyptus globulus | 0.74 | Fair | Fair | Decay in trunk, fire damage | 8.88 | Yes | |

| ID | Species | DBH(m) | Health | Structure | Notes | TPZ | Retain | Reason |
|---|---|---|---|---|---|---|---|---|
| 102 | Eucalyptus obliqua | 1.5 | Good | Good | Fire damage | 15 | Yes | |
| 103 | Eucalyptus obliqua | 0.62 | Good | Good | Younger scorched tree | 7.44 | Yes | Minimal incursion |
| 104 | Eucalyptus obliqua | 1.1 | Fair | Fair | Fire damaged tree comprised of epicormic regrowth | 13.2 | Yes | Protect tree through placing a wall on the edge of the TPZ to avoid batter |
| 105 | Eucalyptus globulus | 0.57 | Fair | Good | Potential root decay fungi. Crown drawn to south. | 6.84 | Yes | Minimal incursion |
| 106 | Eucalyptus globulus | 1.16 | Fair | Good | Crown experiencing slight decline | 13.92 | No | Major disturbance. Unable to alter design |
| 110 | Eucalyptus globulus | 0.59 | Good | Fair | Crown drawn to east | 7.08 | Yes | Minimal incursion |
| 111 | Eucalyptus globulus | 0.5 | Good | Good | Crown drawn to east | 6 | Yes | Minimal incursion |
| 112 | Eucalyptus globulus | 1.23 | Good | Good | Large healthy tree | 14.76 | Yes | Redesign to remove carparking from TPZ |
| 113 | Eucalyptus globulus | 1.97 | Good | Fair | Historic fire damage | 15 | Yes | May require one dead branch to be removed |
| 114 | Eucalyptus obliqua | 0.9 | Fair | Fair | Previous storm damage | 10.8 | No | Within alignment |
| 115 | Eucalyptus obliqua | 0.7 | Good | Fair | Heavily decayed, burnt base. Tree leans away from cables | 8.4 | Yes | May require clearance pruning |
| 116 | Eucalyptus obliqua | 0.9 | Fair | Fair | Thin crown comprised of epicormic growth | 10.8 | Yes | Outside of alignment |
| 117 | Eucalyptus obliqua | 0.5 | Good | Poor | Crown leans heavily to south | 6 | No | Crown within alignment |
| 118 | Eucalyptus obliqua | 1.6 | Good | Fair | Heavily burnt base | 15 | No | Within alignment |
| 119 | Eucalyptus obliqua | 1.19 | Fair | Fair | Moderate foliage coverage | 14.28 | Yes | May require clearance pruning |
| 120 | Eucalyptus obliqua | 1 | Good | Good | Tight crown typical of low light forest tree | 12 | No | Within alignment |
| 121 | Eucalyptus globulus | 1.39 | Dead | Poor | Large dead tree | 15 | No | Within alignment |
| 122 | Eucalyptus globulus | 1.2 | Dead | Poor | Large dead tree | 14.4 | No | Within alignment |
| 123 | Eucalyptus globulus | 0.9 | Good | Good | Tall upright tree with very few branches | 10.8 | No | Within alignment |
| 124 | Eucalyptus globulus | 1.58 | Good | Fair | Historic damage to base. Epicormic crown | 15 | No | Within alignment |
| 125 | Eucalyptus globulus | 1 | Good | Fair | Growing as a copse with 92 and 91 | 12 | No | Within alignment |
| 126 | Eucalyptus globulus | 1.2 | Good | Fair | Growing as a copse with 92 and 90 | 14.4 | No | Within alignment |
| 127 | Eucalyptus globulus | 0.9 | Good | Fair | Growing as a copse with 91 and 90 | 10.8 | No | Within alignment |
| 128 | Eucalyptus obliqua | 0.95 | Good | Fair | Crown biased to the north | 11.4 | Yes | May require some branch reduction |
| 129 | Eucalyptus globulus | 1.07 | Fair | Poor | Major cavity in mid trunk – heavily decayed. May require significant reduction to reduce its probability of failure | 12.84 | Yes | Reduce crown to create habitat tree |
| 130 | Eucalyptus globulus | 0.9 | Fair | Poor | Heavily decayed tree. High probability of failure | 10.8 | No | Within alignment |
| 131 | Eucalyptus obliqua | 0.8 | Fair | Good | Healthy tree | 9.6 | No | Within alignment |
| 132 | Eucalyptus globulus | 0.74 | Poor | Poor | Heavily decayed tree. High probability of failure | 8.88 | No | High probability of failure |

| ID | Species | DBH(m) | Health | Structure | Notes | TPZ | Retain | Reason |
|---|---|---|---|---|---|---|---|---|
| 133 | Eucalyptus globulus | 1.21 | Fair | Poor | Heavily decayed tree. Evidence of recent large branch failure | 14.52 | Yes* | May require pruning – possible habitat tree |
| 134 | Eucalyptus globulus | 1.27 | Fair | Fair | Heavily decayed trunk, small crown volume | 15 | Yes* | Assess footing impacts |
| 135 | Eucalyptus obliqua | 1.45 | Good | Fair | Historic fire damage to base – crown drawn to east | 15 | Yes* | May require some pruning |
| 136 | Eucalyptus obliqua | 1.06 | Good | Good | Healthy tree | 12.72 | Yes* | May require some pruning |
| 137 | Eucalyptus obliqua | 0.93 | Good | Fair | Decay in crown | 11.16 | Yes* | May require some reduction to reduce branch failure |
| 138 | Eucalyptus obliqua | 1.76 | Good | Good | Large veteran tree | 15 | Yes* | Leaning away from cables |
| 139 | Eucalyptus obliqua | 1.01 | Fair | Fair | Heavily decayed – history of storm damage | 12.12 | Yes* | Adequate clearance from proposed cables |
| 140 | Eucalyptus obliqua | 1.76 | Fair | Fair | Large veteran tree | 15 | Yes* | May require some pruning |

# APPENDIX I - ARBORIST REPORT ADDENDUM

NOT APPLICABLE IN THIS REPORT VERSION (SUPERSEDED BY SINGLE REPORT IN APPENDIX H)

# APPENDIX J - CREATION OF ARTIFICIAL TREE HOLLOWS AND REUSE OF EXISTING STRUCTURES

From Guidelines for the Relocation of Large Tree Hollows, NSW Central Coast Council, Wyong, 2016

Figure 11: Place faceplate in position

Figure 12: Secure faceplate to trunk

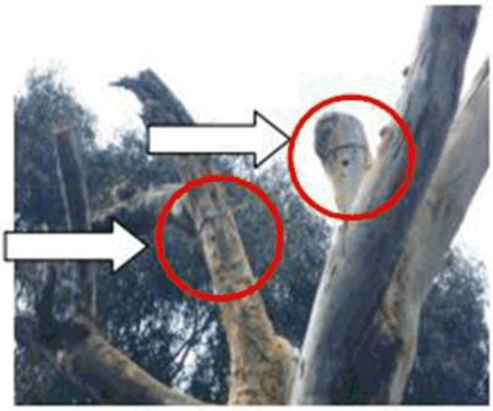


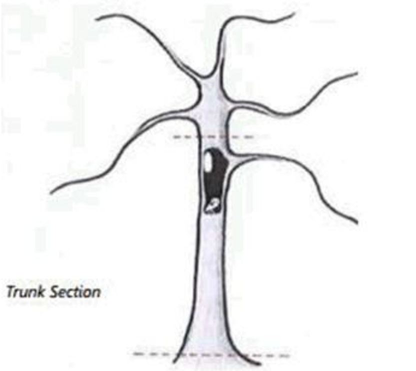
Figure 13: Completed habitat tree with hollows.

Figure 14: Various hole and cavity sizes will determine the different types of wildlife

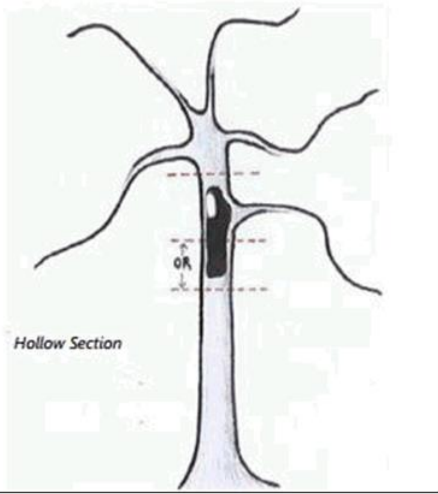
Figure 20: Drill entrance, and or drainage hole.

Figure 21: Attached faceplate.

**Trunk section** - the entire trunk from ground level up to above the hollow chamber. Branches not containing any hollows may be removed for manageability.




**Hollow section** - the section of the tree containing the hollow chamber from the entry hole to the base of the cavity. A section may be shortened to reduce the distance between the entry hole to the base of the cavity by cutting above the natural floor and adding a floor at a desired length to create a section of a manageable size.




northbarker
ECOSYSTEM SERVICES

Mt Wellington Cableway
Development Application PLN-19-345

# Request for Further Information
# Clause 5a (b)- -Biodiversity Matters

30 April 2020

For Mt Wellington Cableway Co

MWC001

## Introduction

This document provides a response to a specific clause in the select matters listed in the Request for Further information from Hobart City Council 17 January 2020.

It acts as an addendum to the report titled: *Mt Wellington cableway, Mt Wellington / kunanyi, Natural Values Impacts Assessment* (North Barker Ecosystem Services, 17 April 2020).

## B5a

> **In regard to (b) the justification in amended planning report (p 95-96) is not considered sufficient to demonstrate that there is no feasible alternative location as well as that the access road has been designed to locate and minimise impacts (as required by E10.7.1, P1(c)(i)).**
>
> **Details quantifying distances of each access option and differences between impacts including ecological impacts should be provided.**

The following discussion is limited to the last clause relating to a comparison of ecological values between each of the nominated options.

Figure 1 presents five route options.

Option 1 is the preferred route from McRobie's Road and forms part of the planning application. 2.35km.

Option 2 links off the end of Old Farm Road. 0.41 km.

Option 3 links off Pottery Road. 3.36 km.

Option 3a nominates an alternate section where the route crosses McRobie's Gully which links to the upper section of Option 1. 3.67 km.

Option 4 starts off Strickland Avenue before sharing the upper portion of Option 2. 1.34 km.

The ecological impacts of each option are determined from analysis of the following values documented on exiting datasets including TASVEG 3.1 and the Natural Values Atlas:

- Native vegetation communities including threatened vegetation
- Threatened flora
- Threatened fauna including GobMap (swift parrot habitat)

Figure 2 presents the mapped vegetation communities along each option (TASVEG 3.1).

Figure 3 presents the records of threatened flora and fauna on the Natural Values Atlas.

Figure 4 shows records specifically relating to swift parrot – nests, foraging and nesting habitat

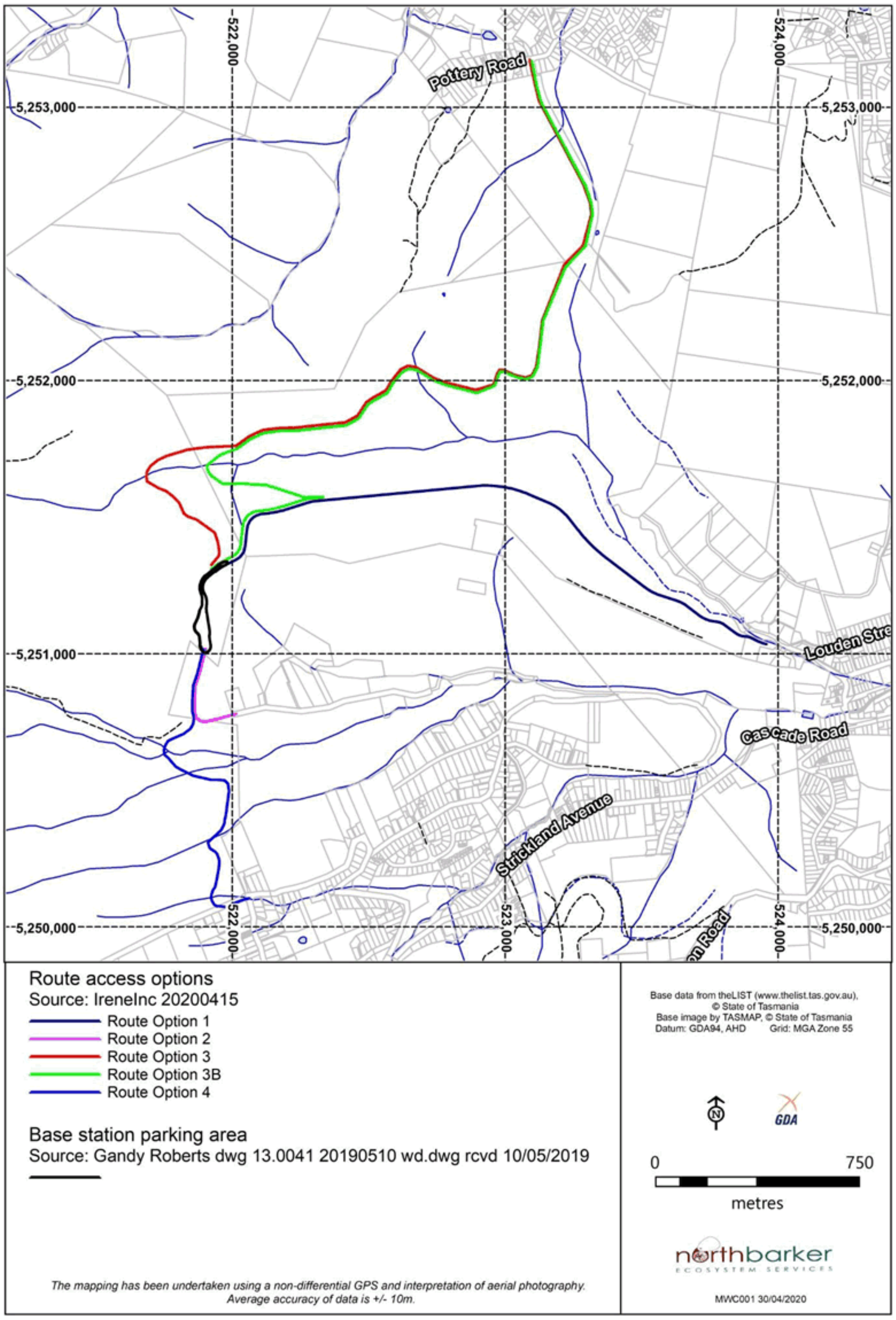



*Figure 1 - Mt Wellington Cableway Base Station Access Road Route options*

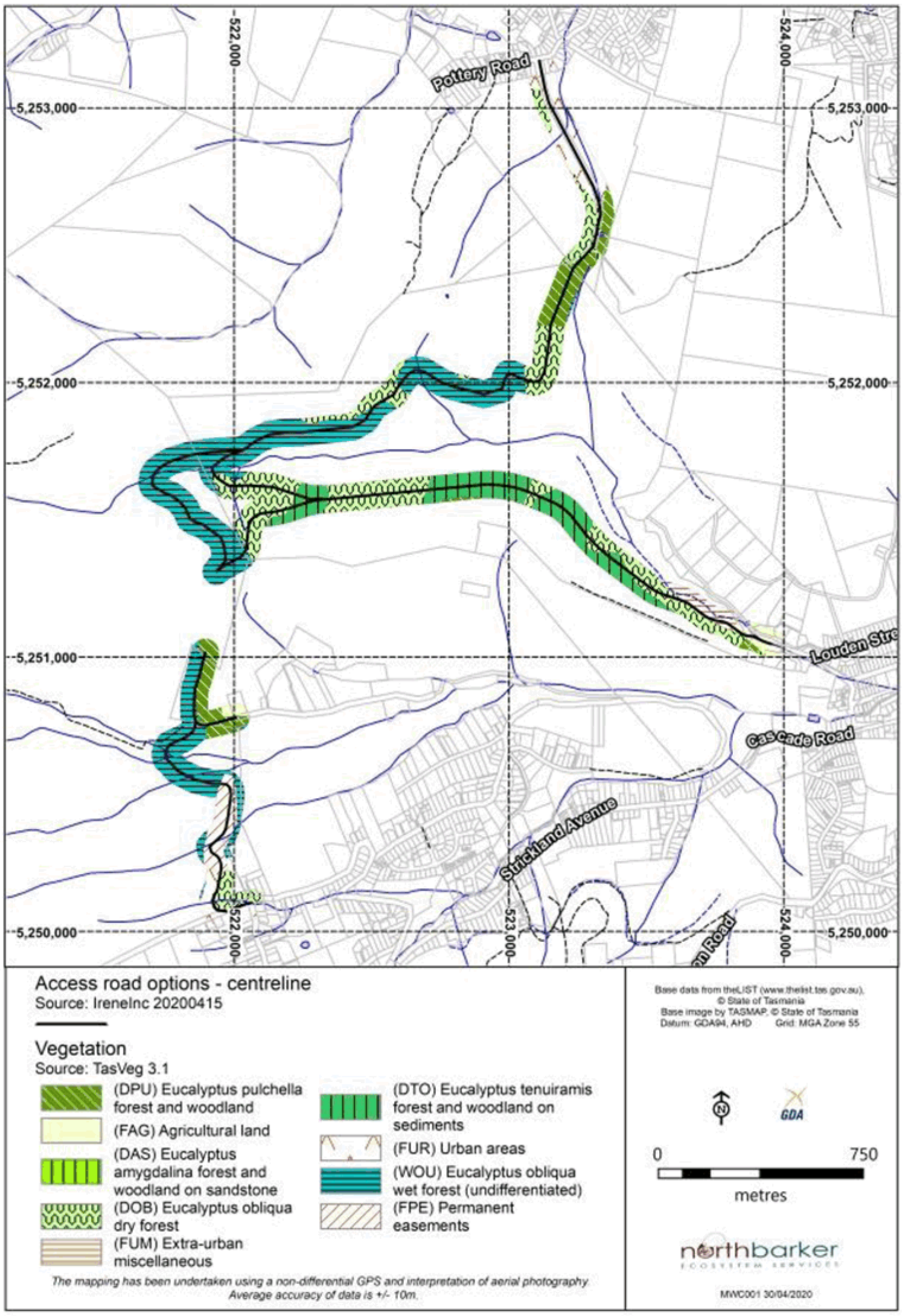



*Figure 2 - Native vegetation communities*

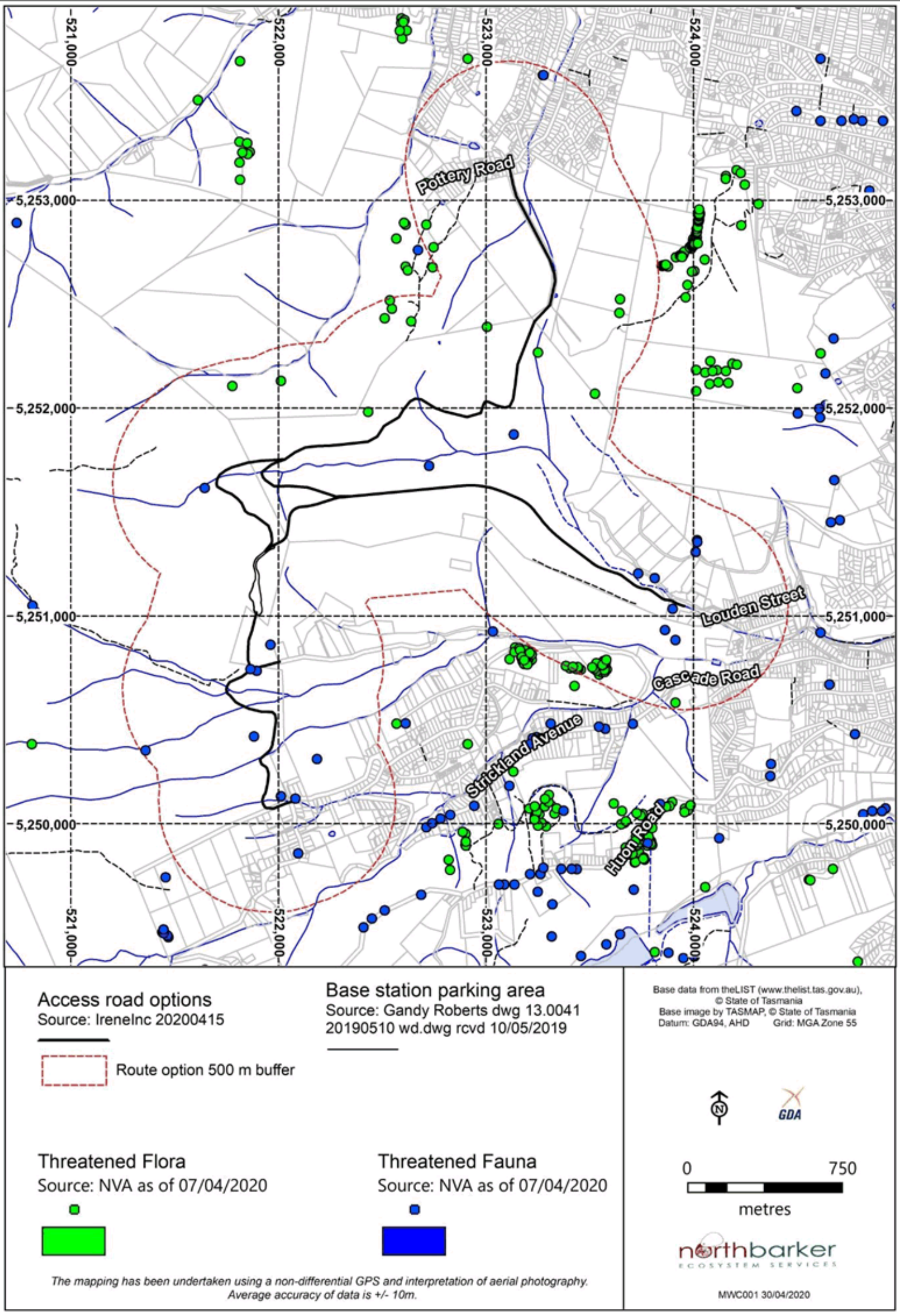



*Figure 3 - Threatened species records NVA*

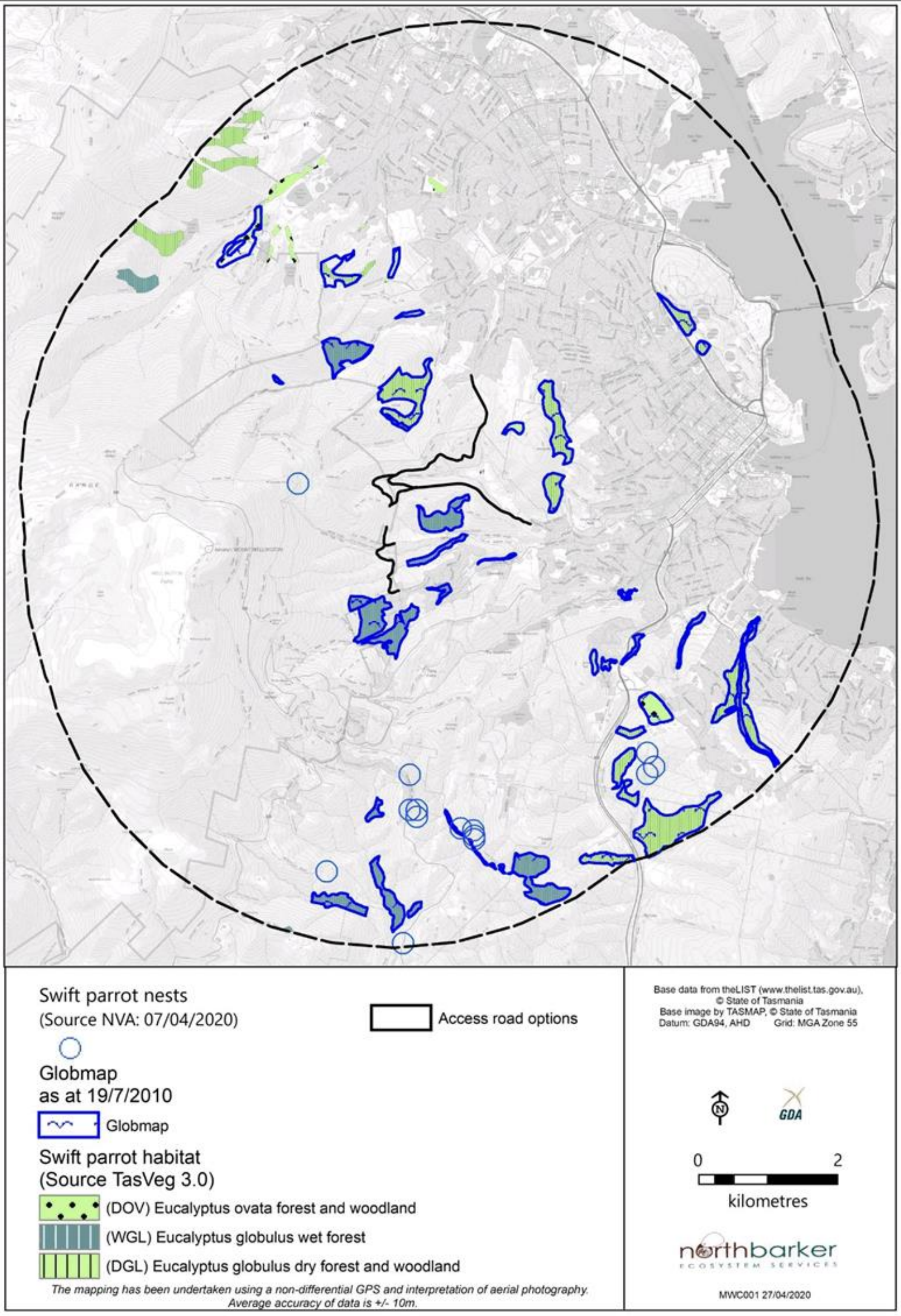



*Figure 4 - Swift parrot habitat*

Vegetation Communities

Table 1 list the extent of each community for each Option assuming a corridor of 25m. This is based on extrapolating the average width of the design footprint for Option 1. It also differentiates threatened vegetation communities listed under Schedule 3a of the *Nature Conservation Act 2002*. Data is taken from TASVEG 3.1. Actual extent of impact calculated for Option 1 is provided as a comparison which is an indication of mapping reliability of TASVEG.

*Table 1: Area of Vegetation Communities (TASVEG 3.1) by Option*

| Community | Threatened NCA | 1 | 2 | 3 | 3a | 4 |
|---|---|---|---|---|---|---|
| DOB - *Eucalyptus obliqua* dry forest | | 2.53 (2.29) | 0.00 | 1.35 | 2.80 | 0.46 |
| DGL – *Eucalyptus globulus* dry forest | YES | (0.20) | | | | |
| DPU - *Eucalyptus pulchella* forest and woodland | | 0.00 (0.00) | 0.54 | 0.77 | 0.77 | 0.23 |
| DTO - *Eucalyptus tenuiramis* forest and woodland on sediments | YES | 2.16 (3.15) | 0.00 | 0.00 | 0.51 | 0.00 |
| WOU *Eucalyptus obliqua* wet forest | | 0.38 (0.00) | 0.52 | 4.82 | 3.47 | 1.48 |
| Total forest | | 5.07 (5.64) | 1.06 | 6.94 | 7.55 | 2.17 |
| FAG, FUM, FUR, FPE Agricultural/Urban | | 0.81 (0.11) | 0.02 | 1.48 | 1.48 | 1.23 |
| Total | | 5.88 (5.75) | 1.08 | 8.42 | 9.03 | 3.40 |

Areas provided in brackets for Option 1 provide the actual calculated areas of the design against amended vegetation mapping presented in the Natural Values Assessment. Although these show some discrepancy in area calculations the analysis of TASVEG is an acceptable tool for comparing options.

The extent of impact to vegetation is greatest for Options 3 and 3a simply due to their greater length. By the same token Option 2 impacts the least vegetation, being almost entirely confined to the existing fire trail. Option 1 impacts on the greatest extent of threatened vegetation (DTO and DGL). It is quite likely that other options also include some DGL especially Options 3 and 3a.

Threatened fauna

There are few records along any route option of threatened fauna on the Natural Values Atlas (figure 3) with most being of observation records of eastern quoll, masked owl and swift parrot, all of which could potentially occur throughout the forested areas of each option. Analysis of swift parrot habitat (Figure 4) shows no significant habitat mapped that intersects with any option. Our investigations along Option 1 located occasional blue gums

(*Eucalyptus globulus*) which provide foraging habitat for swift parrot. It is very likely these occur in areas mapped as DPU, DOB and WOU and so are likely to occur along all options to varying degrees. However, it is not possible to do a quantified comparison of each option for impact to foraging trees.

It is likely that the more forest being cleared the greater the impact to swift parrot habitat, and on that basis relative impacts can be interpreted from Table 1

Threatened Flora

Very few records of threatened flora within 500m with the largest number occurring in the vicinity of Option 3. No Options are likely to have a significant impact to threatened flora.

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# Mount Wellington Cableway

## Roadkill Risk Report and
## Draft Roadkill Mitigation Plan

April 16th 2020

For Mount Wellington Cableway Company (MWC001)

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Table of Contents

**List of Figures**

**100 PINNACLE ROAD, MOUNT WELLINGTON & 30 MCROBIES ROAD, SOUTH HOBART CABLEWAY AND ASSOCIATED FACILITIES, INFRASTRUCTURE AND WORKS**

**APPLICATION NO. PLN-19-345**

**Request for further information by the City of Hobart 21 June 2019**

**BIODIVERSITY**

| | | |
|---|---|---|
| B5b | 21 June 2019 | An roadkill risk report prepared by a suitably qualified person, analyzing the roadkill risk, particularly to threatened fauna, presented by the proposal including risks along the new access road to the base station as well as Pinnacle Road with respect to potential change in evening/night traffic associated with the uses within the Pinnacle Building (including restaurant and bar) and construction impacts.<br><br>This analysis should include a draft Roadkill Mitigation Plan confirming how roadkill risks will be mitigated and managed. |

# 1 Introduction

This document was prepared by North Barker Ecosystem Services in response to B5b. Further amendments were made following further response from Council.

**Request for further information by the City of Hobart 17 January 2020**

This request is not satisfied.

Specifically:

- The proponent claims (and reproduced in North Barker report) that the construction and operation of the cable car will not increase traffic volumes on Pinnacle Road by >10%.
- Visitation report indicates a greater rise in usage and hence an increase in traffic volume to the Pinnacle. Increased traffic volumes will increase roadkill risk and as such a roadkill assessment should be undertaken of the Pinnacle Road and mitigation measures developed based on the assessment. This should be considered in light of the response to request T1 above.
- There are a number of apparent typos in the document which can cause some confusion (e.g. p. 1 "east of the end of Old Farm Road" should be north).
- A range of mitigation measures proposed for the access road and Pinnacle Road. Both include measures to 'restrict hours of operation of construction vehicles and machinery to during the day (including 1 hour after dusk and 1 hour after dawn)'. The period 1 hour after dusk and 1 hour after dawn are high risk times and movements should be restricted during this time (looks to be an error only based on other measures).
- Section 3.1.10 does not mention the eastern barred bandicoot (p. 13). This species is not considered in relation to the access road. It is unclear under the plan whether it will trigger a review of the roadkill mitigation measures, if this species is recorded dead on the access road.

## 1.1 Applicable areas

As part of a proposal to construct an aerial tramway, Mt Wellington Cableway Company propose to construct a 2.2 km access road from McRobies Road in South Hobart to the proposed location of the Base Station. This access road will be used during construction and operation of the cableway. The proposed construction of a new access road increases the risk of native animals being killed by collisions with vehicles, during both the construction and operation of the proposed development. In addition, a change in the level of traffic (particularly at night-time) on the existing Pinnacle Road could also alter the mortality risk to native wildlife (however, we have been advised by the proponent that their traffic modelling indicates that during construction and operation, traffic volumes on Pinnacle Road, which rises from Ferntree to the summit of Mt Wellington (a distance of 10.8 km), will not change from current levels).

These two roads are thus the subject of this risk assessment and plan.

## 1.2 Threatened fauna species at risk

Both roads pass through bushland that supports faunal assemblages typical of the habitat types and landscape locations. Threatened fauna species are known to occur within 500 m of both the proposed access road[1] and Pinnacle Road[2]. Road mortality is recognised as a major threatening process for three of these species: the Tasmanian devil[3], the spotted-tailed quoll[4] and the eastern quoll[5]:

- The Tasmanian devil (*Sarcophilus harrisii*) is listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999*[6] (EPBCA) and the *Threatened Species Protection Act 1995*[7] (TSPA).
- The spotted-tailed quoll (*Dasyurus maculatus* spp. *maculatus* – Tasmanian population) is listed as vulnerable under the EPBCA and rare under the TSPA.
- The eastern quoll (*Dasyurus viverrinus*) is listed as endangered under the EPBCA and is not listed under the TSPA.

These species are particularly vulnerable to adverse population effects from road mortalities because they are ground dwelling, their populations are relatively small, they have large home range sizes, they can use roads as dispersal and movement corridors, and they scavenge on animal carcasses and insects (eastern quoll only) found on roads[8].

Tasmanian devil populations have declined markedly since the emergence of Devil Facial Tumour Disease[9]. In areas where the disease is long-established and has caused significant population declines, the viability of local devil populations may be threatened if exposed to additional demographic pressures, such as an increase in deaths occurring on newly developed roads or when traffic volume or speed increases on existing roads[10]. A previous

[1] Natural Values Report, DPIPWE, 18/09/2019, nvr_1_18-Sep-2019.
[2] Natural Values Report, DPIPWE, 03/09/2019, nvr_1_03-Sep-2019.
[3] Threatened Species Scientific Committee (2009). *Commonwealth Listing Advice on Sarcophilus harrisii*. Department of the Environment, Water, Heritage and the Arts.
[4] Department of Environment, Land, Water and Planning (2016). *National Recovery Plan for the Spotted-tailed Quoll Dasyurus maculatus*, Australian Government.
[5] Threatened Species Scientific Committee (2015). *Conservation Advice Dasyurus viverrinus eastern quoll*. Canberra: Department of the Environment.
[6] Commonwealth of Australia (1999). *Environment Protection and Biodiversity Conservation Act 1999*. No. 91, 1999.
[7] Tasmanian State Government (1995) *Threatened Species Protection Act 1995*. No. 83 of 1995. Government Printer, Hobart, Tasmania.
[8] Jones, ME (2000). Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research*.
[9] Lazenby, BT, Tobler, MW, Brown, WE, *et al.* (2018). Density trends and demographic signals uncover the long-term impact of transmissible cancer in Tasmanian devils. *Journal of Applied Ecology*.
[10] Jones, ME (2000). Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research;* Department of the Environment and

study found that increases in roadkill rates due to road upgrades (resulting in increased traffic volumes and speeds) caused a 50 % decline in the local population of devils, and eliminated the local population of eastern quolls[11,12]. A three-year study conducted between 2001-2004 estimated that 3392 Tasmanian devils were being killed annually on roads, suggesting that between 3.8 and 5.7 % of the total population is killed on roads every year[13].

The eastern barred bandicoot (*Perameles gunnii gunnii*) is also known to occur around the project area. This species is listed as vulnerable nationally under the EPBCA but is not listed as rare or threatened in Tasmania under the TSPA. It occurs in many modified habitats in Tasmania[14] and has been found to be abundant in periurban areas of the southeast, where its high fecundity and habitat preferences appear to mitigate relatively high demographic pressures including road mortality[15]. Road mortality is not listed as a major threat to mainland populations, for which there is more extensive conservation advice[16]. For these reasons, this species is not considered to be at the same level of risk as the above mammals from the proposed roads.

In addition to threatened mammal species, birds of prey can also be at risk of road collision trauma when scavenging carcasses. In the context of the current assessment, threatened species of birds with this risk include the grey goshawk (*Accipiter novaehollandiae*), the Tasmanian masked owl (*Tyto novaehollandiae castanops*), and the Tasmanian wedge-tailed eagle (*Aquila audax* ssp. *fleayi*).

# 2 Roadkill risk - process for assessment and mitigation of roadkill impacts

The '*Survey guidelines and management advice for development proposals that may impact on the* Tasmanian Devil 2015' (referred to as the *Survey Guidelines*)[17] outlines a process for assessing the potential impacts of road developments on Tasmanian devils. This process focuses on identifying and mitigating impacts on devils, but the mitigation measures are also suitable for reducing road mortalities for other native fauna, including quolls. The process involves completing a traffic impact assessment, then, if Tasmanian devil roadkill mortalities are expected to increase by more than 10 %, a roadkill assessment and roadkill mitigation plan must be completed.

Heritage (2006). *Tasmanian Devil (Sarcophilus harrisii) - EPBC Policy Statement 3.6*, Australian Government; Saving the Tasmanian Devil: Recovery through Science-based Management.

[11] Jones, ME (2000). Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research.*

[12] Threatened Species Scientific Committee (2009). *Commonwealth Listing Advice on Sarcophilus harrisii*. Department of the Environment, Water, Heritage and the Arts.

[13] Hobday, AJ and Minstrell, ML (2008). Distribution and abundance of roadkill on Tasmanian highways: human management options. *Wildlife Research;* Threatened Species Scientific Committee (2009). *Commonwealth Listing Advice on Sarcophilus harrisii*. Department of the Environment, Water, Heritage and the Arts.

[14] Threatened Species Section (2019). *Perameles gunnii (Eastern Barred Bandicoot): Species Management Profile for Tasmania's Threatened Species Link*. DPIPWE, Tasmania. Accessed 4/9/2019.

[15] Daniels, G. and Kirkpatrick (2012). The influence of landscape context on the distribution of flightless mammals in exurban developments. *Landscape and Urban Planning*, v 104 (1), pp. 114-123; Daniels (2011). Ecological implications of exurban development: The effects of people, pets and paddocks on avian and mammalian wildlife. Unpublished PhD thesis, University of Tasmania.

[16] Hill, R, Winnard, A and Watson, M (2010). *National Recovery Plan for the Eastern Barred Bandicoot (mainland) Perameles gunnii*. Department of Sustainability and Environment, Melbourne.

[17] Natural and Cultural Heritage Division (2015). *Survey guidelines and management advice for development proposals that may impact on the Tasmanian Devil (Sarcophilus harrisii)*, DPIPWE.

## 2.1 Traffic impact assessment and roadkill assessment guidelines

The construction of the proposed new access road is a *Medium* scale activity (road construction or upgrade >1-10 km) as defined by the *Survey Guidelines*. Due to the potential for increased road mortality, a traffic impact assessment is required[18]. As defined in the *Survey Guidelines*, a traffic impact assessment involves:

> "*comparison of current and projected night time traffic rates (i.e. between one hour before dusk to one hour after dawn) including volume of traffic, types of traffic (light versus heavy vehicles) and/or increased speed on road*." Then, "*If [the] traffic assessment indicates potential for a substantial impact on the local devil population (i.e. >10 % increase in [night-time]*[19] *traffic or speed etc.): roadkill assessment required.*"

A roadkill assessment involves extended field surveys that aim to establish baseline roadkill mortality. According to the *Survey Guidelines*, a roadkill assessment is:

> *"to be conducted where desktop assessment of the local devil population and the projected roadkill risk indicate potential for a substantial impact on the local population (i.e. predicted >10 % increase in deaths). Ideally, the survey should be conducted regularly over a long period of time, preferably covering all seasons (noting that January to April is when peak roadkill of weaned devils may occur). Notwithstanding the previous point, at a minimum, survey of roadkilled devils should cover one of the following set periods of time - either 3 months for weaned devils between January and April or 6 months over the remainder of the year. If assessing the impact of traffic associated with a proposed development on the devil, it is necessary to understand the current roadkill rate, potential construction phase roadkill rate, and potential post-development roadkill rate."*

If the roadkill assessment determines that there is likely to be a greater than 10 % increase in deaths, the prescribed action is to:

> *"mitigate any >10 % potential increase in roadkill risk. If [mitigation is] not possible or practical then consider offset options."*[20]

## 2.2 Assessment of traffic impacts for the new access road and Pinnacle Road

### 2.2.1 Access road

The location of the proposed access road is largely undeveloped bushland. Although located near an existing fire trail, for the purposes of this assessment we assume that the current baseline roadkill rate is zero, and therefore the development of a new access road would exceed the threshold of >10 % increase in roadkill mortality risk. As stipulated in the *Survey Guidelines*, a roadkill mitigation plan must therefore be developed and implemented for this road.

### 2.2.2 Pinnacle Road

According to the traffic modelling of the proponent, the volume or weight of traffic on Pinnacle Road is not expected to increase by > 10 % during construction and/or operation. North Barker have not been supplied with data to determine if this applies to night-times (as per the definition in the *Survey Guidelines*) and thus will not exceed the risk threshold defined

[18] Natural and Cultural Heritage Division (2015). *Survey guidelines and management advice for development proposals that may impact on the Tasmanian Devil (Sarcophilus harrisii)*, DPIPWE.

[19] Text in square brackets inserted by North Barker for clarity.

[20] Natural and Cultural Heritage Division (2015). *Survey guidelines and management advice for development proposals that may impact on the Tasmanian Devil (Sarcophilus harrisii)*. DPIPWE.

in the *Survey Guidelines.* However, as part of ensuring a limit on night-time traffic associated with their development, the proponent proposes to implement access restrictions in the pinnacle facilities – this would consist of the self-regulated prevention of patronage of the facilities at night-time to those that do not have a return ticket to descend the mountain via the cable car.

Based on the proponent advising us that their modelling indicates that Pinnacle Road traffic will not increase by more than 10 %, and that there will be no change in night-time traffic associated with the operation of their facilities, in accordance with the *Survey Guidelines*, a roadkill assessment is not required for Pinnacle Road. Nonetheless, consistent with the precautionary principle, as stipulated within the EPBCA *Survey guidelines for Australia's threatened mammals*[21], we recommend the implementation of traffic monitoring on Pinnacle Road and outline some mitigation contingencies that should be applied should night-time traffic volumes increase beyond the 10 % threshold (section 3.2).

## 2.3 Threatened species presence and potential roadkill impacts

As part of the natural values assessment for the proposed development, a ground survey focused on detecting the presence of Tasmanian devils and quolls (as well as the presence of suitable denning habitat) was conducted for the access road and surrounding areas[22]. Diurnal searching was undertaken for scats and prints throughout the survey area, with survey effort favouring potential dispersal routes (e.g. tracks) and soft substrates. A targeted remote motion-triggered camera survey using five cameras deployed for 20 nights each was conducted in an area identified as potential devil and quoll denning habitat. The cameras were located within 100 m of the proposed access road.

To supplement the surveys conducted for the natural values assessment, a literature search and a search of the Tasmanian Natural Values Atlas (NVA) were conducted to determine the extent of available baseline data on species presence. To the best of our knowledge, no long-term systematic studies on the abundance, population demographics or habitat use of the three threatened species of particular concern (Tasmanian devil, spotted-tailed quoll, and eastern quoll) have been published for these locations.

### 2.3.1 Access road: available data

The Tasmanian Natural Values Atlas (NVA) contains nine records for eastern quolls within 500 m of the location of the proposed access road. The presence of the species was confirmed on camera footage during the natural values assessment (Figure 1).

Despite no NVA records for the Tasmanian devil or the spotted-tailed quoll being attributed to within 500 m of the access road route, the devil was confirmed as present in the area on camera footage during the natural values assessment (Figure 1).

There are seven records for spotted-tailed quoll attributed to within 5 km on the NVA, with the most recently recorded in 2018. There are 44 records for the Tasmanian devil within 5 km of the proposed location, with the most recently recorded in 2018.[23]

No prominent dispersal routes crossing the location of the proposed access road were identified during the ground survey in the natural values assessment.

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[21] Department of Sustainability, Environment, Water, Population and Communities (2011). *Survey guidelines for Australia's threatened mammals: Guidelines for detecting mammals listed as threatened under the EPBC Act.* Australian Government.

[22] North Barker Ecosystem Services (2019). *Mt Wellington Cable Way Natural Values Impacts Assessment.*

[23] Natural Values Report, DPIPWE, 18/09/2019, nvr_1_18-Sep-2019.

### 2.3.2 Pinnacle Road: available data

Pinnacle Road is purportedly regularly checked for roadkill by contractors for Hobart City Council, but as of the time of submitting this report we have not received data on collections from the Council. There are no published roadkill assessments for the road.

Tasmanian devils, eastern and spotted-tailed quolls are nonetheless known to occur within 500 m of Pinnacle Road. The NVA contains four records of devils within 500 m of the Pinnacle Road (most recently recorded 2016) and 36 records within 5 km (most recently recorded 2019). There are six spotted-tailed quoll records within 500 m (most recently recorded 2014) and 16 within 5 km (most recently recorded 2018). There are seven eastern quoll records within 500 m (most recently recorded 2011) and 64 records within 5 km (most recently recorded 2018)[24].

The NVA contains records of two Tasmanian devil carcasses found on Pinnacle Road, recorded from January 2015 and 2016 (Figure 2). No records of eastern quoll or spotted-tailed quoll carcasses are attributed to Pinnacle Road. (Three eastern barred bandicoot carcasses are attributed to Pinnacle Road on the NVA.)

In the absence of detailed abundance, demographic and habitat use data for the species of concern, there are limitations to determining baseline roadkill rates and the subsequent effects any additional deaths may have on local and regional population viability. Even with the limited data available, it is important to note that the actual number of road-killed animals is likely to exceed the number recorded, due to wounded animals dying off the road[25], carcasses being consumed by scavengers, and observations not being lodged on databases.

---

[24] Natural Values Report, DPIPWE, 03/09/2019, nvr_1_03-Sep-2019.

[25] Hobday, AJ and Minstrell, ML (2008). Distribution and abundance of roadkill on Tasmanian highways: human management options. *Wildlife Research*.

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Mt Wellington Cableway
Response to RFI B5b: Roadkill Risk Report

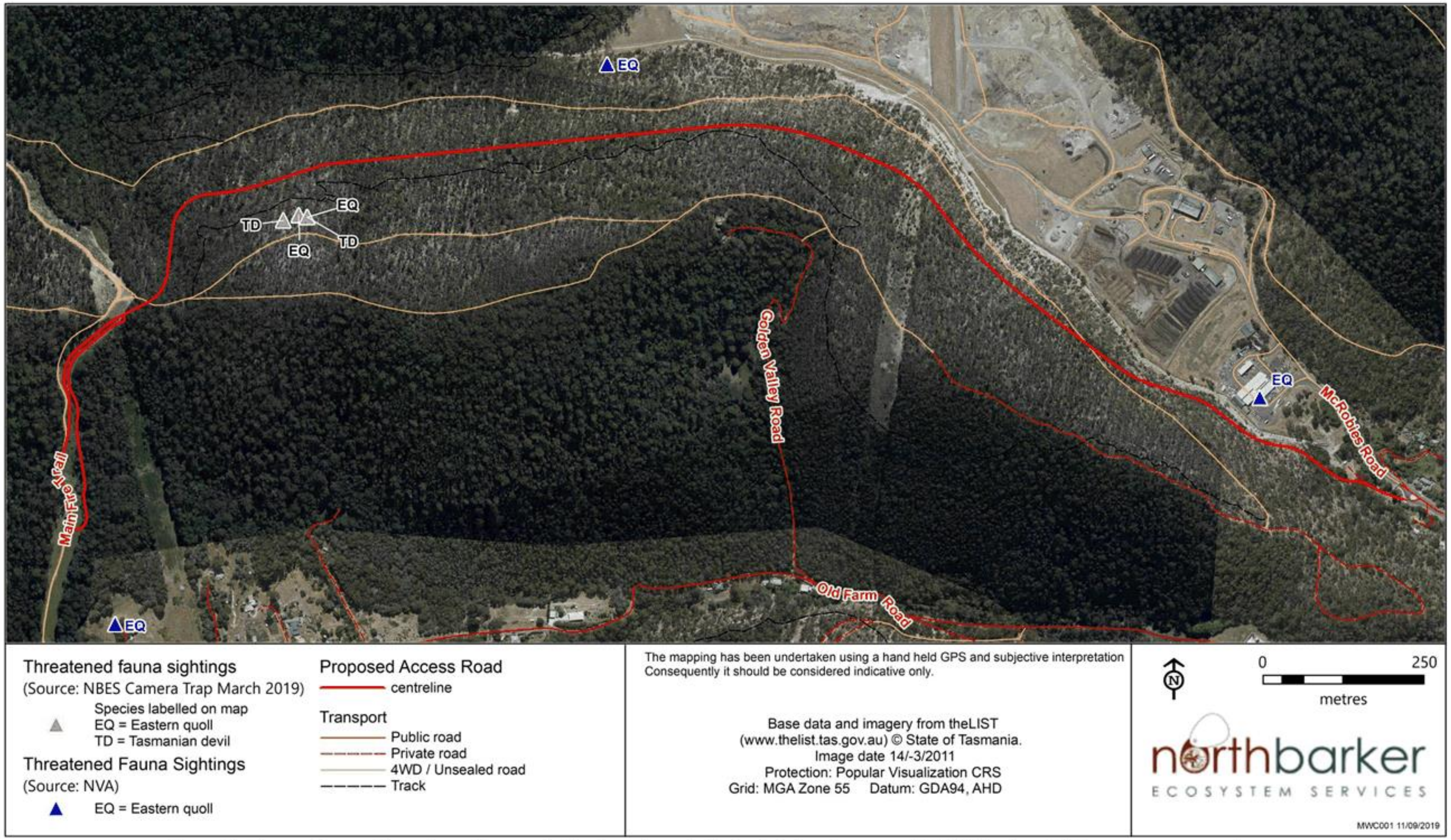


**Figure 1. Observations of threatened fauna at risk of road mortality in vicinity of proposed Mt Wellington Cableway access road.**

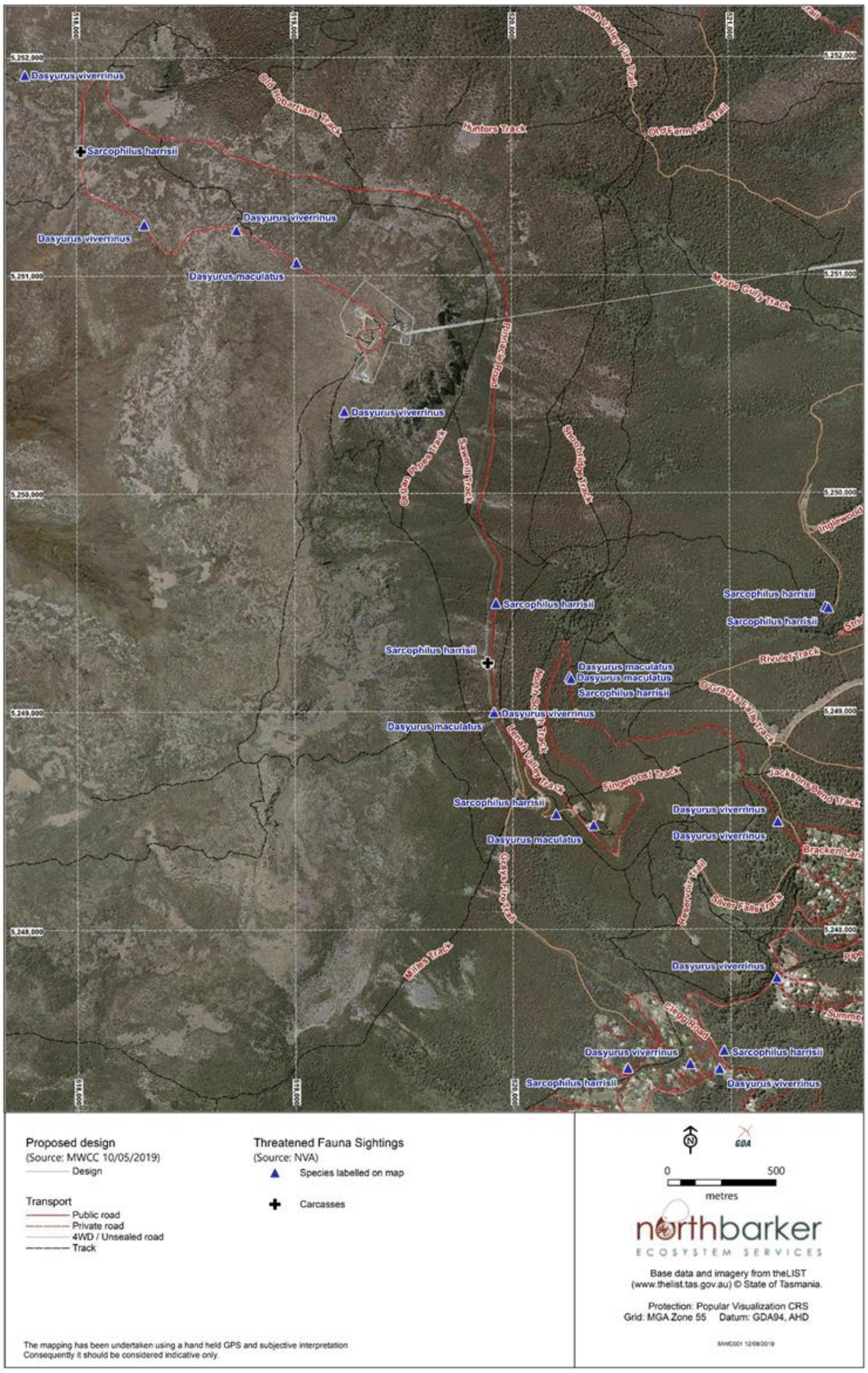


**Figure 2. Locations of Tasmanian devil, eastern quoll, and spotted tailed quoll occurrence records from Pinnacle Road and surrounds. Two records of Tasmanian devil carcasses are shown.**

# 3 Draft Roadkill Mitigation Plan

This plan outlines measures to be implemented by the proponent to mitigate the risk of road mortalities generated by the development of the proposed access road connecting McRobies Road to the cableway Base Station, and for meeting the requirements of the *Survey Guidelines* in relation to Pinnacle Road.

A range of mitigation measures have been proven to reduce the number of animals killed on roads.[26] The mitigation strategies presented in this plan have been demonstrated to effectively reduce wildlife mortalities in Tasmania and elsewhere. No single mitigation measure has been shown to eliminate roadkill risk; therefore, a range of complementary strategies are prescribed. By using a combination of measures shown to effectively reduce wildlife road deaths, it is possible to reduce the risk of road mortality associated with the proposed development to an acceptable level in accordance with the *Survey Guidelines* [27].

The mitigation measures prescribed for the access road are (Figure 3):

- Restrict hours of operation of construction vehicles and machinery to during the day (defined as the time between 1 hour after dawn until 1 hour before dusk)
- Set regulatory speed limit to 40 km/hr during construction and operation
- Prior to opening to the public, install traffic calming structures
- Install virtual fence along length of access road
- Install alternate pathways and escape routes
- Conduct awareness and injured animal training for drivers involved during construction, as well as operations staff
- Install signage, particularly in high risk areas
- Remove road killed animals from the road to prevent secondary deaths of threatened species scavenging on road killed carcasses, record and report roadkill
- Monitor impact and assess against thresholds
- Implement offsets if threshold exceeded and periodically review options for improved mitigation

The prescriptions for Pinnacle Road are:

- Install traffic monitoring devices to accurately measure traffic levels before and after the development (including differentiation of night and day)
- Restrict hours of operation of construction vehicles and machinery to during the day (defined as the time between 1 hour after dawn until 1 hour before dusk)
- Remove roadkill from road, record and report

In the event that monitoring of Pinnacle Road shows that the development has resulted in an increase in roadkill risk in accordance with the *Survey Guidelines*, the recommended contingency mitigation measure is to install virtual fencing, either along the length of the road or in specific spots of high roadkill risk.

Details and justification for each prescription and mitigation strategy are found below.

[26] Jones, ME (2000). Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research;* Fox, S, Potts, JM, Pemberton, D and Crosswell, D (2018) Roadkill mitigation: trialing virtual fence devices on the west coast of Tasmania. *Australian Mammalogy.*

[27] Noting the assumptions necessary based on the limited baseline data and the fact that the *Survey Guidelines* only require the proponent to mitigate any potential increase in roadkill risk >10 %.

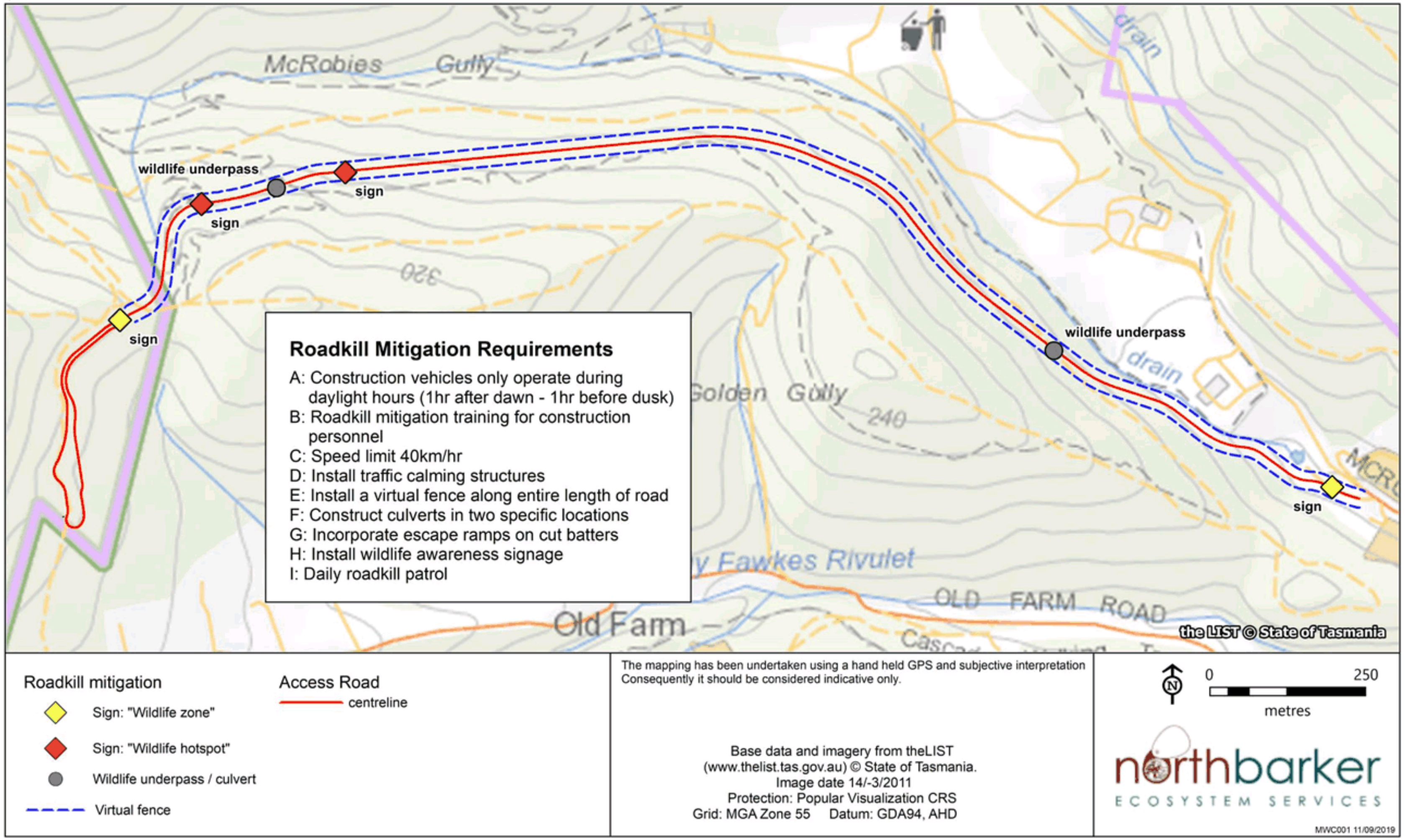


**Figure 3. Indicative locations of roadkill mitigation measures for Mt Wellington Cableway access road.**

## 3.1 Access road: mitigation strategies

Note: physical mitigation requirements C-H must be installed prior to the road being opened for use.

### 3.1.1 Restrict operation of vehicles to daylight hours during construction

The threatened species at greatest risk of being killed on the road are primarily (though not exclusively) nocturnal and are at greater risk of being killed at night. Restricting the operation of vehicles to daylight hours will substantially reduce the risk of threatened fauna species being killed on the access road during the construction phase.

**Requirement A**: During construction, vehicles (including machinery) may only operate during daylight hours, that is, they may not operate between the hours from one hour before dusk to one hour after dawn. This requirement is to be included in contract conditions.

Once operational, there will be night-time traffic on the access road, and additional mitigation measures are required to mitigate roadkill risk.

### 3.1.2 Train drivers of construction and maintenance vehicles, and operations staff

Drivers of vehicles involved in construction are to receive training (from suitably qualified wildlife carers) with regards to:

- Presence of wildlife in the area
- Potential for serious declines in threatened wildlife populations because of road deaths
- How to reduce risk to wildlife – reduce speed, remain attentive
- Location of wildlife hotspots
- What to do if an animal is hit

Requirements for the development and delivery of this training are to be written into contract conditions.

**Requirement B**: Implement training program for construction and operational personnel in relation to how to limit roadkill incidences and what to do when an animal is hit.

### 3.1.3 Set regulatory speed limit to 40 km/hr

Reducing traffic speed has been shown to effectively reduce wildlife road mortalities[28]. A study investigating night-time driver detection distances for several Tasmanian wildlife species found that Tasmanian devils were detected at the shortest distances, and that when driving with headlights on low beam attentive drivers could safely stop and avoid hitting devils at an average speed of 38 km/hr.[29] Given that Tasmanian devils are known to occur in the area, we recommend that the regulatory speed limit on the access road be set to 40 km/hr.

We recommend setting the regulatory speed limit to 40 km/hr rather than installing advisory speed limits and signage. Advisory limits and signage (e.g. "slow down dusk to dawn") have been found to be of limited effectiveness[30], particularly in the absence of accompanying physical structures that slow traffic.

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[28] Jones, ME (2000). Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research*.

[29] Hobday, AJ (2010). Nighttime driver detection distances for Tasmanian fauna: informing speed limits to reduce roadkill. *Wildlife Research*.

[30] Dique, DS, Thompson, J, Preece, HJ, Penfold, GC, de Villiers, DL, and Leslie, RS (2003). Koala mortality on roads in south-east Queensland: the koala speed-zone trial. *Wildlife Research*.

**Requirement C:** Set access road speed limit to 40 km/hr during construction and operation of the proposed development.

### 3.1.4 Install traffic calming structures

Reducing traffic speed has been shown to effectively reduce roadkill; however, signage stipulating regulatory speed limits, and particularly non-enforceable advisory speed limits, have been found to be of limited effectiveness in slowing traffic[31]. In addition to setting the regulatory speed limit to 40 km/hr, structures that physically reduce traffic speed to 40 km/hr are to be installed, prior to the operation phase of the proposed development (Figure 3

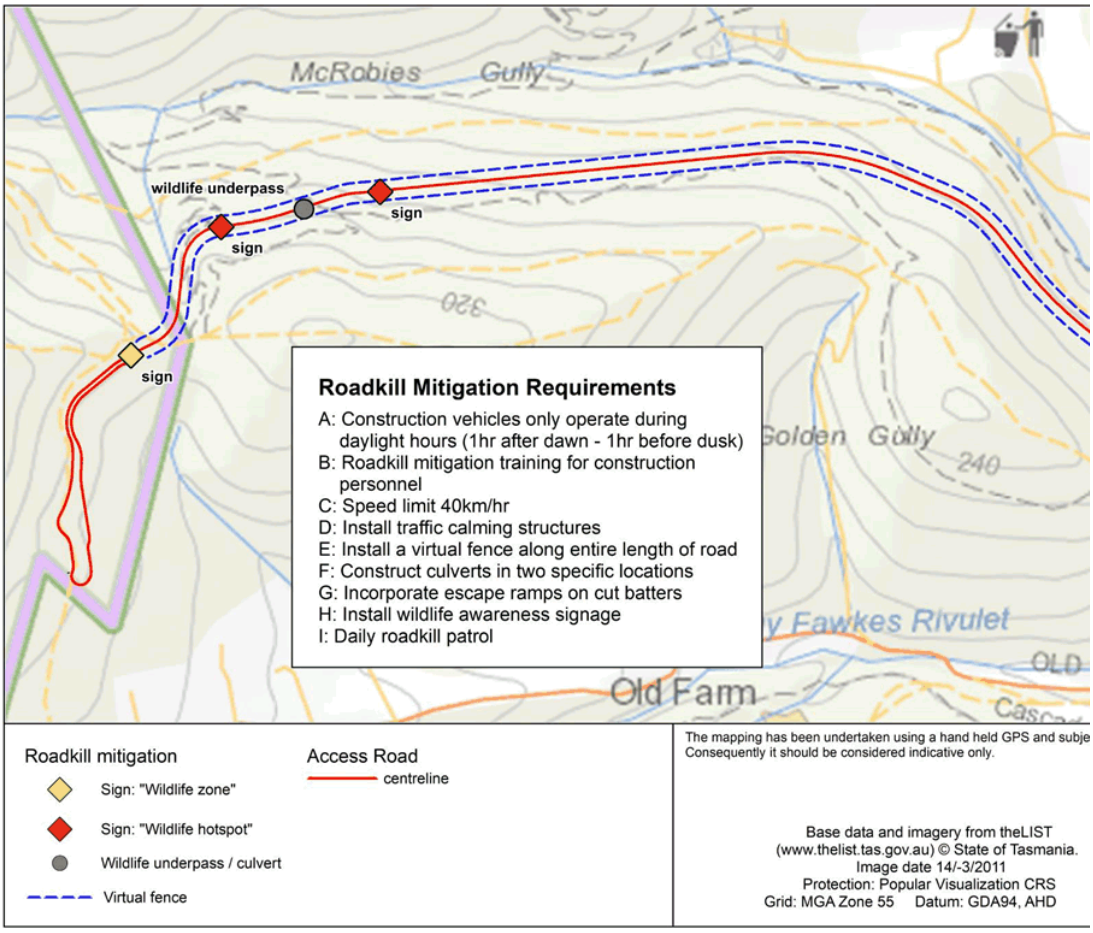


Figure 3). With regards to the specific design of traffic calming structures, this will be the decision of road engineers, but our recommended placements should be adhered to.

**Requirement D:** Install traffic calming structures.

[31] Dique, DS, Thompson, J, Preece, HJ, Penfold, GC, de Villiers, DL, and Leslie, RS (2003). Koala mortality on roads in south-east Queensland: the koala speed-zone trial. *Wildlife Research*.

### 3.1.5 Install virtual fence along length of access road

Virtual fencing involves installing devices which, when triggered by car headlights, emit light and sound, thus creating a 'virtual fence' that scares wildlife off the road and prevents wildlife from entering the road while a car is approaching. The devices are solar powered and mounted on poles alongside the road, facing away from the road.

Virtual fencing reduced wildlife mortality by 50 % in a study conducted over three years in northwest Tasmania[32]. Devices were installed on both sides of the road, at staggered intervals, so there was a 50 m distance between devices on the same side of the road, and a 25 m distance between devices on opposite sides of the road. Although a subsequent study found a negligible effect of the devices in reducing roadkill, the test area for that study was a highway with high vehicle speed, high volume of traffic and high density of animals.[33] It is thus possible to that the effectiveness of the devices is only apparent in low speed, low volume and/or low-density areas. Based on this, it is expected the devices can contribute to the current proposal as part of a suite of roadkill mitigation measures.

**Requirement E:** Install a virtual fence along the length of the access road. Include maintenance regime to maintain function of the fence.

### 3.1.6 Install alternate pathways and escape ramps

#### *3.1.6.1 Alternate pathways: underpass culverts*

Underpasses reduce roadkill risk by providing an alternative pathway for wildlife movement. There has been little work comparing the effectiveness of different underpass designs for Tasmanian wildlife[34]. Underpasses are more likely to be useful for the smaller Tasmanian mammals and those that use burrows (e.g. Tasmanian devils, quolls, bandicoots, wombats)[35]. Culverts of 300-450 mm in diameter have been recommended for small to medium mammals and are known to be used by Tasmanian devils and spotted-tailed quolls, and less frequently by eastern quolls, who may fear predation in such environments[36].

We recommend that 300-450 mm culverts (with supporting design specifications to funnel animals into the culvert[37]) are installed along the proposed access road in two specific locations – the first location is adjacent to an area of potential denning habitat, and the second is near the McRobies Gully Waste Management Centre (which we suggest may receive a relatively high volume of animal traffic due to the abundance of foraging opportunities around the tip site).

During the ground survey, no distinct animal pathways were observed crossing the location of the proposed access road, and therefore we have no basis to recommend further specific locations outside of these two areas. It is possible however, that road engineers will

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[32] Fox, S, Potts, JM, Pemberton, D and Crosswell, D (2018). Roadkill mitigation: trialing virtual fence devices on the west coast of Tasmania. *Australian Mammalogy.*

[33] Department of State Growth (unpublished data)

[34] Magnus, K, Kriwoken, LK, Mooney, N, Jones, ME (2004). *Reducing the incidence of wildlife roadkill: improving the visitor experience in Tasmania.* CRC Sustainable Tourism; Jones, ME (2000). Road upgrade, road mortality

[35] Magnus, K, Kriwoken, LK, Mooney, N, Jones, ME (2004) *Reducing the incidence of wildlife roadkill: improving the visitor experience in Tasmania.* CRC Sustainable Tourism; Jones, ME (2000). Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research.*

[36] Jones, ME (2000). Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research.*

[37] Magnus, K, Kriwoken, LK, Mooney, N, Jones, ME (2004) *Reducing the incidence of wildlife roadkill: improving the visitor experience in Tasmania.* CRC Sustainable Tourism; Jones, ME (2000). Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research.*

recommend that additional culverts are put in place to aid road integrity – in such scenarios we recommend any culverts are 300-450 mm in diameter and include the same design specifications as the recommended culverts.

**Requirement F:** Construct culverts in two specific locations along the proposed access road.

#### *3.1.6.2 Escape ramps*

Banks, cuttings and fences can trap animals on the road and be associated with increased roadkill[38]. These risks can be mitigated by providing escape routes from the road surface. Previous work found that ramps constructed by installing 2 m sections of 300 mm culvert pipe in roadside drains, placed parallel to the road, with a gravel ramp constructed over the culvert connecting the road verge to the top of the embankment, provided an effective escape ramp. These escape routes were constructed at approximately 25 m intervals within roadkill hotspots and were used by wildlife[39]. Reducing the steepness of batter slopes has also been suggested as a mitigation measure facilitating wildlife escape from roads[40] but remains to be tested systematically and is not always achievable from an engineering perspective or where other natural values require avoidance.

Where deep gutters and steep embankments occur along the proposed access road, we recommend the installation of ramps as described above. Where possible, reducing the batter angle will also decrease the likelihood of animals failing to escape the road. However, in this situation, such an option is not feasible where narrowing the footprint is desirable to reduce impact to trees, many of which provide fauna habitat.

Given the topographic setting of the road, cutting across the mid slope of a hill, we expect that embankments will be constructed along sections of the road. In the absence of a detailed road design, it is not possible to indicate the locations that may require escape ramps at this time.

**Requirement G**: In consultation with eventual road specifications and an ecologist, specify locations for escape ramps and install these ramps.

### 3.1.7 Install signage, particularly in high risk areas

General wildlife signage and advisory speed limits are of limited effectiveness in mitigating wildlife road mortalities[41]; however, signs bracketing and alerting drivers to specific roadkill hotspots have been shown to be effective, particularly when implemented alongside physical measures such as traffic calming structures such as chicanes and rumble strips[42].

Despite limited evidence in support of its effectiveness, we recommend the installation of wildlife signage as an awareness and educational measure, so that drivers are aware of the reasons for other mitigation measures such as the 40 km/hr speed limit and traffic calming structures on the proposed access road.

**Requirement H**: Install wildlife awareness signage at the beginning and end of the proposed access road. Install specific 'wildlife hotspot' signage at either end the area of potential

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[38] Magnus, K, Kriwoken, LK, Mooney, N, Jones, ME (2004). *Reducing the incidence of wildlife roadkill: improving the visitor experience in Tasmania.* CRC Sustainable Tourism.

[39] Jones, ME (2000). Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research.*

[40] Magnus, K, Kriwoken, LK, Mooney, N, Jones, ME (2004). *Reducing the incidence of wildlife roadkill: improving the visitor experience in Tasmania.* CRC Sustainable Tourism.

[41] Dique, DS, Thompson, J, Preece, HJ, Penfold, GC, de Villiers, DL, and Leslie, RS (2003). Koala mortality on roads in south-east Queensland: the koala speed-zone trial. *Wildlife Research.*

[42] Jones, ME (2000). Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research.*

denning habitat where Tasmanian devils and eastern quolls were recorded during the natural values assessment.

### 3.1.8 Keep road verges clear of vegetation

Maintaining short and open understorey vegetation alongside a road can increase driver visibility and increase the likelihood that animals will flush earlier, thus increasing escape time and the time available for drivers to respond. Slashing is not recommended as a vegetation control measure in these scenarios as it encourages new growth which is attractive to grazing wildlife. Regular spraying with a biodegradable herbicide is the recommended treatment[43]. In relation to the proposed new access road however, the surrounding vegetation is a native forest community with a naturally relatively sparse understorey and a low tendency to support lush green growth. Based on this we don't see any reason to require additional vegetation control beyond what the responsible road authority will already do for the maintenance of road safety and condition.

### 3.1.9 Remove road-killed animals from the road, record and report

Removing road-killed animals from the road prevents secondary deaths of species which scavenge on road-killed animals[44], including potentially the birds of prey in section 1.2. Removing roadkill early in the morning is required to prevent scavengers being attracted to mortalities to the previous night and becoming casualties themselves.

To aid monitoring and assessment of success, road-killed animals should be documented, with data maintained in a database by the proponent and records submitted to NVA.

**Requirement I:** Patrol road daily within 2 hours of sunrise: remove (by several metres), record and report road-killed animals to the NVA.

### 3.1.10 Monitor impacts and assess against mortality threshold

To monitor the effectiveness of the prescribed mitigation strategies it is essential that impacts of the proposed access road are monitored and assessed. Given that the baseline roadkill rate in this area is being taken as zero, the threshold for mortality to threatened species should be treated as zero[45]; any roadkill death of a threatened fauna species, including the Tasmanian devil, eastern quoll, spotted-tailed quoll, grey goshawk, Tasmanian masked owl and Tasmanian wedge-tailed eagle (but excluding the eastern barred bandicoot for reasons outlined in section 1.2), will thus exceed the threshold for acceptable mortality and trigger a review of existing mitigation measures and consideration of additional options or offsets in accordance with the *Survey Guidelines*. As the eastern barred bandicoot is not considered to be at the same level of risk from roadkill as the above species, but is nonetheless threatened nationally under the EPBCA, we recommend the annual mortality threshold for this species on the access road is two individuals – more than two recorded mortalities on the access road within a calendar year will thus exceed the threshold for acceptable mortality and trigger a review of existing mitigation measures and consideration of additional options or offsets in accordance with the Survey Guidelines.

Given that the extensive suite of mitigation measures prescribed by this plan are the measures currently known to be most effective for the species at risk, it is possible that a review of mitigation measures (should it be precipitated by the breaching of mortality thresholds) in the near future (e.g. next several years) is unlikely to uncover better mitigation measures than those recommended. Based on this, in addition to reviewing available

[43] Magnus, K, Kriwoken, LK, Mooney, N, Jones, ME (2004). *Reducing the incidence of wildlife roadkill: improving the visitor experience in Tasmania.* CRC Sustainable Tourism.

[44] Jones, ME (2000). Road upgrade, road mortality and remedial measures: impacts on a population of eastern quolls and Tasmanian devils. *Wildlife Research.*

[45] Excluding the eastern barred bandicoot, for reasons outlined in section 1.2

mitigations measures, we recommend that an offset is required for every threatened fauna roadkill mortality recorded on the access road above the recommended thresholds. Equivalent mortality offsets in association with developments elsewhere have involved financial contributions made to conservation programs and/or research on the specific species. This will be the most effective offset measure for this proposal and the size of the offset should be determined by regulators with consultation with the Policy and Conservation Branch of DPIPWE. Alternate offsets can be achieved by addressing roadkill on Pinnacle Road should there be identifiable roadkill levels that would be effectively reduced with mitigation there. Irrespective of mortality levels, a review of roadkill mitigation strategies in conjunction with the mortality offsets, should be undertaken every five years to determine the potential for new effective methods or improvements.

**Requirement J:** Follow offset requirements (to be prescribed by the relevant regulators) for each threatened fauna roadkill mortality recorded on the access road above the recommended thresholds.

**Requirement K:** Undertake a review of roadkill mitigation strategies every five years to determine the potential for new effective methods or improvements.

## 3.2 Pinnacle Road: mitigation strategies

Pinnacle Road is an existing public access road. The following are prescribed on the basis that the proposed development will not result in Pinnacle Road having a night-time increase in traffic volume beyond the 10 % threshold. Should traffic exceed this change, then in the absence of robust baseline data there is some risk that the consequences of unanticipated traffic increase to roadkill incidences will not be known. As such, monitoring is considered to be the most appropriate course of action in association with a mitigation measure during construction; an additional mitigation measure is suggested as a contingency should it be shown to be warranted by monitoring.

### 3.2.1 Monitor changes in night-time traffic during construction and operation

An increase in night-time traffic of greater than 10 % will warrant a roadkill assessment and potentially implementation of the contingency mitigation measure (requirement Q).

**Requirement L:** Install traffic monitoring devices (> 3 months before construction) and analyse traffic data annually (this informs the need for requirement Q).

### 3.2.2 Driver training

**Requirement M:** Implement training program for construction and operational personnel in relation to how to limit roadkill incidences and what to do when an animal is hit.

### 3.2.3 Restrict operation of vehicles to daylight hours during construction

**Requirement N:** During construction, vehicles (including machinery) may only operate during daylight hours, that is, they may not operate between the hours from one hour before dusk to one hour after dawn. This requirement is to be included in contract conditions.

### 3.2.4 Remove road kill from road, record and report for monitoring

For the same reasons outlined above for the access road, we recommend that roadkill be removed, recorded and data submitted to the NVA.

**Requirement O:** Patrol road daily within 2 hours of sunrise: remove (by several metres), record and report road-killed animals to the NVA.

**Requirement P:** Have monitoring data independently reviewed after five years to determine if additional mitigation measures or offsets are warranted in relation to the Pinnacle Road.

### 3.2.5 Restrict use of summit facilities to cable car patrons during night-time hours

MWCC have stated that they plan to implement policies that will reduce or eliminate increases in night-time traffic on Pinnacle Road during the operational phase of the proposed development. In particular, they have proposed to restrict restaurant night-time bookings to patrons travelling to and from the summit via the cableway.

### 3.2.6 Contingency mitigation: Install virtual fence

**Requirement Q:** If warranted by monitoring of traffic volumes and a subsequent roadkill assessment, install virtual fencing, either along the length of Pinnacle Road or in specific roadkill hotspots. Include maintenance regime to maintain function of the fence.

## 3.3 Conclusion and list of requirements

A *Roadkill Risk Report and Draft Roadkill Mitigation Plan* has been prepared in response to B5b of the RFI from Hobart City Council, in relation to application no. PLN-19-345. Both the proposed new access road and Pinnacle Road have been considered. A suite of monitoring and mitigation measures have been proposed for the new access road on the basis that a new road by default represents a > 10 % increased risk of roadkill. In contrast, the roadkill risk on Pinnacle Road is not expected to significantly increase based on an expectation of less than a 10% change to traffic volumes. Recommended measures for that road are focussed on monitoring, with scope for future mitigation in the event of increases in levels of roadkill. Future mitigation to Pinnacle Road (independent of traffic monitoring results) provides an alternate offset to any residual roadkill impacts occurring along the access road following recommended mitigation for that road.

Access road

- **Requirement A:** During construction, vehicles (including machinery) may only operate during daylight hours, that is, they may not operate between the hours from one hour before dusk to one hour after dawn. This requirement is to be included in contract conditions.
- **Requirement B:** Implement training program for construction and operational personnel in relation to how to limit roadkill incidences and what to do when an animal is hit.
- **Requirement C:** Set access road speed limit to 40 km/hr during construction and operation of the proposed development.
- **Requirement D:** Install traffic calming structures.
- **Requirement E:** Install a virtual fence along the length of the access road. Include maintenance regime to maintain function of the fence.
- **Requirement F:** Construct culverts in two specific locations along the proposed access road.
- **Requirement G:** In consultation with eventual road specifications and an ecologist, specify locations for escape ramps and install these ramps.
- **Requirement H:** Install wildlife awareness signage at the beginning and end of the proposed access road. Install specific 'wildlife hotspot' signage at either end the area of potential denning habitat where Tasmanian devils and eastern quolls were recorded during the natural values assessment.
- **Requirement I:** Patrol road daily within 2 hours of sunrise: remove (by several metres), record and report road-killed animals to the NVA.
- **Requirement J:** Follow offset requirements (to be prescribed by the relevant regulators) for each threatened fauna roadkill mortality recorded on the access road above the recommended thresholds.

- **Requirement K:** Undertake a review of roadkill mitigation strategies every five years to determine the potential for new effective methods or improvements.

Pinnacle Road

- **Requirement L:** Install traffic monitoring devices (> 3 months before construction) and analyse traffic data annually (this informs the need for requirement Q).
- **Requirement M:** Implement training program for construction and operational personnel in relation to how to limit roadkill incidences and what to do when an animal is hit.
- **Requirement N:** During construction, vehicles (including machinery) may only operate during daylight hours, that is, they may not operate between the hours from one hour before dusk to one hour after dawn. This requirement is to be included in contract conditions.
- **Requirement O:** Patrol road daily within 2 hours of sunrise: remove (by several metres), record and report road-killed animals to the NVA.
- **Requirement P:** Have monitoring data independently reviewed after five years to determine if additional mitigation measures or offsets are warranted in relation to the Pinnacle Road.
- **Requirement Q:** If warranted by monitoring of traffic volumes and a subsequent roadkill assessment, install a virtual fencing, targeting specific roadkill hotspots. Include maintenance regime to maintain function of the fence.

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northbarker
ECOSYSTEM SERVICES

# Mount Wellington Cableway

## Collision Risk Report

March16th 2020

For Mount Wellington Cableway Company (MWC001)

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# Table of Contents

## List of Figures

**100 PINNACLE ROAD, MOUNT WELLINGTON & 30 MCROBIES ROAD, SOUTH HOBART CABLEWAY AND ASSOCIATED FACILITIES, INFRASTRUCTURE AND WORKS**

**APPLICATION NO. PLN-19-345**

**Request for further information by the city of Hobart**

**BIODIVERSITY**

| | | |
|---|---|---|
| B6 | 21 June 2019 | A bird collision report prepared by a suitably qualified person, analyzing the risk of bird collision with cables and other structures (including windows in buildings) as well as during construction, having regard to the intended use of helicopters.<br><br>This bird collision report should specifically consider the likelihood of risk to threatened avifauna that are likely or are known to be present within the area. |

# 1 Collision risks from development components

Any infrastructure can create a potential collision hazard to birds if it is not clearly visible and avoidable. The proposed development has the potential to introduce new collision threats to birds within the development footprint and as part of the construction phase. Birds could be at risk of colliding with both of the buildings (Pinnacle Centre and Base Station), the cable way infrastructure (aerial cables, towers and cable cars), and with helicopters used during construction. Each of these components of the proposed development pose varying collision risks to different bird species.

## 1.1 Buildings

In almost all scenarios, the risk that buildings pose to bird collisions relates to the design and location of windows. Threats posed by windows can be classified into two main categories: reflections and transparency.

- When seen from the outside of a building, glass often has a reflective quality, mirroring the sky, trees and other features. Some types are worse than others. The reflectivity increases when glass is seen at an oblique angle, regardless of whether the glass is transparent or tinted.
- Birds do not understand that a reflection is false. Instead, they perceive a continuation of their habitat or flight path and try to fly to/through it, resulting in collisions.
- Birds cannot differentiate between clear glass and unobstructed airspace; it is invisible to them. Glass lobbies, balconies, windows or glass walls that meet at a corner, or aligned windows (windows installed parallel to each other, on opposite sides of the building) may provide an unobstructed view of habitat and sky on the other side of the building and be particularly dangerous: birds perceive a passageway and attempt to fly straight through. Also, transparent window panes mimic tinted reflective panes when little or no light is visible behind them.

The risk of collision posed by a building's windows can thus be assessed by considering the design and the potential for reflections and/or transparency. In cases where there is a reasonable expectation that collisions could result, the design and/or placement of windows can be mitigated to reduce reflectance and the appearance of flight paths. A range of potential window mitigation options are available. Although, to our knowledge, results of systematic tests of window collision mitigations are not present in the scientific literature, the options are sound from an ecological perspective and have been applied/accepted as mitigation measures in several developments around the Greater Hobart area.

### 1.1.1 Pinnacle Centre design

#### *1.1.1.1 Eastern elevation*

The Pinnacle Centre planning assessment and architectural design documents indicate that windows on the eastern aspect facing Hobart will be tilted downwards or screened in order to reduce reflectance and visibility from the city (Figure 1)[1]. These design principles will reduce reflections and create the perception of solid barriers, which will effectively reduce the risk of reflection-related bird collisions along the eastern face. There is however a potential issue with perceived transparency through the glazed tunnel walkway linking the north and south sections of the building (section 1.1.1.5).

#### *1.1.1.2 Southern elevation*

Two relatively large windows at the southern end of the building lack screens, are not tilted, and are elevated above the surrounding landforms (Figure 2). The southern aspect of these faces in relation to the direction of the sun means that large mirror-like reflections are unlikely. There is still some potential for moderate levels of reflectivity from the diffuse light and reflections at close range. However, given the windows are embedded within and adjacent to solid surfaces (either screens/walls of the building, or the face of the mountain), the scope for reflections of sky or habitat that might entice a bird to attempt to fly through is considered quite low. Subsequently these windows are considered to represent a low risk of reflection-related collisions.

#### *1.1.1.3 Western elevation*

Windows on the western aspect of the building are also not screened or tilted (Figure 3). The potential collision risk associated with reflectivity on this face is low. The likelihood of windows on that face reflecting the sky is very low due to that side of the building being low set into the face of the slope. Habitat reflections are possible but would most likely be at close range due to the slope. In such cases, the close-range reflections are most likely to represent a potential collision risk to small birds utilising adjacent habitat and undertaking short flights. Under such circumstances, any potential collision with the western elevation can reasonably be expected to occur at low speed and thus have a relatively low likelihood of injury and/or mortality.

#### *1.1.1.4 Northern elevation*

The northern elevation includes relatively little exposed glass. Due to the surrounding slopes, other components of the building, and its position in relation to adjacent habitat, the small amount of glass front present on the north face is seen to have a relatively low risk of potential reflection-related collisions in relation the sky and/or adjacent habitat.

#### *1.1.1.5 Potential transparencies – perceived flight paths*

The proposed building is set on a slope and embedded low in the surrounding landscape; these factors, in conjunction with the proposed alignments of windows (and other glass elements), eliminate much of the possibility of sightlines throughout the building. The following exceptions are however seen as having the greatest potential as sight lines:

[1] Ireneinc Planning (2019), *Mt Wellington Cable Car Planning Assessment Report*, last updated 12 June 2019, submitted as part of application no. PLN-19-345, Mt Wellington Cableway Company Development Application; JAWS Architects (2019), *Architecture – Pinnacle Centre*, submitted as part of application no. PLN-19-345, Mt Wellington Cableway Company, Development Application

- The ceiling above one of the windows on the southern elevation (the window in the Sanctum) appears to be partially glazed, which creates the potential for the perception of a clear flightpath through the top corner of this section.
- An enclosed walkway connecting the northern and southern components of the building is glazed on both sides, creating the potential for perception of a flight path through the glazed tunnel.
- A mostly glass room on the upper level of the southern building may in perceived sight lines from a north-south direction in particular.

Each of these potential sight lines is seen as a relatively minor risk, particularly in the context of the immediately surrounding highland vegetation supporting a relatively low density and species richness of birds. In relation to the potential sight lines from the Sanctum and the glass room, these are seen as low risk primarily on the basis that the faces representing potential sight lines are quite small in the context of the open surrounding landscape with few obstructions. Based on this, birds can be expected to avoid the isolated building as a whole, rather than attempt to fly through a relatively narrow perceived flight line through the middle of the only structure in the area. The potential perceived flight path through the glass tunnel is seen as an even lower risk due to the alignment of the western face with the adjacent slope comprised of many rocks, which will strongly reduce the area of perceived flight space.

#### *1.1.1.6 Existing Observation Shelter*

The proposed development of the Pinnacle Centre includes the partial dismantling of the existing observation shelter. The roof and windows and framework infrastructure are proposed for removal leaving the existing stone walls only. This structure appears in Figures 1-3 as a prominent structure that does not fit into the contours in the same way of the new development. It also breaks the skyline. The extensive glazing is likely to have greater reflectivity than the glazing associated with the Pinnacle Centre. It also has see-through glass where the windows wrap around approximately 270 degrees. There is no data available on the incidence of bird collisions with this structure.

**Plate 1: Existing lookout shelter, northern elevation [2]**

[2] Photo M Newton c/o https://www.greaterhobarttrails.com.au/track/hobart-to-the-pinnacle/

#### *1.1.1.7 Overall risk*

Based on the current location and design of the Pinnacle Centre, the building is considered to represent a low risk for bird collisions. This is on account the immediately surrounding highland vegetation supporting a relatively low density and species richness of birds by Tasmanian standards, many window faces either being tilted or screened, and the potential for perceived flight paths from transparent sight lines being quite low.

The removal of the high-risk existing observation shelter will more than offset the added risk presented by the new Pinnacle Centre.

In the event that monitoring (section 3) finds that some windows represent a greater level of collision risk than anticipated, there is scope for later mitigation by applying tints and opaque obstructions to windows.

### 1.1.2 Base Station design

The architectural design document for the Base Station indicates all glazing will be screened by timber and metal composite screens[3]. Provided that glazing is screened as depicted in the design document, we anticipate that the risk of bird collisions with the proposed Base Station building will be low.

[3] JAWS Architects (2019), *Architecture – Base Station*, submitted as part of application no. PLN-19-345, Mt Wellington Cableway Company, Development Application

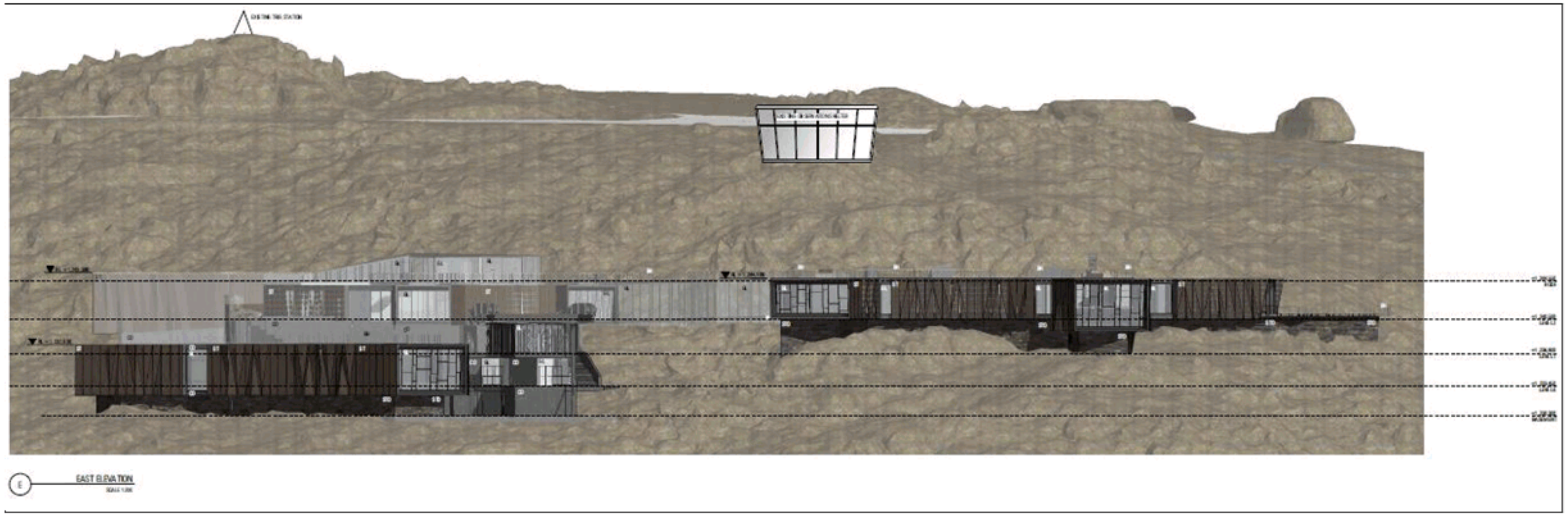

**Figure 1: Building design from perspective of eastern elevation, showing north and south sections of the building, the adjoining enclosed glass walkway, and the proposed obstructions on eastern face windows that may have posed a reflective risk**

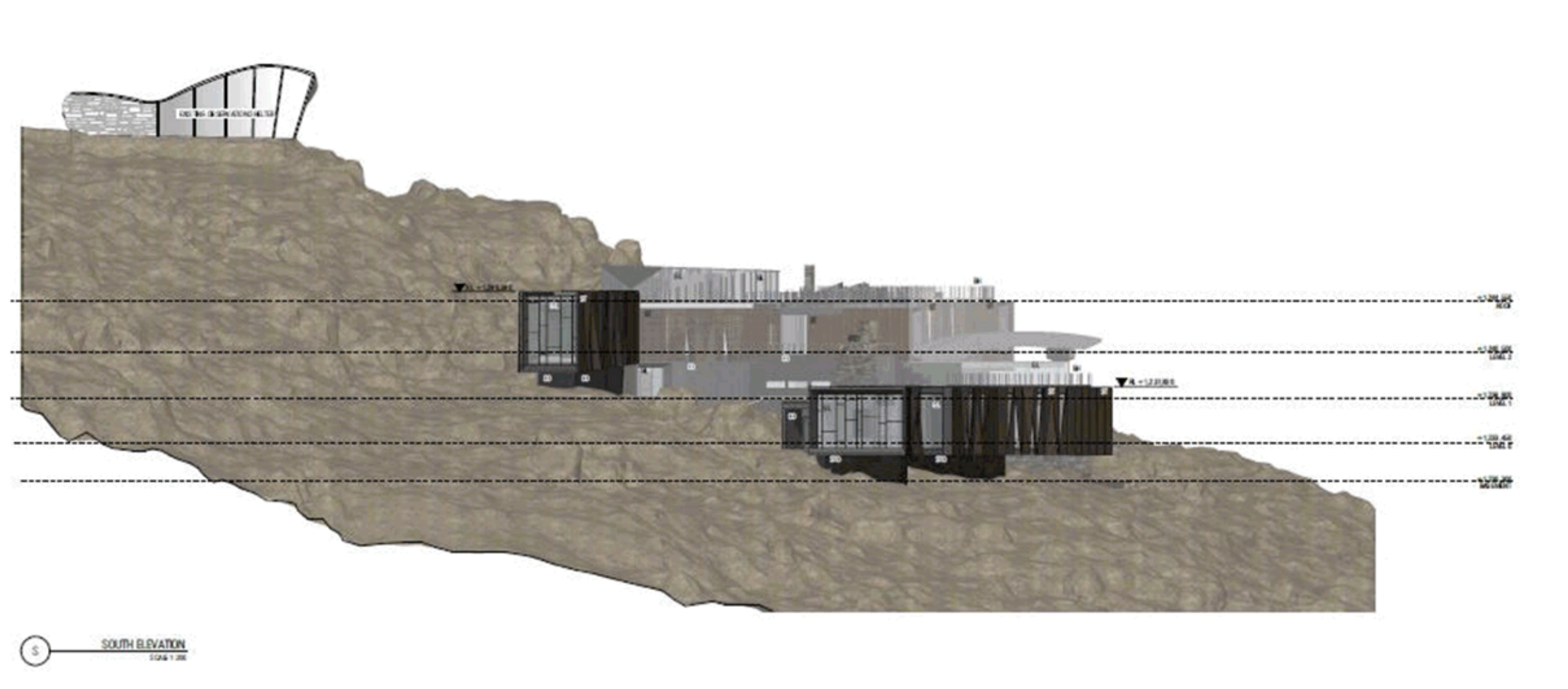


Figure 2: Building design from perspective of southern elevation, showing north and south sections of the building, the adjoining enclosed glass walkway, and the proposed obstructions on eastern face windows that may have posed a reflective risk

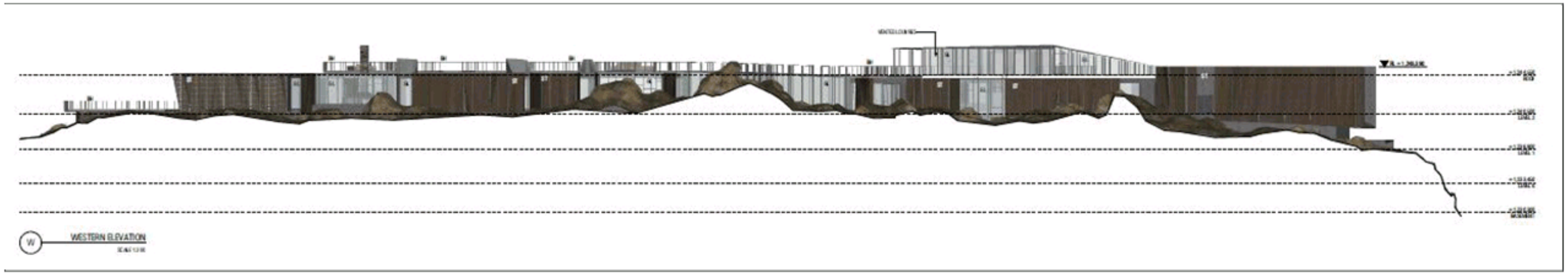


**Figure 3: Building design from perspective of western elevation, showing north and south sections of the building, the adjoining enclosed glass walkway, and the proposed obstructions on eastern face windows that may have posed a reflective risk**

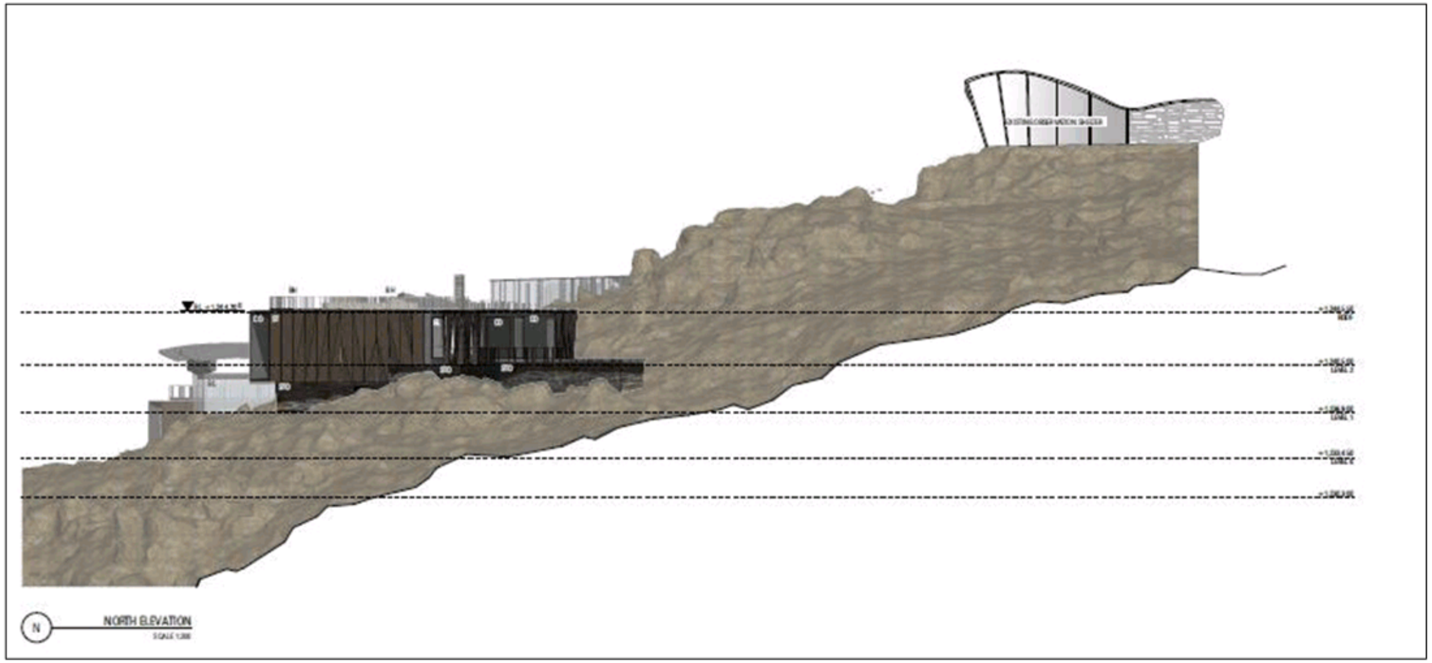


**Figure 4: Building design from perspective of northern elevation, showing north and south sections of the building, the adjoining enclosed glass walkway, and the proposed obstructions on eastern face windows that may have posed a reflective risk**

## 1.2 Cableway infrastructure: aerial cables, towers and cable cars

It is widely accepted that collisions with aerial cables are a source of bird mortality in some species and some situations[4]. However, there is limited scientific literature from Australia that investigates the variations of collision rates between species, locations, and types of cables, with most reports and commentary on relative risks being anecdotal and speculative. There is some scope to apply the findings of international research, however no studies that we are aware of relate to collision risks associated with a cableway and cable cars of similar design to the current proposal under investigation. A similar type of infrastructure that has been studied are ski-lift cables with very small cabins, which have been found to be a significant source of mortality for some bird species in Europe[5]. The majority of cable collision studies however focus on the collision risk posed by powerlines – this is in part due to their abundance in the landscape.

In general, the risk of bird collisions with aerial cables appears to be influenced by a mix of ecological, environmental, and engineering factors[6]. With regard to the current proposal, the species-specific ecological and environmental collision risk factors pertinent to the local suite of threatened species with the potential to occur around the proposal area are examined in Section 2. Engineering factors that influence collision risk are discussed briefly below.

Engineering factors that influence aerial cable collision risk include: cable diameter, height, placement, and span length[7]. It is generally suggested that smaller diameter cables (e.g. shield/earth wires 1 - 1.3 cm) cause most collisions, with larger diameters (e.g. phase conductors 2.5 - 5 cm) posing less risk of collision. Ostensibly this relates to comparative visibility (with smaller diameters being less visible) but studies haven't definitively established this due to confounding factors in the powerlines investigated; e.g. where small diameter earth wires are hung above larger diameter phase conductors, making it difficult to separate the influence of relative height from diameter[8]. Consistent with the visibility hypothesis however, birds are less susceptible to collisions with towers than with cables[9], and collision rates with cables are lower near towers than in spans between towers[10].

In relation to relative landscape position and placement, it has been shown that cables located below the line of a forest canopy cause fewer collisions[11], potentially because subcanopy species are adept at manoeuvring within obstruction rich environments, while other species may avoid the cables by being active above the canopy. Conversely, cables located near take-off and landing areas can be expected to pose an increased collision risk due to the vertical changes associated with these flights intersecting with the line of a horizontal cable[12].

### 1.2.1 Proposed design Mt Wellington Cableway

The proposed cableway design involves two bundles of three cables (2 x 55 mm and 1 x 40 mm) running parallel to one another for the approximately 2.3 km horizontal span of the cableway[13]. The design includes three towers: tower 1 placed 170 m from the Base Station,

[4] Avian Power Line Interaction Committee (APLIC) (2012)
[5] Bech (2012); Buffet (2010)
[6] Avian Power Line Interaction Committee (APLIC) (2012)
[7] Bernardino (2018)
[8] Bernardino (2018)
[9] Bernardino (2018)
[10] Bernardino (2018)
[11] Avian Power Line Interaction Committee (2012)
[12] Avian Power Line Interaction Committee (APLIC) (2012)
[13] Garaventa (2018)

tower 2 placed 130 m from tower 1, and tower 3 placed 2000 m from tower 2 and 99 m from the Pinnacle Centre. Due to the length of the span between towers 2 and 3, the height of the cables will vary with load tension. Based on estimations from the design drawing[14], the height of the cable between the Base Station and tower 1 will be approximately 20 to 45 m. Between towers 1 and 2, cable height will be approximately 40 to 55 m above ground, with the cables located above the current tree canopy. Between towers 2 and 3, the cable will be located above the canopy, and the height above ground level could vary considerably from approximately 45 m to approximately 200 m[15].

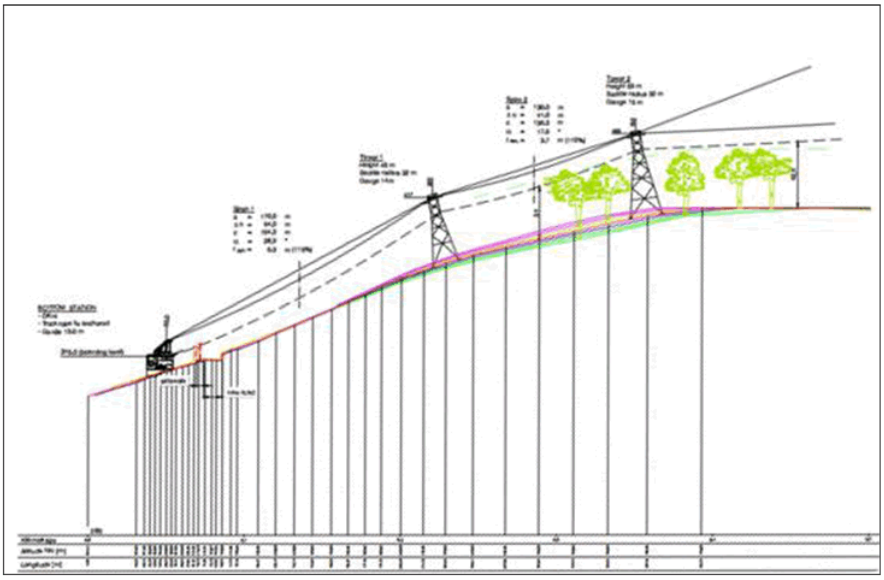

**Figure 5: Conformation of aerial cables and canopy. Base Station to tower 2**

The greatest risk posed by the design is likely to be the long span between towers 2 and 3, where birds will not be able to benefit from the added visibility of closely adjacent towers. However, across the entire span, the very large cable diameter and the bundling of the cables should make the cables highly visible to birds, limiting the potential risk of collisions even within inter-tower spans.

The movement of cable cars could potentially disturb birds where there is little separation between the cableway and the vegetation below, potentially causing birds to flush and be at risk of collision. This would be most relevant in the lower section of the route, where the cabins are proposed to rise through the canopy and then travel in relatively close proximity to vegetation for the first 500 m. At the top of the route, near the top of the Organ Pipes, the cabins will again be close to potential bird habitat, travelling within 5 m of the cliff edge[16]. In the latter scenario there is very little risk of collision from flushing birds, primarily because very few birds are expected to be present on that part of the Organ Pipes due to the altitude and the limited habitat value of the vegetation. The situation towards the lower part of the route, around the height of the forest canopy, can be seen as a relatively greater risk of resulting in

[14] Garaventa (2018)
[15] Garaventa (2018)
[16] Garaventa (2018)

collisions. However, the actual risk is still considered to be very low even in this location. The scenario is comparable to the risk of driving a car through a road in a forest environment and startled birds being at risk of colliding with the car when they flush. Although this type of road mortality does occur, it is far less prevalent and threatening than birds hit by cars when attempting to forage on a road. Furthermore, the travel speed of the cable car will be significantly lower than the road traffic example.

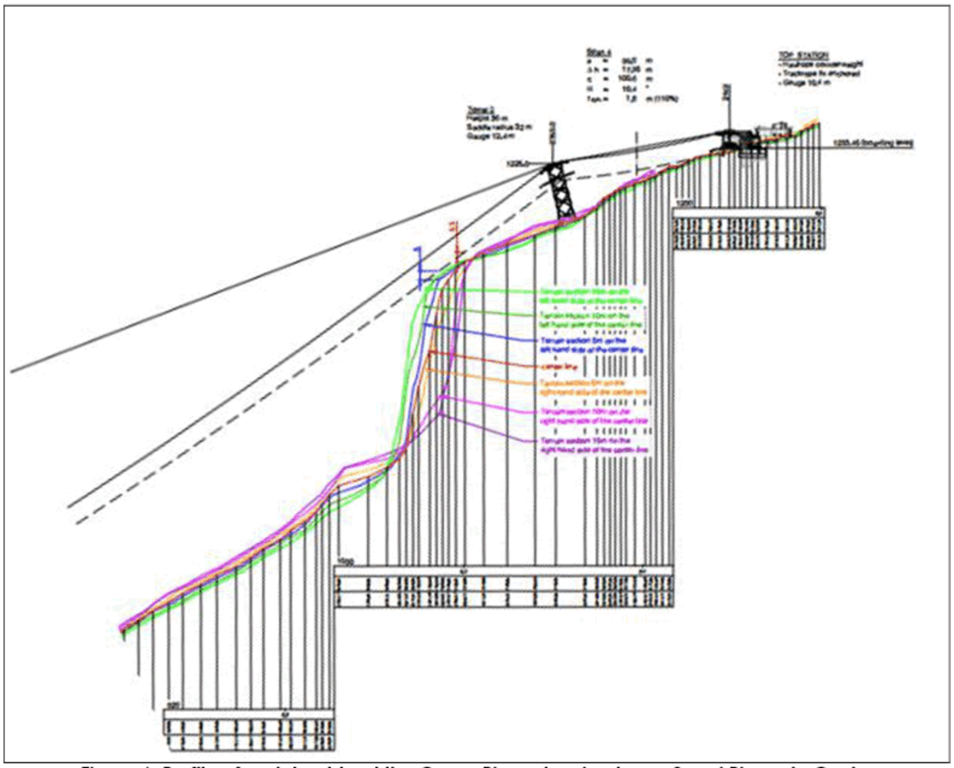

**Figure 6: Profile of aerial cable at the Organ Pipes showing tower 3 and Pinnacle Centre**

## 1.3 Helicopters

The use of helicopters during construction poses a risk of collision with birds, particularly large territorial birds defending their territories and nest sites from perceived intrusion. Several collisions between wedge-tailed eagles and helicopters have occurred in Tasmania. This is discussed in further in section 2.2.2 as eagles are the only local species conceivably at risk from this factor.

## 2 Collision risk and potential impact on threatened bird species

In particular locations or environments, collisions with human infrastructure can represent a significant source of mortality for birds. There is however a limited understanding of the impacts of this mortality on broader population viability for most species and specific scenarios. It can be reasonably expected however, that collision mortality poses the greatest risk to small populations of long-lived, slow breeding species[17], which are inherently at risk from elevated demographic pressures.

Table 1 summarises the threatened bird species with the potential to occur in or around the proposal area with respect to their relative risk of collisions with different components of the proposed development. The relative risk categories are derived from combined consideration of surrounding habitat (influencing the likelihood of species occurrence) and reported observations, consideration of available literature in relation to collision risk, and assessment of the proposed infrastructure with respect to collision risk.

**Table 1. Summary of relative collision risk of threatened bird species that may occur within the vicinity of the proposal.**

| Species | EPBCA status | TSPA status | Likelihood of collision without mitigation | | |
|---|---|---|---|---|---|
| | | | Buildings | Cableway infrastructure | Helicopters |
| swift parrot *Lathamus discolor* | Critically Endangered | Endangered | Low | Very low | Very low |
| wedge-tailed eagle *Aquila audax fleayi* | Endangered | Endangered | Very low | Moderate | Moderate |
| masked owl *Tyto novaehollandiae castanops* | Vulnerable | Endangered | Very low | Very low | Very low |
| white-throated needletail *Hirundapus caudacutus* | Vulnerable, Migratory, Marine | - | Very low | Low | Very low |
| grey goshawk *Accipiter novaehollandiae* | - | Endangered | Very low | Very low | Very low |
| white-bellied sea-eagle *Haliaeetus leucogaster* | Migratory (northern Australian birds only) | Vulnerable | Very low | Very low | Very low |

### 2.1 Swift parrot (*Lathamus discolor*)

Swift parrots are annual spring/summer migrants to Tasmania. From August to March they feed primarily on nectar of the Tasmanian blue gum (*Eucalyptus globulus*) and black gum (*E. ovata*). Breeding occurs in tree hollows in areas within proximity (< 10 km) to foraging habitat.

The location of the proposed development is within the core breeding and foraging range of the swift parrot. The forest between the Base Station and tower 2 contains mature blue gums,

[17] Avian Power Line Interaction Committee (APLIC) (2012); D'Amico (2019)

which are potential foraging and nesting habitat. Due to the stressed condition of the majority of these trees (historic fire damage, small crowns, low crown foliage density and negligible flower capsules evident) it was previously concluded that these trees are unlikely to be prolific flowerers and were therefore classed as low-quality swift parrot foraging habitat[18]. A smaller patch of dry blue gum forest close to McRobies Road supports trees likely to provide foraging habitat in most years based on the evident tree and habitat condition at the time of survey[19]. Blue gums were also recorded just upslope of the proposed Base Station car park and downslope of the fire trail adjacent to the Base Station. Potential nesting habitat (trees with the potential to support viable hollows) is present in the vicinity of the Base Station, access road and towers 1 and 2. The presence of nesting and foraging habitat around the Base Station location can be taken as an indicator of potential swift parrot presence and creates the risk that the building may intersect with their local flight paths.

Swift parrots have previously been recognised as a species that suffers from collision induced mortality, to the extent that there are guidelines for minimising the swift parrot collision threat[20]. Swift parrots are susceptible to collision with a range of artificial structures. Of greatest risk is open fencing, wires, and buildings with reflective glass or see-through flight lines or corners[21]. Pfennigwerth (2008) estimated that up to 2 % of the swift parrot breeding population is killed every year because of collisions, although this was not derived from a systematic survey of collisions or the population as a whole. Furthermore, an investigation of collisions as a contributor to current population demographic pressures has not been undertaken in the context of substantive levels of local predation from the previously unrecognised threat of sugar gliders[22]. The swift parrot national recovery plan discusses collision mortality as a threat to the species[23], but relies on referencing Pfennigwerth (2008) and other limited evidence. The Recovery Plan also acknowledges that the incidences of collisions were not quantifiable during the period covered by the previous recovery plan. In addition, despite 'fauna collision with human infrastructure such as windows' being a threat class[24] under the EPBCA, the swift parrot is not included among the six species listed as being at risk from this threat[25]. 'Continuing to raise public awareness of the risks of collisions and how these can be minimised' is however identified as a conservation and management priority for the species within the EPBCA Conservation Listing Advice.

### 2.1.1 Risk of collision with Base Station building

We have identified that the Base Station footprint is located relatively close to swift parrot foraging and nesting resources (Figure 7). Therefore, the proposed building has the potential to intersect with swift parrot flight paths and collision risks posed by the proposed building warrant consideration. Based on the design specifying that all windows will be screened[26], and that no other apparent structural elements associated with the building pose a collision risk, the likelihood of swift parrots colliding with the Base Station building is considered to be low.

[18] North Barker Ecosystem Services (2019) *Natural Values Impacts Assessment Mt Wellington Cableway*, Hobart, Tasmania
[19] North Barker Ecosystem Services (2019) *Natural Values Impacts Assessment Mt Wellington Cableway*
[20] Pfennigwerth (2008)
[21] Pfennigwerth (2008)
[22] Stojanovic *et al.* (2014)
[23] Saunders and Tzaros (2011)
[24] A sub-threat under 'Residential and Commercial Development' and 'Housing and Urban Areas'.
[25] EPBCA SPRAT profile search
[26] JAWS Architects (2019), *Architecture – Base Station*, submitted as part of application no. PLN-19-345, Mt Wellington Cableway Company, Development Application

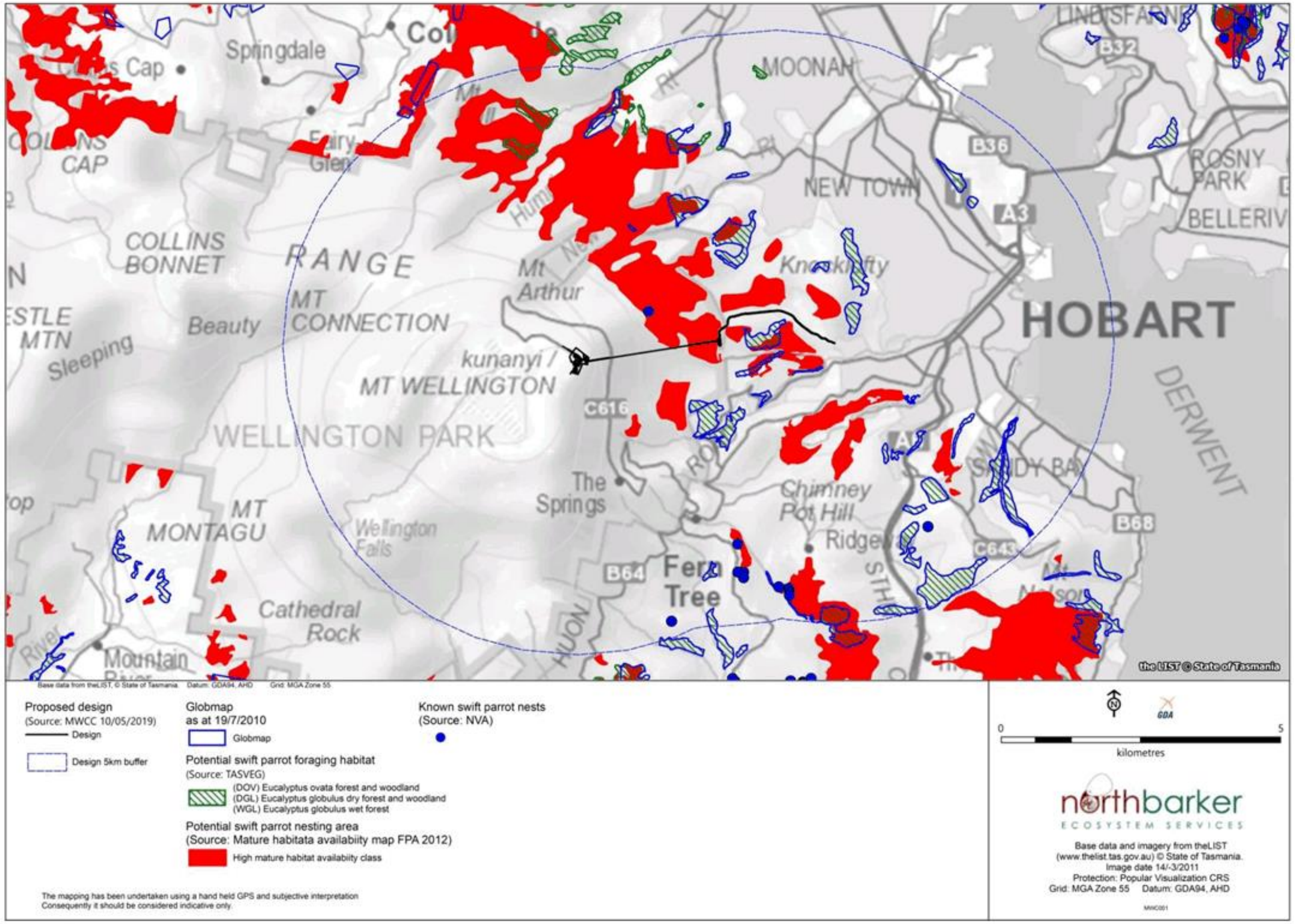


**Figure 7. Distribution of potential swift parrot foraging and nesting habitat in the vicinity of the proposed Mt Wellington Cableway.**

### 2.1.2 Risk of collision with aerial cables

Wires have not been identified as a structure that present a particular collision risk to swift parrots[27]. Potentially, a species which is adapted for flying through the canopy and manoeuvring to avoid impacts from natural habitat obstructions (e.g. limbs and trunks) is able to effectively avoid even narrow-gauge wires such as those used for domestic power lines. The cables used for the cableway are of significantly larger dimensions than power lines and bundled in threes, and so should be obvious (highly visible) and easily avoided. We consider the collision risk to be low between the Base Station and tower 1 and then reducing further to an insignificant level as it separates above the forest canopy.

### 2.1.3 Risk of collision with Pinnacle Centre building

The pinnacle area does not support foraging or nesting resources for swift parrots. The risk of collisions from localised movements between resources is thus non-existent. However, the lower slopes of Mt Wellington contain foraging and nesting resources for this species (Figure 7), which means that individual birds and flocks could traverse the pinnacle area during sub-regional (or greater) movements between habitat patches. For long distant flights birds have been shown to take a high flight path trajectory. However, given the proximity to the pinnacle it is possible that birds following a direct route 'over the top' could approach close to ground level at the pinnacle. It may be, however, that birds prefer to hold the contour and so fly around the mountain between resources. Largely this is conjecture and would require utilisation studies to provide greater certainty.

However, based on the distribution of potential habitat, and the absence of observation records of swift parrots from the pinnacle area on the Tasmanian Natural Values Atlas[28], we conclude that the area of the Pinnacle Centre appears to be an unlikely flight path. Based on this, and the general collision risk assessment for the building in section 1.1.1, the collision risk to swift parrots posed by the Pinnacle Centre is low.

## 2.2 Tasmanian wedge-tailed eagle (*Aquila audax fleayi*)

Collisions with transmission lines and helicopters are known risk factors for wedge-tailed eagles[29]. The population of wedge-tailed eagles in Tasmania is small and the cumulative impact of mortality from collisions with human infrastructure (in conjunction with disruptions to breeding caused by human disturbance) may represent a serious threat to the persistence of the species in Tasmania[30].

Pairs of eagles defend large territories and are typically highly sensitive to disturbance of nesting sites during the breeding season. Novel disturbance occurring even hundreds of metres from a nest site may cause breeding eagles to temporarily desert eggs and chicks, or even to abandon a nest site for many years. They require large trees capable of supporting their massive nests, usually eucalypts, in sheltered aspects typically high in a gully. Viable nesting habitat (in terms of vegetation structure and topography – Figure 8) occurs in the wet eucalypt forest north of the Base Station area in the upper catchment of McRobies Gully. However, the proximity to the noise and activity of the landfill site, and periodic disturbances

[27] Pfennigwerth (2008)

[28] At the time of writing there is only one observation record on the NVA attributed to the pinnacle area for the swift parrot; this record is from 1984 with a spatial accuracy of 2000 m – the actual observation thus may well have been in the habitat downslope

[29] Threatened Species Section (2019), *Aquila audax* subsp. *fleayi (Tasmanian Wedge-tailed Eagle): Species Management Profile for Tasmania's Threatened Species Link*

[30] Department of the Environment (2019). Aquila audax fleayi *in Species Profile and Threats Database*, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed 18/09/2019

from cyclists and walkers on the fire trail, suggest the area is unlikely to be favoured for nest establishment.

The species is known to occur within the vicinity of the proposal area. The nearest known nest site is 4.2 km away from the proposed development, located north of the Wellington Range (Figure 9). According to records obtained from the Tasmanian Natural Values Atlas (NVA) (accessed 12/09/2019) this nest was last observed in 1985. Additional nests located approximately 6 km to the south and west of the site were present in 2014 and 2010 respectively according to records. The data suggest that there has not been a survey for nests for a considerable time in this eastern half of the Wellington Range.

### 2.2.1 Collisions with aerial cables

Collisions with aerial cables are recognised as a major threat to the Tasmanian wedge-tailed eagle[31], with collisions and electrocutions caused by overhead powerlines a significant source of mortality. In the financial year 2017-18, 29 wedge-tailed eagles were found dead beneath Tasmanian powerlines[32]. The cause of death in each case (electrocution or collision) was not disclosed. In 2018-19 TasNetworks reported 24 incidents of threatened birds being killed or injured following collision with their infrastructure[33]. It is likely that more birds died but were not discovered, due to a lack of systematic searches, imperfect detection by observers, the phenomenon of crippling bias (where injured birds travel some distance away from the impact site before dying, thus escaping detection[34]), and because bird carcasses may be scavenged or degrade before detection[35]. Similarly, electrocutions causing power outages are more likely to be detected than collisions that do not interrupt power supply.

The wedge-tailed eagle is a large-bodied bird that employs soaring flight to travel large distances. Radiotelemetry studies on other species of eagles have shown that they disproportionately use landscape features that generate lift. For example, rugged terrain, steep slopes and cliffs generate orographic lift, as air flows are deflected upwards; subsequently, these areas are disproportionately used by eagles[36]. Similarly, to exploit the same effect of the wind, eagles and other birds engaged in long distance movement also frequently fly parallel to or along landscape features such as ridges and cliff lines[37]. Eagles have been found to fly closer to the ground when overflying cliffs and ridgelines. For example, a study of golden eagles in North America found that tracked individuals flew on average 150 m above cliffs and ridgelines[38]. Eagles have also been shown to have concentrated activity in areas of relatively high prey densities, avoid areas with low prey density, and to frequently travel along and near forest edges[39]. All of these traits are consistent with our understanding of how wedge-tailed eagles use the Tasmanian landscape.

[31] Threatened Species Section (2006), *Threatened Tasmanian Eagles Recovery Plan 2006-2010*
[32] TasNetworks (2018), *TasNetworks Annual Report 2017-18*, Hobart, Tasmania
[33] Email from T. Webster (TasNetworks) (21 Aug 2019)
[34] Bech (2012)
[35] Ponce (2010); Barrientos (2018); Riding and Loss (2018)
[36] Sandgren (2013), Singh (2016), Fielding (2019)
[37] Katzner (2012)
[38] Katzner (2012)
[39] Singh (2016), Sandgren (2014)

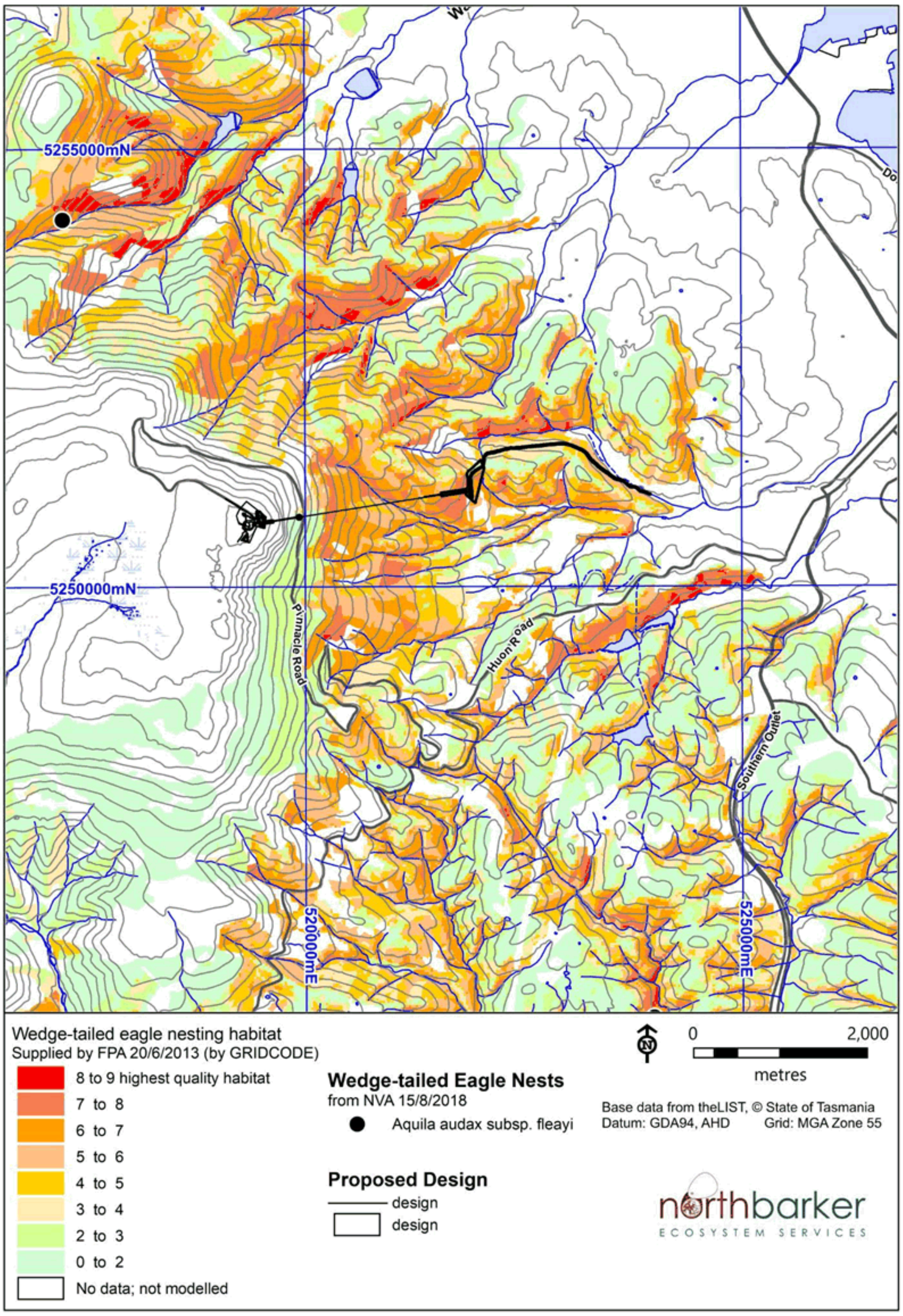


**Figure 8. Modelled nesting habitat suitability for wedge-tailed eagles in the immediate vicinity of the proposed Mt Wellington Cableway.**


Figure 9. Wedge-tailed eagle nest sites in the broader vicinity of the proposed Mt Wellington Cableway.

#### 2.2.1.1 *Potential risk from the proposal*

Based on the expected flying habits of eagles, we have assessed that the upper third of the cable span between towers 2 and 3 poses a moderate collision risk for the wedge-tailed eagle, primarily based on the fact that the cables cross a cliff line (the Organ Pipes). We expect that this area receives disproportionate flight use by eagles and the cables present a risk by intersecting with both the horizontal and vertical planes of potential flight paths along and up the Organ Pipes.

Forest edges and open areas may be preferentially used by eagles. The proposal will however not create new forest edges at a scale attractive to eagles.

Cables near nesting and roosting sites also pose risks to birds, as they can be expected to have a disproportionate amount of flying activity around those areas[40]. Based on the current distribution of known nests in proximity (5 km) to the proposal (Figure 9) and our assessment of local habitat and expected disturbance levels, an elevated collision risk from this factor is not expected from the proposal. It is noted however, that a systematic nest search within the surrounding 5 km may alter this assessment (if more nests are located). We also note that due to the locations proximity to the city of Hobart, high voltage transmission lines are already present in the vicinity of the proposed cable car location (Figure 10). As far as we know, these cables are not systematically searched for eagle mortalities and thus it is not possible to determine the present mortality rates arising from these cables. It is possible however that the addition of cables to an area that already contains cables will result in a smaller collision risk increase than installing cables in an undeveloped area lacking cables. It is also possible however, that the relative risk in such scenarios is entirely dependent on flight utilisation and other habitat variables.

### 2.2.2 Collision risk from helicopters

Helicopters will be used during construction to install towers and cables. Wedge-tailed eagles may menace helicopters while attempting to drive them from their territories. A number of close encounters and collisions between helicopters and eagles have occurred in Tasmania[41]. These collisions are usually fatal for the eagle and present a significant risk to human life. Low, slow flights involving hovering manoeuvres are considered high risk, and are more likely to be perceived as threatening by adult eagles. Eagles are particularly sensitive to helicopter flights near (within 1000 m) active nests.

Guidelines have been developed (and implemented) to manage helicopter flight paths to reduce risks to eagles and human safety[42]. We are not aware of a nominated flight path of helicopters to be used in this proposal. Due to this we cannot assess the level of risk represented to eagles by this factor, other than the to say that there is likely to be a potential risk and it will require mitigation in relation to flight paths and flight timing.

[40] Bernardino (2018)
[41] Forest Practices Authority (2007), Eagle Nest Management, Fauna Technical Note No. 1
[42] Forest Practices Authority (2007), Eagle Nest Management, Fauna Technical Note No. 1

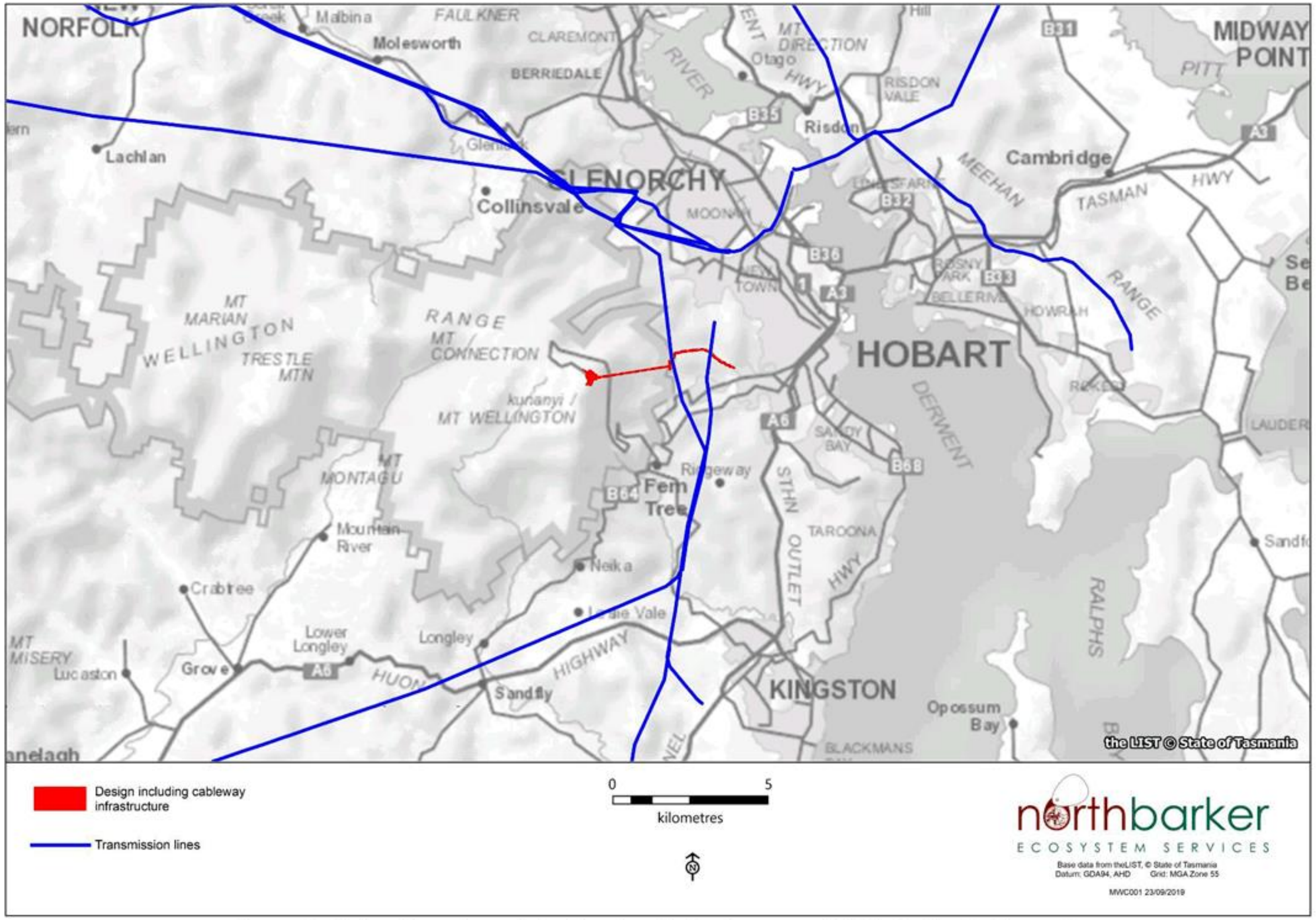


**Figure 10: High voltage transmission lines in vicinity of proposed Mt Wellington Cableway[43].**

[43] Source: ListMap

## 2.3 Masked owl (*Tyto novaehollandiae castanops*)

The species has large home range sizes and moves between forest, woodland edges and open habitats; this behaviour has been postulated to increase the risk of collisions with artificial structures (such as powerlines) due to the greater number of structures encountered as a range increases and in particular when it includes human-modified habitats[44]. Based on this link, collisions with vehicles and man-made structures, including powerlines, are considered a conservation risk to masked owls in Tasmania[45]. However, there is little or no research exploring factors affecting collision risks and rates for the species. Electrocution and collision with powerlines are significant sources of mortality for other owl species, such as eagle owls in the Swiss[46] and Italian Alps[47].

There are two records on the NVA of masked owls observed within 500 m of the Base Station and lower towers, one of which is from 2018 on a fire trail near the end of Old Farm Road. No masked owls were recorded during a three-week period of monitoring during March 2019 using a song meter placed at the saddle at the top of the proposed access road in an area considered to have the best likelihood of supporting a resident bird[48]. Nonetheless, based on the 2018 observation and habitat values, it is reasonable to assume that the area may still be utilised by the species on occasions. A resident nesting pair is possible but unlikely; there are old growth trees with the potential for supporting viable nesting hollows in the vicinity of the Base Station and towers 1 and 2. Although viable nesting hollows may be present, the wet forest in the proposal area constitutes suboptimal habitat for the species[49]. The proposed Base Station is located within an existing clearing and this area could form part of a foraging territory for the species.

With respect to potential collision risk from the proposal, the possibility of collision with the Base Station building is low, given that glazing is screened throughout the building and that a nocturnal species is unlikely to be active in light conditions most conducive to reflections and transparency. In relation to potential collision with aerial cables and towers, this is considered to be a very low risk where the cable is higher than the canopy, as this is not expected to a frequent flight zone for this species, which largely hunts below the canopy. Consequently, the span of cable that is around or below canopy level is likely to present a relatively higher risk. The risk of collisions with helicopters is considered to be negligible.

## 2.4 White-throated needletail (*Hirundapus caudacutus*)

The species is migratory, and when in Australia individuals are at risk of collision with overhead wires, wind turbines, windows and lighthouses. However, it is considered that the overall impact of collisions on population viability is low and collisions are not considered a threat to the survival of the species[50]. At a local level we consider the proposal to represents a very low risk to the species as it is relatively infrequently seen in Tasmania and is predominantly active at heights well above the proposed infrastructure.

[44] Threatened Species Scientific Committee (TSSC) (2010). *Commonwealth Listing Advice on* Tyto novaehollandiae castanops *(Masked Owl (Tasmanian))*
[45] Threatened Species Scientific Committee (TSSC) (2010). *Commonwealth Listing Advice on* Tyto novaehollandiae castanops *(Masked Owl (Tasmanian))*
[46] Schaub (2010)
[47] Rubolini (2002)
[48] North Barker Ecosystem Services (2019)
[49] Forest Practices Authority (2014)
[50] Threatened Species Scientific Committee (2019). *Conservation Advice* Hirundapus caudacutus *White-throated Needletail*. Canberra: Department of the Environment and Energy.

### 2.5 Grey goshawk (*Accipiter novaehollandiae*)

This species has a moderate likelihood of occurring within wet forest in the vicinity of the Base Station and lower cableway infrastructure. No studies examining collision risk factors for this species are available, however we consider the current proposal represents a very low risk based on the species' ecology and expected habitat use. In particular, the species is highly adept at rapidly manoeuvring within vegetation while hunting, which is likely facilitated by acute vision and natural avoidance of branches and trees, which may manifest in the same capacity to avoid non-natural obstructions.

### 2.6 White-bellied sea eagle (*Haliaeetus leucogaster*)

A species of largely coastal environments and large inland waterbodies. No nest sites are known in the vicinity of the proposal and are unlikely to be present. The species is unlikely to be present in the area with any meaningful frequency and is therefore a very low risk of collision. Recommended mitigation measures for the wedge-tailed eagle are expected to also reduce collision risk for this species in the unlikely event it may be present.

## 3 Mitigation options – monitoring and modification

A number of mitigation options are available that could reduce what we have concluded is a relatively low collision risk of the proposal as a whole. In addition, monitoring will assist in refining recommendations and ensuring the proposal maintains a low risk of collision into the future.

### 3.1 Monitor bird utilisation pre- and post-development

Although the available bird data for the area, in conjunction with habitat assessments, has been sufficient for making collision risk estimates, the process could be improved with better data on bird presence and use of the area. To address this, we recommend bird utilisation surveys (such as those applied for collision risk assessments in the development of wind farms) are undertaken from the point of approval for a minimum of two years after the cableway opens for operation, therefore capturing pre- and post-development activity levels and utilisation areas. These surveys would establish better baseline bird occupancy and habitat use data, could be used to validate bird collision risk assessments, would aid in the refinement of physical mitigation measures, and would show if birds are modifying their behaviour in response to the development. The methods and results of these surveys would need to be regulated by the relevant planning authority.

### 3.2 Complete aerial eagle nest search

Prior to the commencement of works (but not more than 2 years prior), an aerial nest search (according to the prescriptions of the Forest Practices Authority) should be conducted examining areas of suitable wedge-tailed eagle nesting habitat within the vicinity of the proposed cable path and proposed helicopter flight paths, to mitigate the possibility of disturbing eagles around their nests and the associated risks of collisions and mortalities. Any new nests discovered must be assessed for potential disturbance risk, with scope to alter helicopter flight paths for avoidance (noting that any route variation would also need to be free from risk of impacting eagles and thus require the same level of survey certainty). A more thorough understanding of the number of active nests within 5 km of the project area will provide greater confidence around our assessment of collision risk for the cableway.

## 3.3 Develop and implement helicopter use protocol

In conjunction with the results of 3.2, develop a protocol for helicopter use, including defining flight times, flight paths, and protocols to follow when an eagle is detected.

## 3.4 Implement staff training

A subset of staff at both the Base Station and Pinnacle Centre must receive recognised training in how to care for injured animals and what to do in the scenario of bird strikes.

## 3.5 Conduct regular carcass searches

The terrain and vegetation structure preclude opportunity to locate carcasses below the upper section of the cableway. The service track below the cableway route between the Base Station and tower 2 and the perimeter of both buildings should be searched weekly for dead birds (by staff trained in accordance with 3.4), and records kept of species identification, injuries and mortalities. Searches must be undertaken early in the morning (prior to 9 am) to limit the likelihood of carcasses being lost to predation.

## 3.6 Install line marking in relatively high-risk areas of cable

Line marking relatively high-risk sections of the aerial cables may reduce collision risk by increasing visibility and available reaction time for birds on the wing. We have identified two areas of potentially elevated risk along the cable path (Figure 11). The first is the upper third of the span between tower 2 and 3, which is expected to be used disproportionately by wedge-tailed eagles. The second area is the span between the Base Station and tower 2, where the cable passes through or just above the canopy and thus can be expected to pose a possible collision risk to the masked owl as well as general woodland birds. Immediately upon construction, both of these areas should have line marking devices installed, such as the flappers which are widely applied on sections of powerlines throughout Tasmania.

## 3.7 Assess monitoring and mitigation measures

Two years after the commencement of operations, the bird utilisation surveys and carcass search data should be independently assessed and a report produced to outline the evident collision impacts in comparison to the initial risk assessments, the efficacy of mitigation measures, the scope for further mitigation measures if warranted, and the consideration of offsets for any residual impacts. Any new research published in that time can also be considered for relevance, such a pending investigation of eagle flight paths using GPS tracking.

Regulation of this assessment and any subsequent recommended actions would fall to the relevant planning authority.

## 3.8 Apply contingencies if warranted

Potential contingencies exist to improve mitigation measures if the assessment under 3.7 demonstrates initial measures are failing. These include screening additional windows on buildings, reducing the potential for reflections and transparencies on windows by adding decal layers of tint or opaque shapes, and adding line markers to additional areas of the cable found to be relatively high-risk.

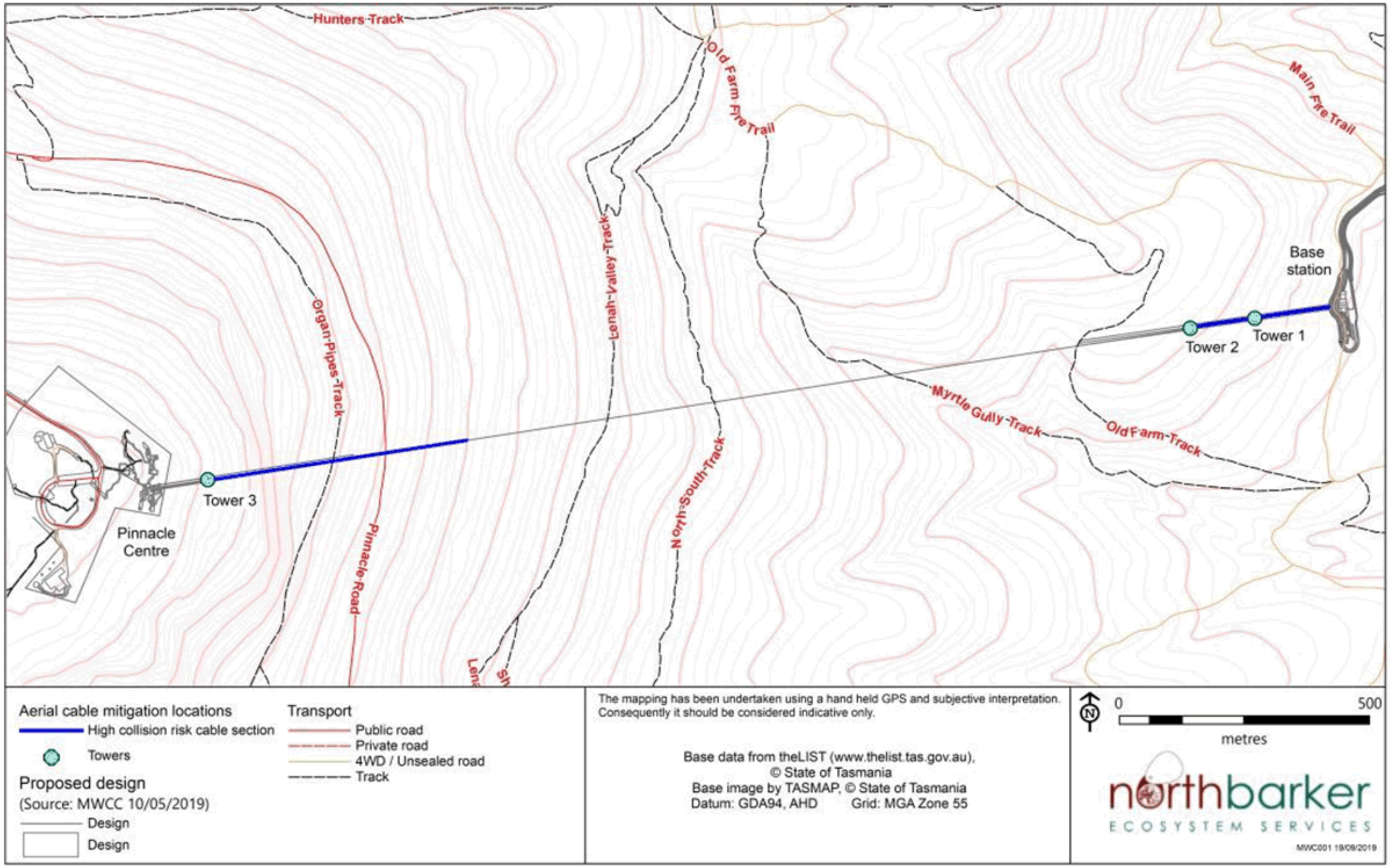


**Figure 11. Relatively higher risk sections of cableway.**

# 4 Conclusion and list of recommendations

The Proposed Mt Wellington Cableway introduces a range of novel infrastructure into a natural and predominantly vegetated landscape, utilised by a range of fauna species including several listed threatened birds which are recognised as being vulnerable to collision mortality with built infrastructure. We have assessed the locations and design of the Pinnacle Centre, Base Station, cableway and associated towers. We identify several elements in the project were there is an elevated risk. These include the vicinity of the Organ Pipes for wedge-tailed eagles and the vicinity of Base Station to tower 2 for the swift parrot.

We conclude that the risk is low to moderate overall and propose a suite of mitigation measures to reduce this risk to acceptable levels:

- Design and implement bird utilisation survey.
- Complete aerial eagle nest survey.
- Develop and implement helicopter use protocol.
- Implement staff training.
- Conduct regular carcass searches.
- Install line marking in relatively high-risk areas of cable.
- Assess monitoring and mitigation measures.
- Apply contingencies if warranted.

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Andrew North
Principal Ecologist
North Barker Ecosystem Services
163 Campbell Street
Hobart TAS 7000

Dear Andrew,

**CABLEWAY HEIGHTS RELATIVE TO NATURAL GROUND LEVEL**

As requested, I have deduced a series of approximate heights of the cables associated with our proposed tramway every 100m or so between towers 2 and 3.

The data in the attached table is based on the approved line profile designed for us by Doppelmayr Garaventa; *MWCC_ATW Line Profile Longitudinal Section Garaventa (2018)*.

This line profile drawing shows the maximum sag and chord length between fixed points and I suggest the table is read in conjunction with this drawing. The chord length line should not be considered minimum sag levels (i.e max height of cable) due to the mass of the cable themselves will cause sag under their own weight. (even without the weight of a tramway cabin).

One way to understand the variability of the cable height is to consider, during operation, the cables slowly rise and fall from their static state position as they compensate for the weight of the cabin at any position along the tramway line.

Doppelmayr confirm that such questions regarding the variable cable height have never been asked for by a client for the purposes of satisfying a planning authority. Discussing a more realistic non-cabin weight sag height along the length of the tramway, Doppelmayr have calculated the minimum sag line is around a quarter of the distance between max sag and the chord length line.

I have attached this longitudinal profile and provided such measurements in the attached table. Note these are approximate deduction but I believe based on our discussions this is sufficient for your purposes.

Please refer to the two letters received from comparable Australian operators, Scenic World NSW and Arthur's Seat Eagle VIC, explaining their experience with and/or mitigation strategies regarding the protection of avian species.

mwCC

| Location description / + distance | Longitude (m) | NGL Altitude (m) | Min Height of cable above NGL with cabin weight (max sag) (m) | *Approx. extra cable height without cabin weight (min sag) (m)* * | Max Height of cable above NGL (m) |
|---|---|---|---|---|---|
| Tower 2, + | 357 | 405 | 55 | *0* | 55 |
| 35 | 392 | 410 | 49 | *3.5* | 52.5 |
| 150 | 542 | 410 | 57 | *15* | 72 |
| 72 | 614 | 405 | 70 | *20* | 90 |
| 83 | 697 | 415 | 74 | *24.5* | 98.5 |
| 106 | 803 | 440 | 70 | *29* | 99 |
| 91 | 894 | 440 | 91 | *32.5* | 123.5 |
| 108 | 1002 | 430 | 130 | *36* | 166 |
| 99 | 1101 | 480 | 109 | *38.5* | 147.5 |
| 97 | 1198 | 525 | 95 | *39.5* | 134.5 |
| 105 | 1303 | 565 | 93 | *40.5* | 133.5 |
| 98 | 1401 | 620 | 77 | *40.5* | 117.5 |
| 94 | 1495 | 655 | 77 | *40* | 117 |
| 107 | 1602 | 700 | 79 | *38.5* | 117.5 |
| 98 | 1700 | 745 | 80 | *36.5* | 116.5 |
| 102 | 1802 | 795 | 81 | *34* | 115 |
| 102 | 1904 | 850 | 80 | *30.5* | 110.5 |
| Pinnacle Road | 2003 | 900 | 86 | *26* | 112 |
| 98 | 2101 | 960 | 87 | *20* | 107 |
| < Organ Pipes | 2203 | 1020 | 96 | *12.5* | 108.5 |
| > Organ Pipes | 2300 | 1170 | 17 | *4.5* | 21.5 |
| Tower 3 | 2350 | 1225 | 35 | *0* | 35 |

**Deduced figures measured from scaled line profile*

I trust this information assists your report.

Adrian Bold
Executive Director

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Re: Bird Strikes around Cable Cars

21/07/2019

To whom it may concern,

Scenic World which is located in the Katoomba, NSW has been operating the Scenic Skyway cable car (384m long) across the Jamison Valley since 1957 and the Scenic Cableway (510m long) which travels into the Jamison Valley since 2000. Both these ropeways have 4 ropes (2 large and 2 small) which travel the length of the ropeways.

Mount Wellington Cable Car has inquired as to whether there have been any issues with bird strikes to our cable cars (ropes or cabins).

In the time we have been operating the rides we have had no incidents of bird strikes into either the cables or cabins to our knowledge. Given that we operate 365 days a year and our cabins are manned by an operator if there were ongoing issues with bird strikes, our staff, who are generally very passionate about the environment would be making us aware so that we could take action around it.

I would be happy to answer further enquiries regarding this matter.

Kind Regards

Anthea Hammon

Managing Director
Scenic World

**31 July 2019**

**Mr Adrian Bold**
**Director and Project Lead**
**Mount Wellington Cable Car**

**Re: Arthurs Seat Eagle Interaction with Native Birds**

The Arthurs Seat Eagle Cable Car is located in Arthurs Seat State Park on Victoria's Mornington Peninsula. The park is home to a diverse range of native birds including: Kookaburras, King Parrots, Rosellas, Cockatoos, Southern Emu-Wrens, Lewin's Rails, Powerful Owls and of course, our namesake the Wedge-tailed Eagle.

The Eagle's Management team work closely with Parks Victoria to ensure the diverse native fauna and flora of the Park is protected. Soon after construction native birds returned to the lift easement, and now happily feed in our native gardens. To ensure the habitat of the native birds and animals is kept as pristine as possible staff from the Eagle regularly removes weeds and rubbish from the state park. Eagle team members have also been proactive in the rescue of and successful release of injured native birds from nesting from the surrounding. Our staff have a keen interest in saving and assisting any native animal in the Park which otherwise would be left to fend for itself if not seen by Park Rangers.

The lift has no issues with the native birdlife in the park and The Eagle has been proactive in reducing the risk of any bird incidents. Some of the preventative initiatives include:

- Maintaining habitat trees in the Lift Easement
- Installation of mesh guard to prevent birds nesting on towers
- Installation of flags to prevent Kookaburras riding the wire rope
- Use of Artificial Owls to deter birds from entering stations (talking owls are the best)
- Use of Eagle kites to reduce interactions with birds at our summit station windows

The Management and staff of The Eagle feel privileged to be located in the Arthurs Seat State Park and will continue to make every effort to protect native birds and their habitat. For further information on the Arthurs Seat Eagle please refer to our website https://aseagle.com.au/.

Kind regards

**Madonna Walters**
General Manager
Arthurs Seat Eagle
www.aseagle.com.au

EAGLE
ARTHURS SEAT
MORNINGTON PENINSULA
@ArthursSeatEagle

Gold Winner 2017 RACV Victorian Tourism Awards
2017 Bronze Australian Tourism Awards
2017 Certificate of Excellence tripadvisor
2018 Certificate of Excellence tripadvisor
2019 Certificate of Excellence tripadvisor

# MOUNT WELLINGTON CABLE CAR: ECONOMIC IMPACT

A comprehensive report on the broader economic impact of the current Mount Wellington Cable Car proposal and its implications for the tourism industry in Southern Tasmania

MAY 2016

mwcc
HOBART | TASMANIA

STRATEGY 42 SOUTH

**SAUL ESLAKE** ECONOMIST www.bettercallsaul.com.au

4/5/2016

## To Whom It May Concern

In my opinion, the Mount Wellington Cable Car Economic Impact Report prepared by *Strategy 42 South* has used plausible, conservative assumptions and a sound, robust methodology to estimate the economic impact of the Mount Wellington Cable Car project.

The Report identifies the pitfalls commonly experienced in undertaking assessments of this nature, and has taken conscious steps to avoid making them in this exercise. While all assessments of this nature are inherently subject to arrange of uncertainty, readers and users of this Report can be confident that its author has taken reasonable steps to avoid inflating the benefits of or under-stating the costs associated with the Mount Wellington Cable Car project.

On the basis of this report, I believe that the Mount Wellington Cable Car project is worthy of serious consideration by business leaders, local and State government officials and elected representatives, and the Hobart and Tasmanian communities more broadly, with a view to allowing it an opportunity to proceed on a commercial basis.

Regards,

Saul Eslake
Economist

## CONTENTS

## QUALIFICATIONS

This report was commissioned by Mount Wellington Cableway Company Pty Limited (the Company) and considers the economic impact of the Mount Wellington Cable Car (MWCC) project and a number of key parameters in the context of the growth of tourism in Southern Tasmania.

This study has been conducted independently and at arms-length from the Company. There is no financial relationship between the author and the Company.

This study is not intended to be a critical review of the Company's financial analysis or parameter assumptions. Accordingly, it is necessary to rely on confidential data provided by the Company and its advisers. However, discussions with the Company (including management and Board members) and its advisers, combined with external verification where possible, have underpinned an assessment that the data provided were robust and supported by the experience attained by the operators of similar assets in other jurisdictions.

Strategy 42 South understands that this report may be released to specific stakeholders or publicly. Any external audiences should acknowledge that the report has not been subject to any specific industry consultations other than those facilitated by the Company.

The report should not be used for any other purposes unless authorised by Strategy 42 South or the Company.

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Phil Bayley
Principal, Strategy 42 South
Hobart, Tasmania

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## EXECUTIVE SUMMARY

There are several approaches to measuring the impact of major projects or business activities, which are based on the contributions of specific sectors to the overall economy. Of the various approaches, multipliers that measure the direct and indirect effects of additional expenditure on the broader economy, based on published input-output tables, are appropriate for a study of a greenfield tourism project such as the Mount Wellington Cable Car. While this is generally the best approach, there are a number of limitations — such as the risk of overstating economic benefits and the impact of imported goods and services that offset these benefits — that must be recognised in quantitative analysis.

In the context of these limitations, this study applies economic multipliers with appropriate degrees of caution, and in some instances, a conservative approach to modelling parameters. The multipliers used in this study are generally consistent with the lower end of estimates contained in a number of studies of the economic impact of tourism in Tasmania and nationally, which suggest that, for every new dollar earned directly in tourism, between 75c and 90c is also generated in other parts of the economy.

Development of the MWCC will occur at a time of strong growth in the Tasmanian tourism sector, with visitor numbers growing by 8 per cent per annum, the length of visits increasing and 11 per cent growth in visitor spending.

However, the Tasmanian economy is very diverse, more so than is often recognised, and there are several sectors that are in decline. Overall, Tasmania's economy has entered a period of sustained, but modest, growth over the past three years which is largely driven by the private sector instead of the public sector. However, this economic performance is yet to translate into consistent employment growth.

In a longer term perspective, structural changes mean that there is a mismatch between the skills and demographics of workers displaced from declining sectors, such as manufacturing, and those of growth industries, such as hospitality and tourism.

As a consequence, tourism-focused projects such as the MWCC — particularly if they are able to induce additional demand or longer stays — have the potential to grow local employment and improve youth unemployment, although they are unlikely to address the State's broader structural unemployment issues.

To analyse MWCC's economic impact, this study separates the respective spending and multiplier effects for the following key markets:

- local patrons riding to the pinnacle on the cable car
- free and independent travellers
- patrons who purchase tickets sold by MWCC through wholesale package channels
- mountain bike (MTB) enthusiasts
- other visitors (local, interstate and international) taking themselves to the Mount Wellington pinnacle, mostly driving.

Instead of projecting future growth rates, three scenarios are presented in this report: an estimate for **year 1** — reflecting industry experience that demand is higher in that year due to a novelty factor, particularly amongst local residents — and a **low case** and a **high case** that are both based on estimates for a standard operating year.

With this approach, the study implicitly assumes that a steady state exists after two to three years and three key variables are constant — MWCC's patronage, the number of visitors to southern Tasmania and MWCC's capture of these visitors. This assumption is likely to be highly conservative.

Industry experience supports two areas where the MWCC would induce additional visitor spending — an extra night for some free and independent travellers and increased visitation from MTB enthusiasts. Other than these cases, it is assumed that MWCC does not, in itself, drive new demand.

In particular, no allowance is made for other pull factors that may eventuate, most likely based on positive visitor experiences and word of mouth. Given Hobart's accommodation is effectively full during peak seasons and around major festivals, the clearest opportunity for the MWCC to create a pull factor for free and independent travellers is in other seasons, particularly winter.

Given this conservative approach, multipliers are only applied to spending at MWCC facilities (ie fares, retail and F&B) reflecting the direct and indirect impacts of this spending, as well as a separate multiplier for spending on transport to Mount Wellington.

In its first year of operation — with a significant boost in riders relative to standard operating years, partly offset by parameter assumptions that are aligned with the low case scenario — the economic impact is estimated to be $64.0 million.

In later years, it is estimated that the economic impact of the MWCC will be between $79.4 million and $99.8 million per annum under the low and high case scenarios respectively.

The difference between the two scenarios largely reflects estimates of the impact of MTB enthusiasts. In the low case, [redacted] MTB enthusiasts are assumed to use the MWCC per annum, with a potential economic impact from this market of $[redacted]. In the high case, [redacted] MTB enthusiasts visit per annum, delivering a potential impact of $[redacted]. As the economic gains from MTB enthusiasts reflect increased spending on accommodation and hospitality in the local economy, the benefits will spread quickly and broadly throughout the community.

These estimated economic impacts of the MWCC for the respective market segments under each scenario are summarised in Table A.

**Table A: Economic impact of MWCC ($m)**

| | Year 1 | Normal operations | |
|---|---|---|---|
| | | Low | High |
| Local | [redacted] | [redacted] | [redacted] |
| Free & independent | [redacted] | [redacted] | [redacted] |
| Wholesale | [redacted] | [redacted] | [redacted] |
| MTB enthusiast | [redacted] | [redacted] | [redacted] |
| Other visitors | [redacted] | [redacted] | [redacted] |
| Total | 64.00 | 79.47 | 99.91 |

The Company is currently estimating core employment levels of [redacted] FTEs. At this employment level, the Company would be liable for payroll tax if its total payroll exceeds $1.25 million. Future decisions on the structure of retail and food and beverage offerings, and staff wages and salaries, will influence whether its liability is material. For instance, it is currently estimated that [redacted] FTEs would be required to internally manage and operate the cable car and all of the retail and F&B operations, which would mean annual payroll tax payments of around $[redacted] based on an average wage of $[redacted].

## 1. ECONOMIC CONTEXT OF THE MOUNT WELLINGTON CABLE CAR

### Social and economic context

Tasmania's economy has entered a period of sustained, but modest, growth over the past three years. State final demand grew by 1.8 per cent in calendar year 2015 relative to the previous year.

A positive feature of the recent economic trend has been the rebalancing between from the public sector to the private sector. Final demand (including consumption and capital spending) in the public sector fell by 2.7 per cent in real terms in 2015, whereas it rose by 3.3 per cent in the private sector.

Further, capital spending in Tasmania grew by 5.5 per cent in 2015. In contrast, weak business investment is a persistent concern at the national level for the Reserve Bank of Australia. Tasmania is the only jurisdiction in which forecasts of investment activity are actually being realised.

However, sustaining this capital spending growth will be a challenge, particularly if investor confidence declines due to external factors such as slowing global growth and a potentially higher AUD.

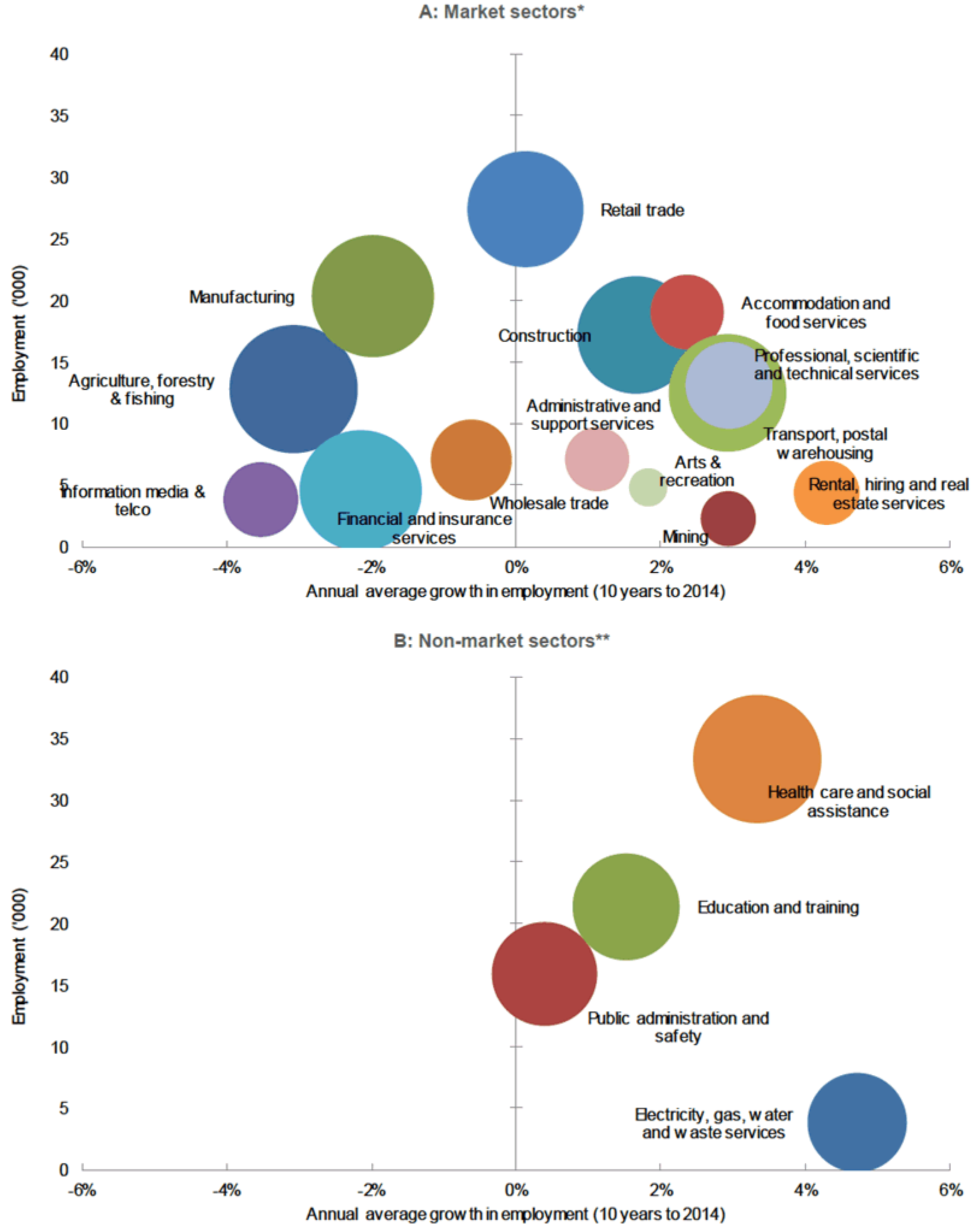
Another economic challenge is that the sustained growth rates, particularly in the private sector, are not consistently delivering new jobs across the State. Broadly, the North-West and West Coast have had the best performing labour market of Tasmania's regions, Greater Hobart has been flat (with some rebalancing from the public to the private sector), and Launceston and the North-East have been declining.

Underlying these regional trends is a complex web of industry growth and decline, which is shown in a longer-term perspective in Figure 1. Even within the broad sectors shown, there are significant changes, for instance falling employment in telecommunications more than offsets growth in information technology.

Figure 1 also demonstrates that the Tasmanian economy is very diverse, more so than is often recognised, as shown by the number of sectors with similar employment and industry contributions to the economy. A consequence is that there is not any single sector, or project, that can drive future growth.

Instead, it is important to continue to grow those sectors in which Tasmania is performing well — including tourism which mostly impacts directly through accommodation and food services — and ameliorate the decline of other sectors to the extent possible.

Figure 1: Industry structure of Tasmania's economy
(Bubble size is industry value added contribution to 2013-14 Gross State Product)




* Industry sectors that primarily involve an exchange of goods or services in organised markets.
** Industry sectors that are primarily funded by the public sector or enable other economic activity
Source: ABS Cat No. 6291 and 5220

**Table 1** shows the labour force status of Hobart's residents in 2015.

Table 1: Labour force status (2015 average)

| | Greater Hobart | | Tasmania | |
|---|---|---|---|---|
| | Persons | Per cent of population 15+ | Persons | Per cent of population 15+ |
| Employed full-time | 67.8 | 37.8 | 154.9 | 36.7 |
| Employed part-time | 38.2 | 21.2 | 85.4 | 20.2 |
| Unemployed | 7.0 | 3.9 | 16.9 | 4.0 |
| Total in labour force | 113.0 | 62.9 | 257.2 | 60.9 |
| Not in labour force | 66.6 | 37.1 | 165.2 | 39.1 |

Source: ABS 6291.0.55.001 - Labour Force, Australia, Detailed - Electronic Delivery

Cafes, restaurants and takeaways comprise about 5 per cent of Hobart's workforce, and just over 4 per cent across the State. Education, health and government administration are all significant sectors in Hobart.

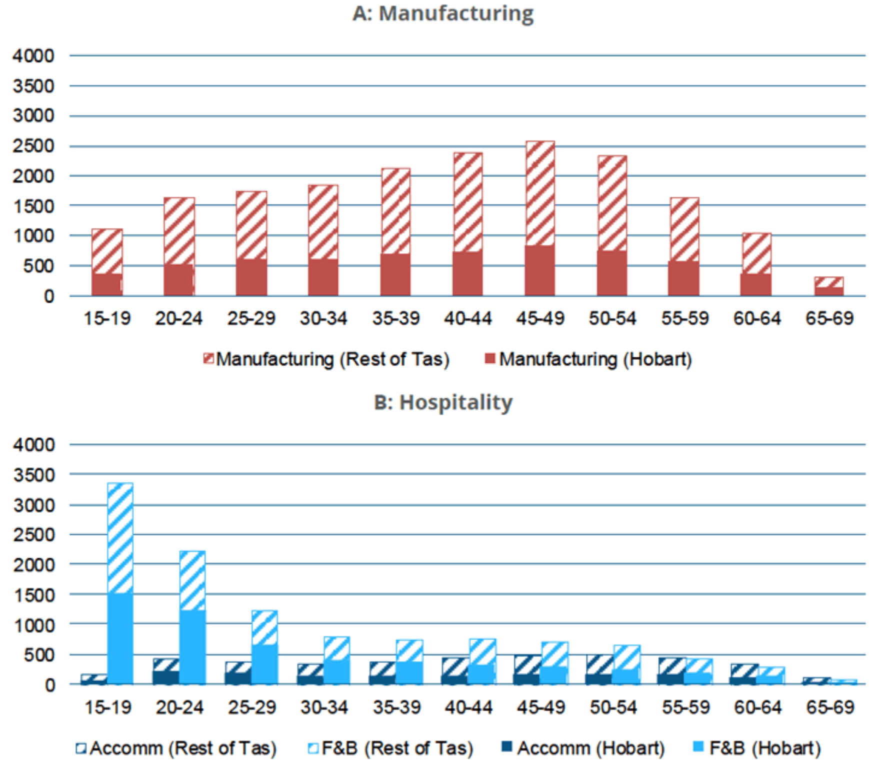
The growth in the Tasmanian tourism sector and many individual success stories are well known. The Tasmanian visitor survey data for the December quarter 2015 show that, over the past year:

- the number of visitors rose 8 per cent (including 11 per cent from all overseas countries and 14 per cent from China)
- nights spent in Tasmania rose 8 per cent
- visitor expenditure increased by 11 per cent to $1.95 billion.

However, like any structural change, there is a generally a mismatch between the skills required and workforce demographics in the growing industries, such as tourism, relative to the declining industries. This is demonstrated in Figure 2, which shows that:

- the manufacturing workforce — which remains a significant sector but is declining — is heavily skewed towards older age groups and predominantly located outside Greater Hobart
- the hospitality workforce, particularly food and beverage services, is dominated by younger age groups and roughly evenly split between Hobart and the rest of the State.

**Figure 2: Sectoral employment by age**




Source: ABS 2011 Census of Population and Housing

As a consequence, tourism-focused projects such as the MWCC — particularly if they are able to induce additional demand or longer stays — have the potential to grow employment through the direct and indirect effects. However, it is more likely that many of the jobs will be taken by newer entrants to the workforce — such as school leavers and recent graduates — than displaced workers in declining sectors. This has the potential to improve labour market outcomes at a local level around Hobart and amongst younger cohorts, but not necessarily the State's broader structural unemployment issues.

In the current economic environment, a key factor to sustaining business confidence and growth in the private sector is visible progress on key projects.

The MWCC will fit into the broader theme of the growth in tourism in Tasmania, and add to visitor experiences, as well as providing the visibility of a successful entrepreneurial project to other potential investors in Tasmania.

## 2. BACKGROUND TO ECONOMIC IMPACT STUDIES

### Options

There are several approaches to estimating the economic impact of major projects or business activities. These are well-established, and focus on isolating the contributions of specific sectors to the overall economy. For a greenfields tourism project, the key techniques are input-output analysis and computable general equilibrium modelling.

### Input-output analysis

Multiplier effects are widely used in economic analysis to demonstrate the effect of different policies or contributions to the economy, focusing on quantifying the impacts on a defined region or community within a known and generally robust framework. They show how $1 of additional expenditure contributed to key economic outcomes, including GSP and employment, both directly and indirectly through links with other sectors.

These multipliers are based on input-output tables published by major statistical agencies, such as the Australian Bureau of Statistics, or derived through quantitative analysis from similar sources.

This analytical approach can be applied to:

- construction projects
- ongoing operations of discrete businesses
- whole industry sectors, or
- major events.

Multipliers reflect the direct, indirect and induced effects from increased spending associated with one of these triggers:

- **Direct effects** are changes in production that are connected with immediate effects of increasing expenditure. This includes the consumption of goods and services, which cover the cost of supplying those goods and services (including overheads such as salaries and taxes)
- **Indirect (secondary) effects** are those changes in production resulting from the direct consumption in connected parts of the supply chain ie increased sales of goods and services amongst all the suppliers that ultimately lead to the final products being sold.
- **Induced effects** describe those changes in economic activity that result from the spending of employee incomes throughout the community.

The total of these effects is known as the output, or production, impact. For more detailed analysis than presented in this report, this impact can be disaggregated to look at the allocation of the gains, including increases in profits (ie return on capital) and wages (ie return to labour).

A Productivity Commission Staff Research Note (Gretton, 2014) specifically reviewed the application of input-output analysis. It found that:

> Input-output data and tables on which multipliers are based may be extremely useful in economic analysis. They can provide valuable information about the structure of economies that is not available from other frameworks. Used appropriately, input-output tables provide a powerful tool for reporting and analysing the industrial structure of an economy. They also form the foundations for constructing a range of economic models which, with due attention to their underpinning assumptions, can be used to more properly assess the impacts of policy changes

The Victorian Auditor-General has also considered the application of input-output analysis. The report on *State Investment in Major Events* (Pearson, 2007) noted the regional dimension to the approach:

> The size of the multiplier for a region is dependent upon the extent to which the expanding industry draws its inputs from the region rather than through imports, and the degree to which additional income from increased employment is spent on goods produced in the region.

Both the PC and the Victorian Auditor-General highlighted a number of limitations:

> Abuse [of these techniques] primarily relates to overstating the economic importance of specific sectoral or regional activities. It is likely that if all such analyses were to be aggregated, they would sum to much more than the total for the Australian economy. Claims that jobs 'gained' directly from the cause being promoted will lead to cascading gains in the wider economy often fail to give any consideration to the restrictive nature of the assumptions required for input-output multiplier exercises to be valid. In particular, these applications fail to consider the opportunity cost of both spending measures and alternate uses of resources, and may misinform policy-makers. (Gretton, 2014)
>
> The IO approach :
>
> - assumes that labour and equipment are, in effect, unemployed with no constraints on their availability which can lead to a tendency to overstate economic value
> - assumes that a static relationship exists between inputs and outputs. In practice the economy is dynamic with significant changes occurring in such factors as productivity through changes in production technology, new product development and external competition
> - is unable to incorporate price changes and their effects such as an increase in the costs of labour as a consequence of the increased demand.
>
> The IO approach is further constrained by the high level of discretion that can be applied when disaggregating national tables to a state and regional industry level where these local levels of data are not available. (Pearson, 2007)

It is also important to recognise that increases in economic activity will, to varying degrees, involve an increase in demand for imported goods and services, known as leakage. In the tourism sector, the key factor is the strength of local supply chains.

However, where it can be assumed that a project or event is sufficiently large to estimate a material economic impact, but not too large in a specific region to change the overall flow of resources or involve financial intervention by a government, many of these weaknesses are overcome with careful treatment and appropriate conservatism.

### *Tourism multipliers*

Economic multipliers are often applied to tourism projects, major events and the entire sector. Examples focusing on tourism that are relevant for this study include:

- a national study for the Australian Government (Kookana, 2013) looked at sectoral contributions, focusing on the contribution of the tourism sector to the Australian economy. The report found that the tourism sector has an economic multiplier of 1.88, which is comparable to other services sectors that have reasonably high multipliers (eg professional services and ICT sectors at 1.953 and 1.839 respectively)
- a study for Tourism Tasmania and Destination Southern Tasmania, REMPLAN (Nichol, 2013) applied a multiplier of 1.90 for tourism in Southern Tasmania, compared to a Statewide multiplier of 2.10; and
- the Institute of Project Management estimated that the economic impact of attracting three AFL games to Hobart was $26.8m, including direct spending totalling $15.32m, which implies a multiplier of 1.75.

To summarise, these reports suggest that, for every new dollar earned directly in tourism, between 75c and 90c is also generated in other parts of the economy.

Gretton criticised Kookana's paper as an example of failing to consider scarce resources and opportunity costs, and also noted that "tourism as conventionally defined, includes people travelling for recreation as well as people travelling for business, study, medical treatment and other non-leisure activities" and that there was a risk of double counting as tourism is not a defined industry in ABS data.

However, REMPLAN appears to have addressed most of these criticisms, by isolating the contribution of tourism in broader industry groupings, despite finding a similar multiplier effect to the other studies.

### CGE modelling

Computable general equilibrium (CGE) modelling is an alternative approach that recognises the complex interactions occurring in the economy, for instance the process of producers of goods and services seeking to maximise profits while consumers seek higher quality or lower prices.

CGE modelling captures how "shocks" to the economy (such as a major investment) change relative prices and the pattern of economic activity until all markets reach a new equilibrium. The CGE approach specifically models business and household demand for goods and services, relative price changes and substitution effects (e.g. equipment for labour).

This is a dynamic approach — reflecting the relatively slow process of economic adjustment given imperfect information — and is based on the premise that all resources are constrained and full utilised in producing goods and services.

The Victorian Auditor-General also noted drawbacks in the practical application of CGE modelling, which include:

- Like IO modelling, it measures economic outcomes but does not capture all aspects of whether a project is worth proceeding with such as environmental and amenity effects.
- It is costly.
- It is only suitable for estimating the outcome of a substantial "shock". The economic advice provided to the audit indicates that [government] expenditure of at least $10 million is required before meaningful economic outcomes can be observed.
- The complexity associated with CGE model specifications and assumptions requires a high level of expertise to carry out the modelling exercise. Such expertise is limited in Australia.

#### *Application to tourism*

Deloitte Access Economics (2013) applied CGE modelling in a paper for the Tourism Industry Council Tasmania, finding that an economic shock resulting from a $1m increase in tourist spending has a net impact of less than $1m. Specifically, Deloitte estimated that the $1m shock would lead to:

- an increase of $900,000 in gross state product (GSP) initially, reducing to $700,000 as the effects of additional economic activity diminish over time; and
- a gradually diminishing employment effect of 12.46 FTE (Full Time Equivalent employment positions) initially down to 8.11 FTE in 2020.

This less than 1:1 output relationship reflects an increase in demand for tourism displacing other economic activity, as the demand for resources in one sector often comes at the expense of these resources being used elsewhere in the economy.

This should not be misinterpreted — any positive shock that has a persistent effect is a positive for the Tasmanian community.

A key difference between input-output analysis and CGE modelling is that the latter assumes that a region's resources are finite and fully utilised, in other words there is no spare productive capacity in the defined region. Given this, any economic shocks inevitably divert resources from other productive activities, which offsets the initial economic gains. This process occurs in the long-run, and as such, CGE modelling takes a long-run, whole of economy perspective.

## 3. SELECTING A METHODOLOGY TO ANALYSE THE ECONOMIC IMPACT OF THE MOUNT WELLINGTON CABLE CAR

The key question in selecting the appropriate methodology is defining what is being measured.

The objective of this study is to analyse the economic impact of the MWCC — primarily the output effect — on the regional economy of Southern Hobart, and Tasmania more broadly, over a discrete timeframe.

Typically, this effect is modelled using the input-output approach.

The earlier discussion highlighted a number of general criticisms made of the input-output approach. However, these are largely avoided in the case of MWCC:

- **opportunity costs** — the project's proponent, Mount Wellington Cableway Company, has consistently noted that it is not seeking any financial support from any level of government and is willing to negotiate lease terms for publicly-owned land at the pinnacle on commercial terms. Accordingly, there are no opportunity costs in public funding, unlike publicly-funded major events or programs;
- **scarcity of resources** — it is arguable that the current employment situation in southern Tasmania — with unemployment averaging 6.2 per cent over the year to January 2016, the labour market is not overly tight — and there is a pool of available labour to absorb the jobs (51 FTEs, including 18 FTEs in operating and maintaining the cable car during its ongoing operations);
- **displacement** — industry feedback to the Company suggests that a very large proportion of riders on the cable car will be visitors to Hobart, either free and independent travellers or on wholesale packages (including cruises). MWCC represents an option for high-value incremental spending in Tasmania, in an environment where some industry participants believe that there are insufficient attractions in or around Hobart to cater for the increasing number of visitors, particularly outside peak seasons and major festivals. As a result, visitors' discretionary spending in Tasmania may displace other options in their home markets, but is unlikely to be materially displacing spending within Tasmania.

  In the case of local users, this displacement effect is more noticeable, and accounted for with a much lower multiplier;
- **leakage** — at a high level, the supply chain for MWCC patrons is generally robust. For instance, visitors will be staying in local hotels and other forms of accommodation, eating in local restaurants and utilising local transport services (eg taxis and buses). Further, Strategy 42 South anticipates that the MWCC's retail and food and beverage offerings will be focused on higher value Tasmanian produce, which reduces the potential leakage relative to lower-value imported tourist goods and kiosk-style food and beverages. Nevertheless, as there will be some leakage from visitors' spending on retail (eg goods manufactured interstate or overseas) and F&B (eg national brand soft drinks or wine), it is conservatively assumed that average transactions are relatively small.

Some residents in South Hobart and Fern Tree — which are the suburbs that may be impacted by the MWCC — and other stakeholders have suggested that there will be a loss of amenity caused by the MWCC.

However, information on the MWCC website shows that cable car's preferred route from Cascade Brewery to the Pinnacle via Golden Gully Park will not pass any residences. Further, the forecasts of MWCC patronage and total pinnacle visitation suggest that there will be net reductions in vehicular traffic on Huon Road and Pillinger Drive and in the occasional congestion that currently occurs in winter. Nevertheless, if any genuine and material impacts are identified during the forthcoming planning phase for the project, it is anticipated that mitigating actions would be undertaken. Accordingly, no attempt has been made to quantify the perceived loss of amenity in this study.

Also, this study is not intended to analyse the long-term economic impact, taking into account the transactions and complex changes in consumer spending and incomes that would result from the MWCC. This would require CGE modelling, which is complicated and specialised as noted in section 2, and may suffer from greater degrees of uncertainty given the rapid growth in the Tasmanian tourism sector that change employment profiles and producer pricing behaviour. As a result, CGE analysis is not warranted at this stage.

Tourism also has significant social and cultural benefits because of its potential to promote understanding and international relationships. This is supported by anecdotal evidence on local operators' experience and trade and investment flows. However, while important for Tasmania as it seeks to expand its economic exposure to the growing Asian economies, analysing and quantifying these benefits are not the primary purpose of this study.

## 4. ECONOMIC IMPACT DURING THE CONSTRUCTION PHASE

The Company and its suppliers estimate that there will be up to 200 jobs on the ground during the construction period. These are:

- around [redacted] jobs involved in building the terminals and ground facilities, which will be largely local jobs, and
- around [redacted] jobs in constructing the cableway, which will be mostly high specialised interstate and European staff.

Nationally, the construction industry is estimated to have an output multiplier of 2.335x, which reflects the high degree of labour intensity in major building projects and the deep industry supply chains. However, as the input-output approach narrows down the regional focus — for instance this study is focused on MWCC's impact on the Tasmanian economy — the share of goods and services that are defined as imports from outside the specified region (ie leakage) increases.

In addition to this general principle, the MWCC website notes that major suppliers to the project include Doppelmayr/Garaventa, as the cableway engineering suppliers, and Gangloff Cabins, for the gondola cabins. These companies, including their manufacturing operations, are both based in Europe.

Further, even though a local company, Vos Construction, is the Company's partner for the ground facilities and terminals, a significant proportion of its physical inputs — such as concrete, structural steel and internal fittings — will be sourced from interstate or overseas.

Given these factors, it is clear that a large share of the capital goods for the project will be brought into Tasmania. This is a clear example of leakage effects identified in section 2 that must be accounted for when selecting an appropriate multiplier.

Accordingly, without access to detailed itemised capital expenditure estimates, no attempt has been made to specify a precise multiplier to apply to the $54 million capital cost of the project during the construction phase. Nevertheless, as a general statement, an appropriate multiplier in this case would be well below the national construction industry multiplier, and may be closer to 1.0. In other words, the economic impact of the project may be between $50 million and around $75 million.

Given this, it is more important to focus on the economic impact of MWCC's ongoing operations, which is discussed in section 5.

## 5. ECONOMIC IMPACT OF MWCC OPERATIONS

To analyse MWCC's economic impact, this study separates the respective spending and multiplier effects for the following key markets:

- local patrons riding to the pinnacle on the cable car
- free and independent travellers
- patrons who purchase tickets sold by MWCC through wholesale package channels
- mountain bike (MTB) enthusiasts
- other visitors (local, interstate and international) taking themselves to the Mount Wellington pinnacle, mostly driving.

Multiplier effects are based on the various reports on input-output modelling for the tourism sector that were discussed earlier. The selected multipliers are generally towards the low end of the possible ranges in these reports, for instance, REMPLAN's Statewide tourism multiplier of 2.10x has not been used.

### Modelling growth profiles

In the first year of operation, passenger demand is expected to be higher than later years, due to a novelty factor that has been evident in other major attractions, including cable cars.

This novelty factor is supported by the experience of the Skyrail in Cairns, where there was a surge in local patronage in the first year, particularly, local patrons who were accompanying visiting friends and relatives.

After the first year:

- [redacted]
- [redacted]
- [redacted]

[redacted]1.

For this study, it is implicitly assumed that a steady state exists after the novelty factor in the first year wanes, and three key variables are constant after two or three years — MWCC's patronage, the number of visitors to southern Tasmania and MWCC's capture of these visitors.

Given this steady-state assumption, three scenarios are presented in this report: a **high case** and **low case** based on estimates for a standard operating year, and an estimate for **year 1** reflecting the novelty factor.

This does not mean that the economic impact will necessarily be stagnant after year 1. The "standard operating year" is not forecast as a precise year kin this study, and therefore the transition from the year 1 scenario to the steady state assumptions is imprecise and may take 2 to three years.

There will also be inevitable fluctuations in total passengers, the mix of patrons and their spending patterns reflecting the broader tourism market and refinement of the MWCC business model.

This effect is shown by the experience of Skyline Enterprises, which operates the extensive tourist attractions that incorporate cableways and MTB trails in Queenstown and Rotorua, which noted in its 2015 Annual report that the "diversification of product mix has resulted in our guests staying longer, spending more on food and beverage and hasn't impacted negatively on our established products" (Skyline Enterprises Ltd, 2015). This emphasises that the initial and ongoing investment in complementary activities and high-class retail and F&B outlets are both likely to have a significant impact on visitor spending at MWCC, and through it, the broader economy.

For such a steady state to occur in practice, market factors might include sustained supply-side airline or accommodation capacity constraints, or a stagnation of marketing effectiveness on the demand-side.

These factors are unlikely to be present in the Tasmanian market, and as a result, the steady-state assumption is likely to be highly conservative. Broad factors that suggest there is potential for ongoing growth in MWCC's patronage include:

- the current growth rates in visitation to Tasmania
- near-term capacity increases in access to Hobart and local accommodation and a lack of longer-term barriers to further capacity increases, and
- the lagging impact of demand drivers such as marketing campaigns and word of mouth.

Further, as explained later in this report, MTB enthusiasts make a considerable contribution to MWCC's overall economic impact. For modelling purposes, different levels of patronage have been applied for this market in the low and high case scenarios. Consistent with the transition between scenarios, it is likely that it may take two or three years to achieve the forecast patronage levels, and possibly several years to stabilise within (or outside) this range after a period of potentially very rapid growth.

### Key parameters

Strategy 42 South has had access to commercial-in-confidence data provided by the Company and its advisers for this study. Selected parameters that contribute to the scenario analysis in this study are shown in **Table 2**, which are mostly sourced from the Company and its advisers. These are discussed in more depth later in this section.

**Table 2: Selected parameters**

| Parameter | Estimate | Source |
|---|---|---|
| Patronage mix | ▸ [redacted]<br>▸ [redacted], 10 per cent stay an extra night due to MWCC<br>▸ [redacted] | ▸ Company (inc advisers)<br>▸ Company and Strategy 42 South<br>▸ Company |
| Mountain bike enthusiasts | ▸ [redacted]<br>▸ [redacted]<br>▸ [redacted] | ▸ Dirt Art<br>▸ Company and Dirt Art<br>▸ Strategy 42 South |
| Mount Wellington visitors | ▸ [redacted] | ▸ Company |
| Staff | ▸ [redacted] | ▸ Company (inc advisers) |
| F&B capture rates | ▸ [redacted]<br>▸ [redacted] | ▸ Company (inc advisers)<br>▸ Strategy 42 South |
| Retail capture rates | ▸ [redacted]<br>▸ [redacted] | ▸ Company (inc advisers)<br>▸ Strategy 42 South |
| Average expenditure(b) | ▸ [redacted]<br>▸ [redacted]<br>▸ [redacted]<br>▸ Accommodation etc: $246/night | ▸ Company<br>▸ Company and Strategy 42 South<br>▸ Company and Strategy 42 South<br>▸ Tasmanian Visitor Survey, December quarter 2015 |

(a) Transport to MWCC
(b) Only applicable to those who purchase transport, retail and/or F&B products

## Analysis of key markets

The key markets and how they affect the selection of these parameters are discussed below.

### *Local patrons*

As shown in Table 2, local patronage is forecast to be a relatively small proportion of total riders, notwithstanding the Company's current expectation that [redacted] It is also assumed that:

- the multiplier for local patrons is 1.0, which fully accounts for potential displacement effects as any indirect gains are offset by a loss of spending on other activities, and
- both the retail capture rate and average retail spending are significantly below other visitors.

### *Free and independent travellers*

While there may be some overlap between the demographic characteristics of free and independent travellers and wholesale channel customers, they have different implications for marketing and pricing. For this study, they are treated as discrete markets, particularly as wholesale channels involve significant leakage.

It is assumed that these two groups of visitors are [redacted] of MWCC's market.

Free and independent travellers will generally pay the full fare, and as a result, they would represent the largest market segment when measured by turnover.

The steady-state assumption is challenged by the current and projected growth in visitors to Tasmania, as highlighted earlier.

In the near future, accommodation supply constraints in Hobart will be alleviated with around 1500 new hotel rooms under construction, although further capacity investment will be required in coming years.

The Government's target of 1.5 million visitors per annum by 2020 implies annual growth rates of 5.5 per cent. If current growth rates of around 8 per cent per annum are sustained, this target will be comfortably exceeded by the time MWCC commences operations.

Further, there is likely to be conservatism in projections of airline passenger movements growth (4.5 per cent per annum to 2020, then slowing slightly to around 3 ½ per cent per annum) included in the respective master plans for Hobart and Launceston Airports. (HIAPL, 2015 and APAL, 2015). Even at these growth rates:

- around 10 per cent growth is expected every two years for the next five years, or 24.5 per cent over the full five years, and
- around 10 per cent growth is expected every three years from 2020-21, or 19.6 per cent over the five years to 2024-25.

It is notable that Qantas will shortly commence its new flights to meet some of this emerging demand.

If the steady state assumption was removed, it is likely that MWCC's patronage and its economic impact would grow year-on-year, at least in line with the overall market.

Industry experience suggests that additional visitor attractions encourage a proportion of visitors to stay an extra night. Based on this, it is assumed that:

- the MWCC would initially induce 5 per cent of MWCC interstate and international patrons to stay an extra night, rising to 10 per cent of this market in the steady state scenarios, and
- expenditure for this extra night is $246 per person, consistent with the current TVS average. (Tourism Tasmania, 2013)

*Wholesale channels*

Cruises are the fastest growing tourism market segment — nationally, in 2014-15, the number of cruise visits rose by 13.4 per cent and passenger days at port rose by 23.3 per cent (Australia Cruise Association, 2015). This growth compares to 2.5 per cent for all retail travel and 4 per cent for business travel.

In this segment, there has also been a substantial change in the passenger mix, with an increasing proportion of interstate visitors occurring in conjunction with the rapid growth in overall visitor numbers.

In the most recent data (from 2012-13) available on cruise passengers arriving in Tasmania:

- 46 per cent of passengers were from interstate
- 44 per cent of passengers undertook a guided tour, the majority of which were sold on-board, and
- 91 per cent of these indicated their interest in returning to Tasmania for a holiday. (Tourism Tasmania, 2013)

The Australian Cruise Association has advised that liners utilise extensive passenger feedback to set future schedules, and Hobart is currently viewed very favourably by passengers. Reflecting this feedback, and overall market growth, the number of ships booked to visit Tasmanian ports rising from 59 in the current 2015-16 season to 92 in the 2016-17 season.

Further, newer and larger ships are being used in the Australian market each season — partly as its seasons are opposite to China, where growth is also very rapid and passengers demand the most modern ships — which means more passengers are arriving in Tasmania on average per ship. This increases the size of MWCC's potential market that is available via wholesale channels.

The MWCC will also be highly relevant to the cruise market in Tasmania, as increasing economies of scale are necessary to satisfy demand from large numbers of passengers, which raises the importance of large scale attractions. It is also important that destinations continue to invest in the local product — MWCC would be a prime example of this product in Hobart — particularly given ongoing competition between major ports that can be accessed by cruise ships.

Apart from the size of the market, the primary issue in assessing the economic contribution of patrons who purchase tickets sold through wholesale channels — including cruise ships, travel agents and local hotels — is the extent of leakage as the revenue is within a pre-purchased transaction environment and there are fewer opportunities for local operators and providers to benefit from the spending. Accordingly, a lower multiplier has been assumed for these customers, which is taken to be the mid-point of local and free and independent patrons for simplicity.

Average cruise passenger spending is $116 per day in port in Hobart. As shown in Table 3, this is well below other Australian ports and indicates that there is likely to be significant latent demand for spending by cruise passengers in Tasmania.

Table 3: Average spending by cruise passengers in selected Australian ports

| Port | $ per passenger day in port |
|---|---|
| Sydney | $431 |
| Melbourne | $275 |
| Hobart | $116 |
| Adelaide | $241 |
| Darwin | $284 |
| Cairns | $210 |

Source: Australian Cruise Association

Accordingly, there is potential for average spending in this market to increase without displacing other spending in Hobart and surrounds, which suggests that the choice of multiples for the broader wholesale channel market is conservative.

### *Mountain bikes enthusiasts*

The MTB market is generally divided into two categories:

- complementary: tourists looking for beginner-friendly trail experiences that satisfy a desire for adventure activities to enjoy as part of their time in the area, and
- enthusiasts: riders who travel to a destination specifically for mountain biking, and generally require more challenging and scenic trails.

While the complementary market and local enthusiasts are included in the patronage estimates, there is substantial latent demand for travelling MTB enthusiasts. In particular, overseas experience suggests that the market is quickly unlocked by a combination of cost-effective access and challenging but largely downhill trails.

This latent demand is the major pull factor included in this study, with an assumption that relatively minor investment in new trails is undertaken by the Company or the public and private landholders of Mount Wellington.[1]

Importantly, any environmental degradation would need to be offset against the economic gains, while noting that many enthusiasts will have access to their own transport to the Pinnacle and as such any degradation would not be solely attributable to MWCC. However, these are expected to be minimal in the context of MWCC, as shown by an international study cited in Meltzer (2014) which found that

> Trail design and management become the largest factors in environmental impacts. Trails that are well designed, have adequate drainage, make appropriate use of the terrain, and are properly compacted to begin with, result in the least overall impact to the environment Of the empirical research, mountain bikers have less than, or equal environmental impacts, compared with hikers

The Company's MTB adviser, Dirt Art, has forecast total patronage of [redacted] MTB riders per annum using the MWCC, of which 70 per cent are enthusiasts. Based on this, it is assumed that [redacted] MTB enthusiasts

[1] The Company has consistently stated that it is not seeking any public funding or financial support for the project. Future funding for new MTB trails from the Pinnacle and connections to existing trails and the Glenorchy Mountain Bike Park is yet to be considered. Landholders including Carlton & United Breweries (owner of Cascade Brewery), Hobart City Council or the Glenorchy City Council may commit to funding contributions in due course. Given the significant potential economic return from any public investment, this would not violate the opportunity cost principle discussed in section 2.

access a new trail park via MWCC in Year 1, growing by year 3 to [redacted] in the low case and [redacted] in the high case.[2]

Around 10 per cent of this enthusiast market may be local residents.

It is appropriate to include spending on other goods and services while in Tasmania for a proportion of the MTB enthusiast market that is assumed to visit the State solely or primarily to use the new facilities, as this represents new spending in Tasmania that is stimulated by the MWCC that otherwise would not occur. In this context, it is assumed that:

- the pull factor is 50 per cent of the MTB enthusiasts that visit Southern Tasmania and ride on the MWCC, which is based on Strategy 42 South's judgement and a discussion with Dirt Art, and
- their spending on accommodation, food and other activities, and their length of stay, are similar to the average of all visitors ($246 for three nights), although some domestic and overseas studies suggest that MTB enthusiasts stay longer and spend more on average than other visitors.

*Other patrons*

Development of the MWCC is expected to have a significant impact of the number of visitors to the Mount Wellington Pinnacle. On current trends, [redacted] people will visit the Pinnacle, compared to [redacted] if it is developed.

Further, the proportion of non-local (ie intrastate, interstate and international) visitors to the Pinnacle is [redacted].[3]

However, as this non-local market will be largely met by MWCC, it is assumed that a majority of the self-driving Pinnacle visitors will be local residents, and the balance will be in Tasmania to visit family and relatives (although there may be some international self-driving visitors, these are not expected to be material). Further, these visitors will need to make an active decision to visit the MWCC pinnacle station.

Accordingly, the capture rates for this market are based on those for local MWCC patrons — [redacted] make a retail purchase and [redacted] make a F&B purchase.

The Company has also advised that there are other opportunities, such as potential snow play facilities targeted at families, which are not reflected in its modelling or this study.

As local self-driving visitors have a high degree of displacement, the applicable multipliers are assumed to be a weighted average of the respective multipliers for local and free and independent MWCC patrons.

**Induced economic impacts**

As noted, industry experience supports two cases where the MWCC would induce additional visitor spending — an extra night for some free and independent travellers and increased visitation from MTB enthusiasts.

Other than these cases, it is assumed that MWCC does not, in itself, drive new demand.

For instance, the MWCC will not directly affect the future schedule of cruise ships visiting Hobart, but does improve the local product available to passengers. There may also be a small proportion of free and

[2] This forecast reflects Dirt Art's judgement on MWCC's ability to satisfy the rapidly growing global market, which is evidenced by other downhill experiences such as Whistler (150,000 to 200,000 per annum in its 4 month season), Rotorua (250,000 per annum, of which 5 per cent are local) and Christchurch (expected to be 125,000 per annum).
[3] These visitation data were provided by the Company, and incorporate Hobart City Council traffic data collected between 2009 and 2013, the Company's own traffic and visitation surveys and the Tasmanian Visitor Survey.

independent travellers and/or other wholesale channel customers (eg. international tourists that book through agents) in order to use the MWCC, although this effect is not expected to be material.

Accordingly multipliers are only applied to:

- spending at MWCC facilities (ie fares, retail and F&B) reflecting the direct and indirect impacts of this spending,
- spending on transport to Mount Wellington
- the small proportion of free and independent travellers who are expected to stay an extra night in Hobart, and
- a large proportion of MTB enthusiasts who will stay in Hobart due to the MWCC and associated downhill trails

Notwithstanding these modelling assumptions, other pull factors may eventuate, most likely based on positive visitor experiences and word of mouth. Given Hobart's accommodation is effectively full during peak seasons and around major festivals, the clearest opportunity for the MWCC to create a pull factor for free and independent travellers is in other seasons, particularly winter. Detailed market research would be required to investigate the extent of this potential pull factor.

### Summary of multipliers

The economic multipliers applied to each market segment, and each scenario, are shown in **Table 4**.

**Table 4: Economic multipliers by market segment and scenario**

| | Year 1 | Normal operations | |
|---|---|---|---|
| | | Low case | High case |
| **Local** | | | |
| MWCC (fare, retail, F&B) | 1.00 | 1.00 | 1.00 |
| Transport | 1.00 | 1.00 | 1.00 |
| Accommodation etc | na | na | na |
| **Free and independent** | | | |
| MWCC (fare, retail, F&B) | 1.75 | 1.75 | 1.90 |
| Transport | 1.75 | 1.75 | 1.75 |
| Accommodation etc | na | na | na |
| **Wholesale** | | | |
| MWCC (fare, retail, F&B) | 1.38 | 1.38 | 1.45 |
| Transport | 1.75 | 1.75 | 1.75 |
| Accommodation etc | na | na | na |
| **MTB enthusiast** | | | |
| MWCC (fare, retail, F&B) | 1.75 | 1.75 | 1.90 |
| Transport | 1.75 | 1.75 | 1.90 |
| Accommodation etc | 1.75 | 1.75 | 1.90 |
| **Other visitors** | | | |
| MWCC (fare, retail, F&B) | 1.44 | 1.44 | 1.53 |
| Transport | na | na | na |
| Accommodation etc | na | na | na |

## Conclusions

*Economic impact of MWCC operations*

The Company has advised that its current estimate is that [redacted] staff, or [redacted] FTEs, would be required to operate the cable car, retail and F&B outlets in-house.

In its first year of operation — with a significant boost in riders relative to standard operating years, partly offset by parameter assumptions that are aligned with the low case scenario — the economic impact is estimated to be $64.0 million.

For modelling purposes, the novelty factor is spread across all markets. If the novelty factor was assumed to be solely derived from the local market and patronage from the free and independent travellers and wholesale channels settled immediately at the steady state levels, MWCC's economic impact would be $4.9m lower due to lower average fares and retail spending. However, these two assumptions are exaggerated and are countered by conservatism in other areas of both MWCC's assumptions and this study.

In later years, it is estimated that the economic impact of the MWCC will be between $79.5 million and $99.9 million per annum under the low and high case scenarios respectively.

These estimated economic impacts of the MWCC for the respective market segments under each scenario are summarised in Table 5.

**Table 5: Economic impact of MWCC ($m)**

| | Year 1 | Normal operations | |
|---|---|---|---|
| | | Low | High |
| Local | [redacted] | [redacted] | [redacted] |
| Free and independent | [redacted] | [redacted] | [redacted] |
| Wholesale | [redacted] | [redacted] | [redacted] |
| MTB enthusiast | [redacted] | [redacted] | [redacted] |
| Other visitors | [redacted] | [redacted] | [redacted] |
| Total | 64.00 | 79.47 | 99.91 |

76 per cent of the difference between the low case and high case scenarios is related to the impact of MTB enthusiasts. As the development of the business case for investment in MTB trails is at an earlier stage than the MWCC itself, and less market testing has been undertaken, there is a wide range of potential visitation forecasts:

- low case: [redacted] MTB enthusiasts using the MWCC per annum have a potential economic impact of $[redacted]
- high case: [redacted] MTB enthusiasts using the MWCC per annum have a larger potential impact of $[redacted].

As the economic gains from MTB enthusiasts reflect increased spending on accommodation and hospitality in the local economy, the benefits will spread quickly and broadly throughout the community.

Kookana (op cit) found that just over half of the indirect gains from tourism are concentrated in manufacturing, professional services and the finance and insurance sector (in order of significance). This partly reflects the sector's supply chain, particularly food and beverage manufacturing. Intuitively, a similar effect would be anticipated for MWCC, although there is a small risk of leakage as the finance and insurance sector is smaller in Tasmania than nationally. Further detailed analysis would be required to verify the allocation of the indirect gains.

### *Potential variations in these estimates*

This study has identified a number of areas where the selection of key parameters and multipliers may be conservative. This results in upside risks. On the other hand, there are downside risks that have been identified. These are summarised in Table 6.

**Table 6: Upside and downside risks to estimated economic impacts**

| Parameter | Page | Summary of risk |
|---|---|---|
| **Downside** | | |
| Novelty factor — first year effect is spread across all markets | 19 | Economic impact would be lower if the novelty factor was only evident in the local market |
| Leakage — finance and insurance sector is smaller in Tasmania than nationally and services are largely provided from interstate | 19 | Minor leakage would occur if interstate firms gain from the positive impact of MWCC operations on the finance and insurance sector. This would result in a slight reduction in the multipliers and economic impact. |
| Patronage — MTB enthusiasts markets may take a number of years to settle | 19 | The MTB market is growing rapidly but is less mature than other tourist markets. It may take longer than three years to reach the assumed patronage levels, and longer to settle into a predictable pattern.<br>These factors also represent an upside risk. |
| **Upside** | | |
| Transactions — assumed average transactions are relatively small | 9 | Due to the risk of leakage, assumed retail and F&B spending are below industry averages, particularly in the free and independent visitor and wholesale markets segments.<br>Low capture rates are also used for local residents, particularly the retail offering.<br>Higher average spending, and improved capture rates, would increase the economic impact. |
| Growth profile — assumed patronage settles at a steady state | 12, 14 | Assumes key variables are constant, including patronage, the number of visitors to southern Tasmania and MWCC's capture of these visitors.<br>In practice, total patronage, the mix of patrons and spending patterns will fluctuate and as the business model is refined, should be expected to grow.<br>Also, the Tasmanian tourism market will continue to grow, albeit at potentially slower growth rates. Like other cable car attractions, MWCC should maintain or grow its share of the growing market.<br>These factors suggest MWCC's economic impact will at least grow at a rate consistent with the Tasmanian market, and probably higher.<br>MTB patronage may take two to three years to reach the range set out in the low and high scenarios, and longer to reach steady state levels. |
| Wholesale channels — MWCC may increase average spending | 15 | Average cruise passenger spending is $115 per day in port. This is relatively low, indicating the potential latent demand for cruise passengers to increase spending on local goods and services. This suggests that the choice of multiples for this market is conservative. |
| Induced economic impacts — pull factors are narrowly applied | 18 | Pull factors have been incorporated in the economic analysis in specific cases, including a small proportion of free and independent travellers staying an extra night and MTB enthusiasts visiting Hobart solely due to the MWCC. Other pull factors that may emerge over time would have a material impact on the economic impacts. |

On balance, the upside risks arising from the conservative biases used in this study strongly outweigh the downside risks.

*State Government revenue impact of MWCC operations*

As noted in section 3, the Company estimates that it will require [redacted] FTEs for the core cable car operations. At this employment level, the Company would be liable for payroll tax if its total payroll exceeds $1.25 million (ie. average wages would need to exceed [redacted] per FTE).

As the threshold is set in nominal terms, wages growth between now and the start of operations in 2020 would have a marginal impact on its payroll tax liability. However, any liability is unlikely to be material as the rate of tax is 6.1 per cent of the amount above the threshold.

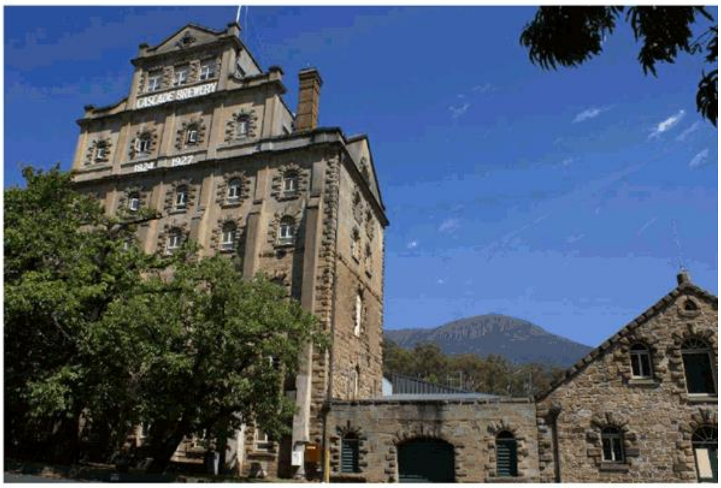
The Company would have a more material liability if the retail and F&B operations are managed internally, reflecting the additional [redacted] FTEs that would be required.[4] At an average wage of $[redacted] — which is broadly consistent with average full-time wages in the retail and food and accommodation sectors nationally — for all of the [redacted] FTEs, the Company would pay around $[redacted] per annum in payroll taxes.

Other tax liabilities impacting on State revenue include:

- Tasmania currently receives 3.9 per cent of the national GST pool, based on a relativity of 1.82x per capita. MWCC estimates that its GST payments would be just under $[redacted] per annum in a standard operating year, which suggests that around $[redacted] would flow to the State per annum. This share may decline marginally with Tasmania's falling share of the pool, and
- an immaterial amount of stamp duties.

As the Company will be leasing land from Carlton and United Breweries and Hobart City Council, it will not be liable for land tax.

[4] This discussion highlights the impact of the Company's future structural decisions. It is not suggesting that the Company will structure its operations to avoid payroll taxes, which would be a very minor consideration in such decisions. Also, it is important to note that the grouping provisions in Tasmania are very robust, and as a result, some corporate structures that involve external equity in related businesses are insufficient to avoid payroll tax liabilities.



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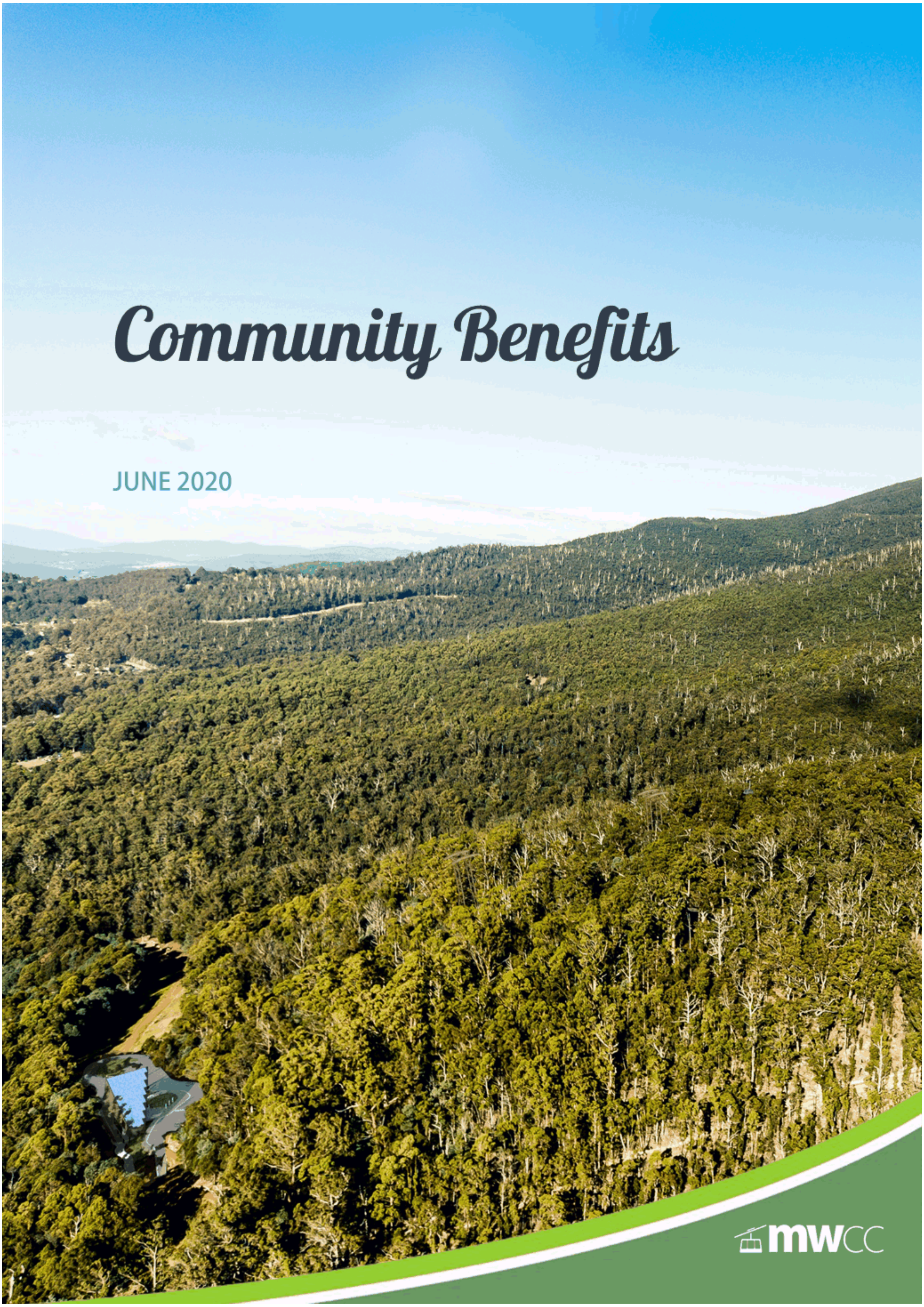
STRATEGY 42 SOUTH

STRATEGY | PERFORMANCE | ECONOMICS | POLICY



# Community Benefits

JUNE 2020

mwcc

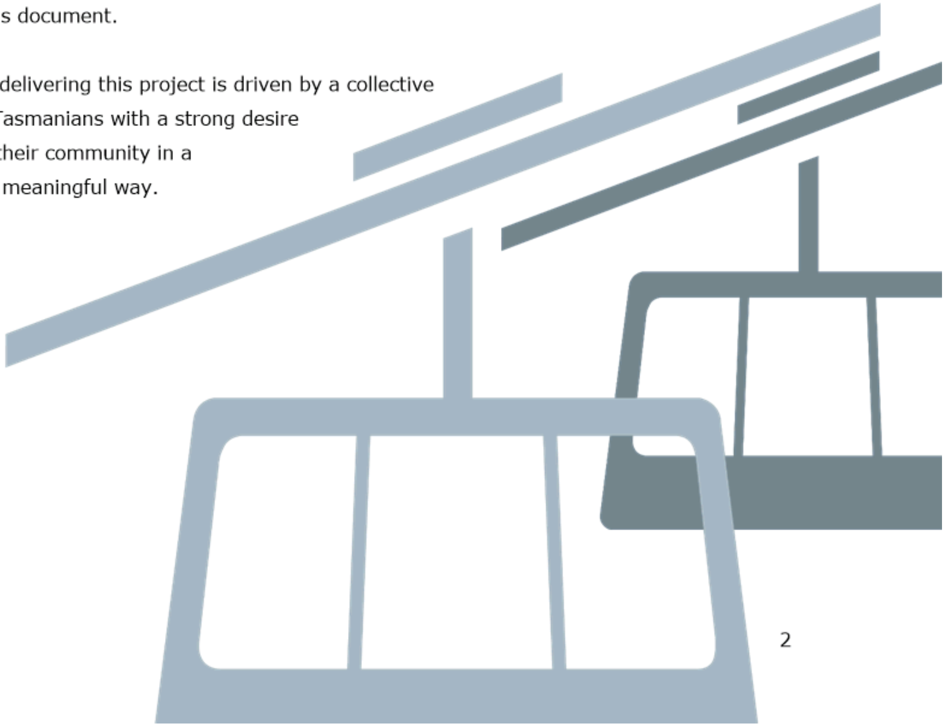
# FOREWORD

For over a century, the residents of Southern Tasmania have endured a constant debate of how best to protect, enhance and showcase the mountain backdrop of Hobart. The Mount Wellington Cableway Company (MWCC) are the fourth proponent in such time to propose the development of an iconic tourism attraction for kunanyi / Mt Wellington, but the first to engage the community to ensure key social principles align with a fully resolved design, operable and costed solution.

MWCC's proposal consists of an aerial tramway offering an alternative method to access the summit of the mountain, whilst consolidating and providing appropriate visitor facilities at the summit. This site is currently accessible by road and serviced with a carpark, toilet block and observation shelter. The project is wholly funded by the private sector to ensure that all the community, social, environmental and economic benefits outlined in this document are not diluted or offset by the cost of any public funding requirement.

To ensure the project's success MWCC engaged the community upfront in the feasibility phase with a 'Local Values and Opinions Survey' in 2013. Findings not only formed the building blocks of the finalised proposal but became the guiding principles throughout the design phase. MWCC also engaged extensively with a broad range of stakeholder groups and community members through workshops, community group and school presentations, kitchen-table discussions, on-site surveys, information sessions and feedback reviews. The aspirations of Wellington Park's user community are embedded in this document.

The passion for delivering this project is driven by a collective of mostly local Tasmanians with a strong desire to give back to their community in a sustainable and meaningful way.



# CONTENTS

# VALUE STATEMENTS

## OUR VISION

*To develop and operate a unique and iconic visitor experience that is economically-sound, environmentally beneficial and socially inclusive, which enhances the appreciation, enjoyment and preservation of intrinsic values of kunanyi / Mt Wellington.*

## OUR MISSION

*To position Wellington Park as the number 1 most popular and recommended tourism destination in Tasmania.*

*To grow Tasmania's overall tourism appeal and be continually recognised for outstanding environmental stewardship, fair social practice and strong corporate responsibility.*

Our values are our founding principles. To achieve success, our management focus is balanced equally between environmental care, social inclusion, cultural vitality and economic returns. These founding principles have been central to guiding the design of this project. Each year the company pledges to publish an annual report detailing our environmental and social impacts.

# KEY SUMMARY OF IMPACTS

Wellington Park is reserved for the preservation and protection of natural, social (including scenic landscape), cultural and scientific values, and for the provision of recreational and tourism uses. Much of the Park comprises the catchments supplying Hobart's water supply.

## PROJECTED IMPACTS

### Net Social Benefit:

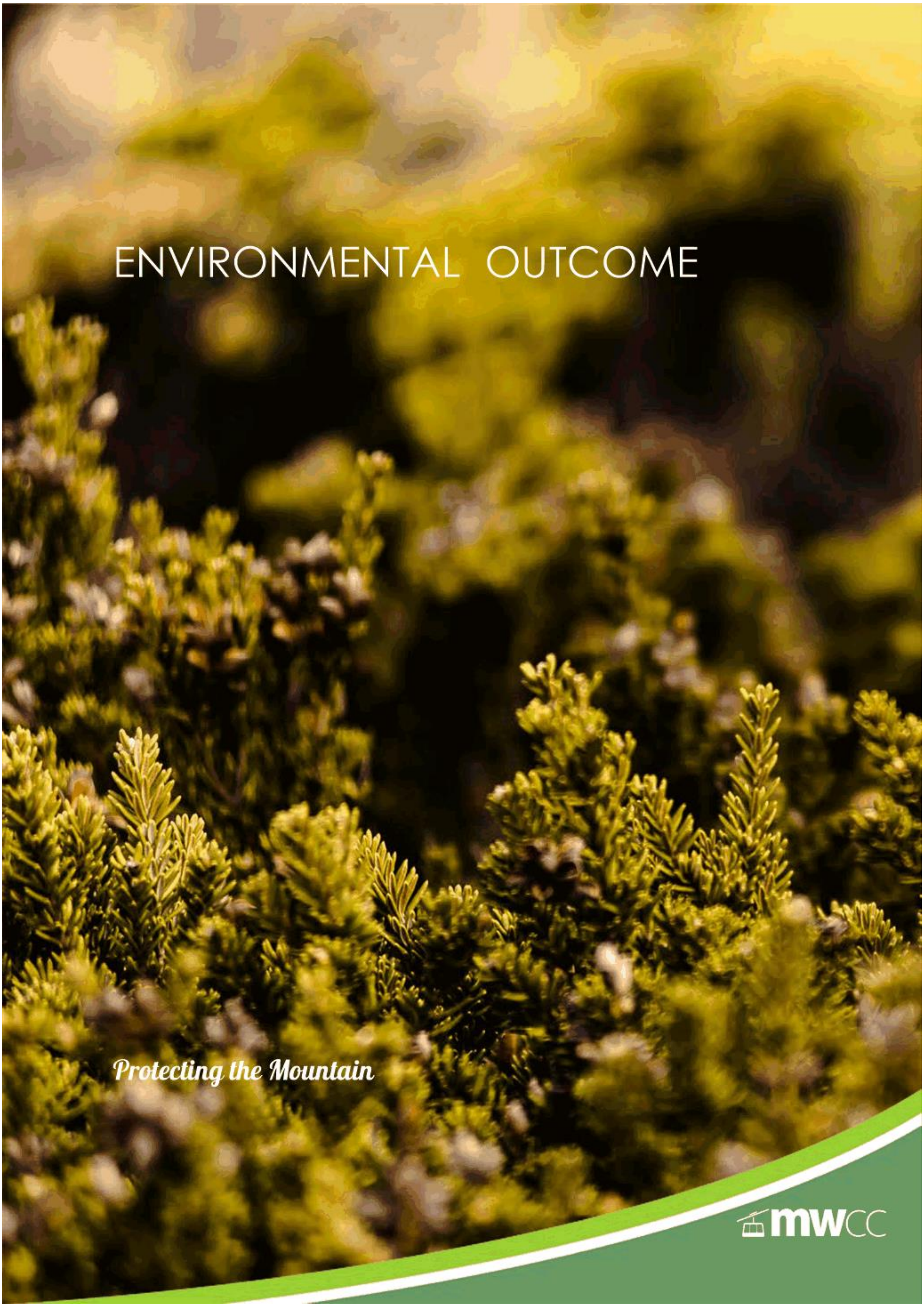
- **New and improved public road access into the heart of the park's recreational foothills for public use, land authorities and emergency services.**
- **Improved inclusive experience for visitors of all ages and abilities to enjoy the park's natural, social, cultural and scenic values.**
- **Improved site interpretation and cultural awareness opportunities**
- **Additional educational opportunities for all ages.**
- **Philanthropic programs and support for community initiatives such as traditional land management practices.**

### Net Environmental Benefit:

- **Reduced environmental load generated per park visitor through reduced carbon footprint and improved water and waste management, assisting the preservation of the natural values of the Park.**
- **Reduced noise pollution from less vehicular traffic on Pinnacle Road.**

### Net Economic Benefit:

- **Up to $99 million net new cash injected into the state economy each year of operation (in today's terms), through increased recreational and tourism use of the Park.**
- **Operating lease provides new income source to better resource park management.**
- **Cost-savings for park authority via joint data monitoring and site storage provisions.**


ENVIRONMENTAL OUTCOME
Protecting the Mountain
mwCC

# PROJECTED CONSERVATION OUTCOMES

One of the major benefits of cable cars is their small environmental footprint relative to the convenience, capacity and efficiency offered as a transport solution. Installed worldwide in locations where they replace or reduce load on existing traditional access corridors to a destination, they are globally regarded as providing an environmental impact that delivers a positive benefit, not negative impost. Hobart's kunanyi / Mt Wellington, with an existing road servicing the pinnacle, is such a location.

As cable cars are electrically driven, this positive benefit is amplified by the location's ready availability of hydro-electricity provided by Tasmania's existing grid network. This further reduces the existing reliance on imported fossil fuels to service the pinnacle destination's participation in the Tasmanian visitor economy.

MWCC's proposal utilises all the benefits this transportation technology can offer, coupled with smart facility operational design. As a result, disturbance to Wellington Park's ecology during the operational phase should be minimal and limited to existing popular activities such as bushwalking, rock-climbing and mountain-biking.

*Wonderful wildlife can be found around the pinnacle (away from the noise of vehicles) when visitors are given the chance to stay a little longer.*

Please refer to the MWCC NVA & Biodiversity Impact Assessment 2019[1] for full details.

## On-Site Staff

The ethos of the MWCC aligns with the Wellington Park Management Plan's intention to concentrate human visitation into manageable visitor nodes. Our proposal aims to achieve this by providing facilities most in demand in a focussed location where people inherently want to be. This enables an efficiency of visitor management.

Visitors to the pinnacle would note the constant issue of littering and rubbish. In 2019 the "Clean Up Australia Day" saw the collection of 100kg of rubbish from the pinnacle by volunteers, highlighting the need for better on-site management.

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[1] ***MWCC Biodiversity Impact Report 2019, North Barker Ecosystem Services***

MWCC's proposal is set to prevent incidental littering and MWCC staff would be on-site to manage and remove waste daily. This provides a cleaner and less toxic habitat for native wildlife.

A reduction of use of the summit carpark (no longer being the sole method of access) would also reduce incidental littering across the Pinnacle Zone, as would adding additional waste management and amenities to prevent this.

## Better Water Management

Currently, sewage from the public toilet facilities is stored at the summit for several days at a time before being pumped out and carted by truck down the mountain. MWCC's proposal aims to reduce or even replace the need for road cartage by a novel wastewater removal system via the cableway. It is expected the existing public facilities will be used far less once MWCC's pinnacle centre amenities are operational.

*Ratepayers currently wear the costs for sewage removal from the pinnacle several times a week.*

Under MWCC's proposal, waste water (otherwise known as sewerage, or black and grey water) will be removed from the cable car's Pinnacle Centre on a daily basis by a carry-tank attached to the underside of the aerial tram, for pumping disposal into the sewer grid at the Base Station. This is the endorsed practice at the Table Mountain Aerial Cableway Company in Cape Town, South Africa and the management team there have provided MWCC with intrinsic daily operational knowledge to implement a similar system in Hobart. Full details are available in the Site Servicing Report[2].

Potable water to supply the Pinnacle Centre will be supplied by a hybrid combination of on-site rainwater collection (for flushing toilets) and trolley-tanks (for all other human consumption) brought up via the cableway system. Capturing rainwater from the Pinnacle Centre's roof will reduce potable supply needs and reduces the distributed rainwater runoff to mitigate risk of localised erosion.

## Less Noise Pollution

Acoustic impacts have been calculated by an independent acoustics expert by recording existing sound levels across the project site and using a comparative noise report from an aerial tramway operation in Grimmelwald, Switzerland. Noise will primarily be generated at the Base Station where

[2] ***MWCC Site Servicing Report, Gandy & Roberts 2019***

the mechanical drive is located, as well as goods-loading and waste removal. This allows a whisper quiet experience for visitors ascending the mountain and other park users.

The more visitors who opt to use the cableway over the roadway will further reduce noise pollution within the Park, in particular along the 12km vehicle corridor that winds its way to the summit and intersects with many walking and riding trails. Stringent noise criteria apply within Wellington Park, as well as neighbouring properties near the Base Station. In both instances the anticipated noise is within acceptable limits and this has been accepted by the Environment Protection Authority Tasmania (EPA). For further details please refer to the MWCC Noise Assessment report 2019[3].

## Air Quality in Check

During the operation of the proposed cable car system, air quality is not expected to degrade. As more visitors are anticipated to arrive by cableway than roadway, estimates using Federal Chamber of the Automotive Industry figures[4] suggest reduction on the estimated 1100 tonnes of carbon monoxide emitted within the Park per annum.

Odour control methods for the temporary storage of sewage at the Pinnacle Centre have been considered and the proposed method complies with the recommendations of the State EPA and the latest adopted standards. Please refer to the MWCC Site Servicing Report for further details.

## Less Need for Road Upgrades

A looming concern for many Southern Tasmanians is the inevitable need to upgrade Pinnacle Road if no other sustainable transport solution is successfully found. From a conservation perspective, such an upgrade along the existing corridor would cause significant visual, geological and ecological impact should road-widening to modern Austroads standards be employed.
Estimates for civil engineering have put the cost of an improved road to the summit at around $30-40 million.

MWCC's sustainable transport solution alleviates this concern by significantly reducing net road usage and increasing the lifespan and capacity of the existing road to cater for non-cableway visitors.

[3] ***MWCC Noise Report 2019 – Pearu Terts***

[4] ***Federal Chamber of the Automotive Industry, assumes small car emissions at 232g p/KM***

# PROJECTED TRAFFIC OUTCOMES

## Reduced Road Demand

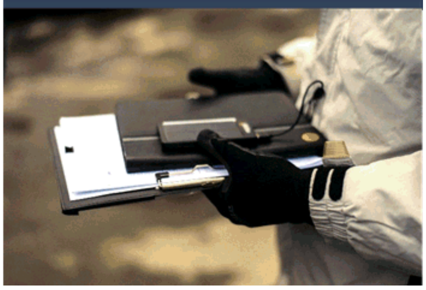
Environmentally, the inclusion of a cable car on kunanyi / Mt Wellington is set to reduce the road vehicle count significantly year-round. It is projected that a 40% net decrease in traffic can be expected along the length of Pinnacle Road and Pillinger Drive, with the equivalent volume removed from Huon Road and Upper Davey Street. The net positive impact for these roads, which are almost exclusively residential and rural roads, will be achieved through partnerships established with tour companies and broader marketing incentives to self-drive tourists and locals to opt for the cable car vs. self-drive.

MWCC have already held positive discussions with existing tour bus operators who are likely to cease driving to the summit in favour of servicing the Base Station. MWCC's vision will be that the Base Station will be serviced by electric buses that will collect patrons from city hotels and designated collection points, also reducing the volume of vehicles.

Less road traffic within the Park also reduces the risk of wildlife ending up as road kill, especially after dark. To support this cause, the primary use of our Pinnacle Centre after dark is the restaurant and wine bar, which requires bookings. Each booking includes passage on the cableway, thus negating patron road use at this time of day. The expected reduction in risk to wildlife has been considered in our Roadkill Mitigation Plan and is a welcome improvement according to a number of residents consulted along Huon Road and Pillinger Drive. Please refer to the Traffic Impact Assessment report by Midson Traffic, 2019[5] for further information.

**DID YOU KNOW?**

Actual traffic data collected on Pinnacle Road indicates visitation into Wellington Park in 2018/19 was a total of 194,000 vehicles. This is a marked increase in vehicles since previous data collected in 2010/11 indicating a total of 135,462 vehicles per annum. Given Pinnacle Road is a dead-end road, this data is considered an accurate record of vehicles when the count is halved. Actual visitation of people by road must consider the amount of people per recorded vehicle. Between 2013 – 2017, MWCC has conducted a series of random headcount surveys during different seasons on Pinnacle Road to determine a reliable average headcount per vehicle, which found a consistent averaged result of 3.3 persons per vehicle. This methodology was recommended as the 'next step' in the City of Hobart's own 'Visitor Strategy' report published in 2018, which in lieu of actual headcount surveys, relied on an assumption on a Parks & Wildlife headcount per vehicle average of 2.5 persons. This previously applied assumption produces an 'official' visitor count of 500,000 per annum, which is at odds with the Park's historical 50/50 visitor mix between locals and tourists given TVS data indicates over 365 ,000 tourists alone are visiting the Park. In contrast, MWCC's current visitor estimate (using actual traffic data and headcount data) of 660,000 people visiting Wellington Park per annum in 2018 is aligns with the TVS survey data and historical visitor mix.



*Actual headcount per vehicle data has been collected by MWCC over several years*

[5] ***Midson Traffic MWCC Traffic Impact Assessment***

# PROJECTED VISUAL OUTCOMES

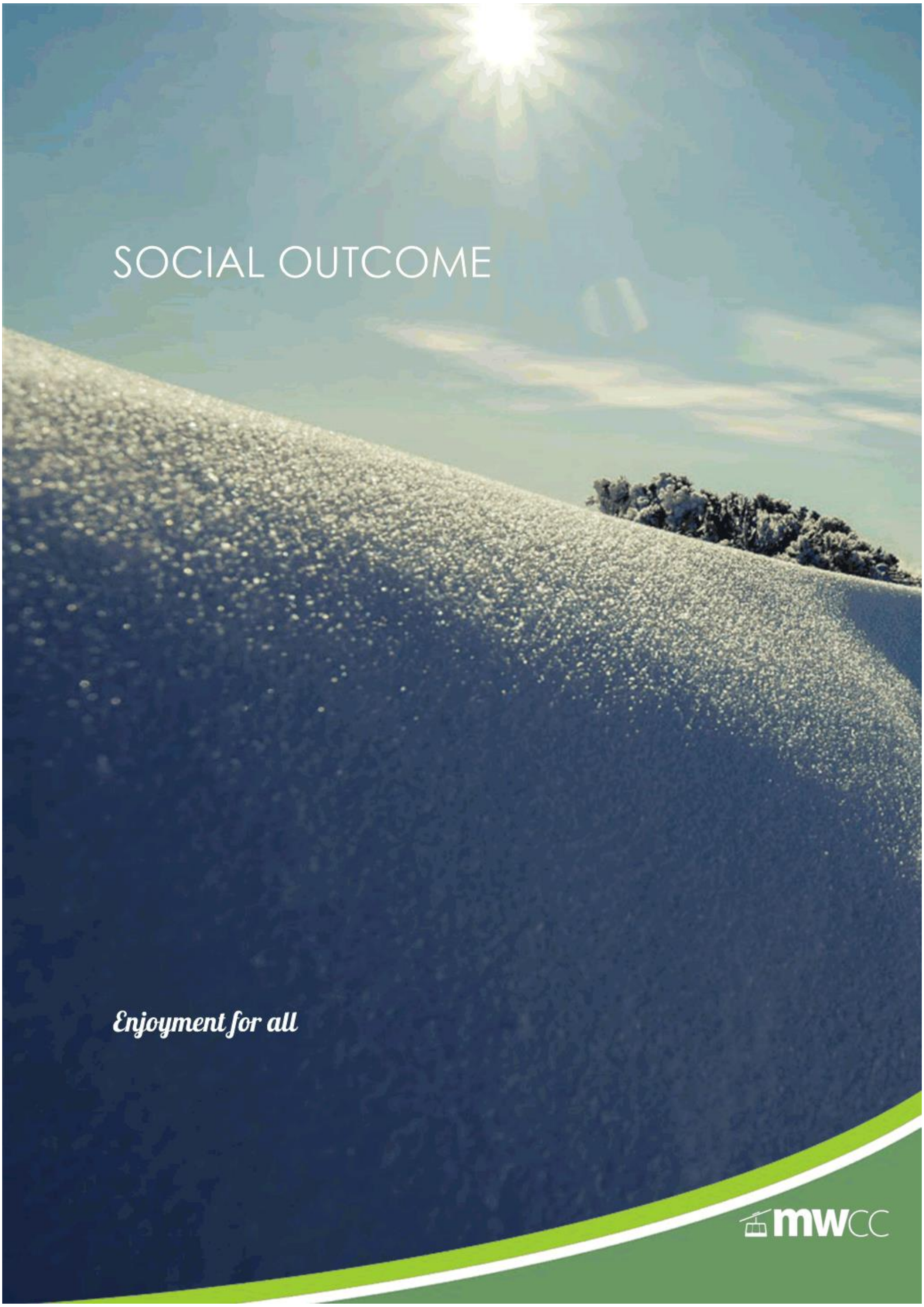
## Restoring the Skyline

Arguably one of the most exciting opportunities for Southern Tasmania from MWCC's proposal is the chance to undo past mistakes, in particular the skyline intrusion across the entire radial viewshed of Greater Hobart caused by the existing Observation Shelter.

Central to MWCC's design brief to local architects was the requirement for the new facilities to sit below the skyline as best as possible, to ensure the iconic silhouette of the mountain from Hobart is not further degraded by another man-made structure. The design solution as proposed essentially achieves this goal and it aligns with the Wellington Park's objectives to consolidate existing facilities wherever possible. MWCC's solution renders the existing shelter superfluous and the proposal includes its partial rehabilitation and reconfiguration into an outdoor lookout.

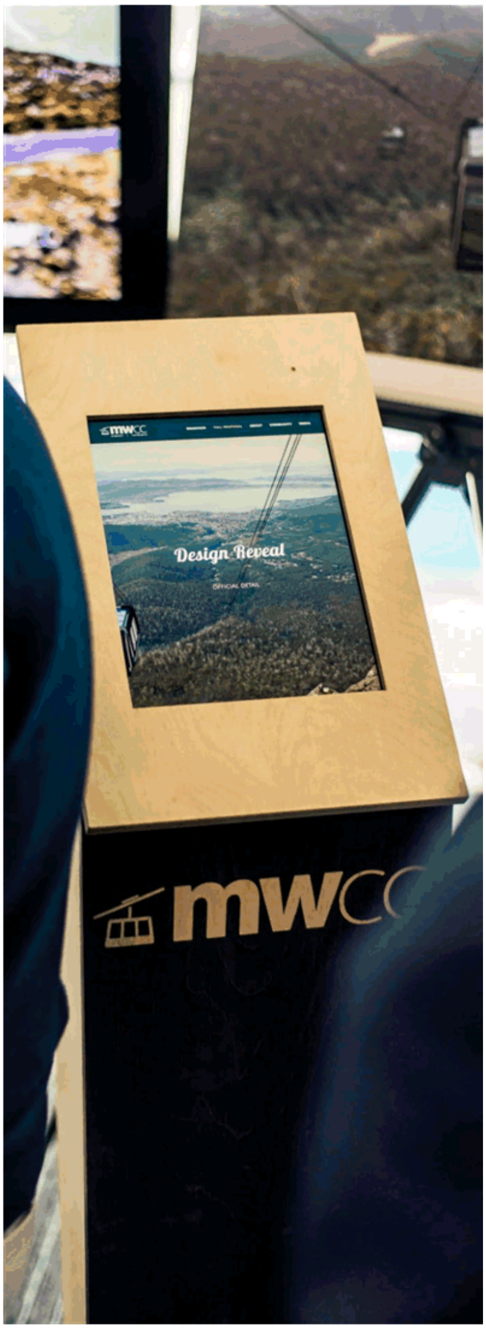
*Thoughtful design, starting with a skyline-preserving building envelope, has enabled the visitor centre to respect the skyline and for the existing Shelter to be consolidated.*

Please refer to the Visual Impact Assessment by Ethos Urban, 2019, and Landscape Catchment Analysis by Another Perspective 2019, for further information.


SOCIAL OUTCOME
Enjoyment for all
mwcc

## Benefits to Local Community

- Massive winter-season tourism driver to fill hotels.
- Between $79M to $99M net economic impact on Tasmania's economy each year[6].
- Catalyst for attracting major sporting events, such as mountain bike competitions.
- Major driver to continue port attractiveness for the cruise ship industry as it recovers.
- Nearby businesses en-route to Base Station to benefit from increase in passing trade from tourism market with disposable income.
- Improved access into Wellington Park for local recreational use and flexibility in community event planning and management.
- Reduction in carbon emissions by up to 1100 tonnes per annum[7],
- Increased turn-around time for cruise-ship passengers to spend time and money in other Hobart businesses (i.e. less time on a bus spending nothing).




## Public Amenity Improvements

MWCC's project proposes to inject up to $3.8M developing 700 square metres of public amenity improvements at the pinnacle, including:

- New observation lookout
- 24/7 emergency shelter
- Park Ranger's storage/office
- Interpretation centre with space for tour-group mustering points
- Rentable lockers for sports and recreation enthusiasts
- Complaint boardwalk replacements with telescopes
- Amphitheatre seating
- Additional thematic and cultural signage
- Additional toilets and parenting room
- Free Wi-Fi

[6] ***Broader Economic Impact Report 2016, Strategy42 South***
[7] ***Federal Chamber of the Automotive Industry, assumes small car emissions at 232g p/KM***

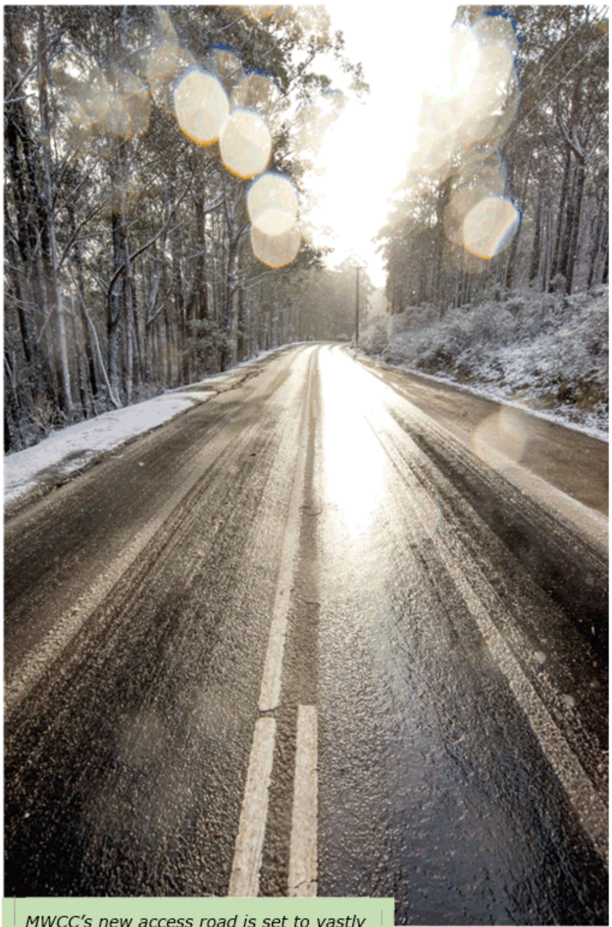
# BETTER ACCESS ROAD

The introduction of the proposed access road to the Base Station, which links McRobies Road to Wellington Park, delivers enormous community benefits beyond simply a way to access the cable car attraction.

First, the road will be the most central, safest, shortest and most convenient entrance into Wellington Park from Hobart, when compared to Pillinger Drive, Strickland Avenue, Old Farm Road or Lenah Valley Road. This can immediately alleviate non-resident traffic, providing a quieter and safer lifestyle traffic for these residential areas.

As an S4 Class road, the link will be built to modern Austroad standards, contain no sharp or blind bends and provides the general public with a new level of access into the Parks' Recreational Zone of the mountain. This is further enhanced by the provision of modern parking facilities and bathroom amenities at the Base Station, all located in a hub location central to the City of Hobart's proposed mountain biking masterplan[8]. This new access road reduces the traffic impost on Old Farm Road which is otherwise set to increase significantly.

Second, the proposed sealed access road also creates a manageable and more easily accessible East-West aligned fire break. Fire authorities can use this road to their advantage as a controlled-burn start/stop line, reducing risk and enhancing the protection of the neighbouring suburbs of South Hobart and Lena Valley. No other East-West aligned firebreak to this standard exists between Wellington Park and Hobart's population centres.



*MWCC's new access road is set to vastly improve access for emergency services and utility organisations into the Park.*

[8] ***City of Hobart 'Riding the Mountain' Summary Report 2020***

Third, the road provides improved ground access for TasNetworks to manage the primary 110kv transmission line easement that laces the eastern boundary of Wellington Park.

Fourth, the design of the new access road is set to feature and promote a suite of contemporary methods for the awareness of wildlife and avoidance of roadkill. As set out in the Roadkill Mitigation Report[9], the new access road respects a wildlife corridor by installing an underpass at a key location. Ropes will be installed in the treetops above the road at intervals to encourage tree-climbing wildlife to cross the road out of harms way. These initiatives will be enhanced using virtual fencing along the 2km route, speed limit reductions and signage along the road raising awareness for wildlife. Combined these installations are set to elevate this new road as a leading precedent and working example for the community.

Lastly, the connection of the new access road with the McRobies Road roundabout provides a suitable grade link for mountain bike trails to follow in parallel and connect with the existing road network. Currently, there is no such trailhead for the Tip Top Track on public land and the need for such a trailhead is identified in the City of Hobart's mountain bike masterplan. Civil earthworks required as part of the construction of the new access road offers this opportunity for this to be established.

## Elevating the Park's Role in Southern Tasmanian Tourism

Figure 2 illustrates that whilst total maximum visitation to Wellington Park is projected to rise from 660,000 visitors currently per annum to nearly 900,000 visitors per annum by 2022, less than half of total visitors are expected to self-drive. It is expected the bulk of self-drives will be local Tasmanians.

This forecast is consistent with findings of a comparable, popular and high-quality tourism attraction in Hobart, MONA[10]. MONA is accessible by a well-maintained 4-lane highway for self-drive customers and a fee-based experiential ferry service, where half their patronage arrives by ferry and most ferry passengers are tourists.

[9] ***Roadkill Risk Report and Draft Roadkill Mitigation Plan, North Barker Ecosystems***

[10] ***Museum of Old and New Art***

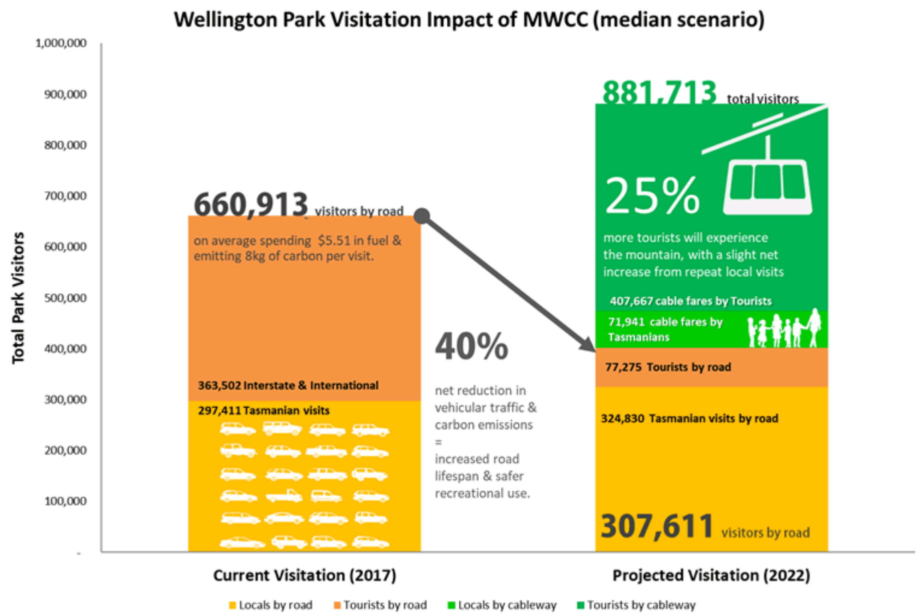



*Figure 1: Comparing current and projected visitation (max), with methods of travel.*

## Improved Passing Trade Opportunities

The project will result in a net increase of traffic along existing main roads towards the Base Station, namely Cascade Road, which is projected to be a minimum of 1 additional standard vehicle per 3 minutes during operational hours, and a maximum of 1 additional vehicle per 2 minutes.

Cascade Road from the Southern Outlet to McRobies Road is considered a significantly preferable route compared to the current primary access to Wellington Park. This stretch of road is well built, wide and as a primary arterial road for South Hobart that carries significant traffic on a daily basis. Current zoning is mixed heavy commercial, residential and includes services such as churches, hospitals, schools, sports venues, age care facilities and the municipality refuse site. Historical industrial use continues to this day.

The Traffic Impact Assessment[11] for the project concludes this primary access route only touches half of its built capacity at peak times, and so has substantial ability to absorb increased traffic volumes. Nevertheless, the actual increase in traffic through South Hobart caused by the addition of the project is considered negligible. For full details please refer to the Midson Traffic Report 2019.

[11] ***MWCC Traffic Impact Assessment 2019 – Midson Traffic***

# SUPPORTING PHYSICAL ACTIVITY

## Improving Access for Wellington Park and Fern Tree

There are significant benefits to improved access to the pinnacle for locals and visitors alike. In conjunction with the existing road, the proposal offers the Park a high level of access redundancy to and from the pinnacle of kunanyi / Mt Wellington. This is because during times when road closure is most likely - whether due to snow, black ice, rock falls and/or public events (average 40+ days of the year) - the aerial cableway can continue to transport visitors and workers to the pinnacle.

Similarly, when the cableway is most likely to be closed while the Park remains open (due to very strong wind velocities above threshold or annual maintenance for example) the road can continue to provide access, increasing the overall availability of access to the Park.

***The positive impact here is safer, quieter road use for cyclists, pedestrians, remaining motorists and residents along Huon Road and Pillinger Drive, with the reliability of year-round access.***

Whilst having both access methods provides the market with options, the MWCC's solution also reduces vehicular road use and provides rapid emergency access and evacuation from the site which will encourage more families to use the road for recreational use.

*RIGHT >>
Popular conditions to visit Wellington Park are often the same time the existing road is incapacitated due to snow and ice.*

*<< LEFT
Pinnacle Road & Huon Road can often surpass designed capacity to the point of gridlock, causing Fern Tree to be inaccessible for critical emergency services.*

All weather activities on the pinnacle and around Wellington Park will offer a new range of experience options and experiences and improve the health, and physical and emotional wellbeing of Tasmanians.

## Snow Play

MWCC has designed sufficient capacity into the proposal for seamless management of high visitor numbers on bumper snow days. This can ensure all families who wish to visit the snow can and avoid current roadway restrictions.

MWCC has met with local snowboarding enthusiasts and will provide lockable storage space within the Pinnacle Centre for seasonal and removable terrain park equipment. Currently such equipment is either transported by private vehicles to/from the summit (if open) or left hidden in the bush for next season. Our solution can ensure such equipment is safely stored when not in use to reduce the risk of posing a hazard to other Park users year-round.

*Snowboarding in the Park is limited to very few good locations. The 'Front Drift', (located south of the Pinnacle Centre) is the most popular due to its natural snow-farming topography.*

For the general public, MWCC will offer the short-term hire of taboggans, snow 'trolleys', sport lockers for recreational users and general snow-play hire. Snow trolleys will be custom-designed buckets on wheels that can be brought down on the cableway to the Base Station carpark, allowing families to continue the tradition of taking snow home on the bonnet of their car, without having to take their car up the mountain.

## Paragliding

MWCC has proactively met with and discussed the opportunities and limitations posed by the mountain with the Tasmanian Hang-gliding and Paragliding Association. In response, the MWCC proposal seeks to enhance the safety, frequency and enjoyment of club members launching from the summit with faster return ascent by cableway, ensuring the cableway alignment does not interfere with key gliding routes, and, once operational, a dedicated launch platform. The Platform is in the early stages of collaborative design.

## Mountain Biking

Between July 2015 and June 2019 the number of visitors who visited Tasmania to engage in mountain biking (MTB) activities increased by 35%[12]. It is predicted Tasmania will be home to 460km of mountain bike tracks by 2024[13]. Tasmanian mountain biking received a major boost in 2017 when the State Government recognised mountain bike tourism as an important economic stimulant, establishing a $6 million Tasmanian Cycle Tourism Fund to help secure the state's potential as Australia's premier cycling tourism destination. Two years on more than 25,000 visitors to Tasmania participated in mountain biking, injecting $67 million into the state economy.

The City of Hobart have stated that mountain biking and other eco-tourism activities will play a substantial role in the economic recovery of Hobart and Southern Tasmania[14].

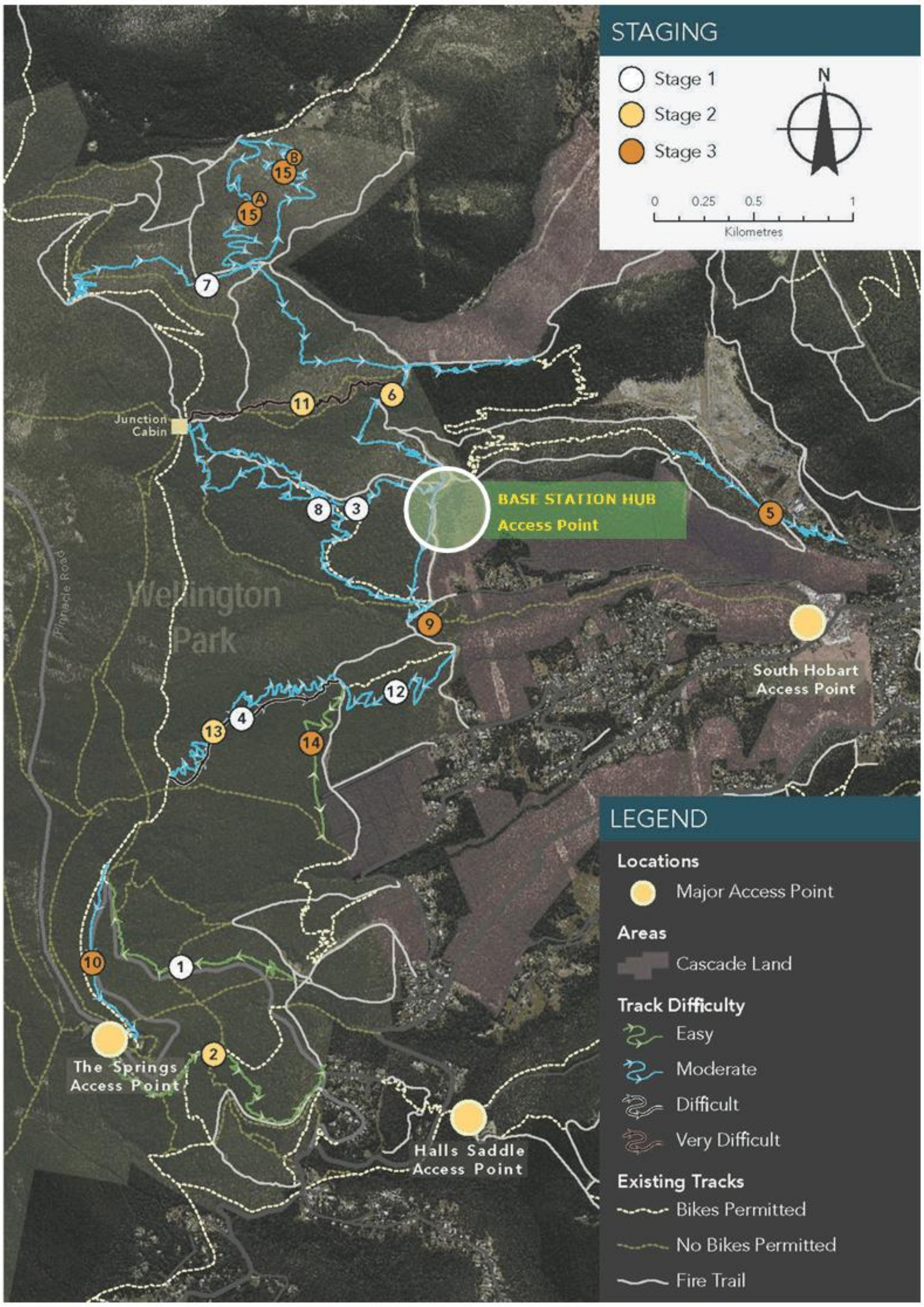
Their MTB masterplan focusses on trails that cross the Park's foothills and it appears the natural entry/exist point where trails and the road converge could place a lot of increased load on Old Farm Road and around the Cascade Brewery. If the masterplan proceeds in its current form, the likelihood for these areas becoming both traffic bottlenecks and carparks local and tourist MTB riders is high.

[12] ***Tourism Tasmania***
[13] ***George Town Mountain Bike Proposal***
[14] ***City of Hobart 'Riding the Mountain' Summary Report 2020***

MWCC has anticipated the future increase and potential locations of new and improved MTB trails within the Park. The proposed Base Station is conveniently and centrally located to provide the carparking and trail access in demand by a growing MTB market.

*MWCC's Base Station will provide a high-quality transport hub for safer recreational access into Wellington Park's existing and proposed mountain bike (MTB) trail network.*

The location of MWCC's facilities and the new access road into Wellington Park therefore serves as a central hub to enhance the recreational goals of the City of Hobart, whilst reducing traffic and carparking issues on existing residential zones. The access road shares this load, reducing disruption to the existing road network and offering additional ingress and egress into Wellington Park to participate in a wider range of activities.




*MWCC's Base Station provides a centralised vehicular entry point for Wellington Park's existing and proposed MTB trail network, providing redundancy of access when road conditions further up the mountain are restricted.*

## Bushwalking

Bushwalkers are set to benefit from MWCC's proposal and its ability to support the realisation of the City of Hobart's mountain biking masterplan. For many years, the community who have formally responded to MWCC's community input and feedback opportunities have highlighted the anxiety experienced with shared trails within Wellington Park. These findings are supported by the City of Hobart's own surveys which found 72% of respondents prefer separation of trail use.[15]

The solution is dedicated, separate single-use trails for mountain bikers and bushwalkers, however such a solution has historically required significant growth in cycling recreation to achieve a critical mass to justify further trail expenditure.

With the continued rollout of the City of Hobart's mountain bike masterplan, and the introduction of MWCC's proposal (which provides an accessible transport hub on the edge of Wellington Park), the dream of reduced anxiety and improved safety for families can become a reality.

## Community Events

The proposed Pinnacle Centre, with its improved amenities and high capacity for peak-load visitation, will better support existing events such as the annual Point to Pinnacle run and will encourage the future development of similar physical health and wellbeing related activities.

The improved redundancy of access to the summit offered by both existing roadway and proposed cableway will ensure spectators can reach the summit efficiently regardless of whether the roadway needs to close for the safety of event participants.

*Existing capacity for peak-load visitation is very low and current facilites can quickly become overwhelmed.*

[15] ***City of Hobart 'Riding the Mountain' Summary Report 2020***

# ALL ABILITY ACCESS

Tourism Research Australia, in partnership with Tourism, Events and Visitor Economy branch of the Victorian Government, and Tourism and Events Queensland, commissioned a study into accessible tourism in Australia in 2017. With an estimated 20% of Australian adults having a disability or long-term health condition, and an ageing population, this tourism sector is set to grow.

By 2050, it is estimated that nearly one-quarter of the Australian population will be aged 65 or over. In 2015, five million people had long-term health conditions in Australia and this is also predicted to grow. Although the Australian Bureau of Statistics Survey of Disability, Ageing and Carers suggests that people over 54 are healthier than previous generational cohorts, the overall growth in the ageing population in both volume and longer life expectancy is expected to lead to greater numbers of travellers who may need extra assistance.

Building upon these findings, *MyTravelResearch* were commissioned to do both a qualitative and quantitative study with the aim of determining the current value of the accessible tourism market, the latent demand and the key barriers preventing travel for people with a disability. This research has placed a total value of the domestic market at $8 billion, when added to the estimated inbound market for accessible tourism of $2.8 billion (not part of the research), the contribution of Accessible Tourism to the Australian Visitor Economy is $10.8 billion. That is greater than the $10.4 billion spend by the Chinese tourist market inbound to Australia per annum.

MWCC was founded on the belief that all visitors, regardless of age or ability should have the opportunity to experience the best of Wellington Park's wonder and scenic beauty. This ethos has carried through to the design solution as proposed.

## Disability and Family Friendly Access

During the design and research phase of the MWCC project, several compliance issues were identified with the current amenities at the pinnacle. Detailed site studies of human use, design and adherence to the current Building Codes of Australia have been employed in the formation of MWCC's proposal, as have contemporary diversity and inclusion guidelines. The project team did not just look at the immediate requirements of the proposal but also any other inherent issues surrounding safe and compliant access on kunanyi / Mt Wellington.

In response, the design solution offers a step-free, flush-floor experience whilst visiting Wellington Park, from the moment visitors arrive at the Base Station to the journey from the Pinnacle Centre to the summit proper and back. The proposal does this with an intuitive, primary visitor circulation route through the visitor centre, its rooftop lookouts and on a compliant-grade boardwalk to the summit proper. This has been proposed as opposed to the standard approach of a stairway for most users and relegating less-able bodied visitors to a hidden wheelchair ramp out of the way. MWCC's solution allows all users of wheeled craft such as prams, pushchairs and mobility scooters to experience all that is on offer. This is a significant improvement on the current visitor experience.

*The current experience for less-able bodied people is denial of access to popular lookouts, causing a higher sense of isolation and less societal inclusion.*

## Reducing Safety Risks

The project design has examined and addressed current risks to visitor safety, inherent in the haphazard human/vehicle interaction at the exit of the existing summit carpark. Observations on site have found drivers arriving at the summit are looking East, towards the view and current Observation Shelter, often not noticing pedestrians attempting to cross the sloping road from the carpark to the Observation Shelter. It is clear even the most aware pedestrians are often unsure if drivers have seen them and their family. This risk is compounded during inclement weather and bluebird days where the road is still covered in ice or melting slush.

MWCC's proposal eliminates this risk by removing and rehabilitating the current asphalt ramp from the carpark to the Observation Shelter, eliminating the appeal for any pedestrians to attempt to cross the road at this T-Junction. Instead, MWCC propose a clearly delineated pedestrian crossing further South, on a level patch of road, connecting to MWCC's compliant boardwalk. This location ensures pedestrians of all ages and abilities have right of way and only need to be aware of one-way traffic.

*The current 'implied' crossover for pedestrians is fraught with high risk of vehicle interaction from awkward angles, especially during icy conditions.*

# CULTURAL INTERPRETATION

## Improved Engagement & Awareness

A significant component of the MWCC proposal will be as a project that showcases the very best of Tasmania through world class interpretation.

The project includes an informative and interactive 'interpretation experience' that will share the stories of the mountain and her people from its geological formation, Indigenous significance, colonial adaptation and modern-day management. The layout and design of this feature will intuitively integrate into the primary pedestrian flow within the Pinnacle Centre and will be finalised with Indigenous cultural and geo-heritage consultants, thematic interpretation experts and interior designers.

The stories will span from the geological formations, the earliest Aboriginal, through colonial times, the feat of the building of the road through the Depression years, as well as more modern tales and stories.

Significant space within the Pinnacle Centre design has been dedicated to this experience, from arrival on the lower floor through to the rooftop lookouts. This will ensure maximum exposure to the interpretive experience, giving all visitors a heightened awareness and appreciation of Wellington Park and its value to Tasmanians.

# Cultural Heritage Impacts and Benefits

In comparison to many other significant and spectacular mountains in Tasmania, kunanyi / Mt Wellington is extremely visible and relatively accessible due to its proximity to the States' major population centre. This broad connection provides it significance as a landmark and has fostered values, traditions, memories as well as stories spanning many generations. This heritage frames a sense of place and identity for Tasmanians.

**"Wellington Park is more than a biophysical reserve, and more than the historical parts that make it up. It is a vital component of the community's identity, strongly forming the local sense of place. The mountain is particularly linked into the psyche of southern Tasmanians who live in its shadow and identify strongly with the area and local stories."**

- *Wellington Park Management Trust*

The cable car project has been discussed and debated for over a century, so much so that it could be argued the debate itself forms part of the mountain's heritage. As shown by comparative projects built abroad, a key positive impact projected from the proposal is likely to contribute to a significant and sustained increase in a broad sense of civic pride amongst the local population.

The vision of MWCC's project presents an innovative experience to deliver people physically into the landscape and to immerse them in these cultural values a meaningful way. This vision aims to offer a better way for visitors to engage and learn about the cultural and geographic landscape of the Park and surrounds, and head home taking not only personal memories with them but also a heightened appreciation and awareness of the mountain's significance.

Importantly, the project's alignment and site locations do not interfere with or replace existing cultural heritage sites or values. These include the Lady Jane Franklin's stone shelter and the ruins of Wragge's Observatory, both from the turn of the 20th Century.


The existing Observation Shelter at the pinnacle (built in 1988) is not a heritage listed item[16] and is unlikely to be able to be considered for listing[17]. The final proposal details its reconfiguration into an outdoor lookout platform, achieved by removing the concrete cast roof and glazing, and trimming down and levelling the natural stone walls to retain a safe handrail 1.2 metres above slab height.

16 ***Tasmanian Heritage Council***
17 ***Wellington Park Management Trust Heritage Report 2010***

The MWCC project has considered and incorporates the rich plethora of cultural heritage within the Park. The proposed interpretive experience will immerse visitors and locals alike with layers of information delivered from the point of arrival at the base station, through the cableway journey, and further upon arrival at the Pinnacle Centre.

*Thoughtful, sensitive and conscious awareness has been a core objective of the design brief, with the final resolution a smart collaboration between two local and award-winning architectural firms.*

There, the interpretive experience consumes the bulk of the circulation space within the Pinnacle Centre, extending from the cable car arrival platform up to the main floor, rooftop and along the new boardwalk towards the existing summit car park. Guided interpretation, in partnership with others will be available during standard operating hours. This interior space will double as a mustering point for school excursions and tour groups.

The proposed project will also include a 'Sanctum' – a viewing room to allow the opportunity to be immersed and enjoy quiet spiritual connection with the mountain and majestic views.

Potential exists for a small gift shop providing the 'best of Tasmania' artisan produce is to be located on the main floor near the café, whilst Tasmanian cheese and whisky can be savoured while overlooking one of the world's most beautiful small cities and the River Derwent.

An opportunity for the WPMT to either partly or wholly manage the guided component of the interpretative experience, in conjunction with MWCC or a sublease, is also a possibility. It is envisaged external tour operators will also make use of the space.

## Indigenous Community Opportunities

MWCC aspire to work with local Aboriginal communities and stakeholders. The opportunity for the MWCC project to enhance identity and sense of connection to place is vast, and we believe can be achieved through better understanding, sensitive interpretation and improving connection to land and culture.

MWCC has built-in this aspiration by costing in interpretative, educational opportunities into the design footprint of the proposal, and are committed to actively explore initiatives to support Aboriginal partnerships and product development. MWCC will continue to seek involvement from the Tasmanian Aboriginal community and support Indigenous tourism product development and operators.

## Commitment to Reconciliation

MWCC recognises the importance and significance of Land, Place and Country to Aboriginal communities, and that their histories, traditions and cultures are unique and complex.

**A CONSCIOUS WORKPLACE**

MWCC is an organisation focusing on a triple bottom line ethos, owning a responsibility to use this project as a force for good in the sphere of cultural identity and Aboriginal reconciliation. To do this, MWCC will focus on initiatives that create shared value for all our stakeholders and purpose beyond the financial and environmental return.

Beyond being an active member of the Reconciliation Tasmania's 'Reconciliation Collective' – which includes a number of private companies, not-for-profit organisations, membership organisations, local government agencies and others – MWCC is committed to progress the development of a tailored Reconciliation Action Plan (RAP)[18]. MWCC aims to develop a RAP that identifies opportunities to align its operating activities with reconciliation objectives that bring positive change to staff and their families, passengers, self-drive summit visitors and the broader community.

As a responsible business, this commitment includes a focus on developing ongoing partnerships with a range of Aboriginal organisations and to encourage and foster initiatives aimed to support reconciliation in the broader community. We believe these initiatives should be managed by local Aboriginal groups with joint goals of supporting traditional land management and cultural interpretation.

[18] **Reconciliation Tasmania – Reconciliation Action Plan**

# EDUCATION

## Class in the Clouds

A core program of the MWCC's planned Community Foundation is an educational program tailored for Tasmanian school class groups from Kinder to Grade 12. The aim of the educational activity is to focus on the peri-glacial alpine environment offered by the pinnacle, the climate, flora and fauna, Aboriginal value and colonial history of human adaption, as well as an engineering showcase of the cable car electro-mechanics.


The 'Class in the Clouds' program will employ a suitable educational guide and include free access on the cable car for all students from one nominated year group each year. This will be extended to schools across Tasmania for Kinder to Grade 12. MWCC proposes school principal discretion as to which year group they allocate to participate in the program each year, and it is envisaged the program will be developed in conjunction with the Tasmanian Department of Education, Aboriginal elders, local historians as well as the Tasmanian Parks and Wildlife Service to fill a knowledge gap in the student curriculum.

The program, including cost of provisioning free tickets for participating students, will be fully funded by the MWCC Community Foundation.

*MWCC's Foundation will heavily focus on life-long educational outcomes.*

# COMMUNITY FOUNDATION

The MWCC Community Foundation will be the charitable & altruistic arm of the Mount Wellington Cableway Company Pty Limited (MWCC). The mission of the Foundation will be to support and enrich the local and broader community in which MWCC operates, assisting to deliver the company's founding principles.

Once the cableway is operational, the Foundation will be an independent committee fully funded by a percentage of operational revenue from the previous fiscal year's takings. The Foundation's activities would be based around Programs, Partnerships & Philanthropy. Public and community consultation will assist the focus of the Foundation's activities over time.

Additionally, MWCC's Community Foundation will support our commitment to an approved Reconciliation Action Plan. It is envisaged support will include the sponsorship of secondary and tertiary level scholarships, bursaries and workplace traineeships to support the preservation of language, transfer of generational knowledge and the wellbeing of traditional custodians.

## Programs

- Run MWCC's the *Class in the Clouds* program
- Register with *Keep Australia Beautiful / Clean Up Australia*
- Participation with *Landcare Tasmania*

## Partnerships

- Assist with track & trail development
- Assist with weed management programs
- Co-management of facilities
- Aid existing/new winter festivals/events
- Support aboriginal product development and traineeships, ceremonies and community initiatives

## Philanthropy

- Reward local residents tickets/annual pass for recognised community/volunteer work.
- Co-fund local school facility upgrades
- Co-fund recreational trail development
- Support existing & start up auxiliary businesses via practical and financial assistance
- Sponsor new and existing event (in cash & in-kind)
- Sponsor further education/scholarships for aspiring staff
- Sponsor bursaries and scholarships for traditional custodians

# ECONOMIC OUTCOME

*Creating meaningful jobs*

# NET ECONOMIC IMPACTS

## Benefits to the Broader Economy

his report focusses on articulating the environmental and social impacts to the community, two key pillars of MWCC's triple bottom line sustainable operating model. The third key pillar is the broader economic impact to the community, beyond the Company's internal shareholders.

To quantify the broader economic benefits of the proposed project, MWCC engaged Strategy 42 South to produce an Economic Impact Report. This report conservatively measures both the short-term construction, as well as the ongoing operation impacts of the project to the Tasmanian economy to gauge the net differential benefit. These results have been endorsed by respected economist Saul Eslake.

Whilst market segment visitation has grown and some design details of the project have been refined since the report was published in 2016, the economic fundamentals of the project such as the ticket pricing, construction cost and employment figures remain constant. As such, the report's findings remain relevant and accurately reflect the economic impact of the project.

Key findings of the report indicate:

- An ongoing $79M to $99M net positive impact to the Tasmanian economy, once operational.
- Likely pull factor extending or increasing new and repeat visitation to the state.
- 80 new jobs (50 Full Time Equivalent positions) once operational in engineering, hospitality and tourism sectors.
- 200 jobs during construction.

For more information on the broader economic impacts to the Tasmanian economy, please refer to the 'Mount Wellington Cable Car: Economic Impact' report by Strategy 42 South 2016.

## Benefits to State and Federal Government

Whilst it is clear that the implications of the COVID-19 pandemic have currently stalled the tourism industry in Tasmania, the numbers indicated in our 2016 report can be considered a relative and robust indicator of the potential economic contribution of the project to Tasmania when open.

Considering the current planning process and the most plausible timeframe for the project's opening date of FY2022/23, it is expected that the visitor economy in Tasmania would be at similar levels to pre-pandemic forecasts.

Whilst expectations are still uncertain, the Australian predictions assume an initial commencement of intrastate tourism mid-2020, gradual returns to interstate visitation, with international and cruise tourism predicted to begin recovering towards the end of 2021, aligning with potential dates for commencement of MWCC operations.

Potentially the project has an incrementally higher importance in helping recovery of the tourism industry in Tasmania through new visitor experiences and infrastructure.

Hobart also has significant new hotel accommodation under design and development, some additional 1000 beds will have been added by the time this project could be operational.
The cableway has the scale to ensure global brand coverage for Tasmania and will add to the compelling reasons to visit Hobart.

In terms of state and Federal governments, the 2016 Economic Impact Report noted that the project would annually:

- Inject $62m of new investment into Tasmania.
- $3.9m in new Government tax revenues per annum (inclusive of projected Income Tax, GST equalisation revenue for Tasmania, PAYG and Payroll Tax).
- New long-term income for land lease agreement[19].

[19] Broader Economic Impact Report 2016, Strategy42 South


## Benefits to Local Government

The MWCC project provides benefits and cost efficiencies to the City of Hobart, including:

- Increased lifespan of existing mountain road.
- Cost savings of approximately $250,000 per annum currently spent to subsidise the Wellington Park Management Trust (WPMT).
- Potential on-cost savings from co-location of WPMT offices/ranger storage within MWCC's proposal.
- Reduced demand on traffic and car parking management during peak visitation.
- Reduced compliance risk of visitor safety.

## Benefits to Wellington Park Management Trust

The MWCC project facilitates several benefits for the Wellington Park Management Trust (WPMT) with a core focus on the Park's objectives, and the financial and resource requirements of the Park on an ongoing basis.

The proposed project seeks to address these with facility inclusions and lease arrangements funnelled into the financial resources of WPMT to add significant capacity to their valuable operation.

The MWCC will collect and share visitation data with the Park Trust and will collaborate on visitor management improvements including:

- Manager's office and Park-Ranger storage facilities at Base Station and/or Pinnacle Centre
- New and secure income per annum from other operating licences and/or leases
- Assessing the reduced demand on traffic and car-parking management during peak visitation.
- Reduced pressure to raise alternative revenue.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# Draft Fire Protection Report
# Building Act Compliance Assessment
# Mount Wellington Cable Car
# Mount Wellington

Prepared for
Mount Wellington Cableway Company

Revision 08
Project 17116

11 May 2021

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# Table of Contents

## List of Attachments



| | Name | Signature | Date |
|---|---|---|---|
| **Authorised by:** | **Ross Murphy** | | **11 May 2021** |

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# 1. Executive Summary

*Planning Approval*

This version of the document is intended to support the planning application for use and development of the Mount Wellington Cable Car. The Wellington Park Management Plan (WPMP), which regulates use and development within the Wellington Park, requires bushfire to be considered within the planning process.

The WPMP requires compliance with Planning Directive No. 5. Since the WPMP was established, a revised version of the planning directive has been enforced. According to the *Wellington Park Act* at Section 23 (5):

> *If a provision of the management plan is inconsistent with a provision of a planning directive issued under section 13 of the Land Use Planning and Approvals Act 1993, the latter provision prevails.*

Legal opinion has verified that Planning Directive 5.1 supersedes PD 5.0 for the purpose of this assessment, as per S23(5) of the Wellington Park Act 1993.

PD 5.1 only applies if the use is a hazardous or vulnerable use as defined by the Bushfire Prone Areas Code or if subdivision is proposed. Neither of those two are triggered by this proposal, so consequently PD5.1 is not applicable.

As outlined below, other approval processes will require further bushfire analysis. For the purposes of the planning application, it is necessary to have some degree of confidence in these outcomes to the extent that the required vegetation management or clearance is known and assessed in terms of the Wellington Park values.

Therefore, bushfire hazard management has been considered where clearance or conversion of vegetation triggers an assessment of the impact on natural values under Issue 2 of the WPMP or the Biodiversity Code of the Hobart Interim Planning Scheme.

*Building Approval*

Bushfire hazard management and structural fire protection are regulated within the building approval process. The hazards associated with bushfire are managed through a proposed performance solution for the Pinnacle node and a prescriptive solution for the Base node developed in accordance with the building regulations, as detailed in the Report. A Bushfire Hazard Management Plan (BHMP) has been provided for both the Pinnacle and Base nodes. Bushfire protection measures are described in the Report and BHMPs. The bushfire protection solution may change within the detailed design phase prior to building approval.

The following illustrates the building approval process during the detailed design phase:

- An application for the detailed design including design certifications is made to the Building Surveyor for a Certificate of Likely Compliance (Section 130 of the Building Act), and the Building Surveyor forwards the relevant aspects of the application to the Tasmania Fire Service (TFS) for comment (Section 131 and Reg 27).

- The TFS are required to provide an opinion on the proposed building work to the Building Surveyor (Reg 27(4)).

- The Building Surveyor is required to consider the report from the TFS (Section 132), and is required to notify the TFS and provide reasons if the Building Surveyor chooses to not implement the advice of the TFS (Section 132(3)). The TFS may appeal the decision of the Building Surveyor to issue the CLC (Section 180A).

- The Building Permit Authority (the Council) is required to consider and issue a building permit (Section 143).

- The Building Surveyor is required to notify the TFS prior to the issue of the occupancy permit (Section 219 and Reg 67) and the TFS need to provide a report. Again, the Building Surveyor must consider the report and provide a copy of the occupancy permit to the TFS (Reg 67). An appeal mechanism is provided at Section 280A.

- The Builder is required to certify that the building work is compliant with the building permit.

The relevant standard that identifies the requirement for fire protection including bushfire mitigation is the *Building Act 2016* which adopts the methodology in the National Construction Code (and associated standards) and the *Director's Determination – Requirements for Building in Bushfire Prone Areas* (the Determination).

In this assessment the methodology applied is that the proposed building work is to achieve a level of protection that is at least equivalent to that achieved by compliance with the prescriptive Deemed-to-Satisfy (DtS) provisions in the Determination.

The Report has been structured to consider each node (Pinnacle and Base) individually. The following is a summary of the bushfire mitigation outcomes for both nodes.

*Pinnacle Node*

In summary, the Pinnacle node is not compliant with the DtS provisions of the Determination and a performance solution is necessary in accordance with the Determination and the building regulations.

The Pinnacle node consists of two fire compartments: the café and the visitor centre. The café is a class 6 building as defined in the NCC and there are no bushfire protection requirements for that fire compartment. Only the visitor centre (Class 9b) requires any bushfire protection.

The requirements necessary to achieve compliance with the DtS provisions of the Determination for the visitor centre are (in summary);

- A HMA around the building to reduce the exposed radiant heat flux to BAL 29 (29kW/$m^2$),
- A firefighting water supply,
- Road access to the building, and
- An emergency plan.

The proposed solution for the visitor centre is not compliant with the DtS provisions of the Determination because;

- The width of the HMA to the visitor centre is less than that required in the DtS provisions of the Determination. The width of the HMA would require up to 25m meet the DtS requirement. A HMA width of 1m is provided in the proposed performance solution.
- Road access is not provided to the hydrants serving the visitor centre. Firefighters need to carry equipment from the firefighting water supply near the carpark to the hydrants.

A performance solution is compliant with the Determination if it demonstrates that an equivalent level of performance is achieved compared to a building that is fully compliant with the DtS provisions of the Determination.

The performance solution for the Pinnacle node includes the following elements;

- An emergency plan is to be developed where the occupants will be evacuated from the building prior to severe bushfire weather or there is a fire in the Park. An emergency plan strategy is provided in the Report that will develop into an emergency plan for the building approval. There remains a potential for a local fire in less severe conditions when the building remains occupied and there is no evacuation in accordance with the emergency plan.
- Fire separation is provided between the café and the visitor centre including a connecting bridge where there is surface stone externally between the two fire compartments. This arrangement provides redundancy being a secondary refuge if the occupants have not evacuated,
- The café and the visitor centre are to be compliant with the construction requirement for BAL 40. There is no requirement for any resistance to bushfire in the structure to comply with the DtS provisions and so this protection measure is over and above that required by the DtS provisions.

- The detail for this construction may vary during the detailed design development and this will need to be incorporated into the performance solution as the detailed design is finalised and submitted for approval under the building regulations.

- A HMA with a width of 1m from the extremity of the building complex is provided compared to a requirement of less than 25m in a DtS compliant arrangement to the visitor centre only (not the café). A reduced width of HMA is desirable to lessen the impact on local flora.

- The threat from the bushfire prone vegetation is less than that anticipated in the DtS provisions because; the site is alpine (where there is a reduce potential for more severe bushfire weather) and there is substantial quantities of surface stone around the building that results in discontinuous vegetation and a significantly reduced fuel load than is otherwise assumed in the DtS assessment. In short, the fire threat at the site is less than that assumed in a DtS compliant arrangement.

- The firefighting water supply is significantly greater in quantity and delivery compared to the DtS requirement in the determination where the firefighting supply could be 10,000 litres in a static tank with no static pressure other than that achieved in the tank for the visitor centre, not the café. The proposed solution has a capacity of 72,000 litres and will deliver 10 litres / second from hydrants with a residual pressure of 250kPa for a period of 1 hour. And will serve the café and the visitor centre.

- The road access to the building is compliant with the DtS provisions of the Determination but for the fact that road access is not provided to the hydrants. Additional protection is provided from the west by the existence of the public carpark at the summit. Firefighters need to carry hoses to the hydrants. The additional time for this activity is minor by comparison to the time required for an appliance to turn out from either Fern Tree or Hobart. Additional protections are provided for the benefit of firefighters in the performance solution above.

To reiterate; the above items are provided in the performance solution to compensate for the reduced width of the HMA to the visitor centre and no road access to hydrants to the visitor centre.

*Base Node*

In summary, a HMA is provided to the Base node compliant with the DtS provisions of the Determination meaning that this node is fully compliant with the DtS provisions of the Determination.

The requirements necessary to achieve compliance with the DtS provisions of the Determination are (in summary);

- A HMA around the building to reduce the radiant heat flux exposure to the building to BAL 29 ($29kW/m^2$),

- A firefighting water supply,
- Road access to the building, and
- An emergency plan.

The HMA occurs entirely within the lease area and the Client is responsible for the management of the HMA on the lease. There is no obligation on others to manage vegetation or to allow the management of vegetation on other property.

These elements are to be provided in accordance with the DtS provisions of the Determination.

In addition to the measures necessary to achieve compliance with the DtS provisions for the Base node, the following additional measures are proposed in the Report and to be developed in the detailed design development for building approval:

- The building is to be compliant with the construction requirement for BAL 29. There is no requirement for any resistance to bushfire in the structure to comply with the DtS provisions and so this protection measure is over and above that required by the DtS provisions. The detail for this construction may vary during the detailed design and this will not require a performance solution as the design is fully compliant with the DtS provisions of the Determination. Notwithstanding, the Client would like to provide additional protection to the structure than that required by the building regulations.

- Sprinkler protection is provided to the building in accordance with AS 2118.1 to reduce the impact of ignition within the building from bushfire. There is no requirement for sprinkler protection in a DtS compliant building for bushfire or structural fire mitigation.

- There is a benefit associated with the power transmission easement to the down slope side of the building and the planned burns and bushfire mitigation measures employed within the Park reduce the threat from bushfire prone vegetation that is additional to the DtS requirement.

- The firefighting water supply is significantly greater in quantity and delivery compared to the DtS requirement in the determination where the firefighting supply could be 10,000 litres in a static tank with no static pressure other than that achieved in the tank. The proposed solution has a capacity of 300,000 litres (including domestic demand) in addition to automatic filling from the town mains supply and will deliver hydrant flows with a residual pressure of 250kPa as well as the sprinkler demand.

- The road access to the building is significantly better than the DtS requirement in that a dual carriageway road is provided with road access around the building and pull offs at the fire hydrant locations to allow for uninterrupted traffic flow in a bushfire. In addition, there is an alternative road access to Old Farm Road. The DtS compliant requirement is for a single carriageway road with intermittent passing bays along the road to allow some passing of opposing traffic and only one access road.

There is no requirement to provide these additional measures. In combination with being fully compliant with the DtS provisions of the Determination, it is clear that an acceptable level of bushfire protection is provided to this building that significantly exceeds the statutory requirement.

# 2. Introduction

Castellan Consulting Pty Ltd (Castellan) has been engaged by the Mount Wellington Cableway Company (the Client) to prepare a fire protection report for the construction of two nodes at either end of the proposed Mount Wellington cableway; the Pinnacle and the Base. Each of these nodes is considered separately below.

This report is prepared to;

- Facilitate stakeholder engagement,
- Support the application for a certificate of likely compliance from the Building Surveyor,
- Support the mandatory referral of the proposed design to the Tasmania Fire Service (TFS) in accordance with Regulation 27 of the *Building Regulations 2016,*
- Support the application for a building permit to the building permit authority.

This report also assists with developing an understanding of elements of the building work that may have a bearing on the application for a planning permit.

For both of these nodes the discussion is broken down into two elements being;

- Structural fire protection that relates to a fire safety assessment of the impact of a structural fire within a building, and
- Bushfire safety that relates to bushfire safety assessment in response to a bushfire approaching these buildings.

The structural fire protection and bushfire protection are dealt with in the same report as both include performance elements that require a referral to the Tasmania Fire Service (TFS) as outlined above and approval in a single building permit. These performance solutions relate to elements of the buildings that are provided for both structural fire protection and bushfire protection where the proposed building work is not compliant with the Deemed-to-Satisfy (DtS) provisions of the National Construction Code (NCC) [1].

There is also an overlap with respect to the provision of a firefighting water supply, fire brigade access and the provision of an emergency plan which benefits from a single report which deals with both bushfire and structural fire.

Notwithstanding the approval process for bushfire protection differs from that prescribed for fire structural fire protection and so these elements are dealt with separately in this report.

The report has been written so that the nodes can be dealt with separately as a separate approval under the building regulations may be necessary for each building.

The structural fire safety element is considered first as there are more onerous requirements for some elements of the structural fire safety assessment such as fire hydrant coverage where there is a benefit to the bushfire assessment in the subsequent discussion.

This assessment at this time (Revision 7.00) is provided to instil confidence at the time of the planning application that the bushfire protection strategy has been considered and that a building permit will follow that can be consistent with the planning application. If the building permit is not consistent with the planning approval, then further planning approval may be necessary.

The Building Surveyor (as the approval authority) and the Chief Officer (CO) of the Tasmania Fire Service (as a Reporting Authority providing advice to the Building Surveyor) have both been involved in the development of the fire protection strategy.

In this context this report is best described as a finalised report for the purpose of the planning application and a draft report for the purpose of the building approval. The detailed design is yet to be developed and it is typical for the fire engineering solution to be finessed during the detailed design development and the assessment of the detailed design prior to the issue of the building permit.

Revision 7.00 was provided in response to correspondence from the Chief Officer of the TFS to the Council outside of their statutory obligation to provide advice to the Building Surveyor prior to the issue of the Certificate of Likely Compliance (CLC) for the building work and includes a change to the approach applied to the bushfire Hazard Management Area (HMA) for the Base node.

This revision to the report (Revision 8.00) includes some additional changes in response to further comment from the TFS including a requirement for a single Bushfire Hazard Management Plan to be prepared for the entire development.

# 3. Structural Fire Protection – The Pinnacle

## 3.1 Introduction

The extent of the building work for the Pinnacle is shown on drawings provided at Attachment 1.00. These drawings have been assessed by the Building Surveyor and it has been determined that the proposed building work is not compliant with the Deemed-to-Satisfy (DtS) provisions of the National Construction Code (NCC) [1] because;

- The shaft to the non-required non-fire-isolated stair to the Visitor Centre connects three levels and is not sprinkler protected.

- A part of the restaurant to the Visitor Centre has a distance of travel to a single exit that exceeds the maximum distance of travel to a single exit of 20m by less than 5m.

- The static water supply for the fire hydrant system to the Visitor Centre is not provided with a four hour firefighting water supply capacity based on 2 hydrants operating simultaneously and the distance from the appliance to the attack hydrant exceeds 50m.

The report from the Building Surveyor addressing the fire protection requirements is provided at Attachment 2.00. This report and the drawings provided at Attachment 1.00 provide a more expansive description of the requirements for fire protection and other things arising from the NCC that are compliant with the DtS provisions of the NCC. The purpose of this section of the report is to provide justification for those elements of the building that are not compliant with the DtS provisions of the NCC.

Compliance with the DtS provisions of the NCC is not mandatory. The mandatory elements of the NCC are the performance requirements. Compliance with the performance requirements can be achieved either by complying with the DtS provisions or by demonstrating that an acceptable level of performance is achieved by other means that may not be compliant with the DtS provisions.

It is also important to note that compliance with the building regulations does not mean that there is no residual risk to the occupants of the building. The level of residual risk for the building work which is acceptable in this report is consistent with that risk that remains for a building that is fully compliant with the prescriptive (DtS) solution in the building regulations.

This assessment does not consider occupant safety during the construction phase and does not consider legislation beyond the *Building Act 2016* and the subordinate legislation and standards adopted by that legislation. The development of the detailed design for the building work is to be undertaken by others.

## 3.2 Fire Engineering Background

This section of the report provides the background material that informs the subsequent analysis.

A Fire Engineering Brief (FEB) as described in the International Fire Engineering Guidelines (IFEG) [2] was prepared as a precursor to the Fire Engineering Report (FER). A meeting with stakeholders was undertaken prior to the development of the FER. The FER is issued as a draft so that the relevant stakeholders may provide further comment on the solution prior to finalising the report.

### 3.2.1 General Objectives

The principal objective of this assessment is to provide a solution that complies with the building regulations. This report is to provide justification for deviations away from the prescriptive DtS provisions of the NCC in accordance with the methodology provided in that document.

The general objectives inherent in the NCC are;

- Protecting building occupants,
- Facilitating the activities of emergency services personnel, and
- Limiting the spread of fire between buildings.

The range of general objectives that are relevant to this assessment will be identified to reflect the DtS non-compliances that are identified later in this report.

No other objectives have been identified by the Client beyond the regulatory objectives that need to be incorporated into this assessment.

### 3.2.2 Regulatory Framework & Methodology

The proposed building work is to be undertaken in the State of Tasmania. The enabling legislation is the *Building Act 2016* (the Act) which adopts the NCC as the technical standard for new building work (at Section 11). Subordinate legislation is provided in the *Building Regulations 2016* (the Regulations).

The mandatory parts of the NCC are the Performance Requirements. Compliance with the performance requirements can only be achieved by;

a) complying with the [DtS] provisions, or

b) formulating an alternative solution which,

    i. complies with the performance requirements [absolute analysis], or

ii. is shown to be at least equivalent to the [DtS] provisions, or

c) a combination of a) and b). (Clause A0.3, NCC)

The proposed performance solution in this report will be assessed using a combination of DtS compliance and equivalence to the DtS provisions. As such the proposed solution is to provide a level of fire safety performance which is at least the same or better than that which is achieved by compliance with the DtS provisions.

The assessment method to be applied is 'comparison with the DtS provisions' and 'expert judgement' (Clause A0.5, NCC). Evidence of suitability is to be in the form of a certificate issued in accordance with Clause A2.2 (iii) of the NCC. The analysis is to be undertaken substantially in accordance with the International Fire Engineering Guidelines (IFEG) [2].

### 3.2.3 Stakeholders

The following are the relevant stakeholders;

- Client — Adrian Bold - MWCC
- Designer — Mike Verdouw – 1+2 Architects
- Designer — Scott Verdouw – JAWS Architects
- Hydraulic Designer — Dale Hayers – Gandy and Roberts
- Building Surveyor — Lee Tyers and Assoc.
- Chief Officer — Tasmania Fire Service
- Fire Engineer — Ross Murphy – Castellan

### 3.2.4 Building and Occupant Characteristics

The assessment by the Building Surveyor considered the complex as two separate buildings. The Café is a single storey building and can be constructed as Type C construction as defined in the NCC. The larger building (the Visitor Centre) is a combination of Class 6 and 9b with 3 storeys and is required by the DtS provisions to be Type A construction (the most stringent Type of Construction).

The following is a summary of the fire protection requirements identified by the Building Surveyor to comply with the DtS provisions of the NCC;

1. Load bearing elements and floor to the Visitor Centre require fire resistance. There is no requirement for the building to contain fire compartmentation by the DtS provisions and the building is not a large isolated building however fire compartmentation is provided in the proposed performance solution.

2. The external walls of the Visitor Centre are required to be non-combustible.

3. Linings and materials are required to have the prescribed fire hazard properties.

4. There may be openings in the external walls that may require spandrels to limit the vertical spread of fire.

5. Exits and egress pathways to enable evacuation from the building and access for the responding fire brigade. The development is in the alpine zone and specific provisions apply including opening external doors inwardly unless sheltered. A performance solution is required for evacuation for occupants from a part of the restaurant on level 0 because of the distance of travel to an exit and access by the responding fire brigade to fire hydrants generally.

6. Access is required to be provided for people with disabilities as defined in the NCC.

7. A fire hydrant system is required in accordance with AS 2419.1. This includes static water storage of 288,000 litres of water in accordance with the standard as well as pumps to achieve the required flows and pressure. This aspect of the proposed building work will be subject to a performance solution.

8. Fire hose reels are a requirement of the DtS provisions.

9. There is a void connecting three levels and the Building Surveyor has identified this as a shaft to a non-required non-fire-isolated stair connecting 3 levels. The DtS requirements for this stair shaft in this building would be the provision of sprinkler protection.

   The Clients preference is to not provide sprinklers because of the need to provide a water supply to the system (in particular). Two (2) exists from each level should be achievable. This aspect of the building work will be subject to a performance solution.

10. A smoke detection and occupant warning system in accordance with AS 1670.1 is required by the DtS provisions and this part of the solution will be compliant with that requirement.

11. Emergency lighting and illuminated exit signage is to be provided in accordance with the DtS provisions of the NCC.

12. An emergency plan for structural fire safety will be necessary prior to the occupation of the building in accordance with the *General Fire Regulations* and approved by the Chief Officer.

The characteristics of the occupants of the proposed building will be consistent with the range of characteristics for occupants that presently visit the summit. This ranges from individuals through to large groups with a broad cross section of ages. These visitors may have disabilities that affect their ability to recognise a fire and / or their ability to evacuate in the event of a fire that is consistent with the broad range of disability that is present in the community.

While the provision of the cable car is likely to improve access for people with disabilities to the Pinnacle and the summit generally through more days in the year it is apparent that there is already access for people with disabilities provided to the existing site though access to viewing platforms is not in accordance with current standards.

### 3.2.5 Proposed Performance Solution

The proposed alternative solution applied in this assessment includes compliance with the drawings provided at Attachment 1.00 and compliance with the DtS provisions of the NCC for the new building work other than:

- A sprinkler system is not provided to the stair well to the Visitor Centre where it connects 3 levels,
- There is an extended distance of travel to a part of the restaurant in the Visitor Centre, and
- There is a reduced firefighting water supply to the fire hydrant system and an extended distance from the fire brigade appliance to the hydrants for the Visitor Centre.

The additional fire protection elements to be provided to the proposed building work include the following;

1. Fire compartmentation between the Visitor Centre and the Café and additional fire compartmentation within the Visitor Centre as shown at Attachment 1.00 with the objective of reducing the size of the fire compartments and to provide a horizontal exit option if there are adverse conditions arsing externally from either bushfire or snow. There is no requirement for compartmentation in the DtS provisions for this building. Door openings to the fire compartmentation will be provided with smoke seals that are rated to 200°C for 30 minutes.
2. The provision of an Emergency Warning and Intercommunication System (EWIS) to supplement the addressable fire detection system is to be provided so that evacuation to different fire compartments and smoke compartments can be better managed. Voice annunciation is to be provided. This will also assist with bushfire management if the building remains occupied and there is a local fire in the near vicinity of the building. The form and cascading messaging to be provided is to be determined prior to the issue of the Occupancy Permit (OP) for the building.
3. A Manual Call Point (MCP) is to be provided to the entrance to the kitchen, the bar, the point of sale (POS) to the Café, at the Fire Indicator Panel (FIP) to the Airlock at Level 2 and at the security office

(if provided) so that staff are able to manually initiate the occupant warning system.

4. An automatic alert is to be provided to the cable car operator at the Base that a fire may exist at the Pinnacle and the cable car is to stop and not deliver occupants to the Pinnacle if an alarm is occurring. If an evacuation tone occurs the closest cable car is to return to the base and the occupants evacuated. Once this has occurred the second cable car is to be returned to the Base. The procedure for the management is to be developed and approved prior to the issue of the OP.

5. The provision of portable fire extinguishers suitable for a broader class of fires for the response by the occupants in addition to fire hose reels. A proportion of staff is to be provided with training in the use of first response firefighting equipment and evacuation procedures.

6. Evacuation is to be provided directly outside from each level. Exits and exit pathways are to be provided in accordance with the drawings at Attachment 1.00.

7. The ceiling height through the restaurant is to remain at a height of greater than 3.6m.

8. The Café and the Visitor Centre are to have independent air handling systems.

9. Louvres are to be provided to the top of the stair shaft with a total area of greater than $3.2m^2$ in the external wall facing east which defaults to the open position on detection of fire within the building. These louvres are to be capable of manual operation as well to allow the natural venting of heat from the stair well. Ember protection is to be provided to this natural vent.

10. A static water supply is to be provided with a capacity to deliver the flow required by AS 2419.1 for a period of 60 minutes. A booster assembly is to be provided to the static water supply to allow for a direct connection to the supply. The location of the static water supply, the road access and the access for fire fighters is shown on the drawings provided at Attachment 1.00.

This list of features and measures is referred to as the proposed performance solution for the remainder of this assessment.

An integration matrix is provided below to assist with understanding the operation of fire protection systems;

| Integration Matrix - Pinnacle | | | | | | |
|---|---|---|---|---|---|---|
| | Outputs | | | | | |
| **Inputs** | Occupant Warning | Base notification | Brigade alert | Door Closure | Mechanical Shutdown | Louvre opening |
| Smoke Detector Activation | 1. | 2. | 3. | 4. | 5. | 6. |
| MCP Activation | 7. | 7. | 7. | 7. | 7. | 7. |

1. An alert tone is to sound in the fire compartment of fire origin initially and escalate to an evacuation tone (and message) after 120 seconds if smoke is still present. An alert tone is to sound in the adjoining fire compartments on the evacuation tone. After a further 300 seconds the alert tone in the adjoining fire compartment will escalate to an evacuation tone. The exception to this is that the evacuation tone in the Café will not operate on detection of smoke in the Visitor Centre (and vice versa) unless there is smoke detected in that space and / or the MCP in that space is activated. This is because it may be necessary for the occupants to remain within the building if there are adverse conditions outside the building.

2. A message is to be provided to the Base control room that smoke has been detected in the building.

3. Alarm Signalling Equipment (ASE) is to provide an automatic message to the TFS that fire has been detected at the Pinnacle.

4. The Fire Indicator Panel (FIP) is to initiate door closure to the various fire compartments on detection of smoke within the building.

5. The FIP is to send a signal to shut down the air handling system where the air handling system distributes air across multiple fire compartments.

6. The louvres at the roof level of the internal stair to the Visitor Centre are to open automatically on detection of smoke in the building.

7. The activation of the MCP is to replicate the actions for the smoke detection.

### 3.2.6 DtS and Performance Requirements

The Building Surveyor has identified that the proposed building work is not compliant with the DtS provisions of the NCC for the reasons outlined in the table below. The relevant performance requirements are also identified as required by the NCC methodology.

| DtS provision | Performance Requirement/s | Objective |
|---|---|---|
| The stair well to the Visitor Centre connects three levels without the provision of a sprinkler system in accordance with Clause D1.12 of the NCC. | DP1.4 and EP2.2 | Occupant safety |
| The distance of travel to a part of the restaurant in the Visitor Centre exceeds 20m in accordance with Clause D1.4 of the NCC. | DP1.4 and EP2.2 | Occupant safety |
| The firefighting water supply and access to fire hydrants is not compliant with Clause E1.3 of the NCC and AS 2419.1. | EP1.3 | Facilities for fire brigade intervention. |

## 3.3 Assessment of Performance Solution

### 3.3.1 Occupant Safety

A number of fire scenarios are considered that examine in particular the impact on occupant fire safety associated with not complying with the DtS provisions of the NCC. It is not necessary to consider other fire scenarios as other parts of the building are compliant with the DtS provisions of the NCC and this is deemed to provide an acceptable level of residual risk.

*Fire in Stair Well*
In this first fire scenario, a fire is considered at a lower level of the Visitor Centre in the stair well where there is a potential for fire and smoke to impact on the occupants of the two levels above. If the stair well connected only two levels the arrangement would be fully compliant with the DtS provisions of the NCC and would require no further consideration.

Likewise, if the stair were provided with a sprinkler system the arrangement would be compliant with the DtS provisions and there would be no requirement to further consider this part of the building.

At Level 0 there is a foyer at the cable car dock and an amphitheatre so that there can be a gathering point and presentation option on arrival or prior to departure. This space is ostensibly open so that people may gather in this location. As such there is limited fuel provided in this location other than the material that may be carried by the people using the cable car. There are sanitary facilities for occupants in this fire compartment and the kitchen and restaurant is in an adjoining fire compartment.

It is plausible that a fire could start in the foyer area by an electrical fault or the misuse of electrical equipment however with this reduced fuel availability it is likely that the design fire would be limited to a slow or medium $t^2$ fire as defined in the Fire Engineering Guidelines [3].

At Level 1 a substantial part of this level is the stair well with a foyer / circulation space provided to three sides of the stair well. Again, this is circulation space where there is limited opportunity for combustible material to be either left or on display. The fuel load in this space is considered low.

In addition to the stair well there are some office spaces at level 1 where there is a greater potential for ignition and adjacent fuel load though again the extent of this is limited.

If there is a fire at these levels it is apparent that the smoke would be detected at the level of fire origin by detectors at the soffit to the apron around the stair well or the buoyant smoke would spill rise to the underside of the roof at the top of the stair well. If there is a large number of people present at the time of the fire it is highly likely that they will be aware of the onset of fire prior to the automatic activation of the fire detection system and in that situation there is an opportunity for staff to raise the alarm via the MCPs (not required by the DtS provisions other than the MCP at the FIP).

In response to the activation of the detection system,

- The louvres at the top of the stair well are to open automatically,

- An alert tone is to sound across the building with the alert tone escalating to an evacuation in the compartment of fire origin after 120 seconds if smoke continues to be detected. If staff confirm that fire exists the use of MCP will result in an evacuation tone in the fire compartment of fire origin. If the fire occurs in the Visitor Centre an audible message is provided that, in this fire scenario, 'a fire has been detected. Please evacuate to an adjoining fire compartment and await further instruction or evacuate directly outside if it is safe to do so.' After a further 300 seconds and there continues to be smoke detected the occupants of the restaurant / function room and the Sanctum are to be evacuated externally to the Café if it is safe to do so and conditions are adverse externally.

- The evacuation plan for the Pinnacle is given effect,

- The TFS are automatically alerted to the activation of the detection system,

- The operator at the Base is alerted to the onset of the alarm and the cable car evacuation strategy is to be employed.

At the upper level of the building there is a small platform which provides an opportunity to see over the roof of the Visitor Centre towards the east. There is limited opportunity for people to linger in this location because it is a small area and limited viewing space. The occupants then have an exit directly outside to the roof of the building which is a fire rated concrete roof.

At this level there are ventilated louvres that default to the open position on the detection of fire. If there is a rapidly developing fire (which is unlikely) the fire plume is more buoyant and the greater the benefit of the smoke venting to the louvres. With a relatively short distance of travel to an exit with few occupants and the reinforcing cues associated with smoke being present in the stair well it is apparent that the occupants of the roof level will safely evacuate from the building.

The venting via the louvres is away from exit pathways and is likely to be downwind of the prevailing wind as shown on the following wind rose information for 9.00am and 3.00pm at Mount Wellington / kunanyi.

**Frequency Analysis of Wind direction versus Wind speed in km/h (01 Mar 1961 to 31 Dec 2010)**

Custom times selected, refer to attached note for details

**MOUNT WELLINGTON**

Site Number 094087 • Opened Jan 1961 • Still Open • Latitude: -42.895° • Longitude: 147.2358° • Elevation 1260.4m

Values are percentage frequency. A "*" indicates the event has occurred but with a frequency less than 0.5%.
Other important info about this analysis is available in the accompanying notes.

**9 am** — **10287 Total Observations**

| Wind speed in km/h | Wind direction | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | NE | E | SE | S | SW | W | NW | Calm | ALL |
| >= 0 and < 40 | 6 | 2 | 2 | 2 | 4 | 16 | 18 | 11 | | 65 |
| >= 40 and < 50 | 1 | * | * | * | 1 | 3 | 5 | 3 | | 13 |
| >= 50 and < 60 | 1 | * | * | * | * | 2 | 4 | 3 | | 11 |
| >= 60 and < 70 | * | * | 0 | 0 | * | 1 | 2 | 2 | | 6 |
| >= 70 and < 80 | * | * | * | * | * | 1 | 1 | 1 | | 3 |
| >= 80 and < 90 | * | 0 | 0 | * | * | * | 1 | * | | 1 |
| >= 90 and < 100 | 0 | 0 | 0 | 0 | * | * | * | * | | * |
| >= 100 | 0 | 0 | 0 | * | * | * | * | * | | * |
| All | 8 | 2 | 2 | 3 | 5 | 24 | 31 | 21 | 5 | 100 |

**3 pm** — **10398 Total Observations**

| Wind speed in km/h | Wind direction | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | NE | E | SE | S | SW | W | NW | Calm | ALL |
| >= 0 and < 40 | 12 | 3 | 2 | 3 | 4 | 12 | 18 | 15 | | 73 |
| >= 40 and < 50 | 1 | * | * | * | * | 2 | 4 | 3 | | 10 |
| >= 50 and < 60 | 1 | * | * | * | * | 2 | 4 | 2 | | 9 |
| >= 60 and < 70 | * | 0 | * | * | * | 1 | 2 | 1 | | 4 |
| >= 70 and < 80 | * | * | * | * | * | 1 | 1 | 1 | | 2 |
| >= 80 and < 90 | * | * | 0 | 0 | * | * | * | * | | 1 |
| >= 90 and < 100 | * | 0 | 0 | 0 | * | * | * | * | | * |
| >= 100 | 0 | 0 | * | * | * | * | * | * | | * |
| All | 14 | 3 | 2 | 3 | 5 | 18 | 29 | 21 | 4 | 100 |

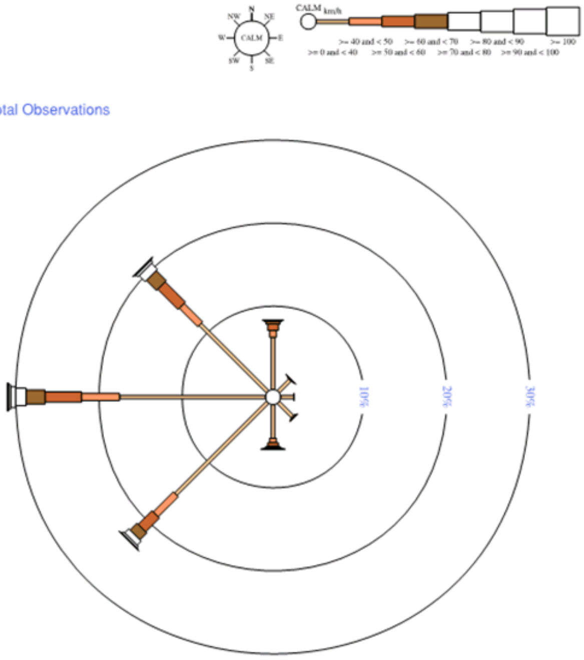
**Rose of Wind direction versus Wind speed in km/h (01 Mar 1961 to 31 Dec 2010)**
Custom times selected, refer to attached note for details

**MOUNT WELLINGTON**
Site No: 094087 • Opened Jan 1961 • Still Open • Latitude: -42.895° • Longitude: 147.2358° • Elevation 1260.4m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.

9 am
10287 Total Observations

Calm 5%

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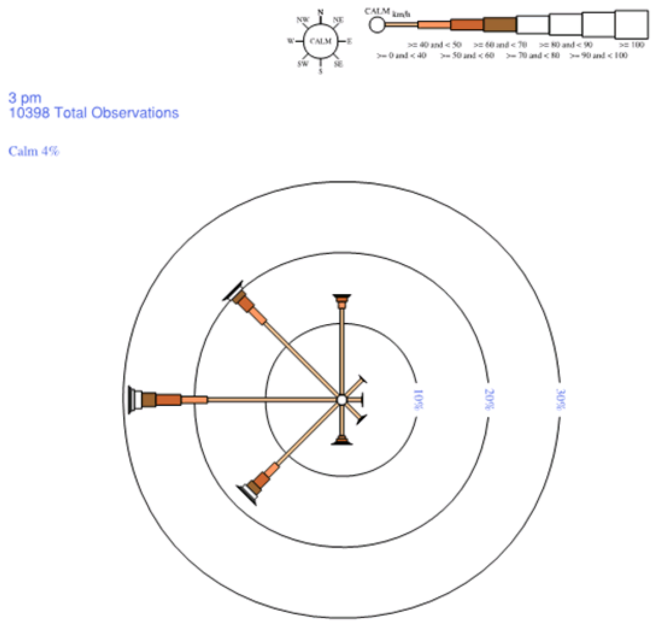
TCZ8094674 Page 1

**Rose of Wind direction versus Wind speed in km/h (01 Mar 1961 to 31 Dec 2010)**
Custom times selected, refer to attached note for details

**MOUNT WELLINGTON**
Site No: 094087 • Opened Jan 1961 • Still Open • Latitude: -42.895° • Longitude: 147.2358° • Elevation 1260.4m

An asterisk (*) indicates that calm is less than 0.5%.
Other important info about this analysis is available in the accompanying notes.

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For the occupants of Level 2 in this fire scenario there is likely to be a larger number of occupants at this level though there are a larger number of exit options. The occupants of the Sanctum are ok because they are in a separate fire compartment with an option to evacuate directly outside. The remainder of this level consists of a foyer / circulation space around the stair well with some ancillary functions including amenities.

Within the foyer / circulation space are areas for retail and interpretation areas as well as lookout positions. These activities can add to the fuel load however this level is at the top of the stair well and a fire at this level would impact that level only (and the roof).

For the occupants of Level 2 in response to a fire at the lower levels (this scenario) there are six exit options in a small space which is a significantly greater number of exits than required by the DtS provisions. Ignoring the exit pathway up to the roof level and the pathway down to Level 1 which are both through the stair well as described above the other four exits provide high quality exit options.

The most advantageous exit pathway is via the fire separation to the walkway and the additional fire separation to the Café. This arrangement of a fire rated airlock provides a significant advantage in this fire scenario of a fire in the stair well. There is a very low probability of external fire spread across this distance. This is a significant refuge if there are adverse conditions externally. There is no requirement for this level of refuge in the DtS provisions of the NCC. In addition, there is an option to exit away from the building towards the road and open space to the north if the Café is threatened.

The second exit option is to pass directly outside via the airlock immediately adjacent to the horizontal exit to the walkway and on to the Café.

The third exit option is to pass through the airlock to the external podium. It is possible to evacuate to the Café via external pathways if there are adverse conditions at the time of this fire scenario.

The fourth exit option is to pass through the horizontal exit to the Sanctum where there is some temporary refuge prior to evacuating to the outside and on to the Café via external paths if there are adverse conditions externally.

This level of exit pathway from the upper level of the stair well is exceptional for the area served and the number of people present. The fact that there are also horizontal exit options that provide a refuge if there are adverse conditions externally that are not a requirement of the DtS provisions of the NCC means that there is clearly a higher level of occupant fire safety provided compared to a DtS compliant arrangement.

The significant benefit associated with the proposed performance solution compared to the DtS compliant arrangement is that the occupants at the upper level are able to discharge directly outside to a safe place if there are no adverse conditions externally. The requirement for a sprinkler system where the stair connects three levels is predicated on the occupants of the stair well having to evacuate down through the stair and discharge from the building at the base of the stair. The occupants would be passing down towards the level of fire origin and there is a time delay associated with passing through these levels; hence the need for a sprinkler system. The need to pass down through the level of fire origin is not necessary in the proposed performance solution.

In addition, if a sprinkler system were provided there would be no requirement for a fire detection and occupant warning system to be provided to the building in the DtS compliant arrangement. There is a significant delay associated with the activation of a sprinkler system and therefore a delay in occupant warning and as a consequence the occupants are more likely to be exposed to untenable conditions where they rely on the sprinkler system to initiate occupant warning.

With respect to first response firefighting equipment it is noted that, while a fire hydrant system is provided, there is likely to be a significant delay in the turn out of the brigade. It is possible that the brigade will not be able to access the site because of snow.

In response to this possible scenario the proposed performance solution provides a higher level of first response firefighting equipment so that there is a better opportunity for staff to suppress / extinguish a fire in addition to providing the enhanced refuge options.

In the proposed performance solution, there is a combination of fire hose reels and portable extinguishers which provides an opportunity for occupants to attack a broader spectrum of fire types if it is safe to do so. Again, this is a significant advantage compared to the DtS compliant arrangement.

Finally, it is noted that the provision of the natural venting arrangement provides a significant benefit in the proposed performance solution.

*Fire in Café*
While the level of fire safety provided to the Café is fully compliant with the DtS provisions of the NCC it is noted that the provision of the fire rated air lock between the Café and the Visitor Centre is bi-directional and there is a significant improvement in the level of fire safety provided to the occupants of the Café with the provision of the fire rate air lock arrangement and the provision of exit pathways externally that provide another option to evacuate to a refuge in adverse conditions.

*Fire in Kitchen*
This fire scenario is provided to address the identified DtS non-compliance where there is a small portion of the restaurant that has a distance of travel to a point where there is a choice of exits that is greater than 20m. The actual distance of travel to the most distant part of the restaurant to a point where there is choice is approximately 25m.

In this scenario it is concluded that the level of fire safety provided in the proposed performance solution is at least equivalent to the DtS compliant arrangement because;

- The width of the restaurant is approximately 8.1m at the most narrow part on the way from the most distant point to the point of choice of exit. If the exit had a width of 9m the DtS provisions of the NCC would say that there is sufficient width to allow the occupants to be able to avoid the potential fire with sufficient clearance irrespective of the location of the fire. In this instance the width is 0.9m less than the DtS threshold value.

- If there was a width of 9m to the exit pathway the DtS provisions would consider that there are two exit pathways and the distance of travel from the most distant part of the restaurant to the exit could be up 40m. The most distant part of the restaurant is well within this distance.

- In this scenario the height of the ceiling in the restaurant in the proposed performance solution is greater than 3.6m. The DtS provisions of the NCC would allow a ceiling height as low as 2.4m. With a higher ceiling in the performance solution the exit pathway stays tenable for the occupants longer and as a consequence the occupants can travel a greater distance without being exposed to untenable conditions. The speed of travel is generally accepted to be 1m / seconds [4] so the extended distance of travel of 5m means an additional 5 seconds of exposure to the fire conditions. The height of the ceiling is likely to provide in excess of an extended 5 seconds of tenability.

- The part of the restaurant where the extended distance of travel occurs is in a position where the occupants are in a single room and there is a direct line of sight from that part to the location where the point of choice of exits is provided. In this situation the affected occupants are better able to sense the onset of fire (smell or sight) which is likely to occur ahead of the activation of the fire detection system. With the reinforcing cues of sight and / or smell the occupants are more likely to be response to an alarm and have a more efficient evacuation. This will reduce the evacuation time. By comparison, in a DtS compliant arrangement the exit pathway could be convoluted and involve smaller rooms where there is no reinforcing cues and there is a more delayed response to the activation of the alarm.

- In addition to the height of the ceiling the building includes the provision of a fire detection and occupant warning system which would not be required if the building were provided with a sprinkler system.

In this assessment it is concluded that the reduced width of 0.9m is addressed by the increased ceiling height and the provision of a fire detection system in particular as well as the fact that the occupants have a visibility through to the point of choice and are able to sense the onset of fire ahead of the operation of the detection system.

### 3.3.2 Fire Brigade Intervention

The need to consider the fire brigade response arises because the proposed performance solution includes a static water supply with a reduced water volume and a greater distance between the fire brigade appliance and the fire hydrants.

This discussion follows several meetings with the TFS where the fire fighting response to both structural fires and bushfires were discussed where the tenor of the discussion was consistent with the outcome expressed in this assessment.

The response time from the Hobart Brigade is likely to be delayed in that it could take in the order of 26 minutes for the brigade to be notified of the onset of a possible structural fire, the turn out of the brigade and travel approximately 20 km to the site.

The following is an assessment taken against the input parameters suggested in the Fire Brigade Intervention Model (FBIM) [5]. These figures are an approximation of the fire brigade response. There is some variability in the number provided.

| Item | Function | Time |
|---|---|---|
| 1 | Time to detection | Say 80 seconds |
| 2 | Time for alarm verification | 20 seconds |
| 3 | Time to notification of the TFS | 0 seconds |
| 4 | Time to dispatch | 90 seconds |
| 5 | Travel in urban area at 43.9km/hr for 2.55 kms (average speed). | 210 seconds |
| 6 | Travel in rural country at 55.7km/hr for 17.9km (average speed). | 1,157 seconds |
| 7 | Total | 1,557 seconds (25.95 minutes) |

If there is snow on the road or congestion this time to turn out to the site could be significantly extended and it is plausible that the brigade may not be able to attend the site using conventional means (fire brigade appliances).

An option exists for the TFS to turn out to the site using the cable car given that the car has the ability to carry 6500kg of equipment to the site from the Base to the Summit in 6.5 minutes. Whether or not this option is exercised will be dependent on the conditions that exist at the time and the confidence that the Officer In Charge has that using the cable car would be both effective and safe.

It is likely that the Fern Tree Brigade may be able to respond more quickly though this will be dependent on the response time of volunteers to turn out to the brigade station to make up a crew and the capability of that crew.

The arrival of the brigade to the site could be delayed to the extent that it is plausible that the fire is fully developed if it has not been extinguished by the occupants. If the fire brigade is unable to access the site there may be no fire brigade assistance.

In this context a design has been developed where there is sufficient redundancy provided in the provision of an onsite refuge where there is no reliance on the intervention by the fire brigade. In this assessment the provision of the double fire wall with the intervening rock scree between the buildings provides a high level of certainty that one of the two buildings will remain tenable for the duration of the fire.

If the fire brigade are able to attend the site, the provision of a level entry into the building from the outside at each level and the provision of a firefighting water supply for 1 hour with two hose streams operating is likely to be sufficient to control the fire in this environment where there is limited fuel load and relatively small fire compartments.

In addition, it is considered that the delay associated with carrying hoses and nozzles to fire hydrants around the building and through other fire compartments is less significant in this context if it has taken the Hobart Fire Brigade in the order of 26 minutes without adverse conditions to reach the site. While the DtS provisions allows for a maximum carry of equipment of 50m from the appliance to the hydrant it is also apparent in high rise buildings that often fire fighters need to carry equipment up through fire isolated stairs to reach the fire affected floor. In this scenario there is a further delay in applying water to the fire affected floor and it could be argued that a similar delay is experienced in this fire scenario.

In this assessment it is concluded that an acceptable level of firefighting facility is provide in the proposed performance solution.

In earlier discussions with the TFS an option was suggested where equipment would be provided at the Pinnacle for the use of fire fighters to reduce the need to carry equipment however this option was declined because of the uncertainty about the availability and condition of that equipment over time.

# 4. Structural Fire Protection - The Base

## 4.1 Introduction

The approach and methodology to be applied in this assessment is the same as the approach and methodology applied in Section 3 for the Pinnacle.

The extent of the building work for the Base is shown on drawings provided at Attachment 3.00. These drawings have been assessed by the Building Surveyor and it has been determined that the proposed building work is not compliant with the Deemed-to-Satisfy (DtS) provisions of the National Construction Code (NCC) [1] because;

- External walls in part are provided with a timber screen that is combustible, and
- The firefighting water supply is designed for two feed hydrants operating simultaneously at 10 litres/second for a period of 1 hour instead of 4 hours.

The extent of the timber screen is shown on the drawings provided at Attachment 3.00.

An additional DtS non-compliance relates to bushfire protection and this is dealt with in a separate section of this report (Section 6).

The report from the Building Surveyor addressing the fire protection requirements is provided at Attachment 4.00. This report and the drawings provided at Attachment 3.00 provide a more expansive description of the requirements for fire protection and other things arising from the NCC that are compliant with the DtS provisions of the NCC. The purpose of this section of the report is to provide justification for those elements of the building that are not compliant with the DtS provisions of the NCC other than bushfire protection.

### 4.1.1 Building and Occupant Characteristics

The building is a three-storey building with a total floor area of 1,651m$^2$ over the three levels (as identified by the Building Surveyor at Attachment 4.00).

Level 0 has a floor area of 661m$^2$ and consists primarily of the machine room for the operation of the cable car including the battery store and plant areas. The machine room penetrates through from level 0 to level 2.

At level 1 are the offices for MWCC. Public access is limited to Level 2. Level 2 is for ticket purchase and access to the cable car. A level exit is provided directly outside from all levels of the building.

At the upper level there are panels with openings between the panels so that there is covered awning with a visual screen to the perimeter. Within the visual screen is the ticketing and sales space (and control room) which are enclosed rooms at that level.

The panels facing the downslope side of the proposed building work (the greater bushfire risk) are metal panels. The panels to the upslope side of the building are timber panels made of bushfire resistant timber.

There are spaces between the timber panels ranging up to openings of sufficient width to permit a person in a wheelchair passing through the panels at the public entrance off the Plaza. The timber panels are supported by a metal frame and the timber panels do not extend through levels 1 or 0.

At levels 0 and 1 the external walls are substantially concrete with openings protected to achieve BAL 29 in AS 3959 (unless modified by this Report). It should be noted that there is no requirement for the building to be compliant with the construction requirements of AS 3959 to meet the DtS provisions of the Determination as there are no construction requirements for this Class of building.

The occupants to the building are broadly classified as 'the community' as there will be a highly accessible pathway from the Base to the Pinnacle for all persons at all times of the year other than during conditions when the Park is closed or there are excessive winds.

The Building Surveyor has identified the maximum number of occupants to be present at any one time at the Base is 204.

The following is a summary of the fire protection requirements for the Base identified by the Building Surveyor to comply with the DtS provisions of the NCC;

1. Load bearing elements, the floor and shafts require fire resistance. The machine room is fire isolated from the remainder of the building. Otherwise there is no fire compartmentation other than at floor levels by the DtS provisions and the building is not a large isolated building.

2. The external walls of the building are required to be non-combustible where they are not loadbearing. The timber panels to the upslope side of the building are bushfire resistant timber which is unlikely to meet the requirement for non-combustibility in AS 1530.1 and this issue is to be addressed as a performance solution.

3. Linings and materials are required to have the required fire hazard properties.

4. Exits and exit pathways are provided that are compliant with the DtS provisions of the NCC.

5. A fire hydrant system is required in accordance with AS 2419.1. This includes a static water storage of 288,000 litres of water in accordance with the standard as well as pumps to achieve the required flows and

pressure. This aspect of the proposed building work will be subject to a performance solution.

6. Fire hose reels are to be provided in accordance with the DtS provisions of the NCC.

7. Emergency lighting and illuminated exit signage is to be provided in accordance with the DtS provisions of the NCC.

8. An emergency plan for structural fire safety will be necessary prior to the occupation of the building in accordance with the *General Fire Regulations* and approved by the Chief Officer.

The occupants of the proposed building will be a consistent with the range of characteristics for occupants that will visit the Pinnacle. This ranges from individuals through to large groups with a broad cross section of ages. These visitors may have disabilities that affect their ability to recognise a fire event and / or their ability to evacuate in the event of a fire that is consistent with the broad range of disability that is present in the community.

### 4.1.2 Proposed Performance Solution

The proposed alternative solution applied in this assessment includes compliance with the drawings provided at Attachment 3.00 and compliance with the DtS provisions of the NCC for the new building work other than:

- The external walls have combustible materials in the timber screen which is provided to a part of the upper level, and

- The fire hydrant water supply has a capacity for 1 hour of flow in accordance with AS 2419.1 instead of 4 hours. This is in addition to the water supply required for the fire sprinkler system.

The additional fire protection elements to be provided to the proposed building work include the following;

1. Sprinkler coverage is to be provided in accordance with AS 2118.1.

2. The external timber screen is to terminate at least 300mm above the surrounding horizontal surface (ground). No garbage receptacles of other combustible material is to be stored either permanently or temporarily against the timber screen. This arrangement is to be confirmed on a weekly basis on the essential maintenance statement.

3. A fire detection and occupant warning system is to be provided to the building in accordance with AS 1670.1 which is monitored by the TFS. Smoke detection is not required to the area within the open timber screen at the upper level where sprinkler protection is provided.

4. A PA system is to be provided with an ability to communicate with occupants in and around the building.

5. Fire separation (60/60/60) is to be provided between the machine room and the remainder of the building at levels 0 and 1.

6. Access to exits directly outside from all levels of the building is to be retained.

7. The two internal stairs are to be fire isolated stairs fitted with smoke seals rated to 200°C for 30 minutes.

8. The Lounge / Ticket Sales / Gifts enclosure at Level 2 is to be enclosed with BAL 29 construction in accordance with AS 3959 (unless modified by the Report).

9. Portable extinguishers (i.e. 6A:40B(E)) are to be provided for first response firefighting in addition to fire hose reels. Staff are to be trained in the operation of first response firefighting equipment.

This list of features and measures identified above is referred to as the proposed performance solution for the remainder of this assessment.

An integration matrix is provided below to assist with understanding the operation of fire protection systems is provided below;

| **Integration Matrix – Base** | | | | | | |
|---|---|---|---|---|---|---|
| | **Outputs** | | | | | |
| **Inputs** | Occupant Warning | Base notification | Brigade alert | Door Closure | Mechanical Shutdown | Louvre opening |
| Smoke Detector Activation | 1. | 2. | 3. | NA | NA | NA |
| MCP Activation | 4. | 4. | 4. | NA | NA | NA |
| Sprinkler Activation | 5. | 5. | 5. | NA | NA | NA |

1. Occupant warning is to sound across the building on detection of smoke in the building.

2. A message is to be provided to the Pinnacle control room that smoke has been detected in the building.

3. ASE is to provide an automatic message to the TFS that fire has been detected at the Base.

4. The activation of the MCP is to replicate the outputs for the smoke detection.

5. The activation of the sprinkler system is to replicate the outputs for the smoke detection system.

### 4.1.3 DtS and Performance Requirements

The Building Surveyor has identified that the proposed building work is not compliant with the DtS provisions of the NCC for the following reasons;

| DtS provision | Performance Requirement/s | Objective |
|---|---|---|
| An external combustible timber screen is not compliant with Clause 3.1b of Specification C1.1 of the NCC. | CP1 and CP2 | Occupant safety |
| The firefighting water supply is not compliant with AS 2118.1 and AS 2419.1. | EP1.3 | Fire brigade intervention. |

## 4.2 Assessment of Performance Solution

A number of fire scenarios are considered that examine in particular the impact on occupant fire safety associated with not complying with the DtS provisions of the NCC.

### 4.2.1 Occupant Safety

*External Fire – Not Bushfire*
This fire scenario is considered because a combustible timber screen is provided externally to a part of the upper level of the building. Where there is pedestrian access to the upper level of the Plaza the public pass through the timber screen to reach the enclosure being the ticket office and lounge. The timber screen is open between the timber members.

The frame supporting the timber screen is a metal structure with steel posts and metal girts where the timber screen is supported off the surrounding ground as described in the proposed performance solution.

Internally these timber members are compliant with the NCC as they are of sufficient density and thickness when provided in a sprinkler protected building. The extent of the DtS non-compliance is associated with the potential for external ignition and vertical fire spread in a Type A building (as proposed) where the occupants of the upper level are threatened by vertical fire spread from lower levels.

This requirement is less applicable in this situation because the timber screen is only provided to the upper level of the building. At the lower levels the external cladding is concrete and glazing which is fully compliant with the DtS provisions of the NCC.

If the Base building were a single storey building and (say) the lower levels were incorporated into a basement level the structural fire protection provisions would permit the external construction to be combustible.

In this assessment it is concluded that the proposed performance solution provides an acceptable level of fire safety because;

- The timber screen is provided at the upper level of the building only and as a consequence there is no potential for the screen to cause vertical fire spread to higher levels if ignited.

- There is a lower level of potential for the external timber screen to be ignited where it is elevated above ground level. Where it is closer to finished ground level there is a management procedure in place to limit the potential for ignition by controlling combustible material adjacent to the screen as described in the performance solution.

- While an unconventional arrangement, the provision of a sprinkler system in the building where the is no infill between the timber means that, if there is ignition of the timber members that does spread vertically, the activation of the sprinkler system near the edge of the enclosure will provide some benefit in both suppressing the fire and wetting the timber in the vicinity.

- From an occupant safety perspective, the ignition of the timber screen will not create a hot layer that could impact on the tenability of Level 2 because the timber screen is an open structure. If a fire occurs heat and smoke will vent to atmosphere and there will be no adverse impact on occupant safety for the period required to evacuate the occupants.

- The timber screen is not structural.

- The proposed timbers are bushfire resistant and as a consequence there is a lower probability of ignition.

In this context it is concluded that an acceptable level of structural fire safety is provided notwithstanding that there is timber screen to the perimeter of the building.

### 4.2.2 Fire Brigade Intervention

With respect to fire brigade intervention to a structural fire to the Base it is apparent that the brigade arrival at the building is likely to be substantially improved compared to the Pinnacle. The response time is likely to be consistent with the response time to an out urban suburb of between 5 and 10 minutes though this would be dependent on traffic conditions and the availability of appliances (i.e. there may be multiple events occurring at the same time).

In this scenario it is considered that the provision of a static water supply with a capacity for 2 hydrants operating for a period of 1 hour is sufficient for the following reasons;

- The building is provided with a sprinkler system and in the event of a more significant fire the sprinkler system is likely to have controlled the fire development to the extent necessary to allow for a more effective response by fire fighters as the fire is more likely to be able to allow for an offensive firefighting strategy. That being the case the demand for water supply by the hydrants will be reduced. If the sprinkler is not effective because of the location of the fire, the responding fire fighters would be able to isolate the sprinkler operation and conserve water for use with hose streams.

- In this proposed performance solution, the building is a Type A building with a total floor area determined by the Building Surveyor of 1,651m$^2$. The machinery room is a separate fire compartment at levels 0 and 1 and this creates relatively small fire compartments for a Type A building. Where there are small fire compartments this translates to a smaller fuel load and a reduced potential for a severe fire and a fire with a longer duration of burning.

- There is a level entry at each of the levels within the building and this allows for a more efficient response from the responding fire brigade as fire fighters are able to provide water connections outside of the building and enter at the level of fire origin with charged fire hoses. Connecting to standpipes in fire isolated stairs is more challenging as it is necessary to get equipment to the standpipe and it is necessary to boost the flow and pressure off the fire main as opposed to using the appliance to boost flow and pressure directly to hoses.

- Smoke detection is provided to the building which would not be a required system by the DtS provisions because of the provision of the sprinkler system. The provision of the fire detection system means that there will be a more efficient and timely response by the TFS in the event of fire even when the building is not occupied as the fire brigade are automatically notified on the detection of smoke in the relevant parts of the building. This means that the fire brigade are more likely to arrive earlier than that anticipated by compliance with the DtS provisions. An earlier arrival will mean that there is a higher likelihood that the fire will be smaller, particularly with the existence of the sprinkler system, and that the actions of the brigade will be more effective.

In this assessment it is concluded that an acceptable level of firefighting facility is provide in the proposed performance solution.

# 5. Bushfire Protection – The Pinnacle

While the bushfire assessment is undertaken in accordance with the requirements of the *Building Act 2016* (the Act) and the NCC (like the structural fire safety assessment above) there are differences associated with the standards that are adopted which make this assessment substantially different from the structural fire assessment. For this reason, the bushfire assessment is separated from the structural fire assessment even though there are some overlapping elements.

This assessment is provided to support an application for a certificate of likely compliance from the Building Surveyor which will then form a part of the application for a building permit from the building permit authority (the Council) for the proposed building work. Where there is a performance solution for the bushfire protection, as in the case in this instance, there is a statutory referral requirement from the Building Surveyor to the TFS prior to the approval of the building work and prior to the occupation of the building in accordance with the Building Regulations. Consultation has also occurred with the TFS in the preparation of this report.

In preparing this assessment it is noted that it is important to achieve a high level of integration with the Mount Wellington Fire Management Strategy [6] at the design stage and in the further review of this strategy in the future.[1] This integration with the current Strategy is provided in this assessment.

For this part of the assessment the scope of the work for Castellan is to provide a Bushfire Hazard Management Plan (BHMP) for the proposed building work which establishes the Bushfire Attack Level (BAL) and a performance solution in accordance with the methodology identified In the NCC where the proposed building is not compliant with the DtS provisions of the Directors Determination on Bushfire [7].

[1] It is noted that the Strategy is currently due for review at the time of preparing this report.

## 5.1 Introduction

The relevant statutory provisions, subordinate legislation and standards applied in this bushfire assessment are[2];

- The *Building Act 2016* (the Act),
- The *Building Regulations 2016* (the Regulations) which adopts Part 1A of the *Building Regulations 2014* (rescinded),
- The National Construction Code (NCC) [8][3],
- Director's Determination – Requirements for Building in Bushfire-Prone Areas [7],
- Australian Standard AS 3959 [9], and
- The Approved Form issued by the Chief Officer of the Tasmania Fire Service (TFS) [10, 11].

As identified for the structural fire safety assessment, it is important to note that compliance with the building regulations does not mean that there is no residual fire risk from the threat of bushfire. The level of residual risk which is acceptable in this report is consistent with that risk that remains where the new building work is fully compliant with the prescriptive Deemed-to-Satisfy (DtS) provisions of the Determination.

It should be noted that the policy settings applied by the government through the adoption of AS 3959 [9], in particular the assumption of a maximum Forest Fire Danger Index (FFDI) of 50 which is exceeded during normal bushfire seasons, are not conservative and as a consequence it is possible that the mitigation measures employed may not be sufficient in more severe conditions. This applies whether the proposed development is assessed against the DtS provisions or this performance assessment.

In addition, AS 3959 makes the following qualification;

> *...this Standard cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the degree of vegetation management, the unpredictable nature and behaviour of bushfire, and extreme weather conditions.*

In this context an initial assessment is undertaken of the proposed node at the Pinnacle against the prescriptive Deemed-to-Satisfy (DtS) provisions of the regulatory regime. A performance approach can be provided where it is considered impractical or preferable to depart from the prescriptive standards.

[2] Confirmation has been provided from the Building Surveyor that the construction standards to be applied to the building work are; the National Construction Code 2016 (including amendment 1.00), the Directors Determination on Bushfire version 2.1 (2017) and, as referenced in those standards AS 3959 (2009).

[3] The Building Code of Australia is Volume 1 of the National Construction Code (NCC).

This report does not consider;

- Any other objective beyond compliance with the building regulations identified above,
- Any deliberate or malicious acts where fire is started to damage property or cause injury. This is outside of the scope of this assessment, and
- Any storage or handling of dangerous substances beyond minor storage quantities associated with the operation of the accommodation complex. No special hazards as defined in the NCC have been identified.

## 5.2 Overview of the Statutory Scheme

The Act (at Section 11(1)) establishes that building work needs to comply with the Act and the National Construction Code (NCC) 'unless otherwise authorised under [the] Act'.

The *Building Regulations (2016)* deals with work in hazardous areas (at Part 5) and Division 6 deals with bushfire prone areas. Schedule 6 to the Regulations deals with savings and transitional provisions where it is established that divisions 1 and 3 of the *Building Regulations 2014* (the Regulations) remain in force until the state-wide planning provisions come into effect.

By way of background the building complex is divided into two parts that are connected by a walkway where there is fire separation at both ends of the walkway. Where there is fire separation within a building like this NCC allows the complex to be considered two (2) separate buildings. This separation between the buildings also coincides with a continuous surface stone area between the buildings. The surface stone in this area means that there is a reduced probability of fire spread by vegetation between the buildings.

The northern building is a Café and the classification of this building is Class 6 in accordance with the NCC. This building is not a vulnerable use and the bushfire prone area provisions of the Regulations do not apply to this building. This building requires no bushfire protection measures; no hazard management area, no bushfire construction, no vegetation firefighting water supply and no bushfire access.

The southern building being the larger building is the dock for the cable car, a restaurant, function room, sanctum, and function room along with other ancillary functions and is identified as the Visitor Centre. This part of the building complex is a 'vulnerable use' as the Building Surveyor has defined this building as a Class 9b assembly building as defined in the NCC.

**Assembly building** means a building where people may assemble for—

(a) civic, theatrical, social, political or religious purposes including a library, theatre, public hall or place of worship; or

(b) educational purposes in a *school*, *early childhood centre*, preschool, or the like; or

(c) entertainment, recreational or sporting purposes including—

  (i) a discotheque, nightclub or a bar area of a hotel or motel providing live entertainment or containing a dance floor; or

  (ii) a cinema; or

  (iii) a sports stadium, sporting or other club; or

(d) transit purposes including a bus station, railway station, airport or ferry terminal.

The Visitor Centre is considered a Class 9b because it may be used for the assembly of people for social and theatrical purposes (for example) and it could be considered a place for the assembly of people for transit (the cable car).[4]

The Visitor Centre is also classified as a Class 6 restaurant and retail area. If the cable car dock were a separate structure and the building were used solely for the purpose of a restaurant with other minor ancillary uses this building would, like the café to the north, have no requirements for bushfire protection under the Regulations.

The remainder of the Regulations applicable to bushfire prone areas (relevant to the Visitor Centre) establishes;

- Compliance with Part 1A of the Regulations is required.
- Compliance with the Director's Determination satisfies the performance requirements of the NCC (at Regulation 11D),
- A bushfire hazard management plan (BHMP) is required as it has been determined that specific bushfire protection measures should be applied to the building (at regulation 11F(1)), and
- For the purpose of this assessment it is assumed that there is no requirement for bushfire protection in the planning assessment and as a consequence the planning permit does not establish the requirement for bushfire protection (at Regulation 11F(2)).

In this context the Act also authorises the Director to make determinations relating to hazardous areas (at Section 20). The following is an overview of the Director's Determination – Requirements for Building in Bushfire-Prone Area (transitional) (the Determination) as they relate to the Visitor Centre.

Consistent with the Regulations, the Determination does not apply to a Class 6 café or restaurant. The Determination does apply to a Class 9 building which includes an assembly building (the Visitor Centre).

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[4] The inclusion of a requirement for bushfire protection is intended for the protection of school buildings in bushfire prone areas as this classification applies to those buildings. The requirement for the protection of a 'place of assembly' is not a requirement in the NCC for other jurisdictions. There is no requirement for any bushfire protection to Class 6 restaurant. In this context it is speculated that the Tasmanian requirement was intended to capture school buildings and may not have been intended to capture transport buildings like the cable car dock.

Clause 3 of the Determination sets out the performance requirement which is considered in more detail in the performance assessment below. As established in the NCC at Clause A0.1 the only mandatory requirement is the performance requirement. A solution that complies with the DtS provisions of the NCC is deemed to satisfy the performance requirement in accordance with Clause A0.4 of the NCC. The assessment methods and approach to be applied in the development and assessment of a performance solution are also provided in the NCC.

The first step in the development of a performance or DtS solution is to undertake an assessment of the relevant prescriptive DtS provisions to establish the extent of the DtS non-compliance that needs to be considered. This process establishes the benchmark level of residual risk that is considered acceptable for a performance solution.

## 5.3 Directors Determination for Bushfire – DtS Assessment

There are five (5) elements to the DtS provisions of the Determination and these are considered below. Again, this assessment only applies to the Visitor Centre as a 'place of assembly', not as a restaurant or café. It is reiterated that the DtS provisions are not mandatory.

### 5.3.1 Construction Requirements

There is no construction requirement for the proposed building work given the building is Class 9b. Construction requirements exist for Class 1, 2 and 3 buildings along with associated Class 10a buildings. Notwithstanding there is some benefit associated with the materials that are to be utilised and these are considered in the performance assessment.

### 5.3.2 Hazard Management Areas

The DtS provisions of the Determination would require the Visitor Centre to be provided with a hazard management area (HMA) 'of sufficient dimensions and provides an area around the building which separates the building from the bushfire hazard.' The requirement for the width of the HMA is found at Table 4.4 of the Determination.

There are several categories that may be applicable and these are considered below.

| | |
|---|---|
| A | Does not apply because the building work is not proposed on a lot where there a Bushfire Attack Level (BAL) was provided at the time of subdivision. |
| **B** | **Applies as the land is a lot not provided with a BAL at the time of subdivision.** |
| C | Does not apply as the building work is not an alteration or addition to an existing building. |
| D | Does not apply because the proposed building work is not for an accommodation building. |
| E | Applies where the proposed building work is a 'vulnerable use' as defined in Planning Directive 5.1 – Bushfire-Prone Areas Code (the Code) as opposed to a 'vulnerable use' as defined in the Regulations. As identified previously the proposed development is a 'vulnerable use' for the purpose of the Building Regulations.<br><br>'Vulnerable use' for the purpose of the Code is provided in the definition of terms at Clause E1.3 of the Code. For the purpose of the Code, 'vulnerable use' means a use that is within one of the following use classes;<br>• Custodial Facility;<br>• Educational and Occasional Care;<br>• Hospital Services;<br>• Residential if for respite centre, residential aged care home, retirement home, and group home.<br><br>The proposed use does not fit within these use groups and is not a 'vulnerable use' for the purpose of the planning Code and as a consequence this option is not applicable.. |
| F | Does not apply because the proposed use is not a hazardous use as defined in the Determination (as opposed to the 'hazardous use' defined in the Code. |

This means that the building, in accordance with the DtS provisions, needs to be;

- Located on the lot so as to be provided with a HMA no smaller than the separation distances required for BAL 29; and
- Have a HMA established in accordance with a certified BHMP.

The following is a BAL assessment used to establish the width of the HMA required by the DtS provisions of the Determination. The proposed solution in this instance will include retaining vegetation up to 1m from the outer extremity of the building (there will be surface stone against the building) so that vegetation retention is maximised and there is minimal disturbance to the environment. This will also produce a more appealing aesthetic outcome for patrons to the Pinnacle with a reduced environmental impact.

That being the case the outcome in this instance will be to provide a performance solution in accordance with the NCC even though there is an argument that the vegetation near the building is consistent with 'low threat vegetation and non-vegetated areas' as defined in Clause 2.2.3.2 of AS 3959 (2009) (extracted below).

**2.2.3.2** *Exclusions—Low threat vegetation and non-vegetated areas*

The Bushfire Attack Level shall be classified BAL—LOW where the vegetation is one or a combination of any of the following:

(a) Vegetation of any type that is more than 100 m from the site.

(b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified.

(c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other.

(d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified.

(e) Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops.

(f) Low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks.

NOTE: Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100 mm).

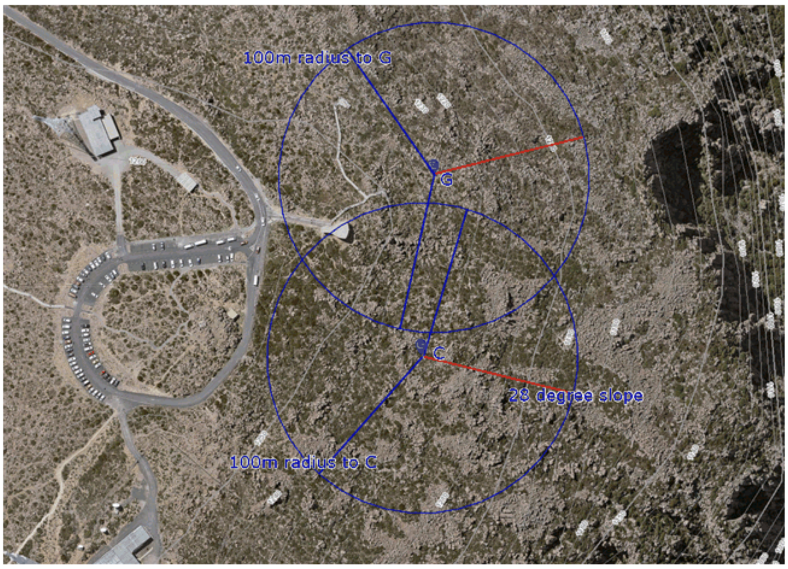
If the vegetation were considered to be 'a maintained public reserve and parkland' and/or a 'cultivated garden' and/or a 'rocky outcrop' the vegetation would be considered exempt and not included in the assessment of bushfire prone vegetation. While the vegetation beyond 1m from the extremity of the building is not maintained in this proposal, the fact that the vegetation is alpine and that there is some browsing by fauna means that the vegetation is comparable to a 'cultivated garden' where there is vegetation in patches and broken up by non-combustible elements being rock in this proposal and in a 'cultivated garden' by pathways.

The above extract also highlights the fact that low threat vegetation can be provided adjacent to a building in a bushfire prone area.

The following assessment provides sufficient detail to provide an appreciation of the extent of clearing that would be required by the DtS provisions on the assumption that the vegetation adjacent to the building is not low threat vegetation. This level of clearance is not what is proposed in the performance solution.

The following image shows an aerial image of the proposed development site with 10m contours superimposed on the image taken from the website www.thelist.tas.gov.au (the list). Also superimposed on this image are two points (C and G) that represent the approximate north east and southern extremities of the proposed building (including the café). Around these points is a blue circle with a radius of 100m which represents the area of interest in the assessment of the bushfire threat for the purposes of AS 3959.

The blue lines radiating from the centre to the circle represents the approximate location of an even grade taken from the contours on the List website. The red line radiating from the centre to the perimeter of the circle represents the steepest gradient to the downslope being identified as being roughly perpendicular to the contours. The gradient of both of these lines across the ground surface is between 25° and 30°. It should be noted that the terrain is complex and variable and that this measurement is an average gradient over the length over the 100m distance.




The vegetation within 100m of the proposed facility is a combination of exposed rock scree and shrubs. The vegetation is discontinuous as there are large areas of surface rock which supports no vegetation. This is evident in the above image. This limits the ability of a bushfire to spread across the landscape. The alpine vegetation in this zone represents a relatively low threat being sporadic and low.

The existence of the carpark and other buildings and infrastructure to the west of the site on the upslope side of the building further limits the spread of fire from this direction. The carpark and the road are outside of the blue circle in the extent of the vegetation considered in a DtS assessment however the road and the carpark are likely to impact on a fire spreading from the west. The lower section of the Pinnacle Road to the north also provides a fire break and an opportunity for fire brigade intervention.

At this elevation (alpine) and with this exposure the existence of vegetation with a height greater than 1.5m is rare. As a consequence, it is highly unlikely that there could be a fire front approaching the site. A more likely scenario would be embers spotting to the landscape around the building from the east and for spot fires to be occurring in the patches of shrub. While shrubland is described in AS 3959 (2009) as having a surface fuel load of 15 tonnes / hectare it is apparent that there is significantly less fuel in this instance because of the large proportion of surface stone.

The vegetation classification applied around the building is 'Shrubland' in accordance with the vegetation classification contained in AS 3959. This vegetation is described as 'Shrubs <2m high; 10-30% foliage cover. Understoreys may contain grasses. Acacias and Casuarina often dominant in the arid and semi-arid zones'. This is clearly an exaggeration of the fuel load associated with those parts of the landscape where the ground cover is rock and there is no standing vegetation. While this classification is not entirely consistent with the alpine vegetation it is the most consistent with the limited options provided in AS 3959.

Applying the Fire Danger Index (FDI) of 50 as per table 2.1 of AS 3959 the following table identifies the width of the hazard management area to achieve BAL 29 for different gradients under the vegetation up to 20°. AS3959 does not provide a simplified assessment (Method 1) for gradients over 20°. For gradients greater than 20° Method 2 of AS 3959 needs to be applied. The method 2 analysis has not been applied in this instance because the analysis would still produce a result with significant uncertainty associated with assumptions about; the width of the flame front, the impact of the large amounts of surface stone and the alpine terrain.

Notwithstanding, the following table, by extrapolation, provides an indication of the HMA width necessary for the greater gradients based on this simplified DtS assessment method.

| **Width of hazard management area at FDI 50 for BAL 29** | | |
|---|---|---|
| **Gradient** | **Width of Hazard Management Area - Shrubland** | **Width of Hazard Management Area - Grassland** |
| **Up slope and flat** | > 9m | > 6m |
| **Downslope >0 to 5°** | > 10m | > 7m |
| **Downslope >5 to 10°** | > 11m | > 8m |
| **Downslope >10 to 15°** | > 13m | > 10m |
| **Downslope >15 to 20°** | > 15m | > 11m |

The Method 2 algorithm (from AS 3959) is not applied to determine a BAL of 29kW/m$^2$ in this assessment as the algorithms are based on assumptions that are not applicable to this environment. In particular the algorithm is based on a flame front width of 100m and a significant fire run prior to impact on the proposed building. In this instance there are significant amounts of surface stone to the downslope side of the building and the extent of the fire run from the down slope direction is significantly affected by the organ pipes (near vertical rock formation) that is a significant break in the fire run approximately 200m to the east of the proposed building.

For the purpose of this assessment it is sufficient to roughly assume that the DtS requirement for the width of the HMA where the gradient is between 20 and 28° would be less than 25m for shrubland vegetation classification and 20m or grassland vegetation classification.

As identified previously this width of HMA is not provided in the proposed solution and a performance assessment is necessary to justify allowing vegetation to be retained as described in the proposed performance solution. The performance assessment is provided at Section 5.4 of this report.

While this arrangement proposed in the performance solution is strictly identified as 'flame zone' for the purpose of the non-mandatory DtS assessment, the reality is that the likely fire attack at this site is ember spotting into shrubs around the building where there could be direct flame impact however there would be very low fuel loads and intensity associated with the spot fire and these spot fires are capable of being resisted by the form of construction provided.

It is reiterated that there is no requirement in the DtS provisions for a hazard management area to be provided to the café.

### 5.3.3 Water Supply for Fire Fighting

The Determination establishes the DTS requirement for firefighting water supply for bushfire protection. It should be noted that there is a greater requirement for a firefighting water supply for building structural fires than that required for bushfire and as a consequence the quality of the firefighting water supply provided to the building significantly exceeds the requirement of the DtS provisions of the Director's Determination.

There is no reticulated water supply to the site so Clause 4.3 of the Determination would require a static water supply in accordance with Table 4.3B of the Determination located near the building and provided with hardstand and suitable connections to allow the responding fire brigade to connect to the water supply to achieve compliance with the DtS provisions.

While it is arguable that the Determination does not require road access to the remote offtake fire hydrants, in response to comments from the TFS, the approach has been applied that the DtS requirement is for road access to be provided. For structural fire safety there are categories of fire hydrants (attack v feed) where the fire appliance can be remote from an attack hydrant (up to 50m) and for this to be a DtS compliant arrangement. The distance to the remote offtake hydrants is greater than 50m and this is dealt with as a performance solution for structural fire safety and bush fire safety.

The following table identifies the elements necessary to comply with Table 4.3B and a description of the proposed solution.

| Element of Table 4.3B | Requirement | Provision |
|---|---|---|
| A | The building area is to be within 90m of the static water supply. | The location of the static water supply is further from the building. |
| B | A remote offtake is permitted. | A remote offtake is provided in the form of fire hydrants off the static water supply. Coverage in accordance with A is achieved where remote offtakes are considered. |
| | A volume of 10kl is required as a dedicated firefighting water supply for each building. For the purpose of the bushfire assessment the complex is one building. | In excess of 75kl is provided in the static water supply to satisfy the requirement for building structural fire safety. |
| | The static water supply is required to be constructed of material to ensure the reliability of the supply. | A concrete static water supply is provided that is compliant with this requirement. |
| C | There are requirements for pipework, fittings and accessories. | The proposed solution will be compliant with this DtS requirement. |
| D | There is a requirement for signage to the static water supply. | The proposed solution will be compliant with this DtS requirement. |
| E | A hardstand is required adjacent to the static water supply to allow for access by the responding appliance. | The proposed solution will be compliant with this DtS requirement. This item is considered further below. |

In this assessment (as discussed above) the interpretation applied is that the static water supply and the remote offtake hydrants need to be provided with access and hardstand in accordance with Clause 4.3(3) of the Determination. Access and a hardstand to each of the hydrants is not achieved in the proposed solution and as a consequence this is considered a DtS non-compliance.

A performance solution addressing this issue is provided in the assessment of the performance solution.

The concept of having the brigade appliance located adjacent to the static water supply with the provision of a pump and booster assembly at this location to allow for firefighting flows and pressures at the hydrants and for the responding fire fighters to carry hoses and branches to hydrants has been part of the discussion with the TFS since 2018. It is understood that the TFS accepted this performance approach 'in principle' since that time. The provision of access and a hardstand to the static water supply / booster assembly is a DtS non-compliance for structural fire safety because of the distance from the appliance to the attack hydrant and this is identified at Clause 3.2.5 of this report. The assessment of the performance solution for this element of the building for structural fire safety is provided at Clause 3.3.2 of this report.

Notwithstanding the above issue, it is also noted that the quality of the firefighting water supply (other than the provision of access and a hardstand to hydrants) is a substantial improvement compared to that achieved by compliance with DtS provisions of the Determination. This is achieved because;

- There is a significant increase in the volume of firefighting water supply being 75kL compared to 10kL required by the DtS provisions.

- There is a significant improvement in the flow and pressure achieved from the hydrants so that it is possible to have multiple hydrants providing firefighting flows and pressures at the same time. There is no requirement for flow and pressure from a static water supply as it is dependent on the appliance providing the flow and pressure.

In addition, the proposed development includes the provision of a fire equipment room at level 0 that will include equipment to allow staff (with appropriate training) to undertake firefighting using the hydrants if there is a delay in the arrival of the fire brigade or Pinnacle Road is blocked.

It is reiterated that there is no requirement in the DtS provisions for a firefighting water supply to be provided to the café.

### 5.3.4 Property Access

As identified above the DtS requirement would be for a road access to the hard stand at the static water supply with coverage within 90m. The proposed solution for this aspect of the proposed development is described above for the firefighting water supply.

The DtS provisions of the Determination would require property access in accordance with Table 4.2 of the Determination including access to within 90m to the furthest part of the building and access to the hard stand for the static water supply.

In this instance the proposed building (including the café) is accessed via a public road being Pinnacle Road. As the proposed building work is being undertaken on public land under lease there is no lot or property boundary that can be used to differentiate between the public road and the property access. For the purpose of this assessment it is assumed that, in this DtS assessment, the property access begins at the proposed lease management area which is roughly the edge of Pinnacle Road to the west of the proposed building.

The approach initially applied in this assessment is that the property access for the fire brigade appliance is limited to the area adjacent to the proposed static water supply. At this location the fire brigade has the ability to connect to the static water supply and boost the flow and pressure to the various hydrants without needing to connect the appliance to the hydrants. As such the proposed development would fall into element A of Table 4.2 and there would be no specific design and construction requirements for the property access.

However, as discussed above, the TFS have a different interpretation to this provision where, in their opinion, it is necessary to have access and a hardstand adjacent to the remote offtake fire (hydrants) to comply with the DtS provisions of the Determination. This interpretation has been adopted in this assessment.

A performance solution is necessary for this element of the bushfire assessment and this is developed below in the performance assessment and has included consultation with the TFS in defining an appropriate level of access to the building commensurate with the level of risk presented. This performance solution is developed at section 5.4 of this report.

It is reiterated that there is no requirement in the DtS provisions for property access to be provided to the café.

### 5.3.5 Emergency Plan

An Emergency plan in accordance with Table 4.5 of the Determination is necessary to comply with the DtS provisions as a part of the new building complex (the Visitor Centre) is being constructed that is a ‘vulnerable use’ in a bushfire prone area.

Table 4.5 requires the emergency plan to the compliant with the TFS Bushfire Emergency Planning Guidelines and approved by the TFS.

An emergency plan is to be developed in consultation with the TFS that meets the DtS provisions. In this instance it is proposed that the emergency plan should be developed and then certified by the TFS prior to the issue of the certificate of likely compliance by the Building Surveyor. An emergency plan is required in the performance solution and a management strategy for the emergency plan is provided at Attachment 9.00.

It is reiterated that there is no requirement in the DtS provisions for an emergency plan to be provided to the café.

### 5.3.6 Summary

In summary the proposed building work is to be compliant with the DtS provisions of the NCC with the following exceptions;

- The width of the HMA is less than that required by the DtS provisions (assuming that the existing vegetation is not low threat vegetation), and

- Access for the fire brigade appliance is not to the external hydrants (remote offtakes) around the proposed building.

An emergency plan certified by the TFS is also required and this is to be provided prior to the issue of the Certificate of Likely Compliance by the Building Surveyor. A concept strategy for the emergency plan is provided in the performance solution.

## 5.4 Performance Solution Assessment – The Determination

This part of the assessment is an assessment against the performance requirement for bushfire appearing in the Determination and applying the methodology prescribed in the NCC as adopted by the Act.

The methodology required by the NCC for the assessment of performance solution is described at Section 3.2.2 of this report.

The relevant performance requirement is provided at Clause 3 of the Determination and is extracted below.

**3. Performance Requirements**

(1) A building to which this Determination applies must, to the degree necessary, be:

(a) Designed and constructed to reduce the ignition from bushfire, appropriate to the –

(i) Potential for ignition caused by burning embers, radiant heat or flame generated by bushfire; and

(ii) Intensity of the bushfire attack on the building;

(b) Provided with vehicular access to the site to assist fire fighting and emergency personnel to defend the building or evacuate occupants;

(c) Provided with access at all times to a sufficient supply of water for fire fighting purposes on the site; and

(d) Provided with appropriate separation of the building from the bushfire hazard.

(2) The performance requirement specified in subclause (1)(a) is applicable to the following:

(a) a Class 1, 2 or 3 building; or

(b) a Class 10a building or deck associated with a Class 1, 2 or 3 building.

From subsection (2) of Clause 3 it is apparent there are no requirements for the fire resistance of the structure as identified previously as the relevant part of the building is Class 9b and Class 6 and so the prescriptive solution is to provide a HMA to the building however the corresponding building construction is not required to resist that level of exposure (under FDI 50 conditions).

The above performance requirement can be satisfied by demonstrating that the level of bushfire protection provided is at least equivalent to an arrangement that is compliant with the DtS provisions. This is the approach applied in this assessment.

### 5.4.1 The Proposed Performance Solution

In response to the DtS non-compliances that have been identified in the DtS assessment above, the following is a list of additional items over and above compliance with the DtS provisions to be provided to the proposed building work to ensure that an equivalent level of residual risk is provided;

1. Both buildings (the Café and the Visitor Centre) are to be constructed in accordance with the requirements of AS 3959 for BAL 40 (unless modified by the Report)[5][6] [12]. Neither building is required by the DtS provisions of the Determination to have bushfire resistant construction. The structure is to be largely concrete and masonry with fixed closed glazing panels of toughened glass (typically 6mm minimum) as the external façade. A concrete roof is provided other than where there is a small section of roof glazing to the stair well that includes ventilation. The loadbearing parts of the external wall are required to have a fire resistance level in accordance with the structural fire requirement and the non-loadbearing parts are required to be non-combustible in the DtS provisions of the NCC for a building fire. It is reiterated that none of the elements of the proposed building work are required for the DtS provisions of the Determination for bushfire.

2. Fire separation is to be provided at both ends of the walkway connecting the two buildings as described for the structural fire performance assessment and surface stone exists between the two buildings. Fire separation provides potential for horizontal evacuation within the building if there are occupants remaining on site when a bushfire approaches. This should be considered a layer of redundancy in the bushfire strategy. A plan showing the location of fire / smoke separation is provided at Attachment 1.00.

3. A Hazard Management Area (HMA) where all vegetation is removed is to be provide where there is an area of 1m of separation to the lower external perimeter of the building as shown on the Bushfire Hazard Management Plan (BHMP) provided at Attachment 6.00. The vegetation beyond the HMA is a relatively low threat at this altitude where there is a significant area of surface zone within the classified area identified in AS 3959 and beyond.[7]

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[5] The concrete external wall panels and the concrete slabs creating an overhang at ground level as shown at Attachment 1.00 drawings will have a fire resistance level that will resist direct flame impingement for the duration of the passing fire front. This detail is to be developed in the detailed design for building approval. Toughened glass is capable of resisting a radiant heat flux of $40kW/m^2$ for in excess of 20 minutes when exposed to a small scale fire test.

[6] It is noted that AS 3959 has not been developed primarily for dwellings and outbuildings and the application of AS 3959 to a significant commercial building such as this will require further analysis and detail development where elements are not readily compliant with the requirements for BAL 40 construction such as the treatment of air handling duct penetrations in the external wall, the treatment of exit door openings etc. The detailed design is to be developed and approved in accordance with the building regulations.

[7] The TFS have identified that the building is exposed to 'flame zone' conditions when considered strictly in accordance with the DtS provisions. The assessment of the performance solution establishes

4. An external siren is to be provided that generates an audible waring to the public in the area of the Pinnacle to commence evacuation.

5. Fire hydrants are to be provided in the locations shown on the drawings provided at Attachment 1.00. This provides a level of coverage beyond the building and quality of flow and pressure that significantly exceeds the requirement of the DtS provisions.

6. The volume of water provided to the firefighting water supply significantly exceeds the requirement for the DtS provisions of the Determination for bushfire.

7. Firefighting equipment is to be provided in the fire equipment room at level 0 so that staff are able (if they are present and it is safe to do so) to utilise the fire hydrant system and other first response firefighting equipment so that there may be suppression of embers in vegetation around the buildings. Staff are to be provided with training to undertake this firefighting response.

8. An emergency plan is to be provided that is compliant with the Directors Determination. A concept plan for the emergency plan is provided at Attachment 9.00.

9. The emergency plan should be revised annually before the bushfire season to ensure that the triggers applied in the emergency plan coincide with the Strategy for Park closure applied by Park management.

The emergency plan strategy is predicated on triggers that are more broadly applied to bushfire mitigation in Tasmania and include the Fire Danger Rating (FDR) and the Bushfire Warnings and Alerts. An overview of these systems is provided at Attachment 11.00.

### 5.4.2 Description of the Land and Adjacent Land

The Pinnacle site is a part of a parcel of land (CT 126375/1, PID 5587226), identified as 100 Pinnacle Road, Mount Wellington. This land forms a part of the Wellington Park and is described in detail in the previous discussion for the performance solution for structural fire safety.

The adjacent land in this instance is taken to be land within the Park in the near vicinity of the site. Within this area there are a number of built structures.

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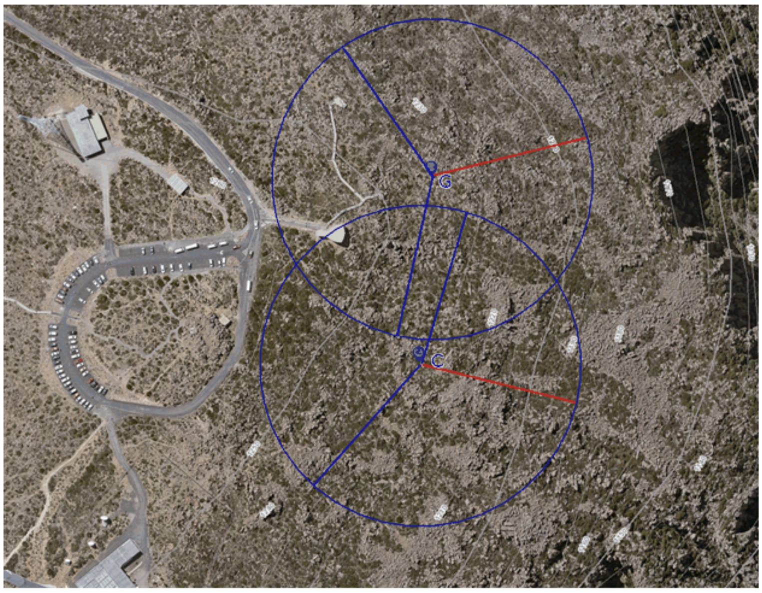
that an acceptable level of protection is provided notwithstanding because of the level of protection provided in the structure, the nature of the vegetation adjacent to the building and the altitude of the site.

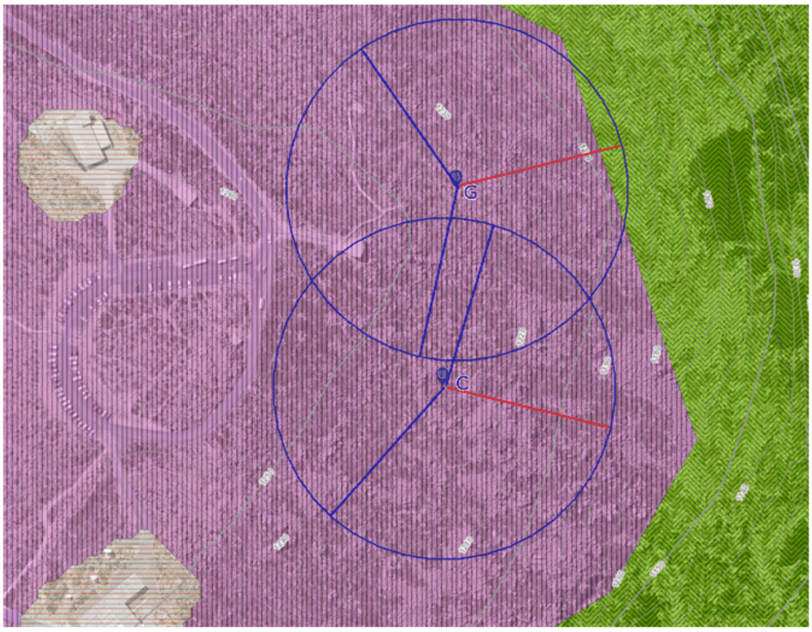



The above image shows the extent of the building being points C and G with blue circles with a radius of 100m provided around those points as previously identified. Part of the organ pipes can be seen to the east of the blue circles. The communications tower is to the bottom left of the image and the toilets are shown to the top left with the car park in between. The existing lookout is shown more centrally and it is understood that the lookout will be removed as a function of this development.

In the above image the extent of surface stone around the proposed development is apparent (grey interspersed between the green vegetation) and this is a significant attribute of the natural environment that limits the threat of bushfire in this location. The ground falls to the east and the existence of the organ pipes is also a significant benefit in terms of reducing the potential for the spread of fire across the ground from this direction.

The terrain also falls to the north where there is a high level of surface stone through to the lower section of Pinnacle Road and beyond. To the west is a high level of surface stone however the vegetation in this direction is denser. This is on the upslope side of the building, under the road and carpark which forms a firebreak to this vegetation and where there is an area that is less than a hectare in area.

The following image is also extracted from 'the list' website and shows the vegetation classification applied to this area from TasVeg 3.




In the above image;

| Colour | Community | Description |
|---|---|---|
| Pink | Highland and treeless vegetation | (HHE) Eastern alpine heathland |
| Green | Dry eucalypt forest and woodland | (DCO) Eucalyptus coccifera forest and woodland |
| Grey | Agricultural, urban and exotic vegetation | (FUM) Extra urban - miscellaneous |

In reality, the alpine heathland (treeless) vegetation extends to the edge of the summit of the organ pipes and there is little vegetation occurring on the organ pipes. The straight line delineation between the alpine heath and the forest / woodland is a crude approximation of the boundary between these two vegetation types.

With respect to fire attributes, the alpine heathland is described as very sensitive though of moderate flammability. The alpine heath is at or approaching a climax community and there appears to be little evidence of bushfire. This is the case notwithstanding that there has been large numbers of visitors to the Pinnacle for a long time and at a time when the prevalence of smoking and carelessly discarding smoking material on the ground during the summer would have been significantly more common than occurs now.

The fire attributes for the DCO vegetation is described as high sensitivity and moderate flammability.

The moderate level of flammability, the elevation of the site (alpine) and the sparseness of the vegetation have contributed to a low level of fire history. The following image is taken from 'the list' website.

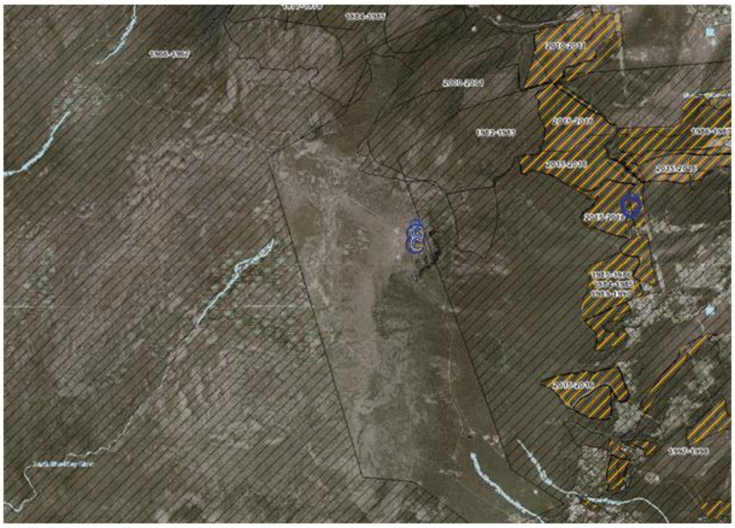

The only recorded bushfire in this area is the 1966/67 bushfire that is recognised as a catastrophic event and the worst bushfire in Tasmanian history in terms of life and property loss. The line of demarcation for this fire event runs north / south along the straight line that is the boundary between the alpine heath and forest / woodland vegetation (the black hatched area in the above image extracted from the List).

Again, it is anticipated that this is a crude approximation of the edge of the 1966/67 fire and it is plausible that the area of the proposed development was burnt in the 1966/67 bushfires. It is reasonably foreseeable that some spot fires may have occurred in the vegetation at the top of the organ pipes however it is unlikely to have spread along the top of the organ pipes as indicated. It is more plausible that the fire spread was limited to the bottom of the organ pipes to the east of the site with patches of burnt vegetation above the organ pipes.

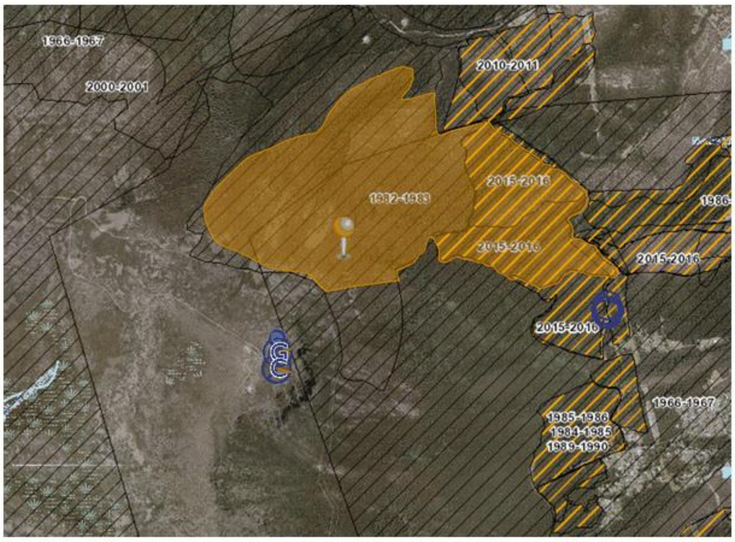
The fire history for the broader region is provided in the following image. Again, the points C and G are highlighted as well as the location of the base site. Drainage lines are also identified. The 1966/67 fire is the only recorded bushfire reported in close proximity to the site to the west.

The following image shows actual bushfires as a black hatched area and completed planned burns are shown with and orange and black hatching. The completed planned burns occur largely at the urban interface with the intention (presumably) of limiting the bushfire impact on urban development and protecting the Park from a fire starting at the urban fringe. It is noted that the

Base site is within the area that has had planned burns in the past and where there is a benefit to the community associated with the management of vegetation in this area. This will be discussed further in the bushfire assessment for the Base site.

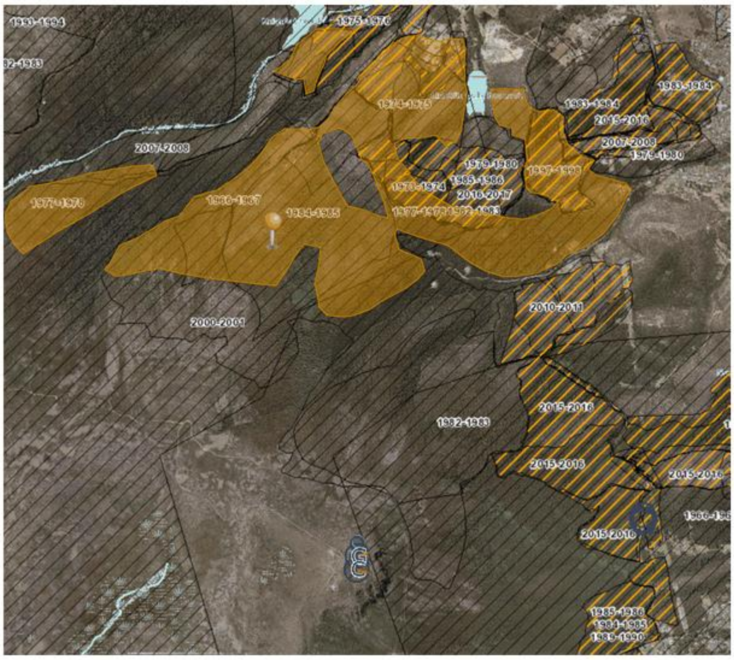


The area highlighted in orange in the following image is the extent of a bushfire that occurred on Australia Day 1983. The source of the fire is described as unknown and burnt 272Ha.

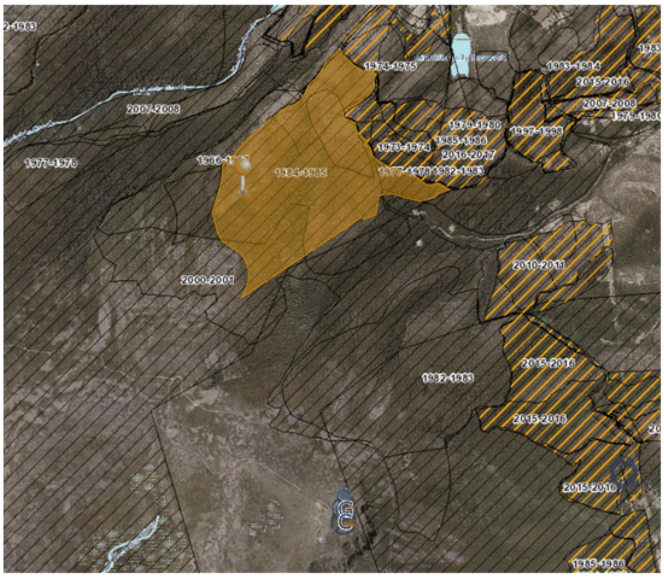



The following fire area highlighted in orange is known as the Tolosa fire. This fire burnt 638Ha of land and is described as an accidental fire that escaped. It appears that the fire approached the Pinnacle though did not spread into the alpine vegetation.


A number of fires also occurred further to the north on 1 January 1978 as shown on the following image.



The following fire also occurred on 1 January 1985 though further to the north and removed from the development site.




The existing fire management plan for the Pinnacle is describe in the Amended Mount Wellington Management Plan (MWMP) 2013 [13] and the Fire Management Strategy for Wellington Park – Revision 1 (the Strategy) [6]. From discussion with the Trust the fire management strategy is due for review though this is not likely to occur prior to the assessment of the proposed MWCC development.

At Clause 5.2.1 of the MWMP the bushfire strategy for the Park is described. The following points are noted;

- A balanced approach is necessary between protecting biodiversity, life safety and property protection,
- Bushfire management in the Park is the responsibility of the Trust however the lead agency to respond to bushfire in the Park is the TFS,
- The fire management strategy is to be reviewed every 5 years and planned fire burns are scheduled over a 15 year period,
- The Park contains extensive fire trails as a strategy for undertaking planned burns and fighting fires,
- Close the Park to all public access during periods of extreme and / or catastrophic Fire Danger Rating (FDR) as declared by the TFS, and when there are active bushfires in or adjoining the Park. Place signs on

all major public access points regarding potential closures during such periods.

In addition, at Clause 8.5.4 the MWMP prescribes the requirement for a development application. Two dot points relate specifically to bushfire and these state;

- An assessment of the potential risks of the proposed use or development to the Parks values and measures to mitigate and manage those identified risks, in particular bushfire risk, and

- For habitable buildings as defined in the [BCA], a BHMP or exemption certificate prepared in accordance with Planning Directive 5…

An assessment of the potential risks to the Parks values is provided by others as described below.

In this context the Fire Management Strategy for Wellington Park exists. The following points in the Strategy are noted;

- A comprehensive approach has been developed for the management of bushfire in and around the Park. Significant resources have been applied historically and ongoing to the development of a strategic approach to protecting, natural values, cultural values and use values.

- The fire management strategy includes the following elements which are defined in more detail in the Strategy;

    - The strategy,

    - Ongoing investigations into fuel loads in strategic locations to develop an appreciation of the threat posed by bushfire,

    - A risk assessment of current assets and the implementation of appropriate mitigation measures,

    - Development of protocols for interagency communications to maximise the deployment of resources,

    - Ongoing periodic review and review following fire events,

    - A multifaceted approach to fire detection in the Park,

    - A multi-agency response to fire in the Park to undertake firefighting activities,

    - The use of controlled burning to manage fuel loads in strategic locations,

    - A comprehensive arrangement of vehicle access / fire trails and access to defined water points,

- The use of fire breaks,

With particular reference to the development at the Pinnacle, the Strategy also makes some notable conclusions;

> *The summit of Mount Wellington has by far the greatest usage of any part of the Park. Tourists and sightseers may be at risk if a large wildfire cut Pinnacle Road, or even covered it with smoke. In this situation, it would be safer for visitors to stay at the carpark at the summit which is large enough to provide a safe refuge from wildfires, rather than trying to 'escape' by hurriedly driving down the road.* (at page 56).

This is the existing strategy at the summit. Granted the park is closed on extreme / catastrophic FDR days and when there is fire present in the Park and as a consequence the likelihood of the public being caught in a large wildfire with extreme bushfire conditions is significantly reduced. This applies equally to the proposed performance solution. In addition, the mitigation measures implicit in the Strategy described above also significantly reduce the level of threat including the threat to the proposed development.

At face value it would seem that the provision of a structure designed to withstand bushfire (the Pinnacle development) is a significant improvement in the level of bushfire protection provided to the public that will be at the summit if the MWCC cable car project proceeds.

With respect to other structures at the summit Table 10 (at ii) of the Management Action Summary forming part of the Strategy identifies two assets at risk being;

- Lookout/ interpretation area at the summit of Mount Wellington – Low current fine fuel load in adjacent vegetation – General comments and recommended fire protection measures are 'Structure is stone and glass – not combustible' and 'General maintenance to prevent any build-up of flammable vegetation within 1m of the building.'

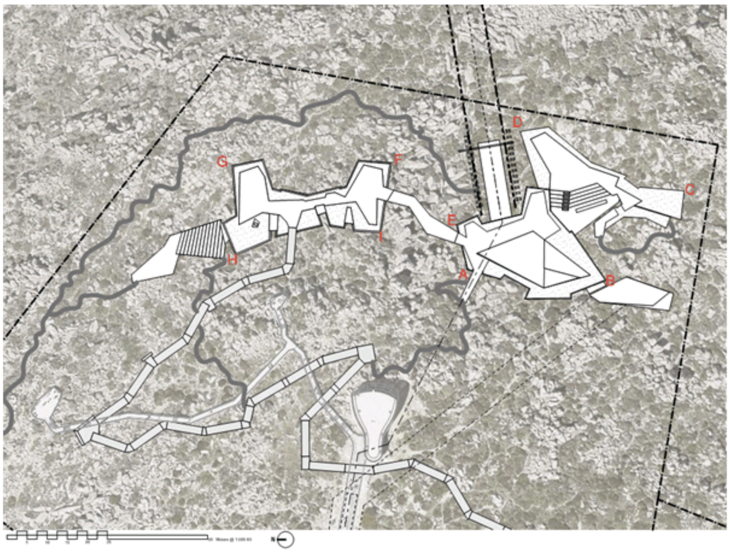
- Radio and television transmitters at the summit of Mount Wellington - Low current fine fuel load in adjacent vegetation – General comments and recommended fire protection measures are 'Situated in a relatively low fire risk area' and 'General maintenance to remove any build-up of flammable vegetation and other materials close to the buildings.'

It is noted that the retention of flammable vegetation up to within 1m of the buildings as identified above for the lookout / interpretation area will mean that there is a possibility of direct flame impingement on the building however the impact of the direct flame impingement is mitigated by the reduced probability of ignition, the sparse nature of the flammable vegetation and the resistance of the structures. This response is a proportionate response to the risk for these buildings. As will be described in the following section of this report describing the proposed development the structure is also fire resistant and a similar arrangement for the management of vegetation adjacent to the

Pinnacle building is proposed with the inclusion of a range of additional bushfire risk mitigation measures.

The following is a series of images included to show the nature of the vegetation to be retained around the building. Some vegetation removal will be necessary to undertake construction though it is understood that the objective is to minimise the disturbance of the vegetation around the building work.

The following image identifies a number of points around the proposed building work which are reference points for the following photo description of vegetation.

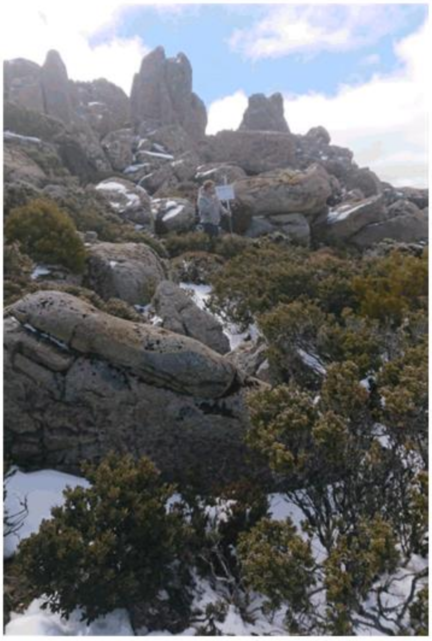



The following photos were taken on 23 September 2018 with the assistance of Leary and Cox Land Surveyors to identify each of these positions with sufficient accuracy to be able to identify the vegetation at these locations.

In the following photo the surveyor is located centrally to the photo with a GPS navigator and a square white board. The lookout is included in the image to provide assistance with the position of the photo. This photo is taken to show the vegetation above point A which will be the retain vegetation above the proposed building.

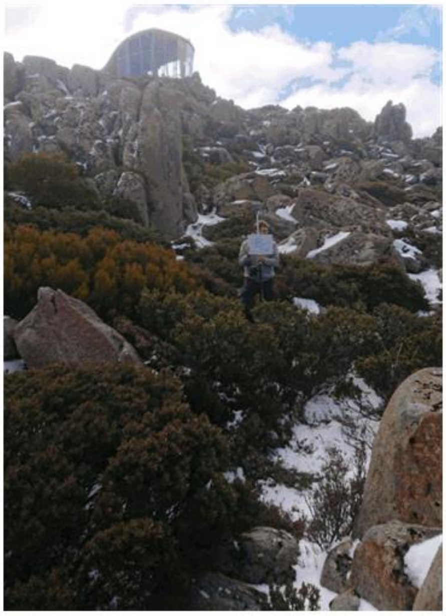
To the right side of this image is a section of rock scree that runs down the slope which extends under the walkway that connects the two parts of the building and where the fire separation exists. This rock scree forms part of the strategy to control the potential for fire spread around the fire compartmentation external to the building.

The following image is taken of Point A from the south looking at the rock scree behind point A.



The following image shows point taken from a more northerly position with the transmission tower to the rear to assist with orientation of the image.

The following image is looking at point B with the lookout included for orientation.

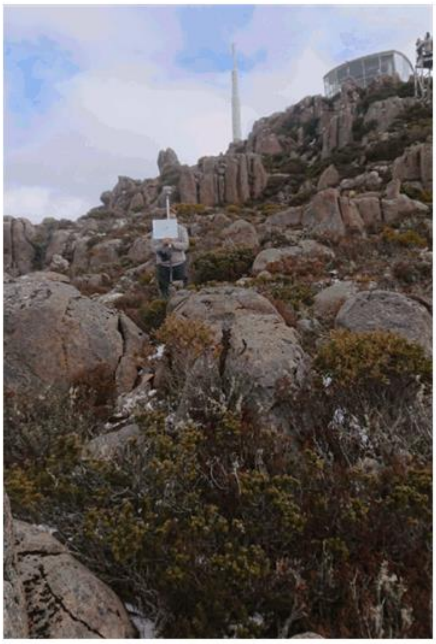


In the above image it can be seen that there is a significant upslope gradient above point B with a low probability of fire spread across the surface from the upslope direction because of the surface rock.

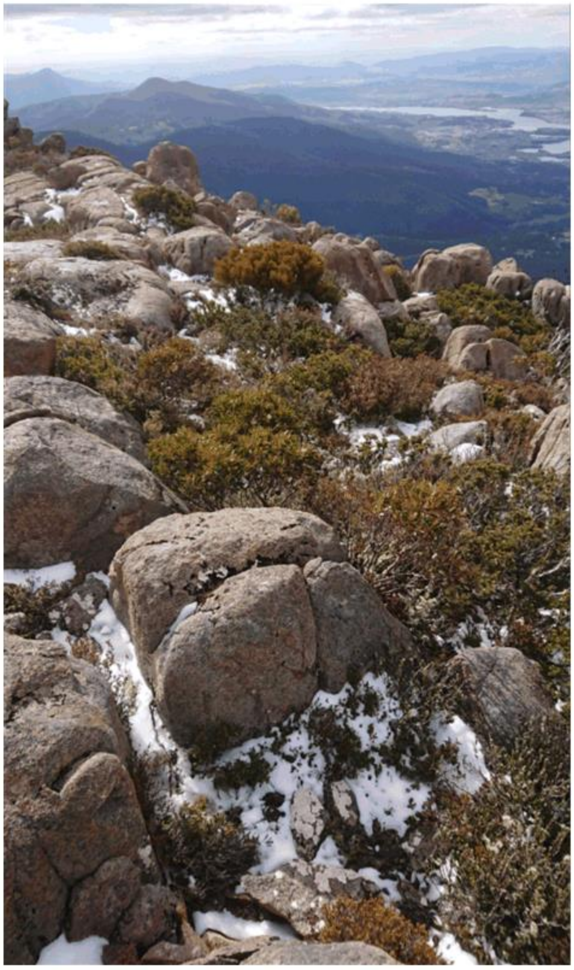
The following image is of Point C with the trig station behind and the lookout to the right side of the image. The vegetation in the foreground is on the downslope side of the building.

The following image is Point C with the transmission tower to the rear.

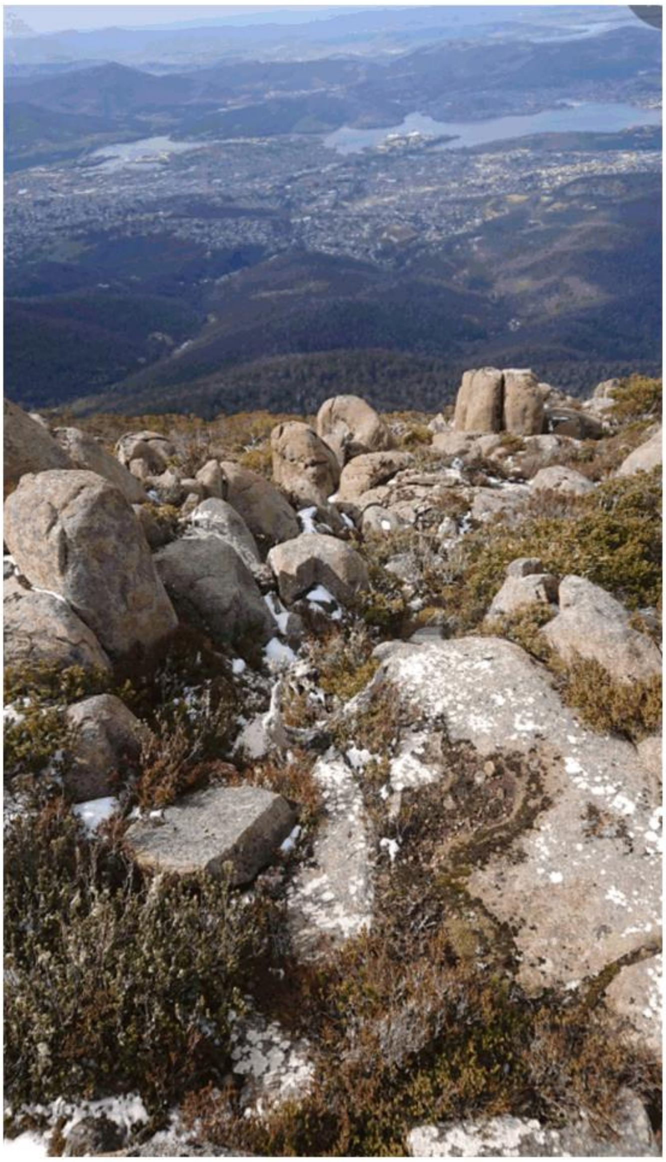
The following two images show point G at the north end of the site with the transmission tower and lookout in the background. The vegetation in the foreground of the image is on the downslope side of the building.



The following image is taken from Point G looking northwards.



The following is an image taken from Point G looking eastwards.



The following image is taken from Point C looking southwards.

### 5.4.3 Description of the Proposed Development

The proposed development is described elsewhere in detail. In brief for the purpose of this assessment for bushfire protection the operation entails;

- The cable car will operate in broad terms for;

  - 9 hours per weekday in the winter,
  - 10 hours per weekend day in the winter,
  - 13 hours per weekday in summer,
  - 14 hours per weekend day in the summer
- The maximum number of occupants for the building complex based on exit width (as determined by the Building Surveyor) is 1188 persons. Sanitary facilities are provided for 1600 persons.
- The Café is expected to operate through the hours that the cable car is operating, and
- The restaurant is expected to operate for lunches and evening meals.
- Visitors to the Pinnacle will be able to drive to the summit or catch the cable car.

The building complex is shown on the drawings provided at Attachment 1.00 and includes the fire protection measures identified at Section 3.2.5 and 4.4.1 of this report. The particularly significant issues for the proposed development with respect to bushfire are;

- The provision of a fire-resistant building which satisfies the structural fire resistance requirements of the NCC for a Type A building and is compliant with the construction requirements to resist a radiant heat flux of $40kW/m^2$ and ember attack (unless modified by this Report). The structure near ground level will resist direct flame impingement.
- Window openings in the external façade are toughened glass (typically minimum 6mm) and therefore more resistant to direct flame impingement as compared to laminated glass where there can be glazing failure associated with a temperature differential across the glazing system and a delamination because of heat exposure. Window openings are above ground level as shown on the drawings at Attachment 1.00.
- The existence of fire and smoke compartmentation within the building that allows for occupants to move from one part of the building to another depending on the nature and the direction of the threat,
- The provision of an Emergency Warning and Intercommunication system (EWIS) that allows the chief warden to communicate with the occupants across the building in the event of an emergency,
- The inclusion of an emergency plan where occupants will not be present in the building on days where extreme bushfire conditions exist or there are fires in the park resulting in the closure of the Park.

The occupants of the building will be staff and the public attending the facility. Staff will be trained in emergency procedures and the use of first response firefighting equipment and fire hydrants. The public using the facility have a broad range of characteristics from the young through to the aged.

The provision of the cable car will improve the level of access to the summit to the extent that people that may not have been able to make the trip to the lookout in the past will be provided with a safer and dignified access. As such access would be possible for a broader range of people with physical disabilities. A proportion of the occupants may also have intellectual disabilities that may also impair their ability to sense / respond to cues that a fire exists or to be able to evacuate without assistance.

From a fire safety perspective this creates additional challenges and as a consequence the provision of fire and smoke compartmentation within the Pinnacle provides an opportunity to systematically evacuate causing minimal stress to the public. This benefit is also provided to the occupants driving to the summit and being unable to use the vehicle to leave because the Pinnacle Road is blocked.

### 5.4.4 Assessment of the Performance Solution

The following is an assessment of a number of bushfire scenarios which emphasise the DtS non-compliance and test the proposed performance solution for the proposed building complex to determine whether or not the proposed performance solution achieves an equivalent level of fire safety as a DtS compliant solution.

The following discussion of particular fire scenarios also provides examples for staff on the how the proposed performance solution is intended to operate.

It should be noted that fire is a complex process and the following scenarios are a simplification of the range of possible fire scenarios that might arise. The Chief Warden will need to be responsive to the conditions as they arise at the time.

*Fire Scenario 1 – Extreme fire conditions*
If there is a fire in the area or extreme fire conditions (or greater) are forecast Park management may have declared that the Park will be closed at a particular time prior to the advice warning from the TFS and if that is the case the cable car will not be operating for the benefit of the public and the Pinnacle will not be operating. Park management will control the potential for vehicles, pedestrians and cyclists to enter the park. If this is the case, there would be no public present at the Pinnacle.[8]

[8] It is noted that the bushfire strategy for the Park may change where the trigger for closure is less threatening; a more conservative trigger. If this occurs the Park may be closed on a greater number of days and the cable car will be operating on fewer days.

Under these more severe conditions it is plausible that Pinnacle Road could be impassable and that there is no responding fire brigade to defend the Pinnacle and other structures at the summit.

If the Park is closed and there are no patrons at the Pinnacle, the building is not performing as either a transport dock or as a place of assembly as there is no public presence. The threat to the public is removed. The requirement for any bushfire protection arises because the building is a 'place of assembly' where there are potentially vulnerable occupants present.

It is noted that once the threat to the public is removed the building is ostensibly performing the function of an empty restaurant. As discussed previously there are no bushfire requirements in the building regulations that would require any bushfire protection measures to a restaurant / café in a bushfire prone area.

The point made here is that the classification of the building as a 'place of assembly' is about the protection of the occupants, not necessarily about the protection of the building.

Notwithstanding, the building is classified as a mixed Class 9b and Class 6 building and as a consequence there is a requirement for bushfire protection measures. In accordance with the Determination this would include;

- Hazard management areas –provided to a reduced width where the threat from the vegetation is reduced,
- A firefighting water supply – provided however there is no vehicle access or hardstand to hydrants (hoses and branches carried from the appliance by the responding fire brigade),
- Property access – provided to the static water supply as described above, and
- An emergency plan – to be provided.

In response to potentially extreme fire conditions it is concluded that the proposed performance solution provides an equivalent level of bushfire protection as a DtS compliant arrangement for the following reasons.

1. The threat to building occupants is substantially reduced given that the Pinnacle is closed to the public. If staff are present at the Pinnacle, they may allow members of the public to enter the building as a safer place compared to the carpark though this will be dependent on the conditions and whether or not it is safe for staff to be present. There would be relatively few people and this arrangement would be consistent with the current arrangement in the event that the Park is closed and there are people at the summit.
2. With an extreme fire spreading from the east towards Mount Wellington (the more credible and threatening fire scenario) with the

Park closed it is considered unlikely that fire brigade appliances would be deployed to the Pinnacle if Pinnacle Road is threatened. Under these conditions the resources of the various agencies responding to the bushfire would be stretched and there is a chance that resources deployed could be threatened on Pinnacle Road and / or unable to leave the Pinnacle because of a threat on Pinnacle Road. In that scenario there should be no reliance on the turnout of firefighting appliances to the Pinnacle and the adverse impact of the additional distance for fire fighters to approach fire hydrants is diminished.

3. In this context the DtS compliant arrangement would be to provide a HMA between the bush and Visitor Centre with a width on the downslope side of approximately 25m. Based on the assumptions implicit in AS 3959 this means that the DtS requirement would allow for a radiant heat flux of $29kW/m^2$ on the building with no construction requirements to resist this radiant heat or ember attack. Under these conditions it is plausible that the building (in a DtS compliant arrangement) would be threatened particularly if there is no-one present to actively defend the property. By comparison, in the proposed performance solution the building is built to resist a radiant heat flux of $40kW/m^2$ (unless modified in this Report) and some direct flame impingement that is proportionate to the level of threat presented. The structure is largely concrete and glass with barriers provided that are selected to resist the bushfire threat. The structure built in accordance with the performance solution is more likely to be resistant in an extreme bushfire event compared to a DtS compliant building which is not designed to resist the design radiant heat flux.

4. In the previous point it was identified that the proposed structure in the performance solution is responsive to the level of threat presented. The DtS provisions are not sensitive to alpine conditions where there is a large proportion of surface stone. The assessment against the DtS provisions in the NCC has conservatively assumed shrubland vegetation is presenting a flame front with a width of 100m approaching the building. This assumption leads to the DtS conclusion that a 25m HMA is necessary to achieve a radiant heat flux of $29kW/m^2$. Having a 100m fire front approaching the building from beyond the organ pipes is implausible. In this assessment it is concluded that it is not appropriate to quantify the radiant heat impact on the building or the duration of potential flame impact given the sporadic nature of the shrub vegetation interspersed with surface stone [14]. If embers do ignite the vegetation adjacent to the building, the ignition is likely to be a point source radiating out from the ignition point with a head fire developing in the direction of the prevailing wind within the copse of vegetation. Once the head fire reaches a point where there is surface stone (depending on the width of the surface stone and the distance to other vegetation) the head fire is unlikely to progress and the remainder of the copse if likely to be burnt. It is unrealistic to apply the principles for determining a radiant heat flux based on a methodology that is not sensitive to the amount of surface

stone present at and beyond the site. It is not appropriate to assume that shrubland has an assumed surface fuel load of 15 tonnes / hectare where there is (say) 50% surface stone and therefore an assumption of a uniform 7.5 tonnes / hectare as this does not take into account the fact that the surface stone provides a fire break to fire spread across the landscape. It is sufficient for the purpose of this assessment to conclude that the potential outcome could result in a limited amount of direct flame impingement on the building from an ember attack on the copse of vegetation near the building where the fuel load is rapidly exhausted. The extent of flame impact is consistent with an arrangement where there is a cultivated garden adjacent to the building.

5. As a further level of redundancy in the proposed performance solution, in addition to a greater level of resistance to fire spread to the structure externally and the protection provided to the cafe, internal fire and smoke compartmentation is provided that could be relied upon in this fire scenario for occupants that seek a safer place at the Pinnacle. If a fire were to occur that impinges on the structure and this was not able to be managed by remaining staff (if present) the occupants could retreat to another fire / smoke compartment. The need for this level of redundancy is remote though it is a provision of the fire strategy provided primarily for the benefit of occupants in a structural fire scenario where evacuation to the outside of the building is less favourable (i.e. winter with snow present).

To reinforce the point that the proposed performance solution provides an equivalent level of bushfire protection to a building that is fully compliant with the DtS provisions of the Determination it is also noted that;

- For a DtS compliant arrangement there would be a continuous shrubland vegetation where there is shrubs up to 2m in height interspersed with grasses where there are no surface stone and no disruption to the spread of fire traveling towards the building from the direction of the prevailing wind and there is no benefit from the alpine conditions. In this scenario it would be possible that there could be a well-developed fire with a flame front with a width of 100m approaching the building. This is not the case in this situation.

- Building construction for a café / restaurant could be (for example) forest vegetation up to the building with no HMA where the building could have no bushfire resistance, no firefighting water supply and no fire brigade access and no emergency plan. No bushfire resistance means the building could have a combustible external cladding, combustible roof sheeting and no ember protection.

- For a transport depot / place of assembly the 'vulnerable use' could have a HMA as described in the first dot point above in accordance with the DtS provisions of the Determination where the design radiant heat flux is $29kW/m^2$ and where the there is no bushfire resistance in the building as described in the second dot point. There could be combustible roof sheeting and a combustible external wall with no

> ember protection. While there is a requirement for a firefighting water supply, access for the fire brigade and a requirement for an emergency plan for this class of building the DtS outcome is that the building is not designed to resist the design radiant heat flux in a DtS compliant building and there is a reasonable probability that a DtS compliant building will fail to resist a bushfire impacting on the building. In fact, because there is no ember protection to the DtS compliant building it is possible that the building will fail where the bushfire is remote from the building.

This discussion is provided to emphasise that there is a residual of loss in a DtS compliant arrangement. The requirement of the NCC is to develop a performance solution where there is an acceptable level of residual risk that is equivalent to the residual risk when a building is fully compliant with the DtS provisions of the Determination. Where the DtS compliant building is satisfied by the provision of a structure that does not resist the design radiant heat flux (or has not bushfire protection where the building is a café / restaurant) the benchmark to achieve equivalence is relatively low. Achieving equivalence to this standard is not particularly onerous. While the benchmark DtS compliant arrangement is not onerous, it is understood that there is a relatively low level of loss of 'place of assembly' buildings in Australia in response to bushfire and therefore the level of stringency in public policy for this class of building appears appropriate.

In this fire scenario where there is extreme bushfire weather the level of protection to the occupants and the property is significantly better than that achieved in a building compliant with the DtS provisions of the NCC where (for example) there is no requirement for ember protection or protection from any level of radiant heat.

*Fire Scenario 2 – Fire in the Park in Local Area*
If there is a local fire at a time when the fire weather conditions are not extreme the Park management may still close the park in accordance with the Strategy. The impact of the Park closure under these conditions will, while there the fire threat is reduced, mean that a similar outcome to that described above for fire scenario 1 will result. The public are unlikely to be present and so there is a reduced potential for public exposure and the building will provide a level of protection and resistance to bushfire that is significantly greater than that achieved for a building that is compliant with the DtS provisions of the Determination.

Given the reduced threat associated with the bushfire vegetation being alpine and being interspersed by surface stone this additional level of resistance in the structure along with an improved capacity for staff bushfire fighting (in the absence of a fire brigade response) given the provision of a pumped firefighting water supply and onsite equipment with trained staff, it is apparent that an equivalent level of bushfire protection is provided in the proposed performance solution.

*Fire Scenario 3 – Local Fire impacting on Pinnacle*

Outside of these conditions there is a fire scenario where the weather conditions are not extreme and where there is no local fire in the Park at the start of the day and the cable car commences operations. Being less than extreme weather conditions the potential severity of a bushfire is reduced though potentially still severe. Notwithstanding, if the FDI is greater than 38 there will be a total fire ban and there will be an elevated awareness and consciousness about a possible fire threat by the public and the relevant agencies.

Two sub fire scenarios are considered; one where there is a fire threatening the Pinnacle and another where the bushfire may threaten the Base. Both will have an impact on the operation of both nodes and therefore need to be considered. This following discussion deals with a scenario with a local fire impacting on the Pinnacle.

If a fire were to start in the forest / woodland vegetation to the north or east there is a potential for the fire to impact on the ability of people to leave from the summit generally as Pinnacle Road may be impassable (worst case scenario).

If this were the case the actions of the Chief Warden (subject to confirmation via the emergency plan) would be, in the absence of a clear understanding of the threat;

- Raise the alarm with the TFS using the emergency number (000),
- Alert management at the Base node to cease patrons travelling to the Pinnacle and to continue to operate the cable car until otherwise advised (if it is safe to do so) decanting occupants from the Pinnacle,
- Seek further information from the TFS incident management team on the location of the fire and the threat level posed by the fire to the Pinnacle, the Base and the cable car. Is the fire spreading towards the facility and what would be the likely time to impact?
- Communicate with the operator on board the cable cars asking them for feedback on the bushfire. If conditions deteriorate so that the cable car operator is unable to see the ground for a distance (to be confirmed) because of smoke the cable car should stop at the next docking. If fire is visible within (distance to be confirmed using visual indicators prior to operation) of the cable car the cable car should stop at the next docking. These parameters need to be confirmed in the emergency plan prior to building approval.
- Advise wardens of the need to potentially commence evacuation,

Where there is a fire near the Park where the effects of fire are visible and the level of warning is limited to 'advice', under these conditions where there is less extreme weather the cable car and the facility may continue operating while the Park remains open.

The warning levels applied by the TFS in response to fire are listed in the following image where the highest level of threat is 'emergency warning' and the lowest level of threat is 'no alert level'. Information on the alert and warning levels is provided at Attachment 11.00.

> *With the aim to produce an appropriate response from the community, bushfire alerts should be specific, as brief as possible and unambiguous. They should cover information such as the location, level and timeframe of threat, and a recommendation for action. [15]*


When the level of warning escalates to 'watch and act' or 'emergency warning' or the Park closes, the procedure is;

- Base operator to be advised to cancel all remaining upwards travel for the remainder of the day (possible longer depending on conditions),

- A message is to be provided over the EWIS system to the effect that there is a fire in the region with a potential to impact on the cable car and that occupants are recommended to leave early via the cable car. This message may be staggered between the different smoke / fire compartments to avoid panic while people are waiting for their cable car availability.

- Once the Pinnacle building is substantially emptied the external alarm is to sound and staff, if it is still safe to do so, are to go to the car park and advise occupants to evacuate if it is safe to do so.

In this fire scenario it is considered that there is sufficient opportunity to be aware of the onset of fire during days that area not extreme conditions for a large proportion if not all of the occupants to be evacuated to the Base station. For those occupants that are unable to evacuate ahead of the closure of the cable car they will need to shelter in the building until such time as conditions allow for transport to be provided. With Pinnacle Road closed to other traffic it may be possible that, under these conditions, occupants will be able to be transported via the road in the evening / at night when the temperature has cooled and the traffic is limited to one direction.

As identified in previous scenarios, the level of construction is likely to be sufficiently resilient in these conditions and a further level of redundancy is provided by fire and smoke compartmentation within the building.

*Fire Scenario 4 – Local Fire impacting on Base*

This fire scenario is similar to fire scenario 3 where the fire conditions are not extreme and the Park remains open and a local fire occurs that may impact on the Base when the facility is open to the public.

The same conclusion is drawn with this scenario as for scenario 3 however there are variations to the response that are identified below.

On becoming aware of the onset of a possible bushfire when the Base is operating, management of the Base are to advise the operator at the Pinnacle that a level of bushfire threat exists and to postpone sending passengers to the Base until there is sufficient clarity that the threat is at an acceptable level. No additional passengers are to be sent to the Pinnacle at this time.

The operator of the Base is to then investigate the level of threat consistent with the discussion provided in scenario 3. If an acceptable level of threat exists and there is a fire in the Park it is likely that the Park will be closed. No further passengers would be sent to the Pinnacle. If it is safe to do so, the operator of the Base would advise the operator of the Pinnacle to restart sending passengers to the Base.

If it is not sufficiently safe to commence the transfer of passengers to the Base the operator of the Base is to advise the TFS and the operator of the Pinnacle so that this contingency as described in the emergency plan can be given effect.

For the reasons identified in fire scenario 3 the level of protection provided at the Pinnacle is acceptable given that the weather conditions are likely to be less severe than that considered for extreme fire events and the fire is a local fire same distance away nearer to the Base.

As identified in the following assessment for the Base at Section 6 the proposed building is likely to be able to resist the bushfire threat however the strategy here is for the occupants to evacuate if it is safe to do so and for the building to be a safer place if it is not safe to evacuate.

Note: An assessment of additional fire scenarios where the regional landscape is considered is provided at Attachment 10.00 in response to comments from the TFS to an earlier version of this report. This assessment is provided primarily to quantify (in broad terms) a scenario where there is a campaign fire that may impact on the sites.

*Fire Brigade Intervention*

An assessment of fire brigade intervention is necessary because of an apparent DtS non-compliance being that fire brigade access to remote offtakes (hydrants) and the provision of a hardstand adjacent to hydrants is not provided in accordance with the DtS provisions of the Determination. The performance solution requires the responding fire brigade to turn out to the static water supply above the Pinnacle building and for firefighters to carry hoses and branches to the hydrants.

For structural fire safety, compliance with AS 2419.1 makes provision of attack hydrants where it is necessary for the responding fire brigade to carry hoses and branches to hydrants. The DtS requirement in that standard is for a maximum distance of 50m where an adequate flow and pressure is achieved at the hydrant without the need for the appliance in that location. The 50m distance is exceeded in this instance and a performance solution is provided for structural fire safety at Clause 3.3.2 of this report. The DtS provisions of the Determination for bushfire do not provided an option of using an attack hydrant though this may be because the Determination is primarily focused on domestic construction where it is highly unlikely for this to occur.

In this assessment it is concluded that the proposed performance solution provides an acceptable (equivalent) level of fire brigade intervention for the reasons outlined below.

Firstly, as per the structural fire safety assessment, there is a significant delay associated with the arrival of the fire brigade to the site under favourable conditions (See Clause 3.3.2 of this report). The proportion of the time required for a crew to carry hoses and branches to a hydrant while the pump operator connects to the booster assembly is relatively low. In that scenario it is apparent that there is likely to be some delay however the extent of the delay in carrying hose lines is not significant.

If there is a delay in the arrival of the fire brigade because of traffic descending Pinnacle Road (with the potential for a vehicle accident to have occurred blocking the road) and / or fire or the effects of fire impacting on the road, it is apparent that the delay could be significantly greater and that fire brigade response may not occur. There are parts of Pinnacle road that are exposed and where there is a limited width in the carriageway where it is foreseeable that an accident/s could occur under the stress of a pending fire front approaching where there is potentially reduced visibility (smoke obscuration).

The probability of this scenario occurring is relatively low though still possible given the frequency of fire impacting on the Pinnacle, improvements on remote firefighting (using aircraft and remote firefighters) and improvements in the management of bushfire (planned burns) and communications. These improvements may be offset in the potential for more severe bushfire conditions associated with climate change.

If access to the Pinnacle is not possible for the fire brigade, provision is made in the proposed performance solution for staff to undertake firefighting activities using hydrants and other equipment provided on site (if it is safe to do so). This is achievable because the firefighting water supply is pumped (as well as boostered) in accordance with AS 2419.1 and this means that a firefighting flow and pressure can be generated from the hydrants without the need for the fire brigade appliance. That being the case there is a significant improvement in the level of protection provided to the buildings and the impact of having to carry hose lines and branches to the hydrants is lessened as hose lines are provided in the building.

In addition, it is noted that the turnout of an appliance to the Pinnacle is more likely to occur because the site provides a high level of protection for the appliance and firefighters. The appliance is provided with protection at the static water supply by the carpark and the vegetation within and adjacent to the carpark is lower threat vegetation as described above with large elements of surface stone and the carpark / road. In a DtS compliant building the road to the property could be through forest and the static water supply could be exposed to bushfire prone vegetation.

As also mentioned earlier there is an improved level of performance also achieved by the capacity of the static water supply and the quality of the water supply in terms of volume, flow and pressure.

In this context it is considered that the adverse effect associated with a requirement to carry hose lines and branches to hydrants is compensated for by the provision of a better quality and quantity of firefighting water supply where there is a better level of access to the site and protection for the fire brigade while on site in this context than that provided by the DtS provisions of the Determination and as a consequence it is concluded that fire brigade intervention is at least equivalent to that achieved by the DtS provisions of the Determination.

## 5.5 Assessment of the Parks Values

The Park Values for the purpose of this assessment are taken from the MWMP Chapter 5 dealing with Maintaining Park Values. An assessment of the impact of the proposed bushfire mitigation measures on the use values, natural values and the natural values is provided by others.

## 5.6 Bushfire Hazard Report – The Regulations

In addition to the assessment in accordance with the Determination above the Regulations also requires the development of a BHMP. The term BHMP is a defined term and means as defined in the *Fire Service Act 1979*.

**60A. Interpretation of Part**

In this Part –

***approved*** means approved by the Chief Officer;

***bushfire hazard management plan*** means a plan showing means of protection from bushfires in a form approved in writing by the Chief Officer.

The approved form of the BHMP is found at 'Bushfire Hazard Advisory Note No 04 – 2020' (Version 4) dated 4 August 2020 [10] (the Approved Form). The assessment against the provisions of the Approved Form has been incorporated in the performance solution prepared above.

The Approved Form requires the development of a BHMP that illustrates and summarises the substance of the bushfire assessment. The BHMP for the Pinnacle is provided at Attachment 6.00.

In addition, the Determination also requires an emergency plan to be developed in accordance with the guidelines developed by the TFS. The concept strategy for the emergency plan for the Pinnacle is provided at Attachment 9.00.

# 6. Bushfire Protection – The Base

## 6.1 Introduction

The introductory sections dealing with the bushfire assessment methodology and standards etc. are provided within the bushfire assessment for the Pinnacle and are not reproduced in this section of the report.

By way of background the building is Type A with internal fire compartmentation between the levels in the building to comply with the structural fire resistance requirements. Two fire isolated stairs connect the levels. As the building is built on a slope there is an option for occupants to evacuate from each level directly outside. This also assists with the provision of fire brigade access to all levels from directly outside as well.

The cable car dock is provided at level 2. Also at this level are a lounge and ticket sales as well as amenities. Level 1 is substantially the cable car operator office and amenities. The remainder of level 1 is the void above the machinery room at level 0. The machinery room and plant room are located at level 0 along with some covered car parking.

The building is a 'vulnerable use' for the purposes of the building regulations as the Building Surveyor has defined this building as a mixture of Class 5 office, 7a car park and 9b assembly building as defined in the NCC. The Class 9b assembly building applies because the building is a building where people assemble for transit purposes. For this building this would be the dominant use of the building.

**Assembly building** means a building where people may assemble for—

(a) civic, theatrical, social, political or religious purposes including a library, theatre, public hall or place of worship; or

(b) educational purposes in a *school*, *early childhood centre*, preschool, or the like; or

(c) entertainment, recreational or sporting purposes including—

  (i) a discotheque, nightclub or a bar area of a hotel or motel providing live entertainment or containing a dance floor; or

  (ii) a cinema; or

  (iii) a sports stadium, sporting or other club; or

(d) transit purposes including a bus station, railway station, airport or ferry terminal.

The first step in the development of a performance or DtS solution is to undertake an assessment of the relevant prescriptive DtS provisions to establish the extent of the DtS non-compliance that needs to be considered.

## 6.2 Director's Determination for Bushfire – DtS Assessment

As for the Pinnacle assessment, there are five (5) elements to the DtS provisions of the Determination and these are considered below.

### 6.2.1 Construction Requirements

There is no construction requirement for the proposed building work given the building is Class 9b. Construction requirements exist for Class 1, 2 and 3 buildings along with associated Class 10a buildings. Notwithstanding there is some benefit associated with the materials that are to be utilised and these are identified below.

As discussed for the Pinnacle building, for the purpose of the Determination, the Base could have combustible walls and roof with no ember protection where (in a DtS complainant configuration), there is a reasonably high probability of the building being impacted when exposed to the design bushfire conditions. While the building may not be exposed to design fire conditions during the life of the building, it is also possible that the building may be exposed to more extreme conditions beyond the design fire conditions.

While there is no requirement in the DtS provision for bushfire resisting construction, the proposed performance solution includes bushfire resisting construction that is compliant with the requirements for BAL 29 as defined in AS 3959 (unless modified by this Report).

### 6.2.2 Hazard Management Areas

The DtS provisions of the Determination would require the building to be provided with a hazard management area (HMA) 'of sufficient dimensions and provides an area around the building which separates the building from the bushfire hazard.' The prescriptive requirement for the width of the HMA is found at Table 4.4 of the Determination.

Item B (highlighted in the table below) is applicable in this instance.

This means that the building, in accordance with the DtS provisions, needs to be;

- Located on the lot so as to be provided with a HMA no smaller than the separation distances required for BAL 29; and
- Have a HMA established in accordance with a certified BHMP.

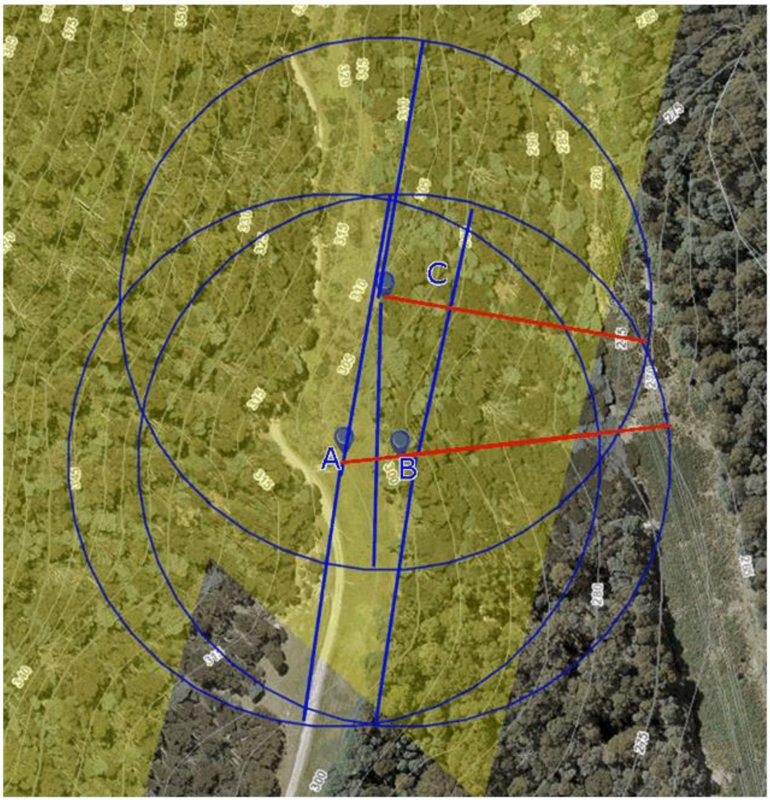
A BAL assessment is provided below that is used to establish the width of the HMA required by the DtS provisions of the Determination.

| | |
|---|---|
| A | Does not apply because the building work is not proposed on a lot where there a Bushfire Attack Level (BAL) was provided at the time of subdivision. |
| **B** | **Applies as the land is a lot not provided with a BAL at the time of subdivision.** |
| C | Does not apply as the building work is not an alteration or addition to an existing building. |
| D | Does not apply because the proposed building work is not for an accommodation building. |
| E | Applies where the proposed building work is a 'vulnerable use' as defined in Planning Directive 5.1 – Bushfire-Prone Areas Code (the Code) as opposed to a 'vulnerable use' as defined in the Regulations. As identified previously the proposed development is a 'vulnerable use' for the purpose of the building Regulations.<br><br>'Vulnerable use' for the purpose of the Code is provided in the definition of terms at Clause E1.3 of the Code. For the purpose of the Code, 'vulnerable use' means a use that is within one of the following use classes;<br>• Custodial Facility;<br>• Educational and Occasional Care;<br>• Hospital Services;<br>• Residential if for respite centre, residential aged care home, retirement home, and group home.<br><br>The proposed use does not fit within these use groups and is not a 'vulnerable use' for the purpose of the planning Code. |
| F | Does not apply because the proposed use is not a hazardous use as defined in the Determination (as opposed to the 'hazardous use' defined in the Code). |

The following image is a marked up image taken from the Tasmanian government website www.thelist.tas.gov.au. The points A, B and C represent the extremities of the Base building.

Around these points is a blue circle with a radius of 100m which represents the area of interest in the assessment of the bushfire threat for the purposes of AS 3959. The blue lines radiating from the centre to the circle represent the approximate location of an even grade taken from the contours overlaid on the website. The red line radiating from the centre represents the steepest gradient to the downslope being identified as being roughly perpendicular to the contours. The yellow shaded area represents the extent of the Park.

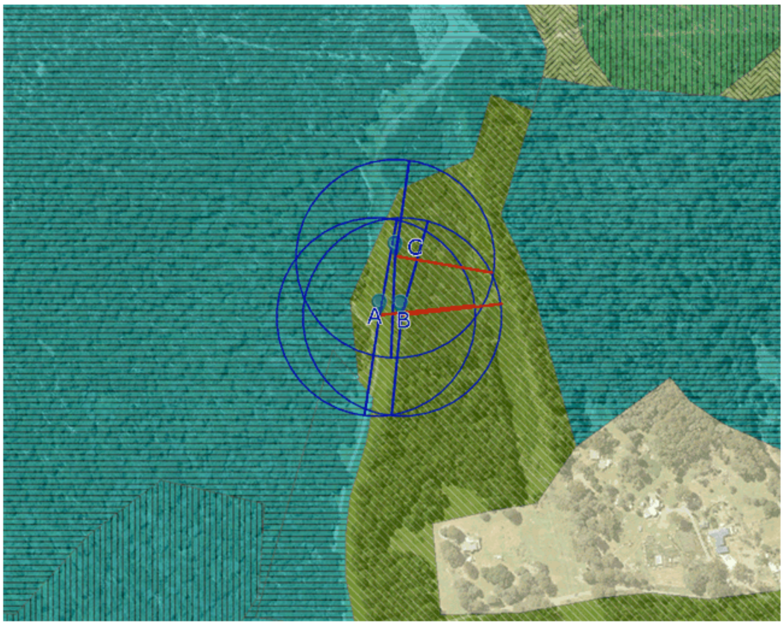
The gradient of both of these red lines across the ground surface is between 15° and 20°. It should be noted that the terrain is complex and variable and that this measurement is an average gradient over the length over the 100m distance.




The vegetation within 100m of the proposed facility is described at Tasveg 3 as a combination of a dry eucalypt forest (vegetation community description is DPU eucalyptus pulchella forest and woodland) to the downslope side of the development and wet forest (vegetation community description is WOU Eucalyptus obliqua wet forest undifferentiated) to the upslope. This is shown on the following image extracted from the list website.

Beyond the 100m radius there is an area of managed vegetation to the south that is associated with existing residential development. To the north east are also areas of dry eucalypt forest as shown on the following image.

On the ground, the area above the site within the 100m radius is considered to be better described as a dry forest and this classification may have changed in response to historic controlled burning to that land.




The vegetation classification conservatively applied around the building is 'forest' in accordance with the vegetation classification contained in AS 3959.

Applying the Fire Danger Index (FDI) of 50 as per table 2.1 of AS 3959 the following table identifies the width of the hazard management area to achieve BAL 29 for different gradients under the vegetation up to 20°.

| Width of hazard management area at FDI 50 for BAL 29 | |
|---|---|
| **Gradient** | **Width of Hazard Management Area - Forest** |
| **Up slope and flat** | > 16m |
| **Downslope >0 to 5°** | > 19m |
| **Downslope >5 to 10°** | > 24m |
| **Downslope >10 to 15°** | > 30m |
| **Downslope >15 to 20°** | > 37m |

Where it is conservatively assumed the slope of the land below even grade is between 15 and 20° the required width of the HMA in a DtS compliant arrangement would be greater than 37m. Above the even grade the width of the HMA would be 16m. This DtS compliant width of HMA is provided in this solution and there is no requirement for a performance solution.

All of the hazard management area is within the lease boundary and can be managed by the Client. There is no reliance on any vegetation management beyond the lease boundary.

Within the HMA, the vegetation is to be compliant with the requirements for 'low threat vegetation' as defined at Clause 2.2.3.2 of AS 3959 in a minimum fuel condition recognizable as short cropped grass to a height less than 100mm during the bushfire season. Maintenance of the HMA during this time is to include;

- Removal of fallen limbs, leaf and bark litter,
- Removal of fallen limbs, leaf and bark litter from roofs, gutters and around the building.
- Cut grass / lawns to less than 100mm.
- Remove pine bark and other flammable garden mulch.
- Minimise the amount of other combustible items.

### 6.2.3 Water Supply for Fire Fighting

The Determination establishes a requirement for firefighting water supply for bushfire protection. It should be noted that there is a greater requirement for a firefighting water supply for building structural fires than that required for bushfire.

There is no reticulated water supply to the site so Clause 4.3 of the Determination would require a static water supply in compliance with Table 4.3B of the Determination located near the building and provided with hardstand and suitable connections to allow the responding fire brigade to connect to the water supply to achieve compliance with the DtS provisions.

The following table identifies the elements necessary to comply with Table 4.3B and a description of the proposed solution.

| Table 4.3B ref. | Requirement | Provision |
|---|---|---|
| A | The building area is to be within 90m of the static water supply. | Achieved by remote offtakes. |
| B | A remote offtake is permitted. | A remote offtake is provided in the form of fire hydrants off the static water supply. Coverage in accordance with A is achieved where remote offtakes are considered. |
| | A volume of 10kl is required as a dedicated firefighting water supply for each building. | 300kl is provided in the static water supply. |
| | The static water supply is required to be constructed of material to ensure the reliability of the supply. | A concrete static water supply is provided that is compliant with this requirement. |
| C | There are requirements for pipework, fittings and accessories. | The proposed solution will be compliant with this DtS requirement. |
| D | There is a requirement for signage to the static water supply. | The proposed solution will be compliant with this DtS requirement. |
| E | A hardstand is required adjacent to the static water supply to allow for access by the responding appliance. | The proposed solution will be compliant with this DtS requirement and includes the provision of a hardstand adjacent to hydrants and the static water supply as shown on the BHMP at Attachment 6.00. |

In this context the proposed firefighting water supply is not only compliant with the DtS provisions of the Determination, it provides a level of firefighting water supply and access to hydrants that is significantly better than that required by the DtS provisions of the Determination.

### 6.2.4 Property Access

As identified above the DtS requirement would be for a road access to the hard stand at the static water supply with coverage within 90m of the hydrants. The proposed solution for this aspect of the proposed development is described above for the firefighting water supply. This arrangement is compliant with the DtS provisions of the Determination.

The Determination would require property access in compliance with Table 4.2 of the Determination including access to within 90m to the furthest part of the building and access to the hard stand for the static water supply.

In this instance the proposed building is accessed via a public road being McRobies Road with an alternative road access for emergencies via Old Farm Road. As the proposed building work is being undertaken on public land under lease there is no lot or property boundary that can be used to differentiate between the public road and the and the property access. For the purpose of this assessment it is assumed that, in this DtS assessment, the property access begins at the lease boundary.

The road access from McRobies Road is designed to allow for passing of buses on the road and is compliant with the DtS provisions of the Determination. In fact, the provision of an arrangement where there is dual carriage way with a hardstand areas for fire brigade use that does not interfere with the other users of the private road is a significant improvement in the level of access provided compared to the DtS requirement in the Determination. The Determination is satisfied with the provision of a single carriageway with passing bays every 200m.

### 6.2.5 Emergency Plan

The Determination requires an emergency plan in accordance with Table 4.5 is necessary to comply with the DtS provisions as a new building is being constructed that is a 'vulnerable use' in a bushfire prone area. As established the Pinnacle the building is a 'vulnerable use' for the purpose of the building regulations.

Table 4.5 requires the emergency plan to the compliant with the TFS Bushfire Emergency Planning Guidelines and approved by the TFS.

The emergency plan is to be developed consistent with the principles identified in this assessment. A concept solution for the emergency plan is provided at Attachment 9.00.

### 6.2.6 Summary

In summary the proposed building work is to be compliant with the DtS provisions of the NCC and there is no requirement for a performance solution for this aspect of the proposed building work. The HMA is provided within the lease boundary and there is no requirement for vegetation on other property.

An emergency plan approved by the TFS is required and an emergency plan strategy for the purpose of the planning application is provided at Attachment 9.00.

## 6.3 Additional Fire Protection Measures

In addition to the measure described above that are required to satisfy the DtS provisions of the NCC, the following are additional measures that are over and above the requirement for compliance with the building regulations. These additional measures are provided by the Client to achieve a level of bushfire protection that is greater than that required by the building regulations.

The following is a list of additional measures adopted over and above compliance with the DtS provisions of the Determination.

1. The building is to be constructed in accordance with the requirements of AS 3959 for BAL 29 (unless modified by this Report). The structure is to be largely concrete and masonry with fixed closed glazing panels of toughened glass (typically minimum 6mm) as the external façade with some panelling to the upper level to the building perimeter. Timber panelling is to be provided where the façade is exposed to bushfire prone vegetation on upslope land and metal panelling is to be provided where exposed to vegetation on an even and downslope grade. The timber panelling is to be bushfire resistant timber as defined in AS 3959. Within the upper level the enclosed building is to be built to BAL 29 construction however the timber panelling is acceptable given the panelling occurs where the building is exposed to the upslope vegetation and shielding is provided to the downslope vegetation.

2. A masonry sleeve is to be provided where the cable penetrates from level 2 to level 0 to a height greater than 2.0m that is provided with ember protection at the top of the sleeve.

3. Fire separation is to be provided vertically within the building so that there are three fire compartments interconnected by fire isolated stairs.

4. An external siren is to be provided that achieves an audible waring to the public in the area of the Base to commence evacuation.

5. The clearing under the transmission easement is to be managed in accordance with the TasNetworks operational specification (as exists at the time). There is no requirement in this assessment for the Client to undertake any vegetation management within the TasNetworks transmission easement.

6. The land beyond the lease boundary is to be managed in accordance with the Fire Management Strategy for Wellington Park (at Table 10 (page 72) of the Fire Management Strategy. The Strategy for the Park has historically included planned burning of the area around the proposed Base which assists with limiting fire spread from residential development to the Park and vice versa. There is no requirement in this assessment for the Client to undertake any vegetation management beyond the HMA shown on the BHMP for the site.

7. Fire hydrants and hardstands are to be provided in the locations shown on the BHMP provided at Attachment 6.00. This provides a level of coverage beyond the building that significantly exceeds the requirement of the DtS provisions.

8. A fire protection equipment store is to be provided where additional bushfire fighting equipment including beaters and fire hoses and branches are stored for use by trained staff if it is safe to use the equipment and the TFS are not otherwise managing the fire ground.

9. The firefighting water supply is to be compliant with the DtS provision of the Determination and the Fire Protection Report. The volume of water provided to the firefighting water supply and the quality of the water supply significantly exceeds the requirement for the DtS provisions of the Determination.

10. Sprinkler coverage is to be provided in accordance with AS 2118.1.

11. The private road access is to be compliant with the DtS provisions of the Determination and the Fire Protection Report. The provision of a dual carriageway so that there is no need for passing bays as well as pull off points for the responding fire brigade is a significant improvement on the DtS requirement of the Determination.

12. There is an alternative vehicle route provided through to Old Farm Road in addition to the proposed primary road access.

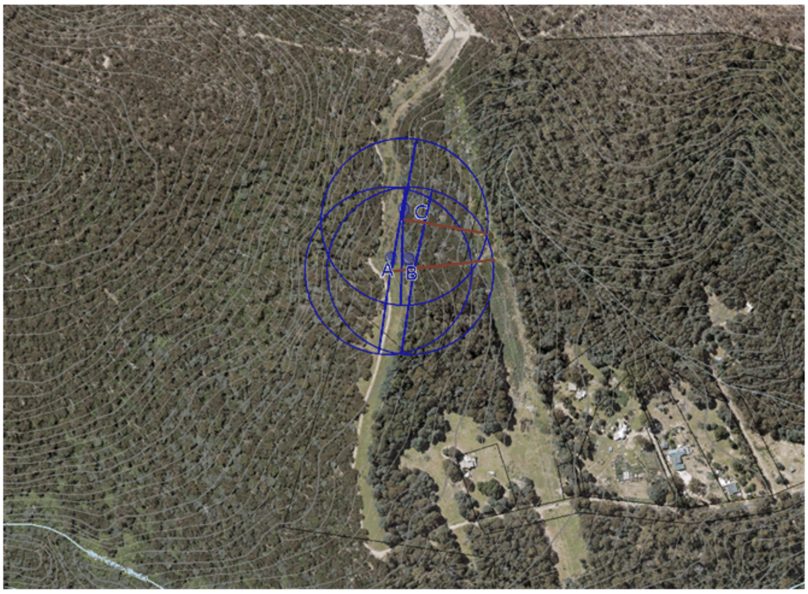
In this assessment the Client has accepted that there is a risk of property loss where a bushfire occurs on days where the fire danger rating is very high or greater however this risk is reduced by the abovementioned items over and above the requirements of the DtS provisions of the Determination.

## 6.4 Description of the Land and Adjacent Land

While there is no requirement for the development of a performance solution for this assessment and the justification for a DtS compliant building is provided in the preceding discussion, the following discussion is provided to assist with understanding the bushfire threat to the site.

The Base site is a part of a parcel of land (CT 252495/1, PID 5587226), identified as 100 Pinnacle Road, Mount Wellington. This land forms a part of the Wellington Park.

The adjacent land in this instance is land within the Park in the near vicinity of the site. Within this area there are a number of built structures on private land as shown on the following image.




The above image shows the extent of the Base building being points A, B and C with blue circles with a radius of 100m provided around those points as previously identified. To the east of the proposed site is a HV transmission easement approximately 100m from the proposed development.

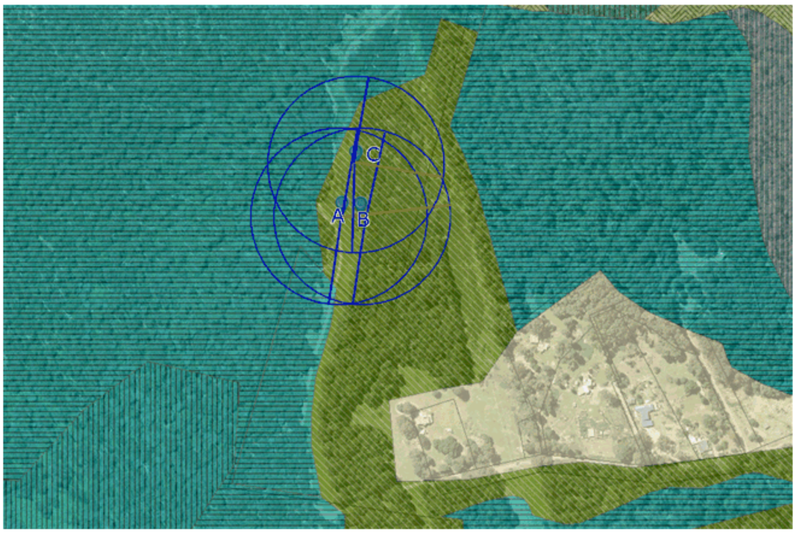
To the south and south east of the site are dwellings (as shown) at the western end of Old Farm Road on land that is outside of the Park. Also shown on the above image are;

- Contours at 5m levels,
- Cadastral boundaries, and
- Drainage lines.

In the above image it can be seen that the land rises (in general terms) from east to west from the drainage line further to the east from the proposed building. The land to the north east of that drainage line rises steeply to the north though this is on the south face of the ridge that runs east west at the top of the image.

An additional drainage line is further to the south which is Guy Fawkes Rivulet. On the south side of the rivulet the land rises on a north facing slope which is more prone to the spread of bushfire because of the radiant heat impacting on the ground earlier in the day and given the prevailing wind could be pushing a possible bushfire up this slope though away from the site. Fire spread down this slope towards this site is still plausible though the rate of spread would be reduced.

The following image is also extracted from 'the list' website and shows the vegetation classification applied to this area from TasVeg3.

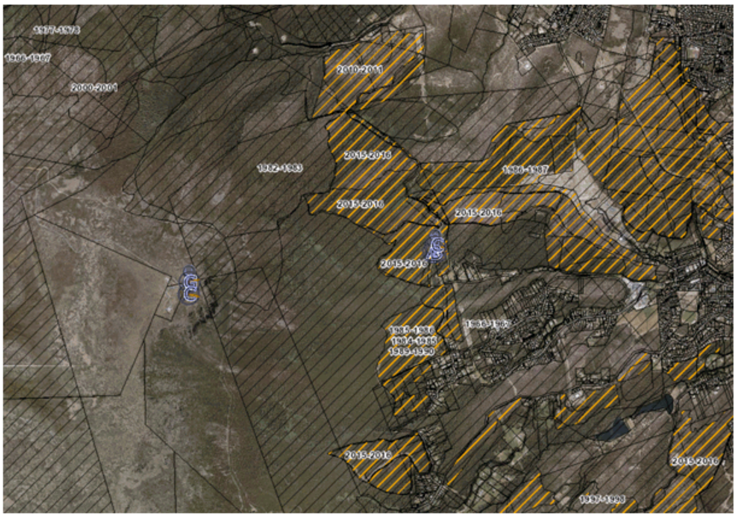



In the above image;

| Colour | Community | Description |
|---|---|---|
| Aqua | Wet eucalypt forest and woodland | (WOU) Eucalyptus obliqua wet forest (undifferentiated) |
| Green | Dry eucalypt forest and woodland | (DPU) Eucalyptus pulchella forest and woodland |
| Clear | Agricultural, urban and exotic vegetation | (FUM) Extra urban - miscellaneous |

With respect to fire attributes, the dry eucalypt forest (E. pulchella) is described as low sensitivity to fire of high flammability. The wet forest (E Obliqua) is described as high sensitivity to fire and of moderate flammability.

It is noted that undertaking controlled burns around the Base site in recent years has reduced the potential for bushfire in the area. The site is the right side blue marker on the following image and planned bushfires are shown as orange hatched areas.



The only recorded uncontrolled bushfire on the fire history overlay from the list website mapping at the site is the 1966/67 bushfire that is recognised as a catastrophic event and the worst bushfire in Tasmanian history in terms of life and property loss.

The only other recorded bushfire for the site occurred is a planned burn on 3/11/1986 where an area of 8.76Ha of land was burned as shown below. The extent of the burned area is highlighted. It would appear from these records that this area has not been burnt since that time.

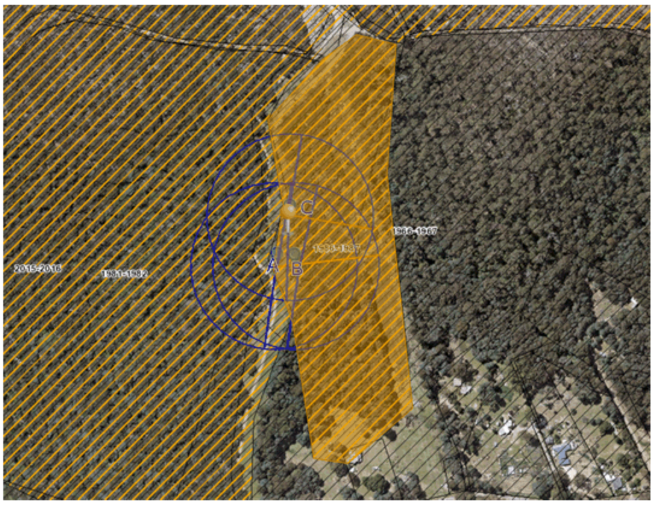
A discussion of planned bushfire events is also described in the bushfire assessment for the Pinnacle and this has some bearing on the Base site as well. The following is a brief overview of planned and uncontrolled events in the immediate vicinity of the site.

Notionally the most threating vegetation to the site is the forest vegetation to the east of the proposed building and the 1986 planned fire which, as described previously, is on a parcel of land that was burnt in the 1967 bushfire and has not been subjected to either controlled or planned burning since that time. This parcel of land is south facing with an area of around 46Ha that falls quite steeply to a minor tributary to the Guy Fawkes Rivulet. The parcel is predominantly south facing with a planned burning regime to the north, east and west and residential development to the south. The planned burning to the north and east of this parcel may be part of a strategy to limit fire spread to and from the McRobies Gully Refuse Site.

This parcel of land is described as Eucalyptus globulus wet forest which is categorised as moderate flammability though high sensitivity to the fire. If there is a fire through this parcel with a wet forest understorey the threat of fire spread through this landscape is further reduced compared to a dry forest.

Fire spread from the easterly direction to the site is plausible though the risk is also mitigated by the fact that the vegetation is on a south facing slope and the gradient of the land towards the Base is more across the gradient and the natural tendency for the fire if it occurred would be to spread up the slope towards the refuse site however this will be influenced by the prevailing wind, and fire induced wind.

The HV power easement is a maintained parcel of land where there is some vegetation management which provides some benefit against the potential for fire spread from the east and north to the Base building.




To the south of the site is an area of residential development to the north side of Old Farm Road. These properties appear to have established HMAs to provide a measure of bushfire protection to their property from a bushfire spreading from the north and west and this provides some reciprocal benefit in limiting the potential for fire to spread towards the site from these properties. The HV power easement is also beneficial where the residential properties are to the eastern side of the easement.

To the west and north west of the Base is a parcel with vegetation that is upslope from the site which has been subjected to planned burning in the past as described above. The following image shows a more recent planned burn known as Wellington Park 38 that occurred on the 17/4/2016 and covered an area of approximately 25.4Ha.

A similar area was burnt in another planned burn on the 28/11/1981.

An existing fire trail exists at the eastern edge of this parcel of land known as the Main Fire Trail. This fire trail provides a protected edge for undertaking planned burning in the past and presumably into the future.

Other planned burns have also occurred to the north of the fire considered above. Again these fires are likely to have been done for a variety of reasons including containing fire spreading to and from the refuse site, the protection of the residential development along Old Farm Road and elsewhere and limiting the potential of fire spread from urban areas into the Park.

The existing fire management plan for the Base land is describe in the Amended Mount Wellington Management Plan (MWMP) 2013 [13] and the Fire Management Strategy for wellington Park – Revision 1 [6]. From discussion with the Trust the fire management strategy is due for review though this is not likely to occur prior to the assessment of the proposed MWCC development.

At Clause 5.2.1 of the MWMP the bushfire strategy for the Park is described. The following points are noted;

- A balanced approach is necessary between protecting biodiversity, life safety and property protection,
- Bushfire management in the Park is the responsibility of the Trust however the lead agency to respond to bushfire in the Park is the TFS,
- The fire management strategy is to be reviewed every 5 years and planned fire burns are scheduled over a 15 year period,
- The Park contains extensive fire trails as a strategy for undertaking planned burns and fighting fires,
- Close the Park to all public access during periods of extreme and / or catastrophic Fire Danger Rating (FDR) as declared by the TFS, and when there are active bushfires in or adjoining the Park. Place signs on all major public access points regarding potential closures during such periods.

In addition, at Clause 8.5.4 the WPMP prescribes the requirement for a development application. Two dot points relate specifically to bushfire protection and these state;

- An assessment of the potential risks of the proposed use or development to the Parks values and measures to mitigate and manage those identified risks, in particular bushfire risk, and

- For habitable buildings as defined in the [BCA], a BHMP or exemption certificate prepared in accordance with Planning Directive 5…

As for the Pinnacle site, an assessment of the potential risks to the Parks values is provided by others as described below.

In this context the Fire Management Strategy for Wellington Park exists. The following points in the Strategy are noted;

- A comprehensive approach has been developed for the management of bushfire in and around the Park. Significant resources have been applied historically and ongoing to the development of a strategic approach to protecting, natural values, cultural values and use values.

- The fire management strategy includes the following elements which are defined in more detail in the Strategy;

  - The strategy,

  - Ongoing investigations into fuel loads in strategic locations to develop an appreciation of the threat posed by bushfire,

  - A risk assessment of current assets and the implementation of appropriate mitigation measures,

  - Development of protocols for interagency communications to maximise the deployment of resources,

  - Ongoing periodic review and review following fire events,

  - A multifaceted approach to fire detection in the Park,

  - A multi-agency response to fire in the Park to undertake firefighting activities,

  - The use of controlled burning to manage fuel loads in strategic locations,

  - A comprehensive arrangement of vehicle access / fire trails and access to defined water points,

  - The use of fire breaks,

As the Park is closed on extreme / catastrophic FDR days and when there is fire present in the Park the likelihood of the public being caught in a large wildfire with extreme bushfire conditions is significantly reduced. In addition, the mitigation measures implicit in the Strategy described above also significantly reduce the level of threat.

With respect to other structures around the Base site Table 10 (at iii & 1v) of the Management Action Summary forming part of the Strategy identifies two assets at risk being;

- Dwellings at the western end of Old Farm Road, Cascade. The current fine fuel load in the adjacent vegetation is described as variable depending on extent of clearing around dwellings. The comments and recommended fire protection measures states; ' Issue hazard abatement notices as required to ensure there are adequate defendable spaces (MP 6 & 7) between dwellings and bushland.'

- High voltage power lines (steel stanchions). The current fine fuel load in the adjacent vegetation is described as variable. The comments and recommended fire protection identifies three items being; 'may be damaged by high intensity fires, power lines are a potential source of ignition, and maintain power line easements and power lines in good condition (Transend)'.

The management procedures (MPs) are found at Appendix A to the Fire Management Strategy for the Park.

In these two items it can be seen that there is an active strategy to defend these assets and protect the Park where there is a substantial secondary benefit achieved for the Base site.

It is also noted that at Table 12 (page i) of the Management Action Summary that the Main Fire Trail (W12) which is immediately adjacent to the Base on the western side is a single lane alternative access for light and heavy tankers and the maintenance priority is High. At May 2005 the condition of the trail is identified as trafficable and in very good condition. Work required includes periodic inspection and maintenance as required (MP2).

The following is a series of images included to show the nature of the vegetation to be retained around the building. Some vegetation removal will be necessary to undertake construction and there is some management of vegetation as described on the BHMP for the Base building.

The following image shows three points around the proposed building work which are reference points for the following photo description of vegetation.


The following photos were taken on 24 September 2018 with the assistance of Leary and Cox Land Surveyors to identify each of these positions with sufficient accuracy to be able to identify the vegetation at these locations.

In the following photo the surveyor is seen with a GPS navigator and a square white board to the left side of the image. On the right side of the image is the Main Fire Trail (W12). There is a clearing with a width of approximately 16m from Point A to the edge of the vegetation with some overhanging canopy in that zone. The photo is taken from the trail looking approximately south.

As identified above the Main Fire Trail serves as a fire break for planned burning and it is envisaged that the clearance below the trail is provided to assist with limiting fire spread towards the dwellings during planned burns and to provide a fire break where there is a potential fire spreading from the urban fringe below the site.

The following photo is taken from the trail looking north at Point A.

Point B is on the edge of the vegetation as shown on the image below and this will require some vegetation clearance to allow for the road to the rear of the building. The photo is taken above looking down the gradient and perpendicular to the edge of the standing vegetation.

The following image which is also looking at Point B from the north looking along the edge of the vegetation. The gradient in this direction is downslope though less than 5°.

Point C is further north and can be seen in the following image.

The following image shows Point C from taken looking east from the fire trail.

### 6.4.1 Description of the Proposed Development

The proposed development is described elsewhere in detail. In brief, for the purpose of this assessment for bushfire protection, the operation has the following attributes;

- The cable car will operate for;
    - 9 hours / weekday in winter
    - 10 hours / weekend day in winter
    - 13 hours / weekday in summer
    - 14 hours / weekend day in summer
- The maximum number of occupants for the building at the Base, based on exit width (as determined by the Building Surveyor), is 204 persons.

The Base building has limited functionality other than to receive patrons, issue tickets if required, and deliver them to the cable car and vice versa for patrons descending from the cable car.

The building is shown on the drawings provided at Attachment 3.00 and includes the fire protection measures identified at Section 3.2.5 of this report. The particularly significant issues for the proposed development with respect to bushfire are;

- The provision of a fire resistant building which satisfies the structural fire resistance requirements of the NCC for a Type A building and is compliant with the construction requirements to resist a radiant heat flux of 29kW/m$^2$ and ember attack (unless modified by this Report).
- Window openings in the external façade are toughened glass (typically minimum 6mm) and therefore more resistant to radiant heat as compared to laminated glass where there can be glazing failure associated with a temperature differential across the glazing system and a delamination because of heat exposure.
- The existence of fire compartmentation within the building that allows for occupants to move from one part of the building to another depending on the nature and the direction of the threat,
- The inclusion of an emergency plan prior to the use of the building where occupants will not be present in the building on days where extreme bushfire conditions exist or there are fires in the park resulting in the closure of the Park.

The occupants of the building will be staff and the public attending the facility. Staff will be trained in emergency procedures, hydrant usage and the use of first response firefighting equipment. The public using the facility have a broad range of characteristics from the young through to the aged.

The provision of the cable car will improve the level of access to the Pinnacle to the extent that people that may not have been able to make the trip to the lookout in the past will be provided with a safer and dignified access. As such access would be possible for a broader range of people with physical disabilities. A proportion of the occupants may also have intellectual disabilities that may also impair their ability to sense / respond to cues that a fire exists or to be able to evacuate without assistance.

From a fire safety perspective this creates additional challenges and as a consequence the provision of fire compartmentation within the Base provides an opportunity to systematically evacuate causing minimal stress to the public.

## 6.5 Assessment of the Parks Values

The Park Values for the purpose of this assessment are taken from the MWMP Chapter 5 dealing with Maintaining Park Values. As for the Pinnacle assessment, the assessment of park values in response to the bushfire mitigation measures is addressed by others.

## 6.6 Bushfire Hazard Report – The Regulations

In addition to the assessment in accordance with the Determination above the Regulations also requires the development of a BHMP. The term BHMP is a defined term and means as defined in the *Fire Service Act 1979*.

**60A. Interpretation of Part**

In this Part –

***approved*** means approved by the Chief Officer;

***bushfire hazard management plan*** means a plan showing means of protection from bushfires in a form approved in writing by the Chief Officer.

The approved form of the BHMP is found at 'Bushfire Hazard Advisory Note No 04 – 2020' (Version 4) [10] (the Approved Form). The assessment against the provisions of the Approved Form has been incorporated in discussion above.

The Approved Form requires the development of a BHMP that illustrates and summaries the substance of the bushfire assessment. The BHMP for the Base is provided at Attachment 6.00.

In addition, the Determination also requires an emergency plan to be developed in accordance with the guidelines developed by the TFS. The emergency plan for the Base is to be provided as a final solution prior to the issue of the certificate of likely compliance by the Building Surveyor. A concept strategy for the emergency plan is provided at Attachment 9.00.

# 7. Conclusions and Recommendations

In this report it is concluded that the proposed performance solution for the proposed building work provides a level of occupant fire safety and facilities for the responding fire brigade which is at least equivalent to that achieved by compliance with the DtS provisions of the NCC and the Determination. A range of measures are proposed that provide a proportionate and targeted response to the type of fire threat that exists at the two nodes and together they provide a strategy that is significantly better than that achieved by compliance with the DtS provisions of the NCC and Determination. A description of the performance solutions are provided at;

- Structural Fire – The Pinnacle – Section 3.2.5
- Structural Fire – The Base – Section 4.1.2
- Bushfire – The Pinnacle – Section 5.4.1

The solution for bushfire safety at the Base node is fully compliant with the DtS provisions of the Determination and this is described at Section 6.2.

The proposed performance solutions comply with the performance requirements of the NCC and the Determination in that they achieve a level of bushfire protection and structural fire safety that is at least equivalent to that achieved by compliance with the DtS provisions of the Determination and it is recommended that the Building Surveyor accepts the proposed solution. An engineering certificate to that effect is to be provided at Attachment 8.00 once the detailed design is finalised. This certificate satisfies the requirement for 'evidence of suitability' as described in the NCC.

# 8. References

1. Australian Building Codes Board, *National Construction Code - Volume 1 - Building Code of Australia - Including Amendment 1.00*. 2016.
2. Australian Building Codes Board (AUS), et al., *International Fire Engineering Guidelines*. 2005: Self Published.
3. Fire Code Reform Centre, *Fire Engineering Guidelines*. 1996, Sydney: Fire Code Reform Centre Limited.
4. Pauls, J., *Movement of People*, in *The SFPE Handbook of Fire Protection Engineering*, P.J. DiNenno, et al., Editors. 1995.
5. Australian Fire Authorities Council, *Fire Brigade Intervention Model - Version 2.2*. 2004.
6. Wellington Park Management Trust, *Fire Management Strategy for Wellington Park*. 2006.
7. Director of Building Control, *Building Act 2016 - Director's Determination - Requirements for Building in Bushfire-Prone Areas*. 2017.
8. Australian Building Codes Board, *National Construction Code Volume 2 - Class 1 and 10 Buildings*. 2016.
9. Standards Australia, *AS 3959-2009 - Construction of buildings in bushfire-prone areas - Incorporating 3 Amendments*. 2009, Standards Australia.
10. Tasmania Fire Service, *Bushfire Hazard Advisory Note No. 4*. 2020.
11. Tasmania Fire Service - Chief Officer, *Bushfire Hazard Advisory Note No 4 - 2016*. 2016.
12. Warrington Fire Research (Aust) Pty Ltd and Building Control Commission, *Fire Resistant Barriers and Structures*. 2000, Melbourne.
13. Wellington Park Management Trust, *Wellington Park Management Plan 2013*. 2015.
14. CSIRO and AFAC, *A Guide to Rate of Fire Spread Models for Australian Vegetation - Revised Edition*. 2015.
15. State Fire Commission, *State Bushfire Safety Policy - Revision 1*. 2015.

## ATTACHMENT 1.00
## DRAWINGS FOR THE PROPOSED BUILDING WORK – THE PINNACLE


NOTE: ALL DETAIL SITE SURVEY INFORMATION REFERENCED IN THE FOLLOWING DRAWINGS HAS BEEN PROVIDED BY LEARY & COX LAND & ENGINEERING SURVEYORS AND NATIONAL SURVEY SOLUTIONS

NOTE: ALL PATHS SHOWN ARE INDICATIVE ONLY

| DRAWING No. | DESCRIPTION |
|---|---|
| 1782_DA101 | SITE PLAN & DRAWING SCHEDULE |
| 1782_DA201 | BASEMENT PLAN |
| 1782_DA202 | LEVEL 0 PLAN |
| 1782_DA203 | LEVEL 1 PLAN |
| 1782_DA204 | LEVEL 2 PLAN |
| 1782_DA205 | ROOF PLAN |
| 1782_DA301 | ELEVATIONS 01 |
| 1782_DA302 | ELEVATIONS 02 |
| 1782_DA401 | SECTIONS |

**TOTAL FLOOR AREAS ($m^2$)**

| | |
|---|---|
| BASEMENT: | 226 |
| LEVEL 0: | 823 |
| LEVEL 1: | 831 |
| LEVEL 2: | 1210 |
| ROOF: | 77 |
| TOTAL | 2147$m^2$ |

OUTDOOR (TRAFFICABLE ROOFS/OUTDOOR SEATING ETC.): 1178$m^2$

1782_DA101

H+2 ARCHITECTURE

JAWS ARCHITECTS

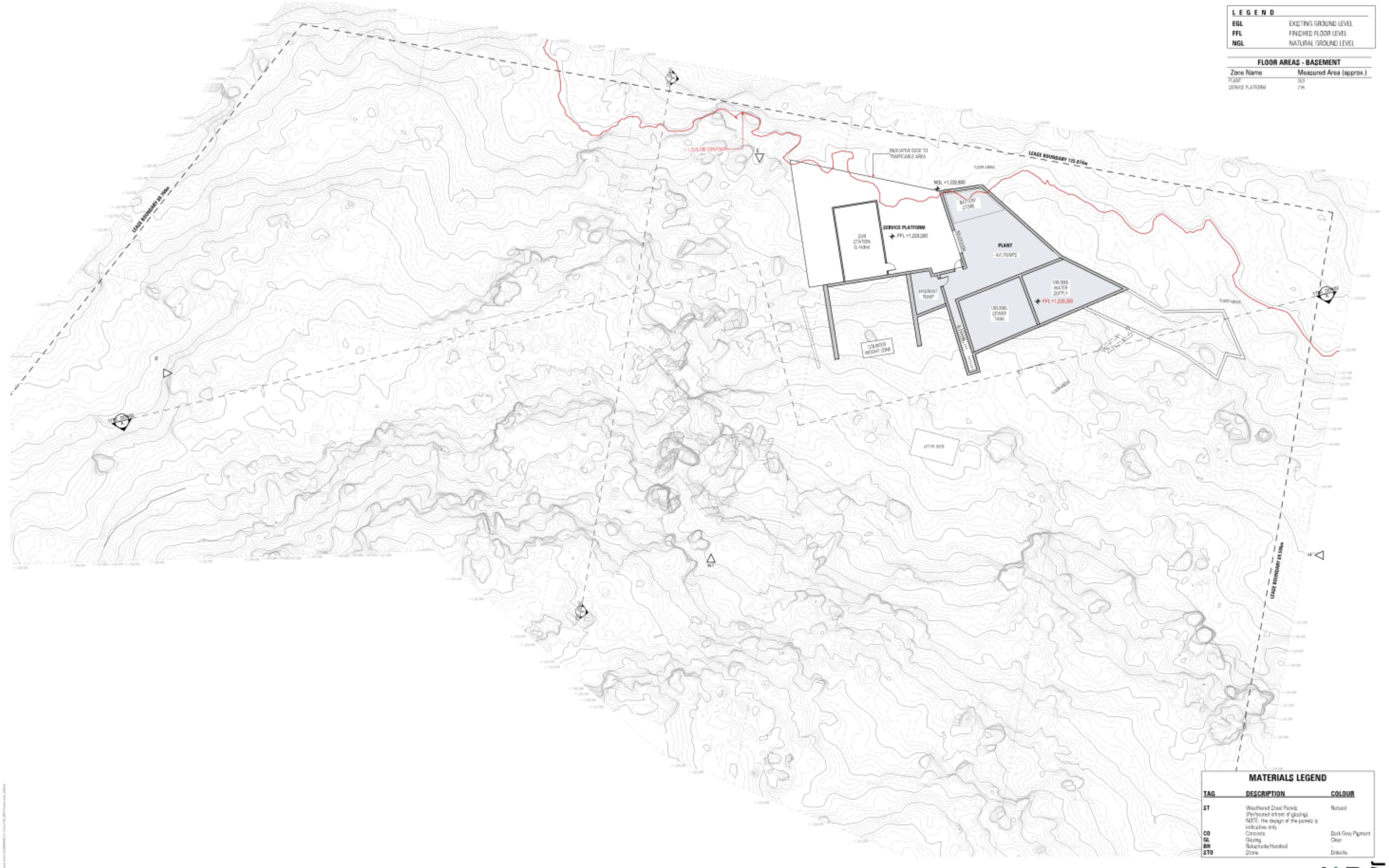
DEVELOPMENT APPLICATION

Mt. Wellington Cable Car

mwCC

SITE PLAN & DRAWING SCHEDULE

1782_DA101




DEVELOPMENT APPLICATION

PROJECT
**Mt. Wellington Cable Car**
Mt Wellington

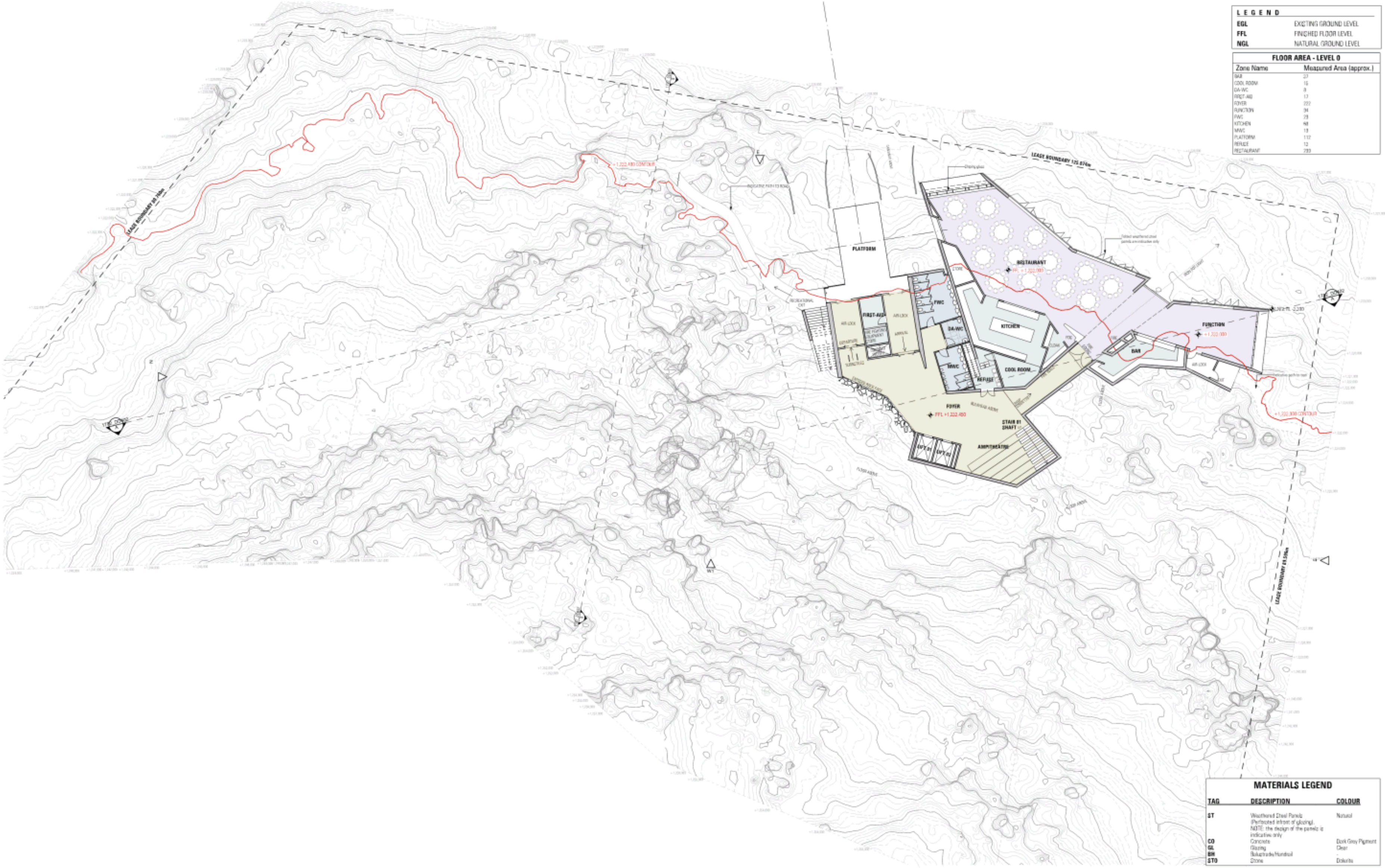
mwCC

1782_DA201

BASEMENT PLAN

1782_DA201

ARCHITECTSMAJ




| LEGEND | |
|---|---|
| EGL | EXISTING GROUND LEVEL |
| FFL | FINISHED FLOOR LEVEL |
| NGL | NATURAL GROUND LEVEL |

**FLOOR AREA - LEVEL 0**

| Zone Name | Measured Area (approx.) |
|---|---|
| BAR | 27 |
| COOL ROOM | 15 |
| DA-WC | 8 |
| FIRST-AID | 17 |
| FOYER | 222 |
| FUNCTION | 94 |
| FWC | 23 |
| KITCHEN | 68 |
| MWC | 13 |
| PLATFORM | 112 |
| REFUSE | 12 |
| RESTAURANT | 233 |

**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| ST | Weathered Steel Panels (Perforated infront of glazing). NOTE: the design of the panels is indicative only | Natural |
| CO | Concrete | Dark Grey Pigment |
| GL | Glazing | Clear |
| BH | Balustrade/Handrail | - |
| STO | Stone | Dolerite |

1782_DA202

DEVELOPMENT APPLICATION

Mt. Wellington Cable Car

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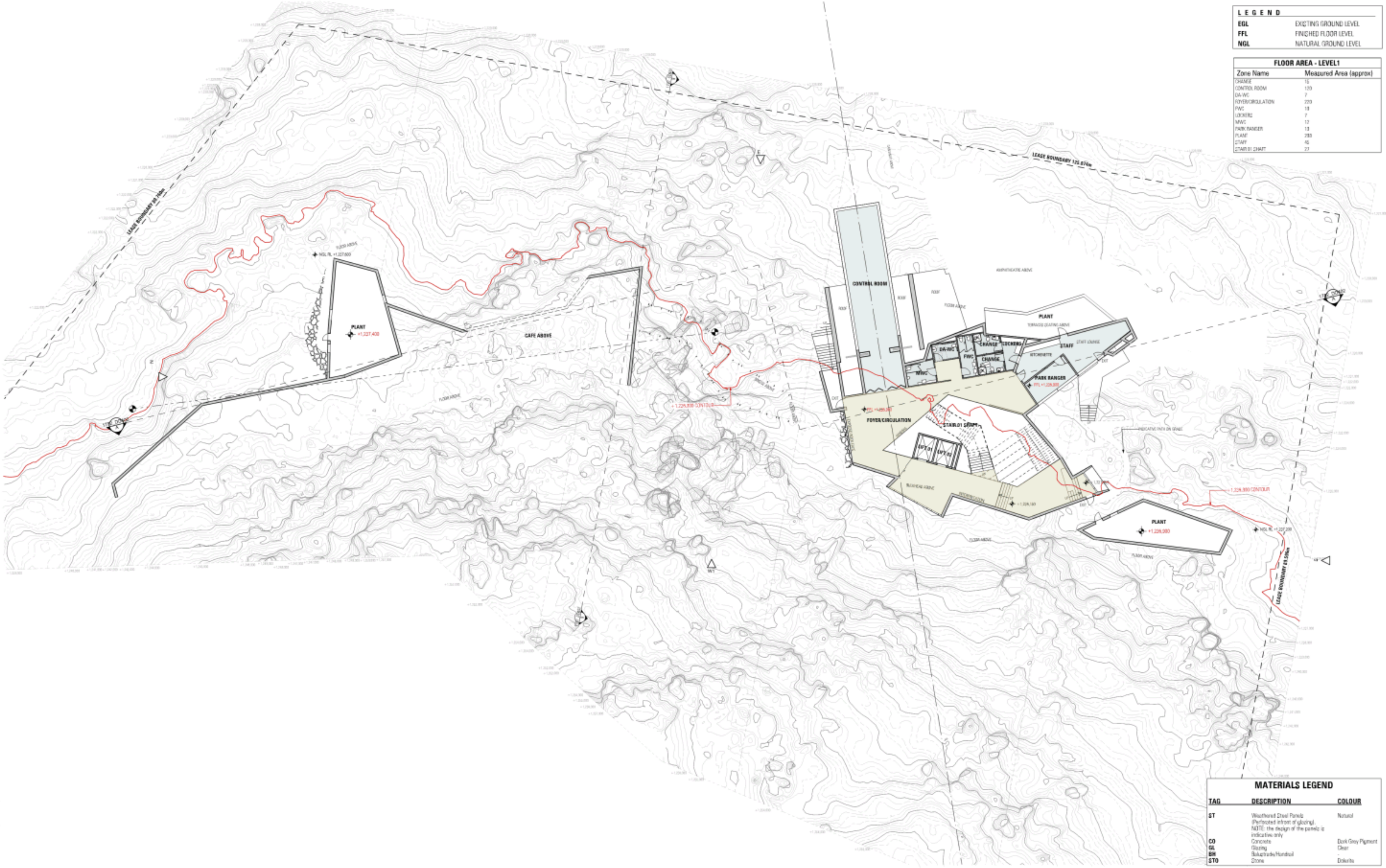
LEVEL 0 PLAN

1782_DA202

01

ARCHITECTS JAWS

1+2 ARCHITECTURE




**LEGEND**

| | |
|---|---|
| EGL | EXISTING GROUND LEVEL |
| FFL | FINISHED FLOOR LEVEL |
| NGL | NATURAL GROUND LEVEL |

**FLOOR AREA - LEVEL1**

| Zone Name | Measured Area (approx) |
|---|---|
| CHANGE | 15 |
| CONTROL ROOM | 120 |
| DA-WC | 7 |
| FOYER/CIRCULATION | 220 |
| FWC | 18 |
| LOCKERS | 7 |
| MWC | 12 |
| PARK RANGER | 13 |
| PLANT | 283 |
| STAFF | 45 |
| STAIR 01 SHAFT | 27 |

**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| ST | Weathered Steel Panels (Perforated infront of glazing). NOTE: the design of the panels is indicative only | Natural |
| CO | Concrete | Dark Grey Pigment |
| GL | Glazing | Clear |
| BH | Balustrade/Handrail | - |
| STO | Stone | Dolerite |

DEVELOPMENT APPLICATION

Mt. Wellington Cable Car

1782_DA203

LEVEL 1 PLAN

1782_DA203 REV 01

JAWS ARCHITECTS

1+2 ARCHITECTURE


**LEGEND**

| | |
|---|---|
| EGL | EXISTING GROUND LEVEL |
| FFL | FINISHED FLOOR LEVEL |
| NGL | NATURAL GROUND LEVEL |

**FLOOR AREA - LEVEL 2**

| Zone Name | Measured Area (approx) |
|---|---|
| CAFE | 427 |
| DA-WC | 22 |
| FOYER/CIRCULATION | 283 |
| PWC | 28 |
| MWC | 22 |
| OUTDOOR AMPHITHEATRE | 216 |
| OUTDOOR SEATING TERRACE | 182 |
| PARENTING | 25 |
| PODIUM | 32 |
| SANCTUM | 120 |
| SERVE KITCHEN STORE | 44 |
| STAIR 01 SHAFT | 24 |
| STORE | 18 |
| WALKWAY BRIDGE | 71 |

**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| ST | Weathered Steel Panels (Perforated infront of glazing). NOTE: the design of the panels is indicative only | Natural |
| CO | Concrete | Dark Grey Pigment |
| GL | Glazing | Clear |
| BH | Balustrade/Handrail | - |
| STO | Stone | Dolerite |

1782_DA204

H+2 ARCHITECTURE

JAWS ARCHITECTS

DEVELOPMENT APPLICATION

PROJECT
Mt. Wellington Cable Car
Mt Wellington

mwCC

| | | | |
|---|---|---|---|
| SCALE | 1:200 @ A1 | | |
| DATE | SEPTEMBER 2018 | PLOT DATE | 28/09/2018 |
| DRAWN | TI | ACCREDITED DESIGNER | ZV |
| CHECKED | ZV/MW/CH | ACCREDITATION NUMBER | CC 5471 I |
| CAD REF | 1782_MWCC Pinnacle Centre_DA01.pln | | |

DRAWING
LEVEL 2 PLAN

DRAWING NO 1782_DA204 REV 01

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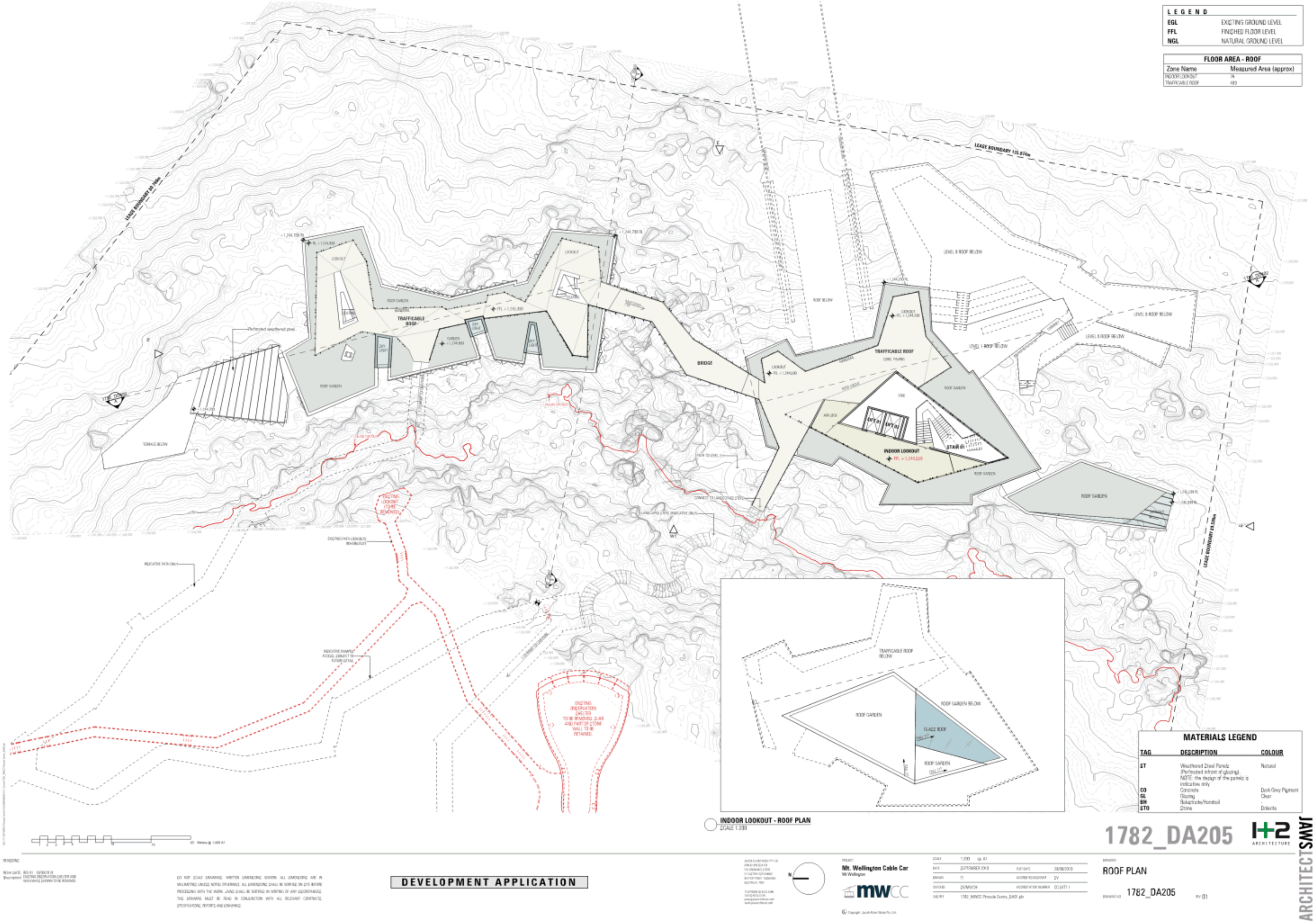
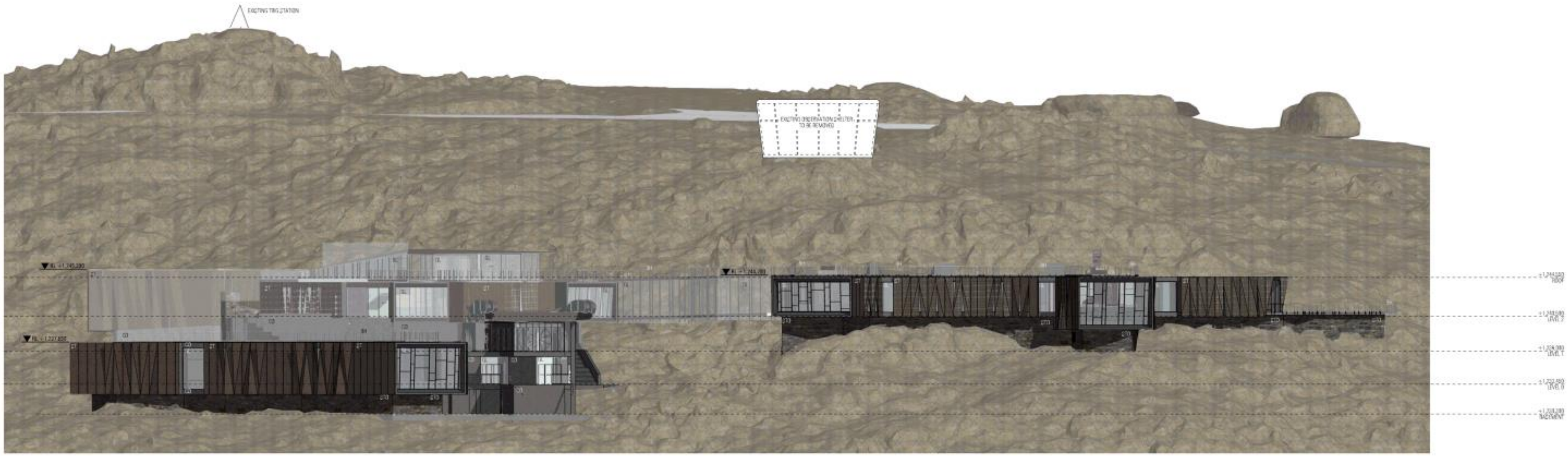
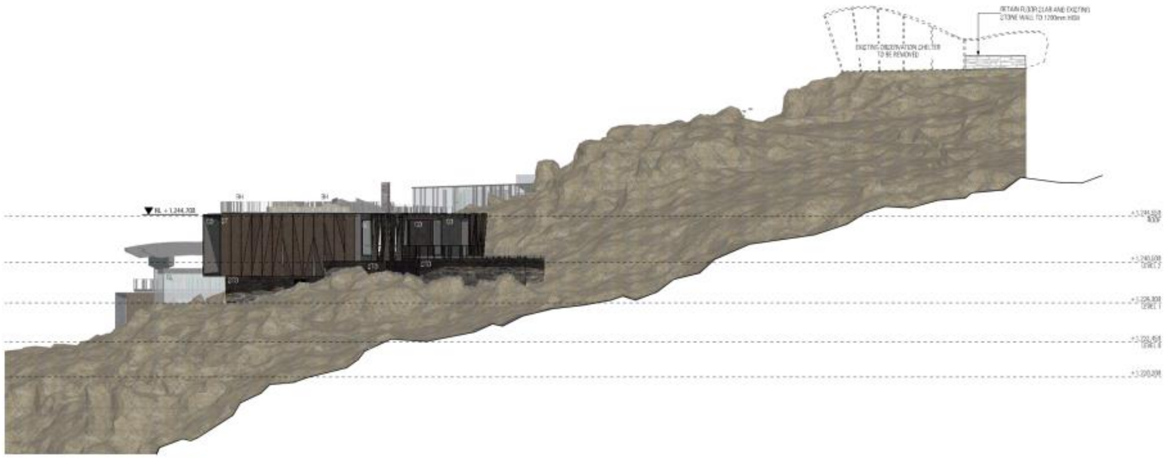

LEGEND
EGL EXISTING GROUND LEVEL
FFL FINISHED FLOOR LEVEL
NGL NATURAL GROUND LEVEL
FLOOR AREA - ROOF
Zone Name
Measured Area (approx)
INDOOR LOOKOUT
TRAFFICABLE ROOF
LEASE BOUNDARY
TRAFFICABLE ROOF
BRIDGE
TRAFFICABLE ROOF
INDOOR LOOKOUT
STAIR 01
ROOF GARDEN
TERRACE BELOW
LEVEL 0 ROOF BELOW
LEVEL 1 ROOF BELOW
INDOOR LOOKOUT - ROOF PLAN
TRAFFICABLE ROOF BELOW
ROOF GARDEN BELOW
ROOF GARDEN
GLASS ROOF
MATERIALS LEGEND
TAG DESCRIPTION COLOUR
ST Weathered Steel Panels (Perforated infront of glazing). NOTE: the design of the panels is indicative only Natural
CO Concrete Dark Grey Pigment
GL Glazing Clear
BH Balustrade/Handrail -
STO Stone Dolerite
1782_DA205
I+2 ARCHITECTURE
JAWS ARCHITECTS
DEVELOPMENT APPLICATION
Mt. Wellington Cable Car
mwCC
ROOF PLAN
1782_DA205
01



E — EAST ELEVATION



N — NORTH ELEVATION

**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| ST | Weathered Steel Panels (Perforated infront of glazing). NOTE: the design of the panels is indicative only | Natural |
| CO | Concrete | Dark Grey Pigment |
| GL | Glazing | Clear |
| BH | Balustrade/Handrail | - |
| STO | Stone | Dolerite |

1782_DA302

I+2 ARCHITECTURE

JAWS ARCHITECTS

DEVELOPMENT APPLICATION

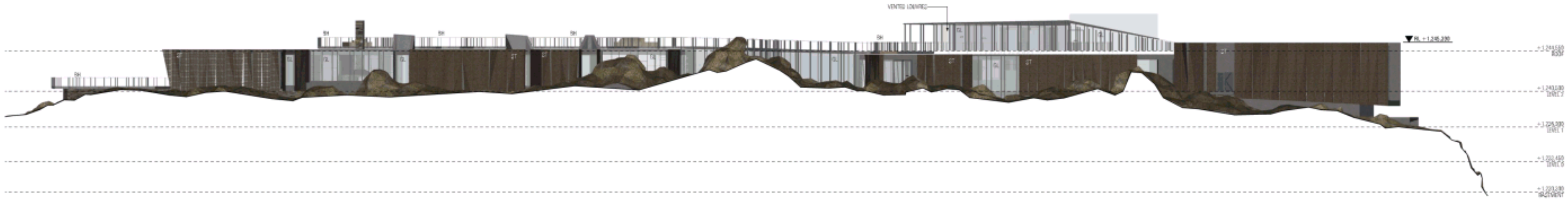
Mt. Wellington Cable Car

mwCC

ELEVATIONS 02

1782_DA302

SOUTH ELEVATION



WESTERN ELEVATION

**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| ST | Weathered Steel Panels (Perforated infront of glazing). NOTE: the design of the panels is indicative only | Natural |
| CO | Concrete | Dark Grey Pigment |
| GL | Glazing | Clear |
| BH | Balustrade/Handrail | - |
| STO | Stone | Dolerite |

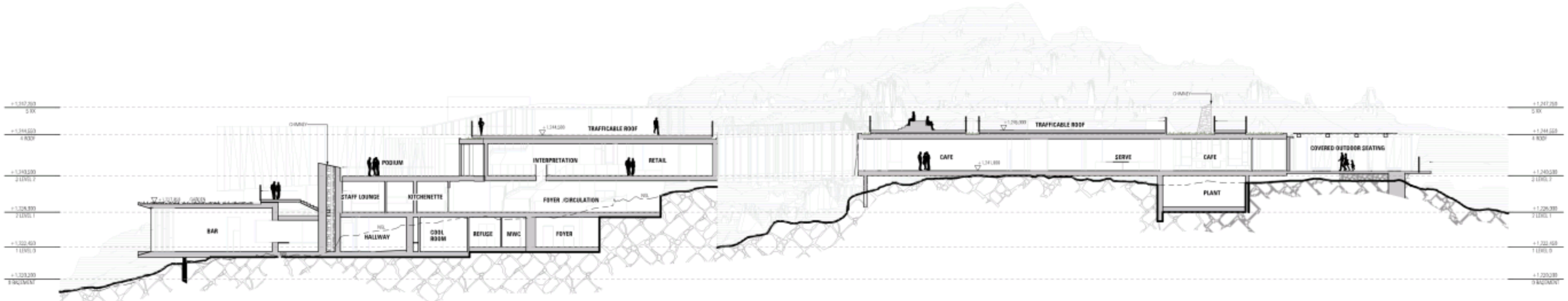
1782_DA301

DEVELOPMENT APPLICATION

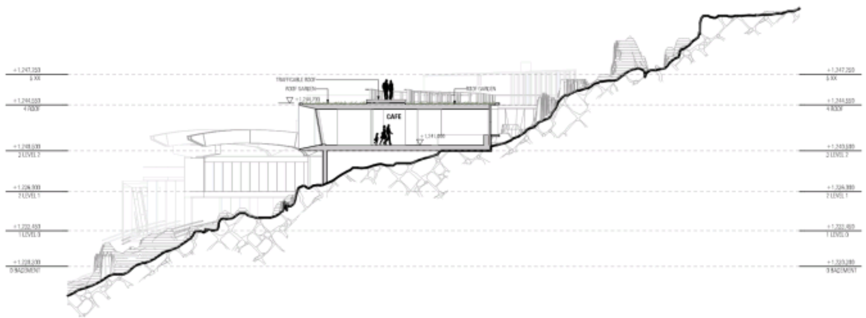
Mt. Wellington Cable Car

ELEVATIONS 01

1782_DA301




SECTION A-A
1:200




SECTION B-B
1:200

**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| ST | Weathered Steel Panels (Perforated infront of glazing). NOTE: the design of the panels is indicative only | Natural |
| CO | Concrete | Dark Grey Pigment |
| GL | Glazing | Clear |
| BH | Balustrade/Handrail | - |
| STO | Stone | Dolerite |

1782_DA401

DEVELOPMENT APPLICATION

PROJECT
**Mt. Wellington Cable Car**
Mt Wellington

SCALE 1:200 @ A1
DRAWN T1
CAD REF 1782_MWCC Pinnacle Centre_DA01.pln

DRAWING
SECTIONS

DRAWING NO 1782_DA401 REV 01

ARCHITECTSJAWS

ATTACHMENT 2.00

BUILDING SURVEYOR REPORT – THE PINNACLE

LEE TYERS
BUILDING
SURVEYORS

# Email Transmission

| | | | |
|---|---|---|---|
| **To:** | 1+2 Architecture | **From:** | Peter Short |
| **Attention:** | Mike Verdouw | **Job No:** | 1702.104 |
| **Email:** | mike@1plus2architecture.com | **Date:** | 29/10/2018 |
| **Copies:** | ross@castellan.com.au<br>scott.verdouw@jawsarchitects.com<br>cath@1plus2architects.com | **No of Pages:** | 6 |
| **Subject:** | **MWCC – Pinnacle Station** | | |

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Dear Mike,

We have undertaken a preliminary assessment of drawings dated the 26/9/18 for the above development and have identified the following issues for your consideration.

| | |
|---|---|
| **Building Class:** | 5, 6 & 9b |
| **No. of stories:** | 4 (Visitor Centre) and 2 (Café) |
| **Construction:** | Type A construction (Visitor Centre) and Type C (Café & Sanctum) |
| **Floor Area:** | Basement – 457m2 approx. |
| | Level 0 – 932m2 approx. |
| | Level 1 – 691m2 approx. |
| | Level 2 – 1198m2 approx. |
| | Level 3 – 76m2 approx. |
| | Total – 3354m2 approx. |

**Structural Provisions:**

1.1 Structural drawings accompanied by a Form 35 to be provided for the structural elements of the building.

**Fire Resistance:**

2.1 All external walls and components, flooring and floor framing of lift pits, lift shafts and non-loadbearing internal walls that are required to be fire resisting are to be non-combustible under Clause C1.9 of the BCA Vol 1 for the Southern Portion of the building that is of Type A construction. The Café Portion of the building is not required to be non-combustible as it separated from the remainder of the building in accordance with Clause C2.7 and can therefore be Type C construction. The same can be said for the Sanctum area to the south of the Visitor Centre.

2.2 Separation of building into different fire compartments is to comply with Clause C2.7 of the BCA Vol 1.

2.3 Floors separating different classifications are to have a Fire Resistance Level (FRL) for the classification of that below, please document FRL's on drawings.

2.4 Lift shaft is to have an FRL in accordance with Table 3 of Specification C 1.1 and is to be non-combustible.

2.5 Stairways and lifts are to be in separate fire resisting shafts in accordance with Clause C2.11 of the BCA Vol 1.

2.6 Services that pass through a floor required to have an FRL are to comply with Clause C3.12 of the BCA Vol 1.

2.7 All building elements that are required to be fire resisting are to have an FRL in accordance with Table 3 of Specification C1.1 of the BCA for the parts of the building that are Type A construction and Table 5 of Specification C1.1 for those parts that are of Type C construction. Please have these FRL's documented on the drawings.

2.8 The fire hazard properties of all internal floor, wall and ceiling linings, air handling ductwork and lift cars are to comply with Specification C1.10 of the BCA Vol 1. We believe the the use of natural timbers will be heavily incorporated in the interior design, these will need to either meet the requirements of Table 4 of Specification C1.10 or be justified under a Performance Solution by the Fire Safety Engineer.

2.9 Performance of external walls in a fire are to comply with Clause C1.11 of the BCA Vol 1 for those portions of the building that are of precast panel construction and where there is a rise in stories of not more than two.

2.10 Substation located at the basement level must be separated from the remainder of the building in accordance with Clause C2.13 of the BCA Vol 1.

2.11 We assume the generator located in the basement is not required to sustain emergency equipment operating in an emergency mode, please confirm.

2.12 Doorways in fire walls are to comply with Clause C3.5 of the BCA Vol 1, they are to be self-closing or automatic closing upon the activation of a fire alarm and are to have an FRL equivalent to the wall in which they are located.

2.13 A doorway that forms part of a Horizontal Exit must be protected in accordance with Clause C3.7 of the BCA Vol 1.

2.14 The stair shaft void area is covered by a non-combustible metal roof, under Clause 3.5 of Specification C1.1, the ceiling is to have a resistance to an incipient spread of fire of not less than 60mins. The glass roof portion of this area is to maintain the resistance to incipient spread of fire as per Clause 3.6(c) of Specification C1.1.

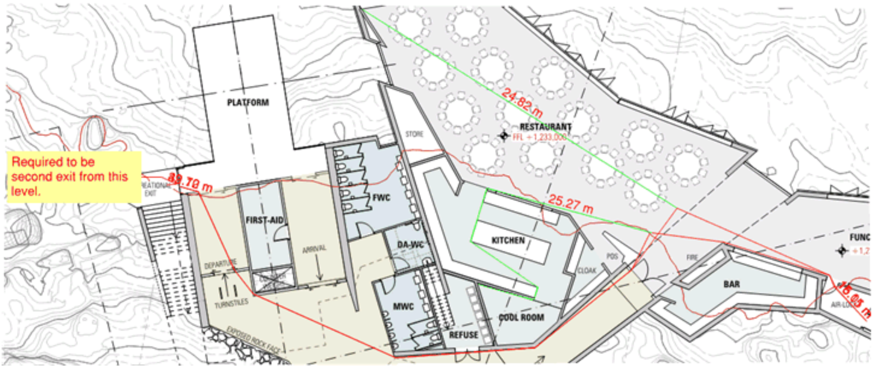
**Access and Egress:**

3.1 We have assumed that the stairs are not required exits as it seems every level has been provided an exit directly to an open space, confirmation to be provided that these open spaces are directly connected with a public road via a system of paths, ramps or stairs.

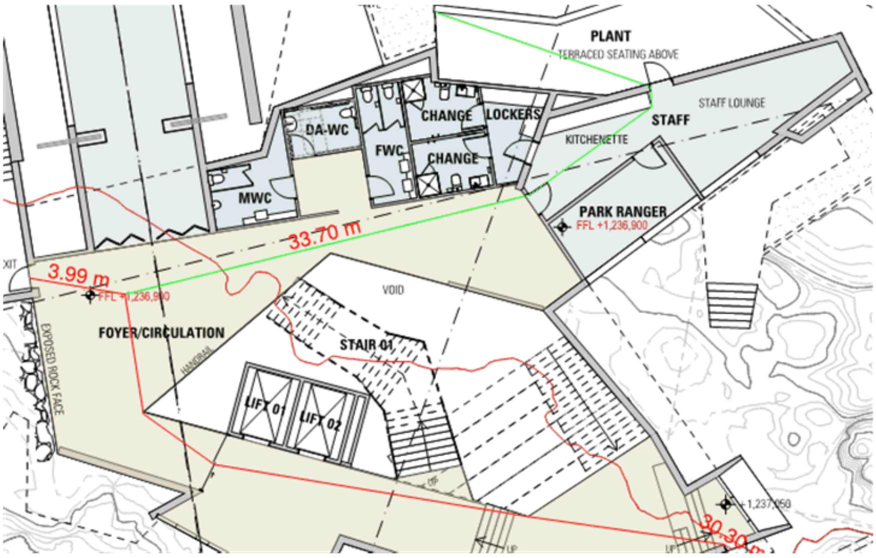
3.2 We have classified the open void space connecting 3 levels as a stair shaft and not an atrium. Non-required, non-fire isolated stairs are to comply with Clause D2.12 of the BCA Vol 1.

3.3 There are extended travel distance issues apparent on each level other than the basement:

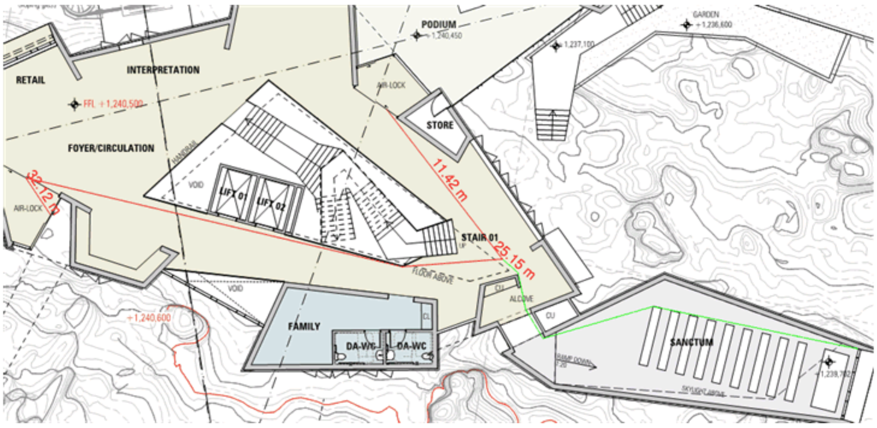
Level 0 – 24.8 & 25.3m distance to a point of choice to two exits. More than 40m to one of those exits from the farthest point of the Coolroom.



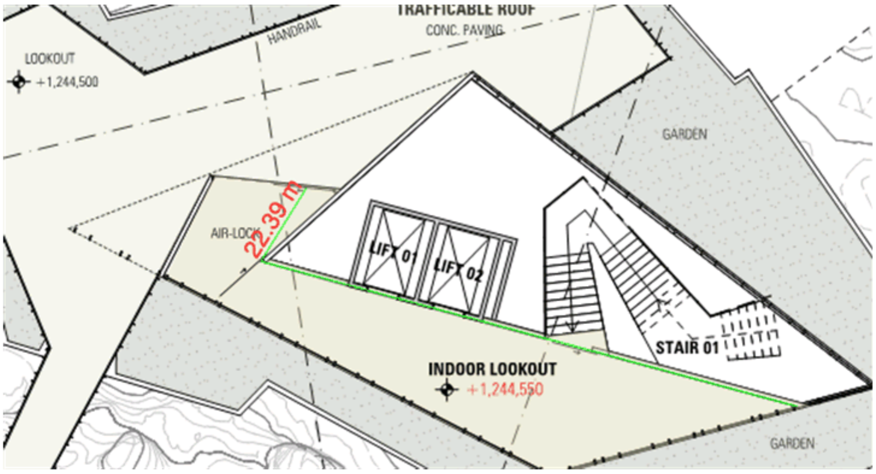

Level 1 – 33.7m to a point of choice of two exits from the plant room.




Level 2 – 25m to a point of choice to two exits from the Sanctum.




Roof Level – 22.4m to the door opening to the trafficable roof area with an FRL leading to an open space.




Either exits are to be move or further ones installed to comply or the extended travel distance may be able to be justified as a Performance Solution from a Fire Safety Engineer.

3.4 The current Pinnacle Station design is capable of accommodating 1241 occupants at any given time when calculated in accordance with D1.13 of the BCA Vol 1.
Level 0 – 439
Level 1 – 58
Level 2 – 551, and
Indoor Lookout – 193.

3.5 Goings and risers of stairs, balustrades and handrails are to comply with Clause D2.13, 2.16 & 2.17 of the BCA Vol 1. Please document compliance on the drawings.

3.6 Any power operated doors serving as a required exit must be able to be opened under a force of not more than 110N if there is a malfunction or power failure. If the door leads directly to a road or open space the door must open on the activation of a fire or smoke alarm anywhere in the fire compartment served by the door.

3.7 The building is required to be accessible, therefore disabled access is to be provided to and throughout the building other than those areas exempted under D3.4 of the BCA Vol 1, e.g. plant room, machinery room & store room. All stairs (non-fire isolated stairs), ramps and passenger lifts are required to be accessible.

3.8 A hearing augmentation system must be provided where an inbuilt amplification system, other than one used only for emergency warning is installed. Please confirm if an inbuilt amplification system is to be installed.

3.9 Braille and tactile signage is to be provided to all sanitary compartments and exits in accordance with Clause D3.6 of the BCA Vol 1.

3.10 Visual indicators are to be provided to all full height glazing that can be mistaken for an opening or a doorway in accordance with Clause 6.6 of AS 1428.1-2009. Please provide details of visual indicators to be used.

3.11 Doorways, doors and circulation space at doorways are to comply with Clause 13 of AS 1428.1-2009. Please note that circulation around doorways in the Public Transport Area is to be increased 100mm in the length measurement and 50mm either side in the width measurement.

3.12 Ground tactiles are to be installed in accordance with AS/NZS 1428.4.1 – 2009.

**Services and Equipment:**

4.1 Fire hydrants are to be provided to achieve coverage in accordance with AS 2419.1.

4.2 Fire hose reels are to be provided achieving coverage in accordance with AS 2441 to those fire compartments that are greater than 500m2.

4.3 Under Clause E2.2a of the BCA Vol 1, the building is to have an automatic smoke detection and alarm system complying with Clause 4 of Specification E2.2a installed or sprinklers or zone smoke control system in accordance with AS/NZS 1668.1 if the building has more than one fire compartment.

4.4 The Visitor Centre portion of the building is to have an automatic smoke exhaust complying with Specification E2.2b of the BCA Vol 1. If parts of the building can be fire isolated to reduce the compartment size for the 9b portion around the stair void to less than 2000m2 then there will be no need to have the automatic smoke exhaust system installed.

4.5 Lifts are to be installed in accordance with Clause E3.6 and Specification E3.1 of the BCA Vol 1. Details to be provided.

4.6 Lifts are required to provide stretcher facilities and fire service controls as per Clause's E3.2 & E3.7 of the BCA Vol 1.

4.7 Emergency lighting and exit signage is to be installed in accordance with AS 2293.1.

**Health and Amenity:**

5.1 Male and female ambulant facilities are to be provided to each bank of toilets where there is an accessible facility provided.

5.2 Detailed dimension drawings to be provided showing compliance for accessible and ambulant facilities in accordance with Clause 15 & 16 of AS 1428.1-2009.

5.3 Artificial lighting will be required, please provided drawings from a Building Services Designer showing compliance with AS/NZS 1680.0 and Part J6 of the BCA Vol 1.

5.4 Mechanical ventilation is to be installed in accordance with AS/NZS 3666.1 and Part J5 of the BCA Vol 1.

**Special Use Buildings:**

6.1 Parts of this building has been designated as a Public Transport Building and needs to comply with Part H2 of the BCA Vol 1.

**Energy Efficiency:**

7.1 Details to be provided showing compliance with Part J1 Building Fabric and J3 Building Sealing of the BCA Vol 1.

7.2 A glazing calculator is to be provided showing compliance with Part J2 of the BCA Vol 1.

**Other:**

8.1 Location of the Pinnacle Station is in a Designated Bushfire-Prone Area. In accordance with the Directors Determination – *Requirements for Building in Bushfire-Prone Areas* issued on the 29/8/18, the deemed-to-satisfy requirements for a building of this class requires the following elements to be achieved:

a. Property access;
b. Water supply for fire fighting; and
c. Hazard management areas.

**Items which may be addressed by a Performance Solution:**

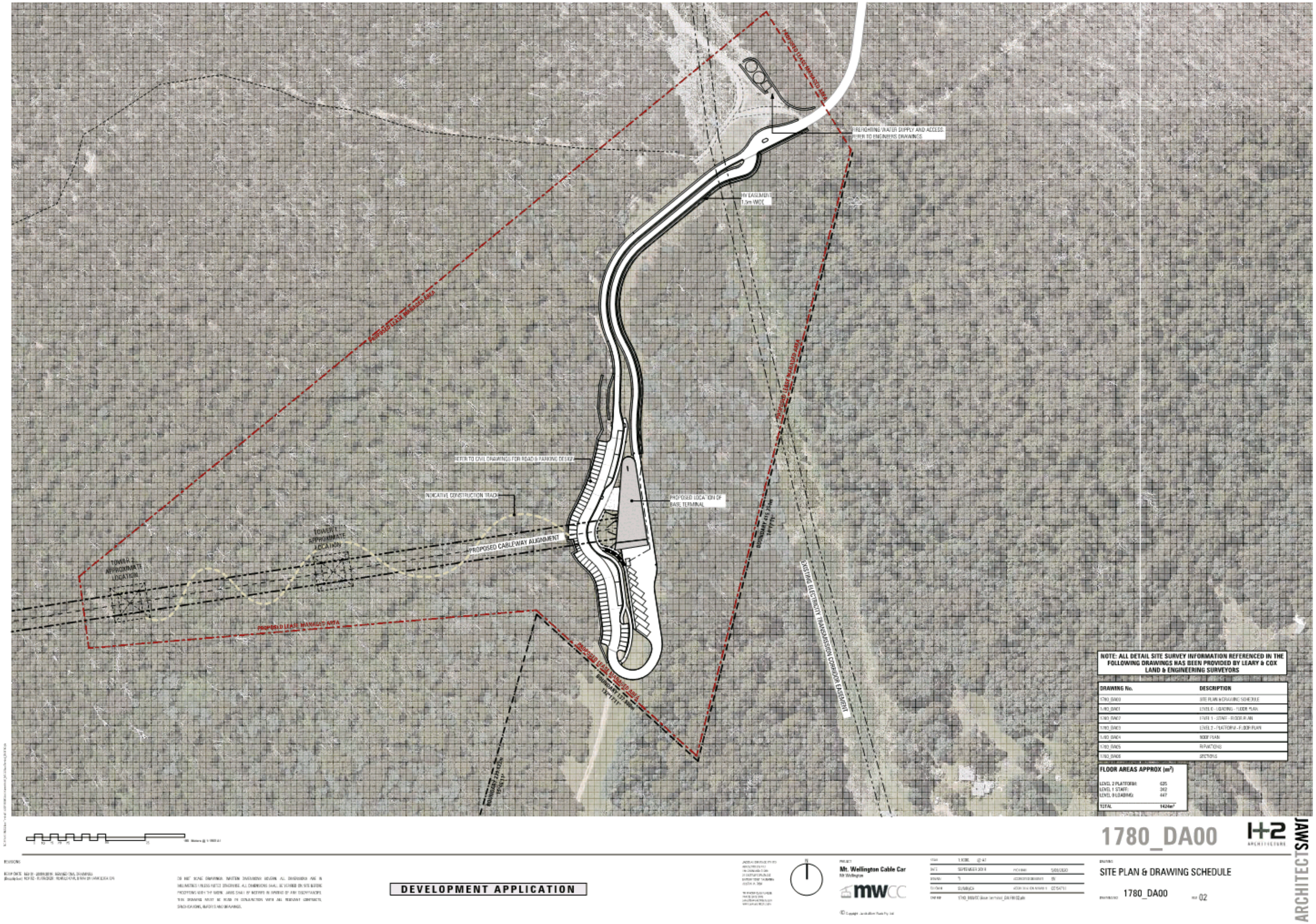
The following items from above assessment may be able to be addressed in a Performance Solution prepared in accordance with Clause A0.3 of the BCA Vol 1 by a Fire Safety Engineer: Items 2.8, 3.2, 3.3, 4.1 and 4.2.

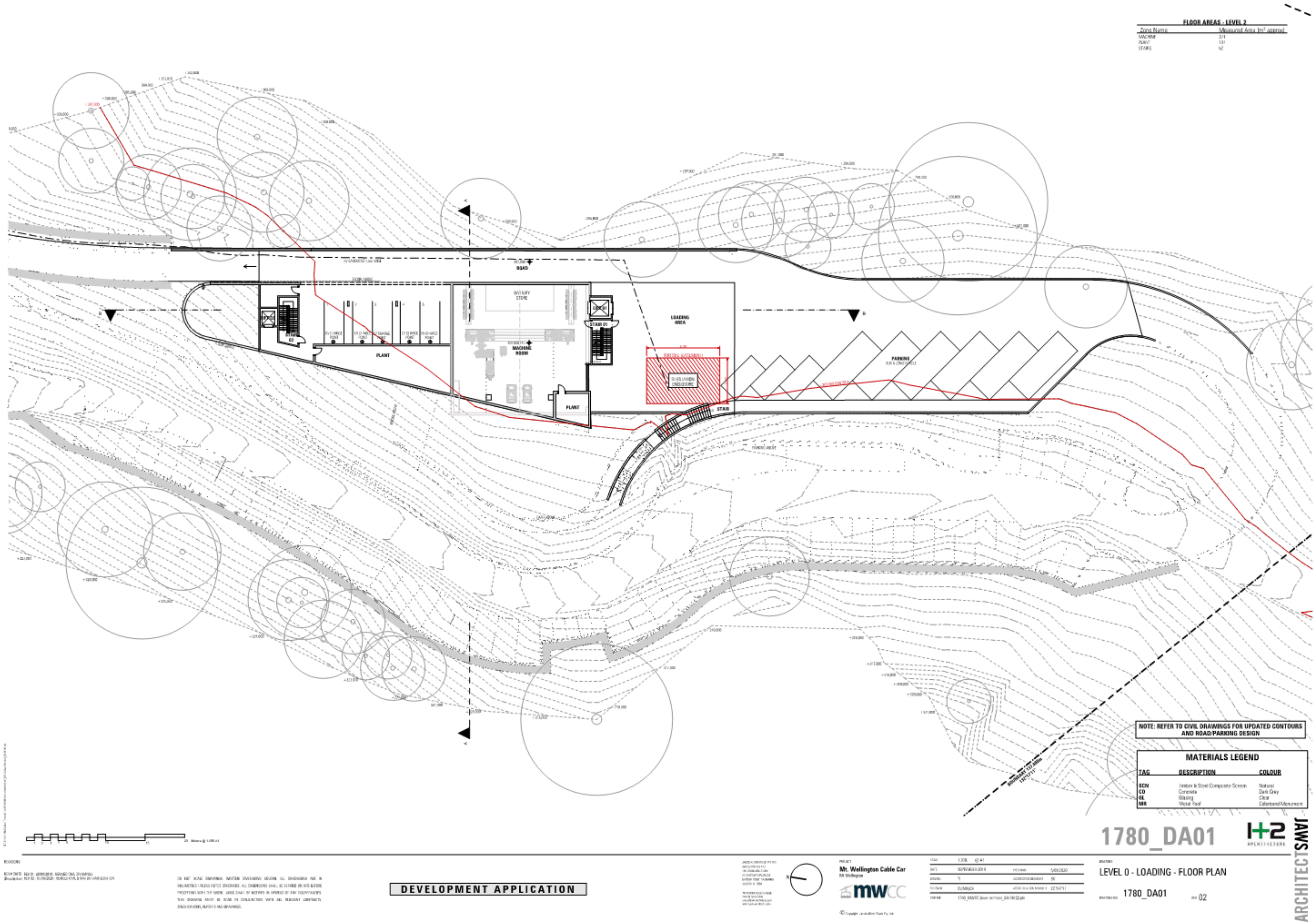
Please do not hesitate to contact me on 6229 2440 if you have any queries regarding the above.

Yours sincerely,

**Peter Short**
BUILDING SURVEYOR

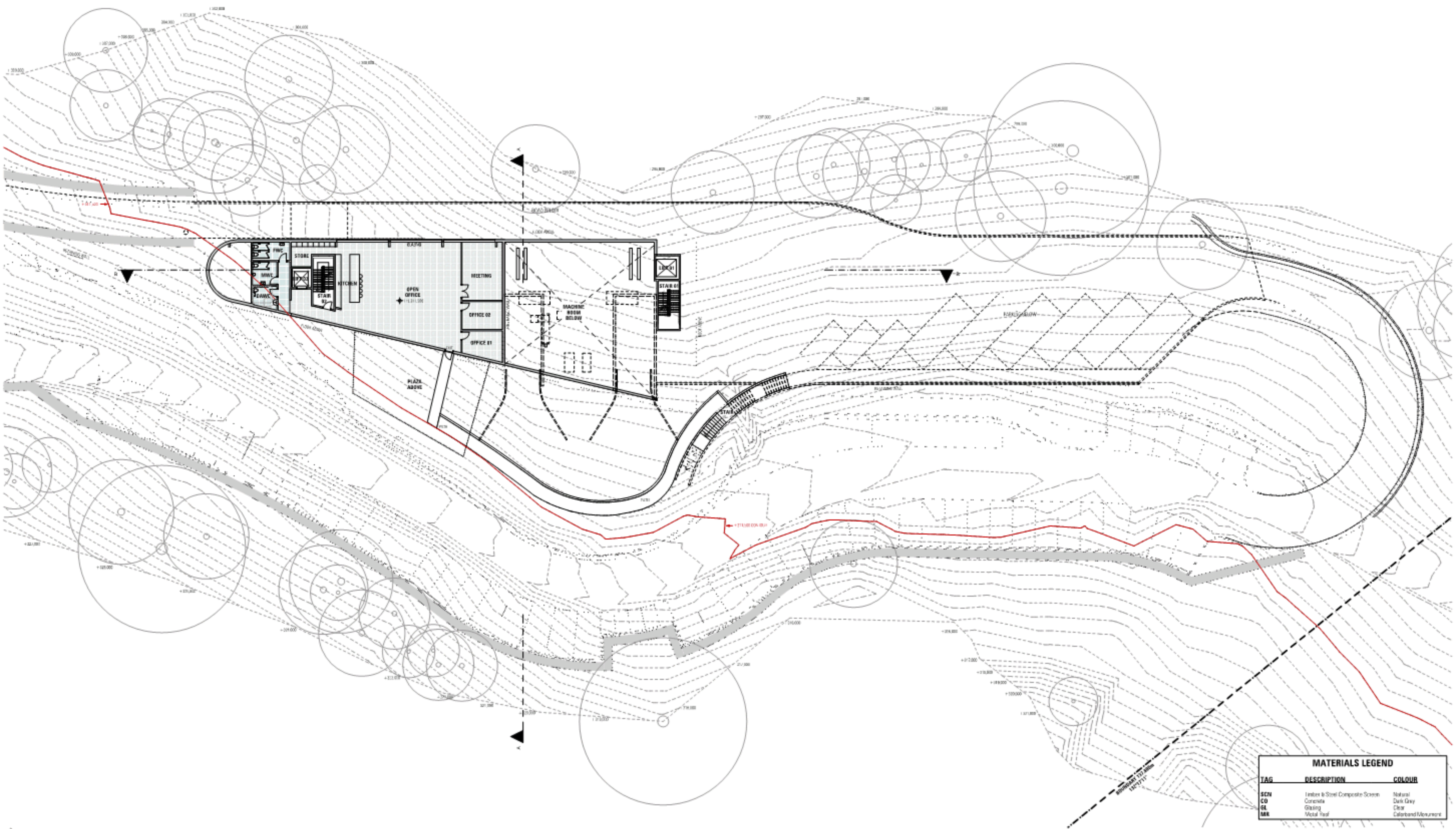
## ATTACHMENT 3.00
## DRAWINGS FOR THE PROPOSED BUILDING WORK – THE BASE


FIREFIGHTING WATER SUPPLY AND ACCESS
REFER TO ENGINEERS DRAWINGS
HV EASEMENT
1.5m WIDE
PROPOSED LEASE / MANAGED AREA
REFER TO CIVIL DRAWINGS FOR ROAD & PARKING DESIGN
PROPOSED LOCATION OF
BASE TERMINAL
INDICATIVE CONSTRUCTION TRACK
PROPOSED CABLEWAY ALIGNMENT
TOWER 1
APPROXIMATE
LOCATION
TOWER 2
APPROXIMATE
LOCATION
EXISTING ELECTRICITY TRANSMISSION CORRIDOR EASEMENT
NOTE: ALL DETAIL SITE SURVEY INFORMATION REFERENCED IN THE FOLLOWING DRAWINGS HAS BEEN PROVIDED BY LEARY & COX LAND & ENGINEERING SURVEYORS
DRAWING No.
DESCRIPTION
1780_DA00
SITE PLAN & DRAWING SCHEDULE
1780_DA01
LEVEL 0 - LOADING - FLOOR PLAN
1780_DA02
LEVEL 1 - STAFF - FLOOR PLAN
1780_DA03
LEVEL 2 - PLATFORM - FLOOR PLAN
1780_DA04
ROOF PLAN
1780_DA05
ELEVATIONS
1780_DA06
SECTIONS
FLOOR AREAS APPROX (m²)
LEVEL 2 PLATFORM: 635
LEVEL 1 STAFF: 342
LEVEL 0 LOADING: 447
TOTAL 1424m²
1780_DA00
DEVELOPMENT APPLICATION
Mt. Wellington Cable Car
Mt Wellington
SEPTEMBER 2019
SITE PLAN & DRAWING SCHEDULE
1780_DA00
02
ARCHITECTS JAWS


FLOOR AREAS - LEVEL 2
LOADING AREA
PARKING
MACHINE ROOM
PLANT
STAIR 01
STAIR
ROAD
NOTE: REFER TO CIVIL DRAWINGS FOR UPDATED CONTOURS AND ROAD/PARKING DESIGN
MATERIALS LEGEND
TAG DESCRIPTION COLOUR
SCN Timber & Steel Composite Screen Natural
CO Concrete Dark Grey
GL Glazing Clear
MR Metal Roof Colorbond Monument
1780_DA01
DEVELOPMENT APPLICATION
Mt. Wellington Cable Car
mwCC
LEVEL 0 - LOADING - FLOOR PLAN
1780_DA01
02
ARCHITECTS JAWS
1+2 ARCHITECTURE

**FLOOR AREAS - LEVEL 2**

| Zone Name | Measured Area ($m^2$ approx) |
|---|---|
| OFFICES/STORE | 295 |
| TOILETS | 16 |
| STAIRS | 52 |




**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| SCN | Timber & Steel Composite Screen | Natural |
| CO | Concrete | Dark Grey |
| GL | Glazing | Clear |
| MR | Metal Roof | Colorbond Monument |

1780_DA02

DEVELOPMENT APPLICATION

PROJECT
Mt. Wellington Cable Car
Mt Wellington

DRAWING
LEVEL 1 - STAFF - FLOOR PLAN

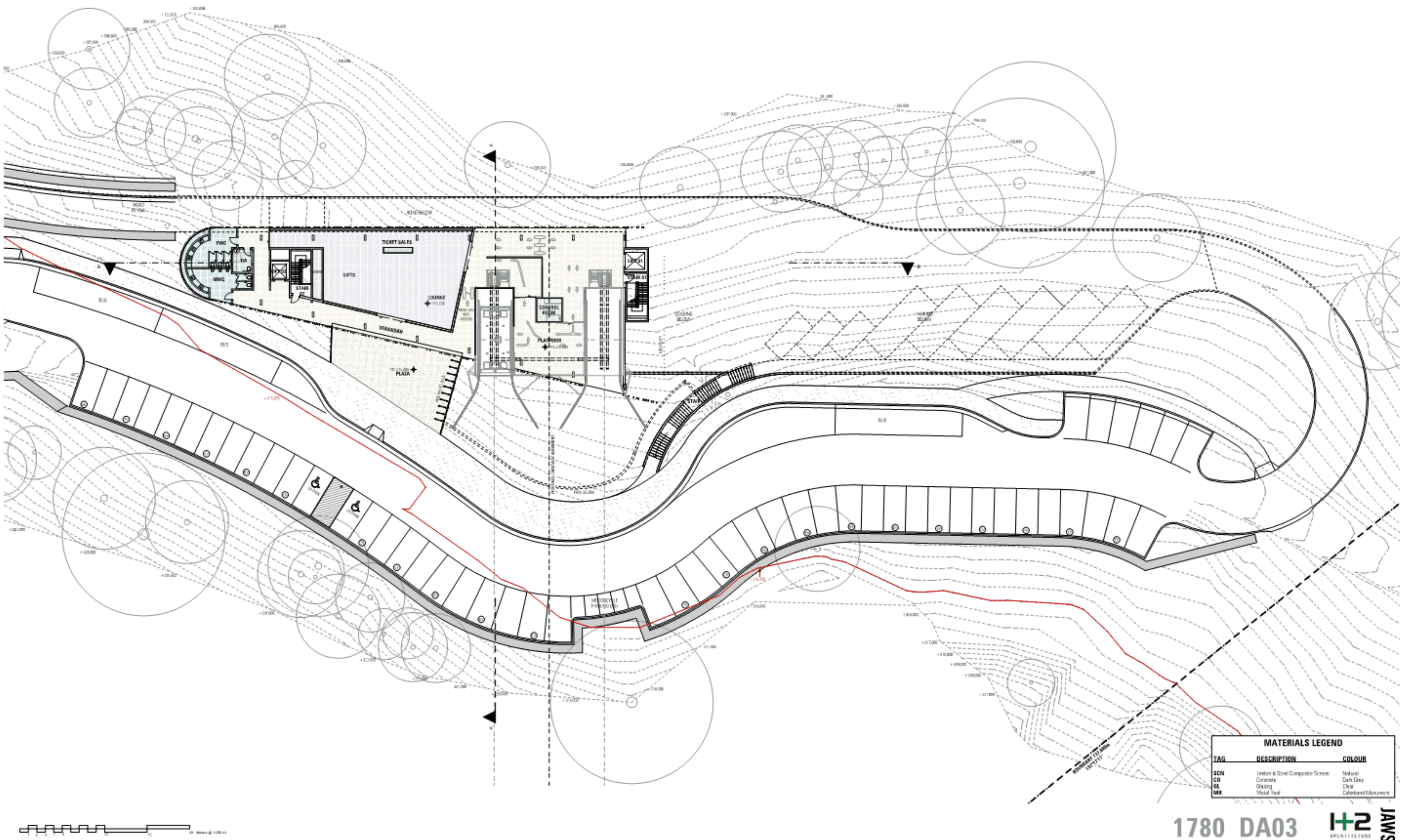
DRAWING NO 1780_DA02 REV 02

ARCHITECTS JAWS

I+2 ARCHITECTURE

**FLOOR AREAS - LEVEL 2**

| Zone Name | Measured Area (m² approx) |
| --- | --- |
| VERANDAH/PLATFORM | 324 |
| LOUNGE/GIFTS/TICKET SALES | 192 |
| TOILETS | 58 |
| STORE | 9 |
| LIFTS/STAIRS | 52 |



**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
| --- | --- | --- |
| SCN | Timber & Steel Composite Screen | Natural |
| CO | Concrete | Dark Grey |
| GL | Glazing | Clear |
| MR | Metal Roof | Colorbond Monument |

DEVELOPMENT APPLICATION

1780_DA03

I+2 ARCHITECTURE

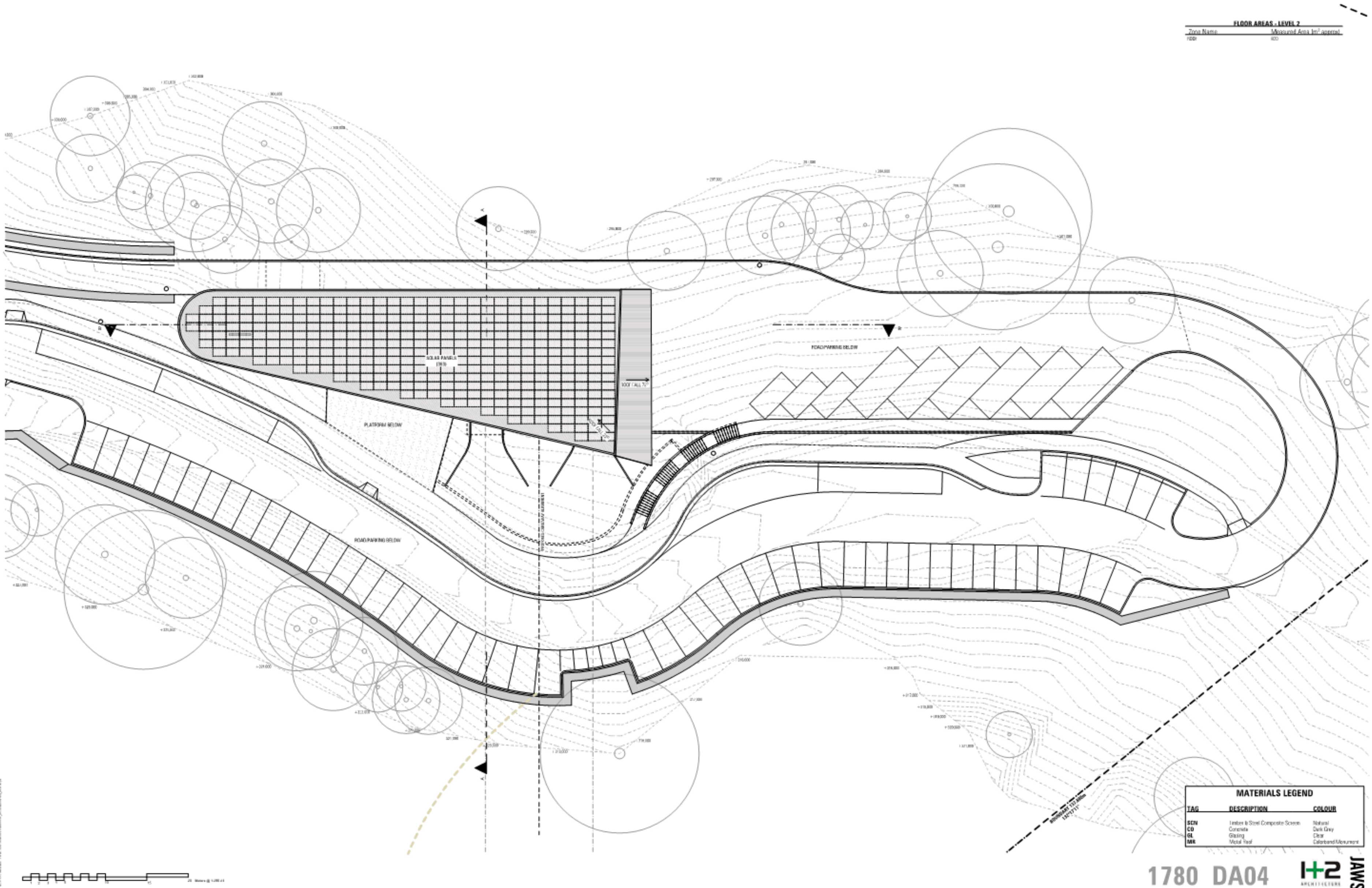
JAWS ARCHITECTS

PROJECT
Mt. Wellington Cable Car
Mt Wellington

mwCC

DRAWING
LEVEL 2 - PLATFORM - FLOOR PLAN

DRAWING NO 1780_DA03 REV 02




**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| SCN | Timber & Steel Composite Screen | Natural |
| CO | Concrete | Dark Grey |
| GL | Glazing | Clear |
| MR | Metal Roof | Colorbond Monument |

DEVELOPMENT APPLICATION

PROJECT
Mt. Wellington Cable Car
Mt Wellington

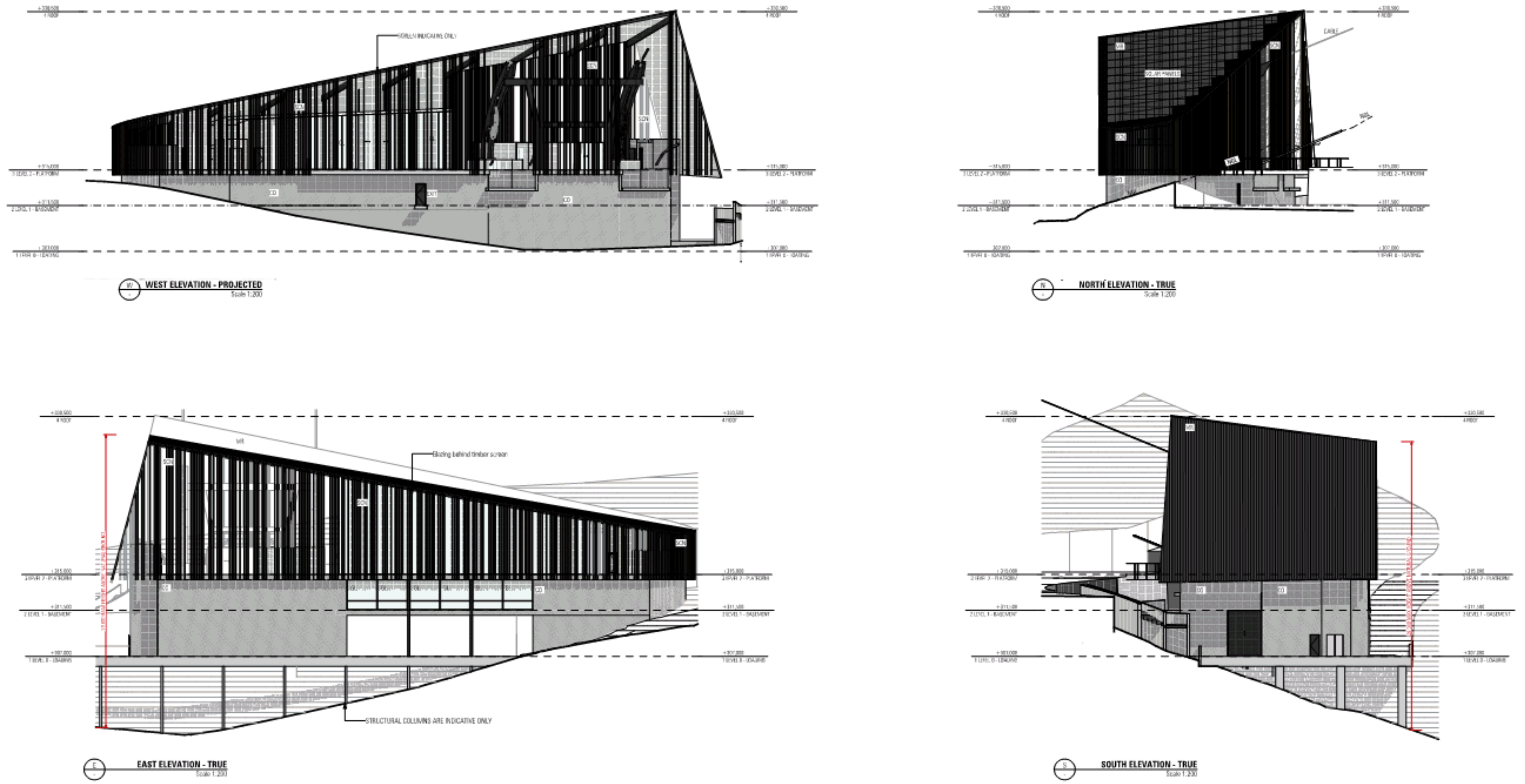
mwCC

DRAWING
ROOF PLAN

1780_DA04
REV 02

1780_DA04

ARCHITECTS JAWS
I+2 ARCHITECTURE




MATERIALS LEGEND

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| SCN | Timber & Steel Composite Screen | Natural |
| CO | Concrete | Dark Grey |
| GL | Glazing | Clear |
| MR | Metal Roof | Colorbond Monument |

1780_DA05

DEVELOPMENT APPLICATION

Mt. Wellington Cable Car

mwCC

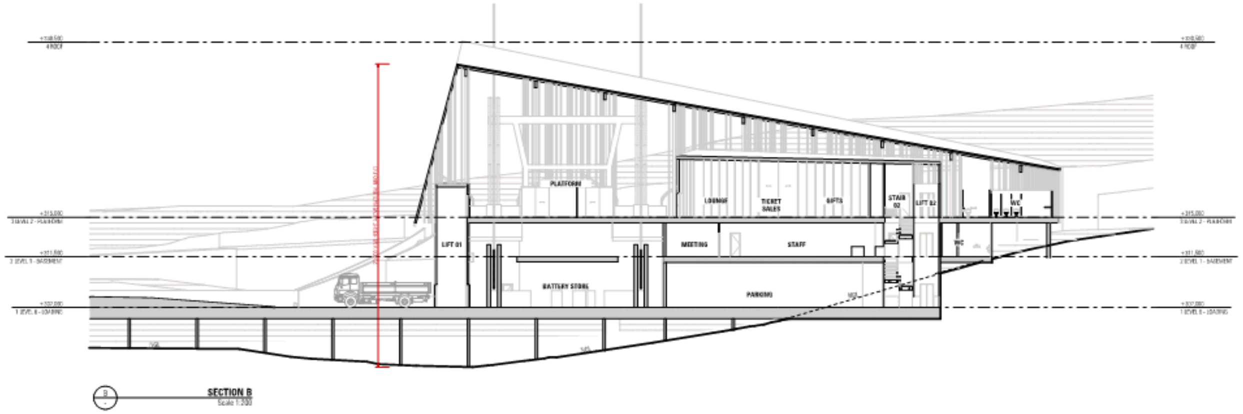
I+2 ARCHITECTURE

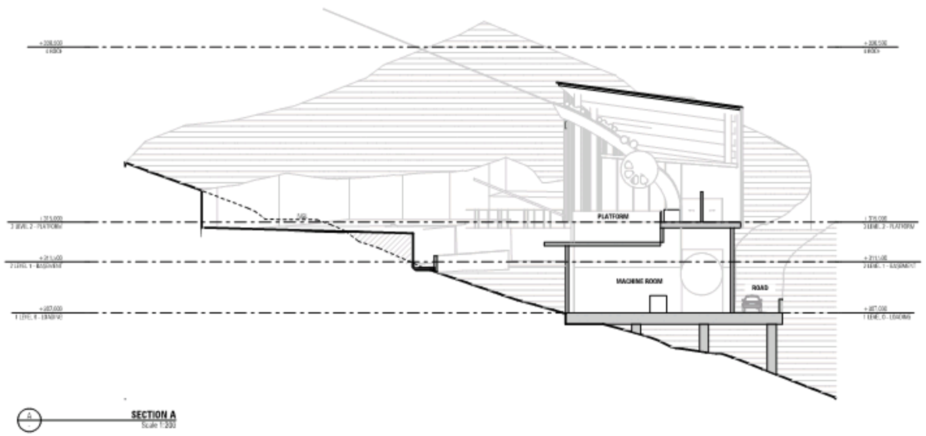
JAWS ARCHITECTS

ELEVATIONS

1780_DA05

REV 02




**MATERIALS LEGEND**

| TAG | DESCRIPTION | COLOUR |
|---|---|---|
| SCN | Timber & Steel Composite Screen | Natural |
| CO | Concrete | Dark Grey |
| GL | Glazing | Clear |
| MR | Metal Roof | Colorbond Monument |

1780_DA06

DEVELOPMENT APPLICATION

Mt. Wellington Cable Car

SECTIONS

1780_DA06

02

ARCHITECTS JAWS

# ATTACHMENT 4.00
# BUILDING SURVEYING REPORT – THE BASE

LEE TYERS
BUILDING
SURVEYORS

# Email Transmission

| | | | |
|---|---|---|---|
| **To:** | 1+2 Architecture | **From:** | Peter Short |
| **Attention:** | Mike Verdouw | **Job No:** | 1702.104 |
| **Email:** | mike@1plus2architecture.com | **Date:** | 29/10/2018 |
| **Copies:** | ross@castellan.com.au<br>scott.verdouw@jawsarchitects.com<br>cath@1plus2architecture.com | **No of Pages:** | 4 |
| **Subject:** | **MWCC – Base Station** | | |

This email may contain PRIVILEGED AND/OR CONFIDENTIAL INFORMATION intended only for the use of the addressee. If you are not the addressee, or the person responsible for delivering it to the person to whom it is addressed, YOU MAY NOT COPY OR DELIVER THIS MESSAGE TO ANYONE ELSE. If you received this email by mistake, please telephone the nominated office (reverse charges). Thank you.

Dear Mike,

We have undertaken a preliminary assessment of drawings dated the 26/9/18 for the above development and have identified the following issues for your consideration.

| | |
|---|---|
| **Building Class:** | 5, 7a & 9b |
| **No. of stories:** | 3 |
| **Construction:** | Type A construction |
| **Floor Area:** | Level 0 – 661m2 approx.<br>Level 1 – 319m2 approx.<br>Level 2 – 671m2 approx.<br>Total – 1651m2 approx. |

**Structural Provisions:**

1.1 Structural drawings accompanied by a Form 35 to be provided for the structural elements of the building.

**Fire Resistance:**

2.1 All external walls and components, flooring and floor framing of lift pits, lift shafts and non-loadbearing internal walls that are required to be fire resisting are to be non-combustible. It was noted during the assessment that a timber screen (combustible) has been detailed for the external walls of Level 2 of the building which will need to be justified by a Fire Safety Engineer or alternatively non-combustible materials used.

2.2 Vertical separation of openings on the Eastern elevation are to comply with Clause C2.6 of the BCA Vol 1.

2.3 Walls separating different classifications located alongside one another are to be in accordance with Clause C2.8 of the BCA Vol 1.

2.4 Floors separating different classifications are to have a Fire Resistance Level (FRL) for the classification of that below, please document FRL's on drawings.

2.5 Lift shaft is to have an FRL in accordance with Table 3 of Specification C 1.1 and is to be non-combustible.

2.6 Stairways and lifts are to be in separate fire resisting shafts in accordance with Clause C2.11 of the BCA Vol 1.

2.7 Batteries located on Level 0 in the Machine Room are to be separated from the remainder of the building with walls having an FRL of 120/120/120 and doors are to be -/120/30 self-closing if the voltage exceeds 24 V and the capacity exceeds 10 ampere hours.

2.8 Doors providing access to the fire isolated stairs are to be -/60/30 self-closing fire doors in accordance with Clause C3.8 of the BCA Vol 1.

2.9 Services that pass through a floor required to have an FRL are to comply with Clause C3.12 of the BCA Vol 1.

2.10 All building elements that are required to be fire resisting are to have an FRL in accordance with Table 3 of Specification C1.1 of the BCA. Please have these FRL's documented on the drawings.

2.11 The fire hazard properties of all internal floor, wall and ceiling linings, air handling ductwork and lift cars are to comply with Specification C1.10 of the BCA Vol 1.

**Access and Egress:**

3.1 We assume that both Stair 1 & 2 are fire isolated stairs only and are not for general use.

3.2 Travel distance on Level 1 exceeds 20m to the one required exit, the second exit provided cannot be used as it is within 9m of the other exit, therefore not complying with Clause D1.5. Please move the second exit to further than 9m apart, thereby providing 2 complying exits from the floor level.

3.3 Bollards will be required to be installed where doors opening from the stairs on Level 0 in order to prevent the egress path from being blocked complying with Clause D1.10 of the BCA Vol 1.

3.4 The current Base Station design is capable of accommodating 204 occupants at any given time when calculated in accordance with D1.13 of the BCA Vol 1.

3.5 Goings and risers of stairs, balustrades and handrails are to comply with Clause D2.13, 2.16 & 2.17 of the BCA Vol 1. Please document compliance on the drawings.

3.6 Any power operated doors serving as a required exit must be able to be opened under a force of not more than 110N if there is a malfunction or power failure. If the door leads directly to a road or open space the door must open on the activation of a fire or smoke alarm anywhere in the fire compartment served by the door.

3.7 The building is required to be accessible, therefore disabled access is to be provided to and throughout the building other than those areas exempted under D3.4 of the BCA Vol

1, e.g. plant room, machinery room & store room. All stairs (non-fire isolated stairs), ramps and passenger lifts are required to be accessible.

3.8 A hearing augmentation system must be provided where an inbuilt amplification system, other than one used only for emergency warning is installed. Please confirm if an inbuilt amplification system is to be installed.

3.9 Braille and tactile signage is to be provided to all sanitary compartments and exits in accordance with Clause D3.6 of the BCA Vol 1.

3.10 Visual indicators are to be provided to all full height glazing that can be mistaken for an opening or a doorway in accordance with Clause 6.6 of AS 1428.1-2009. Please provide details of visual indicators to be used.

3.11 Doorways, doors and circulation space at doorways is to comply with Clause 13 of AS 1428.1-2009. Please note that circulation around doorways in the Public Transport Area is to be increased 100mm in the length measurement and 50mm either side in the width measurement.

3.12 Ground tactiles are to be installed in accordance with AS/NZS 1428.4.1 – 2009.

**Services and Equipment:**

4.1 Fire hydrants are to be provided to achieve coverage in accordance with AS 2419.1.

4.2 Fire hose reels are to be provided achieving coverage in accordance with AS 2441.

4.3 Under Clause E2.2a of the BCA Vol 1, the building is to have an automatic smoke detection and alarm system complying with Clause 4 of Specification E2.2a installed or sprinklers or air pressurization systems to the fire isolated stairs (if constructed as such) as per AS/NZS 1668.1.

4.4 Lifts are to be installed in accordance with Clause E3.6 and Specification E3.1 of the BCA Vol 1. Details to be provided.

4.5 Emergency lighting and exit signage is to be installed in accordance with AS 2293.1.

**Health and Amenity:**

5.1 Current sanitary facilities provided for the Base Station allows for 350 occupants.

5.2 Male and female ambulant facilities are to be provided to each bank of toilets where there is an accessible facility provided.

5.3 Detailed dimension drawings to be provided showing compliance for accessible and ambulant facilities in accordance with Clause 15 & 16 of AS 1428.1-2009.

5.4 Artificial lighting will be required, please provided drawings from a Building Services Designer showing compliance with AS/NZS 1680.0 and Part J6 of the BCA Vol 1.

5.5 Natural ventilation is provided to Level 2, however Level 1 will require further information to confirm natural ventilation, alternatively mechanical ventilation is to be installed in accordance with AS/NZS 3666.1 and Part J5 of the BCA Vol 1.

**Special Use Buildings:**

6.1 Level 2 of this building has been designated as a Public Transport Building and needs to comply with Part H2 of the BCA Vol 1.

6.2 Unobstructed widths of accessways are required to be 1.2m. Columns, poles, bollards, etc. cannot encroach into this accessway. A column is encroaching into this space on Level 2 (see below).


**Energy Efficiency:**

7.1 Details to be provided showing compliance with Part J1 Building Fabric and J3 Building Sealing of the BCA Vol 1.

7.2 A glazing calculator is to be provided showing compliance with Part J2 of the BCA Vol 1.

**Other:**

8.1 Location of the Base Station is in a Designated Bushfire-Prone Area. In accordance with the Directors Determination – *Requirements for Building in Bushfire-Prone Areas* issued on the 29/8/18, the deemed-to-satisfy requirements for a building of this class requires the following elements to be achieved:

a. Property access;
b. Water supply for fire fighting; and
c. Hazard management areas.

**Items which may be addressed by a Performance Solution:**

The following items from above assessment may be able to be addressed in a Performance Solution prepared in accordance with Clause A0.3 of the BCA Vol 1 by a Fire Safety Engineer: Items 2.1, 2.2, and 8.1

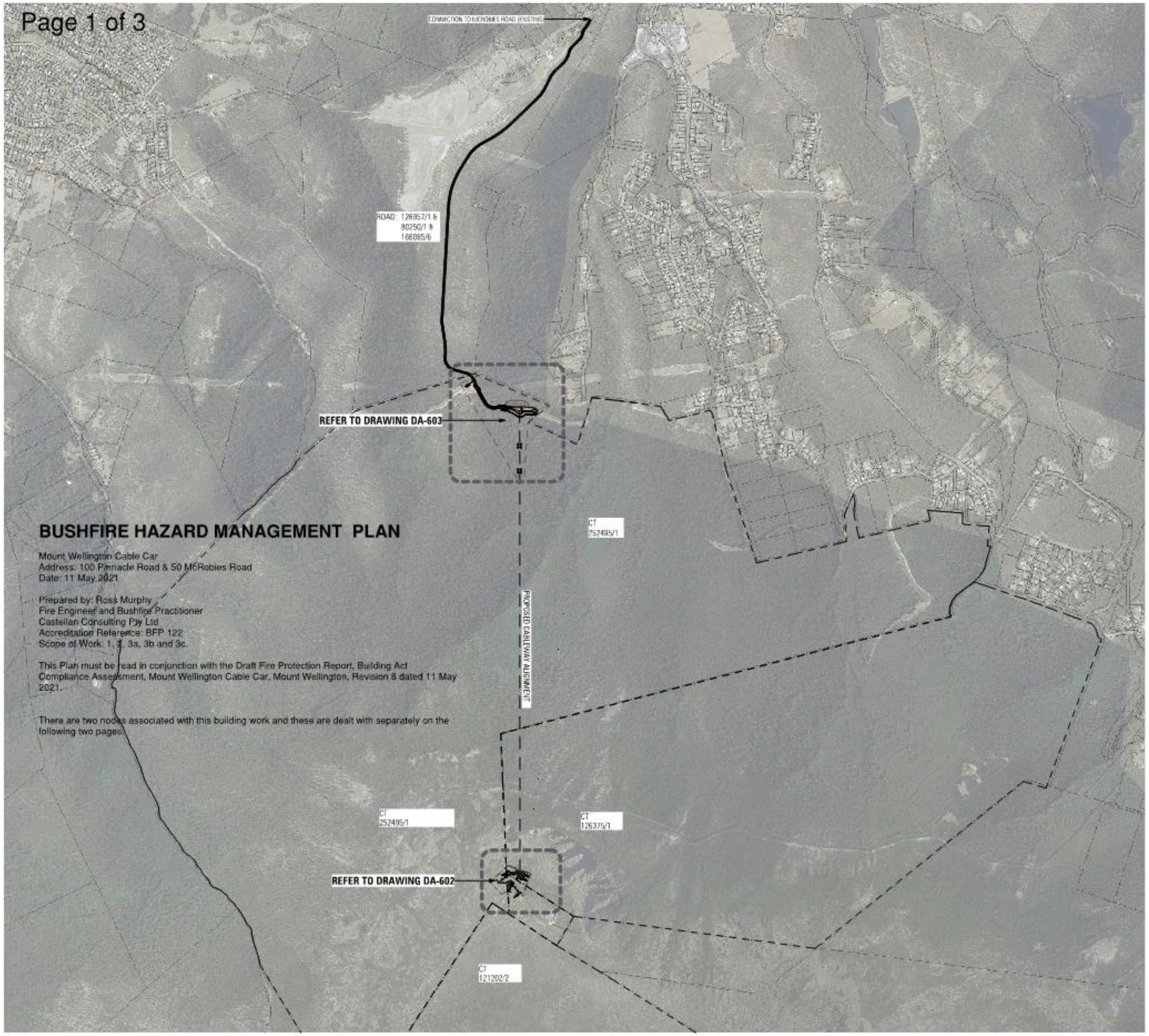
Please do not hesitate to contact me on 6229 2440 if you have any queries regarding the above.

Yours sincerely,

**Peter Short**
BUILDING SURVEYOR

ATTACHMENT 5.00
<ATTACHMENT REMOVED>

# ATTACHMENT 6.00
# BUSHFIRE HAZARD MANAGEMENT PLAN – BOTH NODES




| DRAWING No. | DESCRIPTION |
|---|---|
| DA-601 | OVERALL SITE PLAN |
| DA-602 | INDICATIVE FOUNDATIONS PLAN - PINNACLE CENTRE |
| DA-603 | INDICATIVE FOUNDATIONS PLAN - BASE TERMINAL |
| DA-604 | SITE SURVEY (LEARY & COX) |

NOTE: - REFER TO SURVEY DRAWINGS BY LEARY & COX FOR SURVEYED BOUNDARY LOCATIONS. ALL SURROUNDING BOUNDARIES ARE INDICATIVE ONLY (SOURCE *THE LIST* 2021)
- REFER TO ENGINEERS DRAWINGS FOR CIVIL AND HYDRAULIC DESIGN

DA-601

DEVELOPMENT APPLICATION

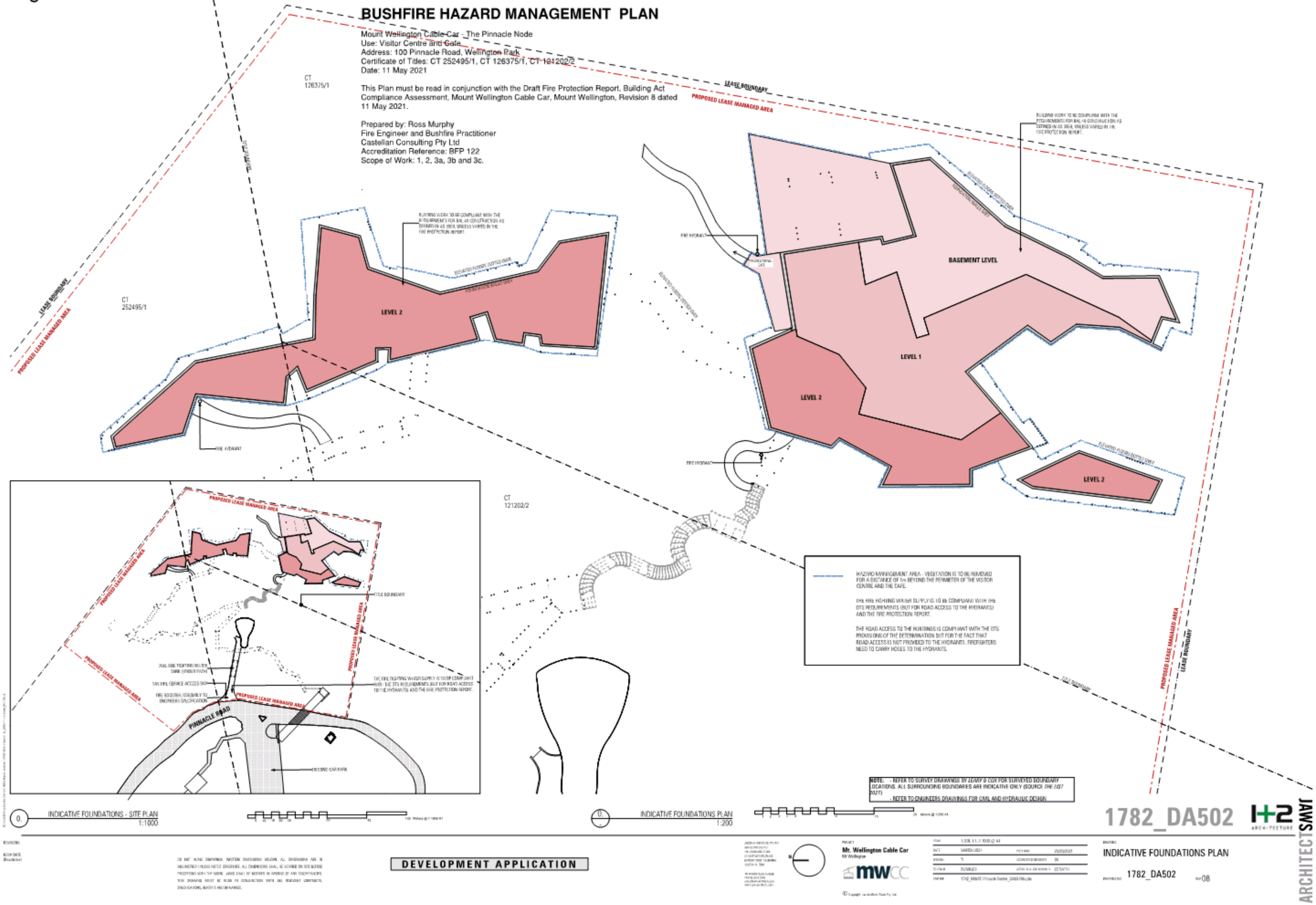
Mt. Wellington Cable Car

OVERALL SITE PLAN

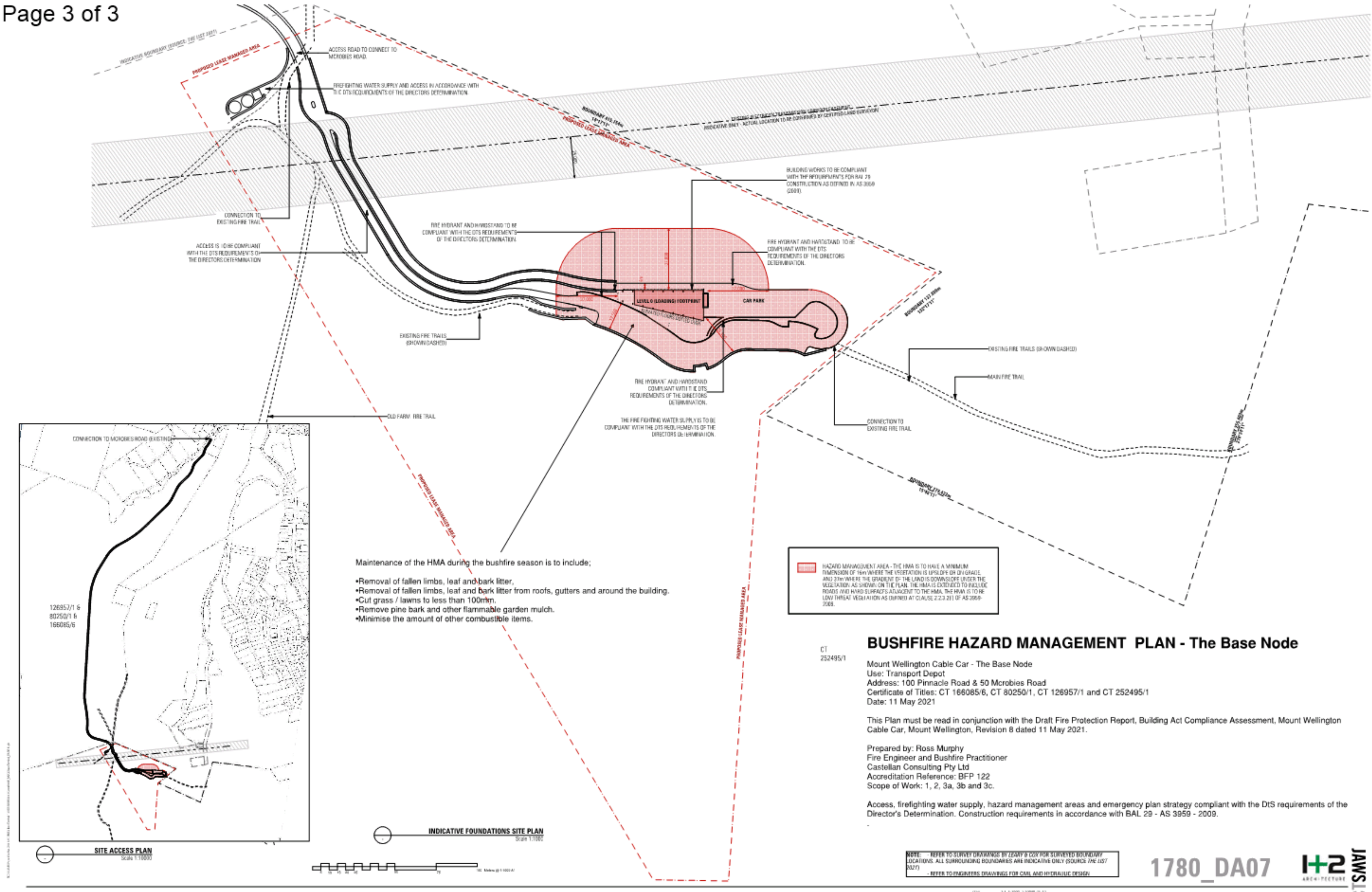
DA-601 REV 01

JAWS ARCHITECTS

Page 2 of 3


BUSHFIRE HAZARD MANAGEMENT PLAN
Mount Wellington Cable Car - The Pinnacle Node
Use: Visitor Centre and Cafe
Address: 100 Pinnacle Road, Wellington Park
Certificate of Titles: CT 252495/1, CT 126375/1, CT 121202/2
Date: 11 May 2021
This Plan must be read in conjunction with the Draft Fire Protection Report, Building Act Compliance Assessment, Mount Wellington Cable Car, Mount Wellington, Revision 8 dated 11 May 2021.
Prepared by: Ross Murphy
Fire Engineer and Bushfire Practitioner
Castellan Consulting Pty Ltd
Accreditation Reference: BFP 122
Scope of Work: 1, 2, 3a, 3b and 3c.
CT 126375/1
CT 252495/1
CT 121202/2
LEASE BOUNDARY
PROPOSED LEASE MANAGED AREA
LEVEL 2
LEVEL 1
BASEMENT LEVEL
FIRE HYDRANT
HAZARD MANAGEMENT AREA - VEGETATION IS TO BE REMOVED FOR A DISTANCE OF 1m BEYOND THE PERIMETER OF THE VISITOR CENTRE AND THE CAFE.
THE FIRE FIGHTING WATER SUPPLY IS TO BE COMPLIANT WITH THE DTS REQUIREMENTS (BUT FOR ROAD ACCESS TO THE HYDRANTS) AND THE FIRE PROTECTION REPORT.
THE ROAD ACCESS TO THE BUILDINGS IS COMPLIANT WITH THE DTS PROVISIONS OF THE DETERMINATION BUT FOR THE FACT THAT ROAD ACCESS IS NOT PROVIDED TO THE HYDRANTS. FIREFIGHTERS NEED TO CARRY HOSES TO THE HYDRANTS.
PINNACLE ROAD
INDICATIVE FOUNDATIONS - SITE PLAN
1:1000
INDICATIVE FOUNDATIONS PLAN
1:200
1782_DA502
DEVELOPMENT APPLICATION
Mt. Wellington Cable Car
mwcc
INDICATIVE FOUNDATIONS PLAN
1782_DA502
ARCHITECTS

Page 3 of 3




Maintenance of the HMA during the bushfire season is to include;

•Removal of fallen limbs, leaf and bark litter,
•Removal of fallen limbs, leaf and bark litter from roofs, gutters and around the building.
•Cut grass / lawns to less than 100mm.
•Remove pine bark and other flammable garden mulch.
•Minimise the amount of other combustible items.

## BUSHFIRE HAZARD MANAGEMENT PLAN - The Base Node

Mount Wellington Cable Car - The Base Node
Use: Transport Depot
Address: 100 Pinnacle Road & 50 Mcrobies Road
Certificate of Titles: CT 166085/6, CT 80250/1, CT 126957/1 and CT 252495/1
Date: 11 May 2021

This Plan must be read in conjunction with the Draft Fire Protection Report, Building Act Compliance Assessment, Mount Wellington Cable Car, Mount Wellington, Revision 8 dated 11 May 2021.

Prepared by: Ross Murphy
Fire Engineer and Bushfire Practitioner
Castellan Consulting Pty Ltd
Accreditation Reference: BFP 122
Scope of Work: 1, 2, 3a, 3b and 3c.

Access, firefighting water supply, hazard management areas and emergency plan strategy compliant with the DtS requirements of the Director's Determination. Construction requirements in accordance with BAL 29 - AS 3959 - 2009.

NOTE: - REFER TO SURVEY DRAWINGS BY LEARY & COX FOR SURVEYED BOUNDARY LOCATIONS. ALL SURROUNDING BOUNDARIES ARE INDICATIVE ONLY (SOURCE THE LIST 2021)
- REFER TO ENGINEERS DRAWINGS FOR CIVIL AND HYDRAULIC DESIGN

1780_DA07

DEVELOPMENT APPLICATION

Mt. Wellington Cable Car

INDICATIVE FOUNDATIONS PLAN

1780_DA07

**ATTACHMENT 7.00**
**<VOID – CONSOLIDATED BHMP AT ATTACHMENT 6.00>**

# ATTACHMENT 8.00
# ENGINEERING CERTIFICATION

## Draft CERTIFICATE OF QUALIFIED PERSON – ASSESSABLE ITEM - <To be completed for Detailed Design>

**Section 321**

Form **55**

| | | |
|---|---|---|
| To: | MWCC – Adrian Bold | *Owner /Agent* |
| | | *Address* |
| | Hobart | *Suburb/postcode* |

### Qualified person details:

| | | | |
|---|---|---|---|
| Qualified person: | Ross Murphy | | |
| Address: | GPO Box 2030 | Phone No: | 0447710152 |
| | HOBART 7001 | Fax No: | NA |
| Licence No: | CC 457 B & BFP 122 | Email address: | ross@castellan.com.au |
| Qualifications and Insurance details: | Engineer – Fire Safety<br>Bushfire Practitioner | *(description from Column 3 of the Director of Building Control's Determination)* | |
| Speciality area of expertise: | Fire safety engineering<br>Bushfire safety | *(description from Column 4 of the Director of Building Control's Determination)* | |

### Details of work:

| | | | |
|---|---|---|---|
| Address: | 100 Pinnacle Road | Lot No: | |
| | Mount Wellington | Certificate of title No: | |
| The assessable item related to this certificate: | See fire protection report revision 8 dated xxxx. | *(description of the assessable item being certified)*<br>*Assessable item includes –*<br>- *a material;*<br>- *a design*<br>- *a form of construction*<br>- *a document*<br>- *testing of a component, building system or plumbing system*<br>- *an inspection, or assessment, performed* | |

### Certificate details:

| | | |
|---|---|---|
| Certificate type: | Fire safety | *(description from Column 1 of Schedule 1 of the Director of Building Control's Determination)* |

This certificate is in relation to the above assessable item, at any stage, as part of - *(tick one)*

building work, plumbing work or plumbing installation or demolition work: [x]

or

a building, temporary structure or plumbing installation: [ ]

In issuing this certificate the following matters are relevant –

| | |
|---|---|
| Documents: | See fire safety report. |
| Relevant calculations: | See fire safety report. |
| References: | See fire safety report. |

*Substance of Certificate: (what it is that is being certified)*

See fire safety report.

*Scope and/or Limitations*

See fire safety report.

**I certify the matters described in this certificate.**

| | *Signed:* | *Certificate No:* | *Date:* |
|---|---|---|---|
| Qualified person: | | 17116(8) | |

# ATTACHMENT 9.00
# EMERGENCY PLAN STRATEGY

## EMERGENCY PLAN STRATEGY – PINNACLE AND BASE NODES

The following is an overview of the proposed triggers for the emergency plan. The finalisation of the emergency plan requires input from operators of the facilities and the detailed design of systems. This has not occurred at the time of preparing this version of the report. This version of the Report (revision 8) is provided to assist with understanding the fire protection strategy for the purpose of the planning approval. As identified in the Introduction, this report remains a draft report for the purpose of the building approval where there is likely to be some further amendment as the detailed design develops.

The detailed design of the fire protection system includes the detailed design of systems, further consultation with stakeholders and the approval by the Building Surveyor and the Council (Building Permit Authority). The statutory building approval process involves a mandatory referral mechanism to the TFS and the emergency plan will need to be certified by the TFS. The approval process under the building regulations is appealable to the Resource Management Planning Appeal Tribunal.

It is also noted that the development of the emergency plan is not a fixed position and is expected to be reviewed annually once the building is operational.

The requirement for an annual review of the emergency plan occurs because there are shifting expectations with respect to bushfire management and the risk of bushfire. For example, there are calls for greater prescribed burning to reduce fuel levels, better co-ordination of various agencies and authorities and recognition of potentially more severe bushfire events that may need to be captured in future emergency plans.

As outlined in this report there has been a recognition that there needs to be a level of communication and coordination between, in particular, the Park, the TFS and the Client. The objective in this assessment to date has been to retain a level of flexibility with the emergency plan to accommodate future changes in policy around land management impacting on the Park.

In this context it is also noted that the need for flexibility in this report (while not compromising fire safety) also allows for the annual review of the plan to occur without the need to amend this report other than where a more substantive change in land management or the environment occurs.

Notwithstanding, it is noted that the operation of the emergency plan has little impact on the development of the site and as a consequence there is likely to be little bearing on the planning application. The emergency plan still requires certification by the TFS prior to acceptance in the building permit.

The emergency plan needs to remain relatively simple so that there is an ease of implementation while being sensitive to the various scenarios that may develop.

For the purpose of this assessment the following triggers are identified;

| Trigger | Response |
|---|---|
| Park Closure. | The cable car and the facility at the Pinnacle is to cease to operate. |
| Where there is no total fire ban day for southern Tasmania – FDI less than 38 | Where there is no alert warning, make sure that the emergency plan is up to date and that fire protection systems are operational. |
| Where there is a total fire ban day for southern Tasmania though not a Severe FDI – greater than 38 and less than 50 | Where there is no alert warning from the TFS (no advice, watch and act or emergency warning), activate the MWCC alert action below. |
| FDI warning of Severe or greater – FDI of 50 or greater | Where there is no TFS alert warning, activate the general action below. NB the Park is likely to be closed under and Extreme or Catastrophic FDI. |
| Advice warning from the TFS | Alert Action as below unless there is a greater requirement above. |
| Watch and act warning from the TFS | General alarm action as below unless there is a greater requirement above. |
| Emergency warning alert from the TFS | General alarm with a possibility of Emergency Lockdown. |
| Advice from emergency services. | Follow the advice of the emergency service unless there is a greater requirement above. |
| Fire in the immediate area (spot fire or fire front) or there is substantial smoke[9] | Emergency Lockdown. |

[9] Indicators are to be established prior to occupation of the building. Markers may be established to define a trigger for unacceptable smoke density.

## ACTIONS

The following is a preliminary description of the actions arising from the above triggers. In all instances these actions need a caveat that the response is predicated on an assessment about whether or not it is safe to undertake the action. It is safer for the public to evacuate early.

The emergency plan is to also reference the contacts that will be updated from time to time for the benefit of the chief warden.

| Action | Response |
|---|---|
| Alert | • Cease transporting visitors to the Pinnacle between the hours of 9.00am and 7.00pm).<br>• Arrange for a shuttle bus to stand by the evacuate visitors at the Base if they do not have other means of transport to a nearby safer place (to be defined) (may be waiting for a pick up bus).<br>• Advise visitors at the Base that the cable car may not be operating for the remainder of the day and suggest departure. |
| General Alarm | • Undertake the alert actions if these have not been initiated previously.<br>• Cease transporting visitors to the Pinnacle from the Base. Continue to evacuate occupants to the Base if it is safe to do so.<br>• Commence the alert tone at the Pinnacle if it is considered safe to continue to operate the cable car. The system is to be programmed to not escalate to evacuation mode unless initiated off a Manual Call Point (MCP). Smoke detection within the Pinnacle is to be isolated if there is smoke present from an external fire.<br>• Sound the alarm externally at the Pinnacle and commence evacuating visitors to the Base if it is safe to do so. |

| | |
|---|---|
| | • Cease transporting waste and water to expedite the transport of visitors.<br>• Commence shuttle bus service to transport occupants at the Base to a designates nearby safer place (to be determined). |
| Emergency Lockdown | • The cable car ceases to operate.<br>• The evacuation tone off the occupant warning system is not to be activated in response to a bushfire attack.<br>• The Chief Warden is to be in communication with the incident control team to advise them of the situation and to take advice.<br>• Occupants of the Pinnacle report to the assembly area and await instructions from the Chief Warden.<br>• The occupants of the Base continue to evacuate if it is safe to do so.<br>• The Pinnacle building is closed up (detail to be provided prior to the occupancy permit).<br>• The Base building is closed up if it is unsafe to evacuate. |

# ATTACHMENT 10.00
# LANDSCAPE FIRE SCENARIO ASSESSMENT

An assessment of additional fire scenarios in this attachment to the Report where the regional landscape are considered following advice from the TFS. This assessment is provided primarily to quantify (in broad terms) a scenario where there is a campaign fire that may impact on the sites.

While an assessment in accordance with AS 3959 is concerned with the vegetation within 100m of the proposed development, the following assessment provides a description of the broader environment so that there is a better understanding of the context for the bushfire and the spread of fire towards the proposed building work.

It should be noted that there are a number of variables associated with the quantification of the bushfire scenarios where there is a multitude of possible outcomes. The probability of these scenarios involves the conditional probability of each parameter.

It should also be noted that the algorithms developed for bushfire protection are rough approximates where they exist and an educated estimation where there are no agreed algorithms [14]. As such the quantification of these fire scenarios should be viewed with scepticism and with an understanding that there is a high level of uncertainty associated with the algorithms and the range of variables that may occur.

For this reason, the approach applied in this assessment has been to determine whether or not the proposed performance solution provides an equivalent level of fire safety to that achieved where a building compliance with the prescriptive solution in the building regulations where similar variables are applied.

## Fire Scenario 1 – Fire from the Northwest

This fire scenario is developed to consider the impact of a fire spreading from the northwest under conditions where there is notionally a risk to the occupants of the cable car and associated facilities (i.e. when the buildings are occupied) and under conditions where there is a risk of fire spread from a common wind direction; the north west under challenging bushfire conditions.

**Input Parameters**

| Parameter | Description / Discussion |
|---|---|
| Fire Danger Index (FDI) | 49 - The FDI is selected in this instance is the design FDI for the building work that is referenced in AS 3959. Under this FDI there is likely to be Total Fire Ban (TFB). |
| Fire Activity in Area | In this assessment it is assumed that there is no prior fire activity in the area. If there are fires already in the area the risk of fire spread to the proposed building work would be assessed and an alert level applied; emergency warning, watch & Act, advice or no advice. The emergency plan would be sensitive to the existing bushfire threat. If there are multiple fires with a potential for impacting on the Hobart a higher level of warning would be provided. |
| Fire Ignition | Ignition occurs at a dwelling at Mount Hull Road, Collinsvale. This location is selected as it represents a location where fire could start (road access and residential development) with a significant flame front prior to the flame front impacting on the proposed building work under the prevailing wind conditions. The elevation of the point of ignition is around 440m which is roughly 800m below the Pinnacle site and 140 above the Base site. There is a distance of approximately 5.7km to the Pinnacle site and 7.5km to the Base site. |

**Assessment**

Under these conditions it is apparent that there is a total fire ban and that there is a heightened awareness of the fire in the environment. Under these conditions and with a wind pushing the fire towards the proposed development (and Hobart) it is likely that there would be a rapid and well-resourced response to this fire by the relevant agencies.

Between the point of ignition and the areas of interest to the south east the land;

- rises up through to the ridge between Mt Hull and Tom Thumb,
- falls down to Knights Creek,
- rises up to a ridge between the Big Bend Trail and the Quarry Fire Trail,

- Falls down to Humphreys Rivulet,
- Rises up to the ridge between Mt Arthur and the Priest Fire Trail,
- Falls down to the New Town Rivulet, and
- Rises up to the Mt Wellington (for the Pinnacle) or
- Rises up to a ridge between Mt Wellington and Brushy Hill
- Falls to McRobies Gully,
- Rises up to the ridge along the Old Farm road Fire Trail, and
- Falls to the Base.

The spread of fire from the point of ignition will be affected by the shape of the land and the nature of the vegetation (including the extent of mitigation undertaken prior to the fire, the orientation of the various slopes and the affect of fire brigade intervention during the event (assuming a relatively constant wind direction supporting fire spread to the south east).

In addition, the growth of fire from the point of ignition to a fully developed fire is also difficult to quantify.

For complex terrain such as this it is apparent that the fire will spread more quickly up slopes that are exposed to radiant heat from the sun during the day and more slowly down slopes through vegetation that is in creek lines and on the south side of slopes. The fire is likely to take an indirect pathway where it follows pathways more conducive to fire spread and assisted by the wind. The topography is likely to also impact on the wind in localised areas.

With the effect of wind, vegetation, land form, orientation etc it is difficult (if not impossible) to quantify accurately the spread of fire from Mt Hull Road towards the area of interest.

For the purpose of this assessment to provide an indicative understanding of fire spread it is crudely assumed that; there is a steady grade of land from the point of ignition to the area of interest, that there is a forest vegetation with an understorey for the entire fire run, that there are no changing wind conditions or local wind effects that deviates the direct pathway from the point of ignition to the area of interest, and that there is an instantaneous fully developed fire at the point and time of ignition. These input parameters are very conservative and exaggerate the rate of fire spread as it is important to overestimate the risk rather than underestimate. Under these worst-case conditions, the rate of fire spread is calculated below using the formula provided in AS 3959.

| Parameter | Pinnacle | Base | Hobart |
|---|---|---|---|
| Point of Ignition | Mt Hull Road, Collinsvale | | |
| FDI | 50 | | |
| Vegetation | Assumed universally forest with a surface fuel load of 25 t/Ha and an overall fuel load of 35 t/Ha. | | |
| Effective Slope | + 7.98° | -1.07° | Say -1.07° |
| Rate of Fire Spread (ROS) | 1.5km/hr | 1.5km/hr | 1.5km/hr |
| Slope Adjusted ROS | 3.95km/hr | 1.39km/hr | 1.39km/hr |
| Time to reach destination | 86 minutes | 324 minutes<br>(5.4 Hours) | 324 minutes<br>(5.4 Hours) |
| Flame Length approx. | 30m | 13m | 13m |
| Assumed width of flame front | 100m | | |
| Fire intensity approx. | 71MW/m | 25MW/m | 25MW/m |

**Discussion – The Pinnacle**

From this calculation it is apparent that, in this fire scenario where a range of conservative and broad assumptions are made in the input parameters, there is a possibility that a fire may impact on the Pinnacle building ahead of the time required to clear the Pinnacle building.

While the above calculation suggests that the fire could arrive in 86 minutes based on the conservative assumptions provided it is apparent that there will be some delay associated with the fire developing and spreading towards the area of interest. As a new fire it is likely that the TFS will provide an advice alert initially from the TFS as it is possible that it may be contained where there is an FDI of 49. An alert action from the emergency plan strategy would be in place so there is already a reducing number of occupants at the Pinnacle and at the Base. If the fire develops more rapidly and is unable to be contained the warning from the TFS may escalate to ‘watch and act’ and ‘emergency warning’ (given the trajectory towards Hobart).

Under these conditions the Chief Warden will need to remain in contact with the TFS and receive updates on whether or not to continue to operate the cable car to evacuate occupants. It may be difficult for the Chief Warden to appreciate the distance of the fire from the site and as a consequence there will need to be regular if not ongoing communication. If conditions are such that there is uncertainty about the location of the fire and it could impact on the site, the Chief Warden will proceed to Emergency Lockdown action as described in the emergency plan strategy at Attachment 9.00.

Notwithstanding, it is concluded in this assessment that the proposed performance solution provides an acceptable level of performance for the reasons outlined below. This discussion complements the discussion provided in the main part of this report.

1. Firstly, if a fire occurs where there is a prospect of a fire front with a width of 100m and fireline intensity of 25MW/m within 5.4 hours from impacting on Hobart there would be a concerted effort to manage the fire and evacuate the occupants. While the above analysis suggests that fire could impact on the Pinnacle in under 86 minutes where there is a FDI of 49 (with no other fires in the area) it is also apparent that there would be an emergency warning alert from the TFS if a significant fire occurred that could impact on the site within 2 hours. In response to an emergency warning there would be an immediate stop to visitor arrivals to the Pinnacle from the cable car, the emergency warning would occur and there would be evacuation from the site as per the triggers to the evacuation plan strategy at Attachment 9.00.

2. In reality, it is highly likely that there will be a smaller fire initially which will take longer to develop to a fire spreading across the landscape. In addition, there will be creek lines and downslopes, and a reduced fuel load (variable vegetation types) etc. that will also slow fire development towards the south east. While it is difficult to be definitive it is likely that there will be an initial advice / watch and act alert from the TFS prior to escalation to the emergency warning alert. As such, under these conditions in this fire scenario where there are occupants present, the rate of fire spread to the site is reduced and there will be a better opportunity for an escalating response to the bushfire emergency.

3. In addition there will be a firefighting response that may include aerial firefighting and back burning on the ground that stops or slows the fire spread. The effectiveness of this response is difficult to quantify.

4. To emphasise the uncertainty associated with the application of AS 3959 it is noted that the standard is not sensitive to the vegetation, bark composition, or gradient of the land under the bushfire prone vegetation where it is greater that 100m from the proposed building. For example, the proposed development could have a section of downslope forest vegetation for several kms leading up to a point 100m from the building which has a significant impact on the potential

for a spreading fire front as opposed to the complex terrain (creeks and sections of downslope vegetation) in this scenario, and the fact that the proposed development is in alpine vegetation where there is a large amount of surface stone and a low level of emergent standing vegetation. In this environment there is a significant benefit for the proposed development associated with the existence of this terrain and alpine vegetation near the building and at a distance greater than 100m to the building that is not factored into the DtS assessment.

5. In addition to the vegetation associated with the alpine landscape it is also noted that there is a significant car park and other structures included the Pinnacle Road which also break the lines of vegetation from the north west direction. Where there is alpine vegetation with limited flame length and sporadic vegetation on both sides of the road, a road can be an effective fire break. There is no benefit associated with these features from a prescriptive bushfire fire safety assessment in AS 3959.

6. When it comes to the vegetation with 100m of the building it is noted that, as identified above, the shrubland vegetation is interspersed with large areas of surface stone so that there is a reduced threat of ember attack to the building. This occurs because;

    a. With a FDI of 50 and a complex land form there is a reduced potential for a canopy fire where there are no trees heavy bark involved,

    b. There is a reduced potential for ignition if embers drop onto surface stone or the building that is provided with ember protection, and

    c. If the ember lands on vegetation that ignites the stand of vegetation is generally limited and there is a reduced potential for a developed fire occurring.[10]

7. If a fire front approaches the site from the north west (or the north) the fire front is downslope and across the gradient to the building. (in addition to there being large amounts of surface stone and non-combustible structures. The TFS have suggested that the spread of fire should be quantified to determine the potential for radiant heat flux and flame impingement on the building. The TFS agreed in discussions that the spread of fire across alpine vegetation where there is a large amount of surface stone is not empirically established. While there

[10] It is noted that compliance with AS 3959 defines low threat vegetation that can be excluded from the bushfire assessment (See Clause 2.2.3.2 of AS 3959). Examples include; multiple areas of vegetation [undefined] less than 0.25Ha in area and not within 20m of the site, strips of vegetation less than 20m in width… regardless of length and not within 20m of the site or each other or other areas of vegetation being classified, and low threat vegetation including… maintained public reserves and parklands, .. and cultivated gardens… The vegetation around the Pinnacle could be considered consistent with the fuel load associated with a cultivated garden where the vegetation is considered low threat and potentially not exposed to bushfire prone vegetation.

was some discussion about the relationship between the amount of surface stone and the rate of fire spread and the flame length there is, in my opinion, too much uncertainty with this assessment, particularly where the fire is not fully developed, and that reaching conclusions may not be appropriate as it may imply a level accuracy that doesn't exist. In this assessment it is preferred to demonstrate that there is a significantly greater level of fire safety provided in the proposed solution notwithstanding the uncertainty associated with the prediction of the radiant heat flux and possible reduced intensity flame impingement on the building.

8. To reach the conclusion that there is a substantial level of fire safety associated with the proposed performance solution the following points are made;

    a. The rate of fire spread is qualitatively described as 'chugging'[11] along through this type of landscape where there is substantial surface stone. It is clear that the rate of fire spread would be significantly less than 3.95km/hr as described above across vegetation approaching 100m distance from the building.

    b. Where there is vegetation close to the building (greater than 1m), the proposed structure consists of concrete panels where the external wall will be non-combustible and will have a fire resistance that will resist direct flame impingement and radiant heat. By comparison a restaurant could be built in this location with no requirement for bushfire protection in accordance with the DtS provisions of the Determination because there is no bushfire protection requirement for a Class 6 building.[12]

    c. Where there are windows in the external walls at ground level windows are to be elevated off the ground and be shrouded in the concrete panel. The window is to be fixed glass (toughened heat tempered – typically minimum 6mm) to AS 1288 for safety glass).[13]

    d. As a Class 9b building the DtS requirement would be for a building with a HMA consistent with BAL 29 with no requirements for the building to be constructed to BAL 29. So, compliance with the prescriptive DtS standard means that the building is notionally designed to be exposed to a radiant heat flux that does not exist in the structure. This is the current public policy. In the proposed performance solution; there is a reduced level of bushfire threat associated with the terrain and

[11] As coined by the TFS.
[12] A restaurant could be constructed within a forest with no HMA or building fire conduction. The only reason this building requires any protection is because it is deemed to be a Class 9b building because there is a mode of transport connecting the buildings (like and airport, bus depot or a train station) though the similarity with these buildings from a fire safety perspective is less obvious. The complex is more like a restaurant and café with a dedicated bus service than airport, train station or bus depot.
[13] The detail for the structure is to be developed for the building approval.

the vegetation and the level of resistance in the structure is likely to exceed the threat for the period the building threat passes even though it is difficult to quantify the level of threat. It is clear that the proposed structure is substantially improved in its ability to resist the bushfire threat compared to a DtS compliant building.

e. In addition to the form of construction a measure of redundancy is provided in the provision of separate fire compartments within the building. A boulder scree coincides with the bridge between the rock scree so that there is a reduced level of probability associated with a single spreading bushfire impacting on both fire compartments. Again, the algorithms do not exist to consider the localised spread of fire where there is a large surface area of stone and other non-combustible structures in the area.

9. In this context it is also necessary to consider the provision of the road access. The road access is provided so that there is a road for the evacuation of occupants and for fire fighter intervention. If the Pinnacle were a restaurant and café with a dedicated bus service (Class 6) there would be no additional requirement for any bushfire protection including suitable road access. It is also noted that there is already a high volume of visitors to the Pinnacle and it is understood that the quality of the existing road access is currently under investigation for safety reasons. In the proposed performance solution a level of transport is provided for visitors where the cable car is able to continue to operate at optimum efficiency irrespective of traffic congestion issues on Pinnacle Road in an emergency when there could be emergency vehicles attempting to access the summit at the time where there is a high volume of cars and buses leaving the site. While there is always a risk of fault with the cable car as well, in this situation it is more plausible that there could be an accident or other fault with vehicles that result in traffic congestion on Pinnacle Road. Having two options for descending from the summit improves the overall reliability of the system. The fire engineering solution is designed to be effective whether or not the TFS turn out to the Pinnacle. In this context it is considered that the cable car provides a measure or redundancy for all people on Mt Wellington (kunanyi) and as a consequence there is an improved level of performance achieved compared to the existing arrangement where the public road may be less than ideal.

10. The final element for consideration is the level of firefighting water supply provided. As discussed previously, in this fire scenario where there is a fire impacting on Hobart in less than 5 hours it is highly unlikely that there will be any land based resources deployed to Pinnacle Road. Notwithstanding, if there is a less threatening fire, provision is made for a firefighting water supply (static tank) where there is a hardstand adjacent to the tank as shown on the BHMP. The

performance solution in this instance (developed in collaboration with the TFS) is for firefighters to carry hose lines and branches to hydrants.

In this context it is concluded that the level of protection provided to the Pinnacle complex in this fire scenario is at least equivalent to the level of protection provided where the building is constructed to the prescriptive DtS standard.

**Discussion - The Base**

As identified above, the gradient under the bushfire prone vegetation is a negative slope to the Base so the fire would be travelling downslope generally from the point of ignition. This is reflected in the slope adjusted rate of fire spread which, based on a number of potentially widely divergent variables, is notionally estimated to take 5.4 hours to arrive at the site.

At an FDI of 49 the draft emergency plan identifies that cable car would continue to operate while there are no fires in the area. Once there is a fire identified at Mt Hull Road, as identified above, the Alert action protocol would be activated and there would be limited access to the Pinnacle using the cable car. If the fire enters the Park, the Park will be closed. Once the warning escalates (if the fire is not contained near the source) the protocol would switch to general alarm action where the occupants of the Base are taken by bus to a nearby safer place if they do not have their own mode of transport. People from the Pinnacle would continue to arrive where it is safe to use the cable car.

In this fire scenario the risk to the occupants at the Base is less compared to the Pinnacle and it is likely that occupants will be evacuated from the site in advance of the fire front arriving. At some point the occupants of the Pinnacle may stop arriving because it is unsafe to use the cable car and a lockdown protocol will be in place. The emergency lockdown protocol will be in place in advance of the arrival of the fire front at the Base.

In this fire scenario it is concluded that an acceptable level of performance is provided in the Base building for the reasons identified below;

- Firstly, as shown on the BHMP for this site the building is setback from the bushfire prone vegetation for a fire coming from the northwest by a distance of at least 16m between the bushfire prone vegetation and the building where the vegetation is upslope of the building. This would be the direction of fire spread in this fire scenario. This separation distance satisfies the width of HMA requirement for BAL 29 as required by the DtS provisions and therefore is fully compliant with the DtS requirement for this fire scenario. In a fully compliant DtS solution there is no requirement for the building to have any construction requirement. The external walls for the purpose of the DtS provisions could be combustible for bushfire protection. In addition to achieving the required HMA, the provision of resistance in the building is a substantial improvement to what could be provided in a DtS compliant arrangement.

- As identified in the report the steepest gradient under bushfire prone vegetation under the building is 37°. The width identified for the downslope side is 37m and so the width of the HMA is compliant with the DtS provisions. In this fire scenario it is possible that a crowning fire could be occurring (though less likely with a FDI of 49 and the fire burning predominately downslope) so that there is ember spotting over the building and there is a fire coming back up the slope towards the building. As the wind direction is from the north west in this scenario the threat to the building from spotting ahead is reduced.[14] Where spotting is occurring over the building and burning back towards the Base, the building would be in emergency lockdown and there is unlikely to be anyone present (in this fire scenario).[15] In response to ember spotting the proposed performance solution includes; a fully compliant HMA of 37m next to the building as described in the main part of the Report. As identified previously, modelling fire development from an ember attack over the building and spreading back upslope towards the building is complex (if not impossible) to predict accurately. Notwithstanding it is concluded that there is an acceptable level of performance provided because; the occupants have been evacuated, the fire threat is reduced in this scenario from a fire in this direction (ember attack), the building is constructed to resist bushfire attack (compared with a DtS compliant arrangement where there is no construction requirement) and the owner accepts that there is a residual risk of property loss in some scenarios.[16]

- It is also reiterated that, if the building were a class 6 restaurant for example, with the same number of occupants as the Pinnacle, the building would not require any HMA or bushfire emergency plan to comply with the DtS provisions of the Determination.

- As identified above, the building is provided with construction designed to resist bushfire attack. This is a substantial improvement compared to the DtS provisions where there is no requirement for bushfire resistance construction even though the building is design with some bushfire exposure.

- The road access from the public road to the building is compliant with and exceeds the DtS provisions. In the proposed solution the quality and the width of the surface of the road allows for a more efficient road system where there is a potential for passing heavy vehicles (including buses and a fire brigade appliance) without resorting to passing bays to allow vehicles to pass. Road access is provided to the hydrants and the firefighting water supply. In addition to this access, while not formally

[14] A fire spreading from an easterly direction towards the Base is considered in the following fire scenario.

[15] It is possible that the brigade may see this as a strategic location to defend this part of the urban interface and may apply additional resources in this fire scenario. This could provide a significant benefit to the community.

[16] As noted previously, the practice exists in Tasmania for development to be permitted in areas of sensitive vegetation for a reduced HMA and a greater risk of property loss where the tourism business is predicated on a wilderness experience. The owner wears this risk.

identified as a feature of the bushfire risk management strategy it is also noted that there is a fire trail (the Main Fire Trail) that links the proposed building through to Old Farm Road. It is anticipated that this trail is provided for the benefit of the responding fire brigade and potentially the residents of Old Farm Road and as a consequence there is a high probability that the road link will remain available.

- A firefighting water supply that complies with the requirements for a structural fire with external feed hydrants providing coverage to the adjacent bush as well. The volume of water available and the level of access provided significantly exceeds the requirement of the DtS bushfire protection provisions.

- An emergency management strategy is provided that is to be converted to the final emergency plan during the development of the detailed design. For the purpose of this assessment, an emergency plan will be developed to meet the DtS requirement.

Again, it is concluded that the proposed solution is fully compliant with the DtS provisions of the Determination for the Base. The Base node provides a level of protection that significantly exceeds the requirement that would apply for a building that complies with the DtS provisions of the Determination because additional bushfire mitigation measures are applied by the Client. In this context the level of residual risk is acceptable.

## Fire Scenario 2 Fire from the East

This fire scenario is developed to consider the impact of a fire spreading from the east (the urban fringe) under conditions where there is notionally a risk to the occupants of the cable car and associated facilities (i.e. when the buildings are occupied) and under conditions where there is a risk of fire spread from a wind direction where the fire is pushed towards the proposed development.

**Input Parameters**

| Parameter | Description / Discussion |
|---|---|
| Fire Danger Index (FDI) | 49 - The FDI is selected in this instance is the design FDI for the building work that is referenced in AS 3959. Under this FDI there is likely to be Total Fire Ban (TFB). At a greater FDI there is a reduced access to the Pinnacle and use of the Base as per the emergency plan strategy.[17] |
| Fire Activity in Area | In this assessment it is assumed that there is no prior fire activity in the area. If there are fires already in the area the risk of fire spread to the proposed building work would be assessed and an alert warning applied; emergency warning, watch & Act, advice or no advice and the Park would be closed. The emergency plan would be sensitive to the existing bushfire threat and would dictate the bushfire response. If there are multiple fires with a potential for impacting on the Hobart (for example) a higher level of warning would be provided. |
| Fire Ignition | Ignition occurs at a dwelling at McRobies Gully Road, South Hobart. This location is selected as it represents a location where fire could start in a location where a significant fire to occur with a significant flame front prior to the flame front impacting on the proposed building work under the prevailing wind conditions. The elevation of the point of ignition is around 100m which is roughly 1140m below the Pinnacle site and 200m below the Base site. There is a distance of approximately 4.5km to the Pinnacle site and 2km to the Base site. |

**Assessment**

Under these conditions it is apparent that there is a total fire ban and that there is a heightened awareness of the fire in the environment. Under these conditions and with a wind pushing the fire towards the proposed development it is likely that there would be a rapid and well-resourced response to this fire given the potential impact on residential development in Old Farm Road and off Strickland Avenue as well as the Park.

[17] It is reiterated that the emergency plan is not fixed until there is a building permit and may be subject to change through to the issue of the occupancy permit for the building work. During this period there is ongoing engagement with stakeholders.

The focus of this assessment is on the impact of fire on the Base as the fire would impact on the Base prior to the Pinnacle. If there were fire approaching the Base there will be no cable car operating. For the occupants of the Pinnacle node they will remain at the Pinnacle building until there is a safe means of evacuating them from the building. For similar reasons outlined for Fire Scenario 1 the Pinnacle building will resist a fire spreading from the east and provide a level of safety at least equivalent to the prescriptive DtS provisions for the reasons outlined in the main part of this Report and fire scenario 1 immediately above.

Returning to the assessment for the Base building, the first point to make is that the Base node is fully compliant with the DtS provisions of the Determination and as a consequence there is no requirement for a performance solution. Additional mitigation measures are provided over and above compliance with the DtS provisions by the Client so the level of protection significantly exceeds the level of protection required by the building regulations.

In this context, the emergency plan strategy identifies that where there is a local FDI of 49 (not Severe) there is a total fire ban day and the alert action protocol would be activated. This includes;

- Cease transporting visitors to the Pinnacle during the hotter part of the day and advising visitor that the cable car is unlikely to operate for the remainder of the day,

- Encouraging visitors at the base to depart, and

- Providing a shuttle base to take those visitors without transport to a nearby safer place (to be defined).

Under these conditions there would continue to be visitors at the Pinnacle returning to the Base and reducing the number of visitors at the Pinnacle with no new arrivals at the Pinnacle. There are no other fires in the area and there are no alert warnings from the TFS. If there are other fires the response would differ in accordance with the emergency plan depending on the circumstances.

For example, if the is an FDI of 75 or greater the cable car would not be operating[18]. If there are people at the Base they have made their own way there and would leave under the same means.

If a fire starts at McRobies Gully Road under these condition, it is likely that there would be an alert issued. Again, it is not clear what the content of the advice would be as there are a multitude of possible outcomes based on the conditions as they exist on the day.

Notwithstanding, if the TFS thought that it was plausible that the fire could impact on the Base in a short period of time the TFS may issue an emergency

[18] It has been suggested by the TFS that this threshold is not sufficiently stringent and that they would be recommending a revised (lower) threshold for Park closure in the revised Strategy.

warning alert. The probability of this occurring on a day with an FDI of 49 is possible. Any ignition that could impact on the building in the immediate future would be less developed and therefore less threatening. A fully developed fire takes time to develop and therefore there is some advanced warning of a more severe impact.

If the FDI is 50 the emergency plan strategy identifies that the General Alarm action would be in place where the cable car is not operating. If the cable car is not operating the risk of injury to visitors is removed. Notwithstanding, it is noted that visitors may still be at risk if they chose to drive to the Pinnacle and where it is plausible that Pinnacle Road could be affected by fire from a similar fire scenario.

In this fire scenario, as identified above, the distance from the point of ignition to the Base is around 2km. The most likely pathway for the wind assisted fire would be to run along the ridge to the south of McRobies Gully running up to the west where that ridge runs into the convergence of the Main Fire Trail and the Old Farm Road Fire Trail.

While there can be some variation through the day it is more likely that the fire would spread along the ridge and down the north face where the understorey and near surface fuels are drier from solar exposure. For this fire to be impacting on the Base it needs to spread down the south facing (cooler / wetter) facing slope from Guy Fawkes Rivulet (and tributaries). This is possible though less likely as a fire on the north side of this ridge. The wind direction would be a significant factor.

In this context it is noted that there would be a significant risk to the occupants of the dwellings along Old Farm Road in this scenario. If there is a threat to these residents it is considered that the provision of the Base where there is an open area with a carpark, a bushfire protected building and an alternative road access through to McRobies Gully is a significant improvement in the fire safety options currently provided to these residents irrespective of the direction of the approaching fire front.

As identified for fire scenario 1, the spread of fire from the point of ignition will be affected by the shape of the land and the nature of the vegetation (including the extent of mitigation undertaken prior to the fire, the orientation of the various slopes and the affect of fire brigade intervention during the event (assuming a relatively constant wind direction supporting fire spread to the west).

With the effect of wind, vegetation, land form, orientation etc it is difficult (if not impossible) to quantify with certainty the spread of fire from McRobies Gully Road towards the area of interest. In addition, the development of fire from the point of ignition to a fully developed fire is also difficult to quantify.

For the purpose of this assessment it is crudely assumed that; there is a steady grade of land from the point of ignition to the area of interest, that there is a forest vegetation with an understorey for the entire fire run, that there are no changing wind conditions or local wind effects that deviates the direct pathway from the point of ignition to the area of interest, and that there is an instantaneous fully developed fire at the point and time of ignition. Under these worst-case conditions, the rate of fire spread is calculated below using the formula provided in AS 3959.

There is no entry for Hobart as the point of ignition is assumed to be on the urban fringe of the city.

| Parameter | Pinnacle | Base | Hobart |
|---|---|---|---|
| Points of Ignition | McRobies Gully Road, South Hobart | | |
| FDI | 50 | | |
| Vegetation | Assumed universally forest with a surface fuel load of 25 t/Ha and an overall fuel load of 35 t/Ha. | | |
| Effective Slope | + 14.2° | + 5.7° | |
| Rate of Fire Spread (ROS) | 1.5km/hr | 1.5km/hr | km/hr |
| Slope Adjusted ROS | 4.0km/hr | 2.2km/hr | km/hr |
| Time to reach destination | 68 minutes | 54 minutes | minutes |
| Flame Length approx. | 30m | 18.6m | m |
| Assumed width of flame front | 100m | | |
| Fire intensity approx. | 71MW/m | 40MW/m | MW/m |

**Discussion - The Base**

Where there is an FDI or 49 forecast (this fire scenario) there is a reduced access to the Pinnacle in the emergency plan strategy and a deterrent for people to be at the Base and for there to be fewer people at the Pinnacle. If there is a fire that is not capable of being extinguished quickly the TFS warning is likely to escalate to emergency warning particularly for the residents at the end of Old Farm Road and the occupants of the Base.

In response to the emergency warning the emergency management strategy identifies that a general alarm protocol would follow with the possibility of an emergency lockdown. The alert tone would be initiated in the building requiring the occupants to assemble and the Chief Warden would need to liaise with the incident management team to determine an appropriate course of action. The cable car would cease to operate.

If it is safe to evacuate via the road, the occupants of the Base may continue to use the road to evacuate. If it considered unsafe to evacuate via the road the occupants may need to seek refuge in the building.

While the calculation identified that the fire could arrive at the building in less than an hour it should be noted that this is predicated on there being an instantaneous fully developed fire. This is unlikely to occur and there is no agreed methodology for the development of a fire from ignition to having (say) an assumed width of fire front of 100m. As such the underpinning assumptions and their application in this situation where the ignition and the target structure is approximately 2km apart are highly conservative.

It is distinctly plausible that there is some delay associated with the fire development where there is a sufficient period for the occupants to evacuation, particularly if the fire brigade intervention is effective.

Still, if the fire develops at a rate and spread consistent with the underpinning algorithms in AS 3959 and the fire arrives at the leading edge of the transmission easement, the rate of fire spread will reduce given there is likely to be some management of the transmission easement by the network operator.

Again, the algorithms contained within AS 3959 are crude approximations and not sensitive to the complex landform and vegetation arrangement. Notwithstanding, the objective of this assessment is to provide sufficient confidence that the final arrangement for building approval will provide a level of bushfire protection that is at least equivalent to that achieved by the DtS provisions. This is achieved because the proposed solution is fully compliant with the DtS provisions of the Determination.

In this assessment it is reasonably assumed that the fire is slowed where it runs into the transmission easement, particularly where there is an FDI of 49, and the fire is spreading across the slope on the south side of the ridge. Within the transmission easement it is also reasonable to assume that the fire is sustained by the near surface fuels and continues to spread to across the easement.

Once the fire reaches the opposite side of the easement there are standing trees and understorey for a section before the 37m HMA on the downslope side of the Base node in accordance with the DtS requirements of the Determination.

Again, by comparison, a DtS compliant building is one where there is a designed radiant heat flux of 29kW/m$^2$ and there is no fire resistance in the building. It is also concluded that the proposed performance solution is at least equivalent to this outcome because the building is provided with a level of resistance that is consistent with the design radiant heat flux (which is not required in a DtS compliant building).

With respect to ember attack it is noted that there will need to be some further detailing during the detailed design development for building approval where further refinements are provided prior to building approval. Again, it is reiterated that embers can travel significantly greater distances than 100m however AS 3959 ignores the threat of ember attack where the building is more than 100m from the bushfire prone vegetation. Ember proofing is provided to the degree necessary in the proposed solution taking into account other fire protection systems provided in the building (i.e. fire hose reels, sprinklers, extinguishers). None of these protection systems are required in a building for bushfire protection.

It is concluded that the Base is provided with a level of bushfire protection that is at least equivalent to that achieved in a DtS compliant building and is therefore provided with an acceptable level of performance (and residual risk).

**Discussion – The Pinnacle**

From this calculation it is apparent that, in this fire scenario where a range of conservative and broad assumptions are made in the input parameters, there is a possibility that a fire may impact on the Base building ahead of the time required to clear the Pinnacle building. As a consequence occupants would need to shelter in the Pinnacle building.

Notwithstanding, it is concluded in this assessment that the proposed performance solution provides an acceptable level of performance for the reasons outlined below. This discussion complements the discussion provided in the main part of the report.

1. Firstly, if a fire occurs at the urban fringe of Hobart under these conditions there would be a concerted effort to manage the fire and evacuate occupants. While the above analysis suggests that fire could impact on the Pinnacle in 68 minutes where there is a FDI of it is also apparent that there would be an emergency warning alert from the TFS if a significant fire occurred that could impact on the site within 2 hours. In response to an emergency warning there would be an immediate stop to visitor arrivals to the Pinnacle from the cable car, the emergency warning would occur and there would be evacuation from the site as per the triggers to the evacuation plan strategy at Attachment 9.00.

2. In reality, it is highly likely that there will be a smaller fire initially which will take longer to develop to a fire spreading across the landscape. In addition, there will be creek lines and downslopes, and a reduced fuel load etc. that will also slow fire development towards the west. While it is difficult to be definitive it is likely that there will be an initial advice / watch and act alert from the TFS prior to escalation to the emergency warning alert. As such, under these conditions in this fire scenario where there are occupants present, the rate of fire spread to the site is reduced and there will be a better opportunity for an escalating response to the bushfire emergency.

3. To emphasise the uncertainty associated with the application of AS 3959 it is noted that the standard is not sensitive to the vegetation, bark

composition, or gradient of the land under the bushfire prone vegetation where it is greater that 100m from the proposed building. For example, the proposed development could have a section of downslope forest vegetation for several kms leading up to a point 100m from the building which has a significant impact on the potential for a spreading fire front as opposed to the complex terrain (creeks and sections of downslope vegetation), and the fact that the proposed development is in alpine vegetation where there is a large amount of surface stone and a low level of emergent standing vegetation. In this environment there is a significant benefit for the proposed development associated with the existence of this terrain and alpine vegetation near the building.

4. In addition to the vegetation associated with the alpine landscape it is also noted that there are other structures including Pinnacle Road which also break the lines of vegetation from the north and east direction. Where there is alpine vegetation with limited flame length and sporadic vegetation on both sides of the road, a road can be an effective fire break. There is no benefit associated with these features from a prescriptive bushfire safety assessment.

5. When it comes to the vegetation with 100m of the building it is noted that, as identified above, the vegetation is interspersed with large areas of surface stone so that there is a reduced threat of ember attack to the building. This occurs because;

    a. There is a reduced potential for ignition if embers drop onto surface stone or the building where ember protection is provided, and

    b. If the ember lands on vegetation that ignites the stand of vegetation is generally limited and there is a reduced potential for a developed fire occurring.[19]

6. To reach the conclusion that there is a substantial level of fire safety associated with the proposed performance solution the following points are made;

    a. The rate of fire spread is qualitatively described as 'chugging'[20] along through this type of landscape where there is substantial surface stone. It is clear that the rate of fire spread would be significantly less than 3.95km/hr as described above leading to

[19] It is noted that compliance with AS 3959 defines low threat vegetation that can be excluded from the bushfire assessment (See Clause 2.2.3.2 of AS 3959). Examples include; multiple areas of vegetation [undefined] less than 0.25Ha in area and not within 20m of the site, strips of vegetation less than 20m in width… regardless of length and not within 20m of the site or each other or other areas of vegetation being classified, and low threat vegetation including… maintained public reserves and parklands, .. and cultivated gardens… The vegetation around the Pinnacle could be considered consistent with the fuel load associated with a cultivated garden where the vegetation is considered low threat and potentially not exposed to bushfire prone vegetation.

[20] As coined by the TFS

the 100m distance from the building. The reality is that the rate of fire spread will be significantly less than this.

b. Where there is vegetation within 2m of the building, the proposed structure consists of concrete panels where the external wall will; be non-combustible and will have a fire resistance that will resist direct flame impingement and radiant heat. No vegetation is within 1m of the lower outer extremity of the building as shown on the BHMP. By comparison a restaurant could be built in this location with no requirement for bushfire protection in the DtS compliant arrangement because there is no requirement for a Class 6 building.[21]

c. Where there are windows in the external walls at ground level windows are to be elevated off the ground and be shrouded in the concrete panel, the window is to be fixed glass (toughened typically minimum 6mm) to AS 1288 for safety glass.[22]

d. As a Class 9b building the DtS requirement would be for a building constructed with a HMA consistent with BAL 29 construction however there is no requirement for the building to be constructed to BAL 29. So, compliance with the prescriptive standard means that the building is notionally designed to be exposed to a radiant heat flux that does not exist in the structure. This is the current public policy. In the proposed performance solution; there is a reduced level of bushfire threat associated with the terrain and the vegetation and the level of resistance in the structure is likely to exceed the threat for the period required for the bushfire threat to pass passes even though it is difficult to quantify the level of threat. It is clear that the proposed structure is substantially improved in its ability to resist the bushfire threat compared to a DtS compliant building.

e. In addition to the form of construction a measure of redundancy is provided in the provision of a separate fire compartment within the building. A boulder scree coincides with the bridge between the rock scree so that there is a reduced level of probability associated with a single spreading bushfire impacting on both fire compartments. Again, the algorithms do not exist to consider the localised spread of fire where there is a large surface area of stone and other non-combustible structures in the area.

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[21] A restaurant could be constructed within a forest with no HMA or building fire conduction. The only reason this building requires any protection is because it is deemed to be a Class 9b building because there is a mode of transport connecting the buildings (like and airport, bus depot or a train station) though the similarity with these buildings from a fire safety perspective is less obvious. The complex is more like a restaurant and café with a dedicated bus service than airport, train station or bus depot.

[22] The detail for the structure is to be developed for the building approval.

7. In this context it is also necessary to consider the provision of the road access. The road access is provided so that there is a road for the evacuation of occupants and for fire fighter intervention. If the Pinnacle were a restaurant and café with a dedicated bus service (Class 6) there would be no additional requirement for any bushfire protection including suitable road access. It is also noted that there is already a high volume of visitors to the Pinnacle and it is understood that the quality of the existing road access is currently under investigation for safety reasons. In the proposed performance solution a level of transport is provided for visitors where the cable car is able to continue to operate at optimum efficiency irrespective of traffic congestion issues on Pinnacle Road in an emergency when there could be emergency vehicles attempting to access the summit at the time where there is a high volume of cars and buses leaving the site. While there is always a risk of fault with the cable car as well, in this situation it is more plausible that there could be an accident or other fault with vehicles that result in traffic congestion on Pinnacle Road. The fire engineering solution is designed to be effective whether or not the TFS turn out to the Pinnacle. In this context it is considered that the cable car provides a measure or redundancy for all people on Mt Wellington (Kunanyi) and as a consequence there is an improved level of performance achieved compared to the existing arrangement where the public road may be less than ideal (to be determined by others).

8. The final element for consideration is the level of firefighting water supply provided. As discussed previously, in this fire scenario where there is a fire impacting on Hobart in less than 5 hours it is highly unlikely that there will be any land based resources deployed to Pinnacle Road. Notwithstanding, if there is a less threatening fire provision is made for a firefighting water supply (static tank) where there is a hardstand adjacent to the tank as shown on the BHMP. The performance solution in this instance (developed in collaboration with the TFS) is for firefighters to carry hose lines and branches to hydrants.

In this context it is concluded that the level of protection provided to the Pinnacle complex in this fire scenario is at least equivalent to the level of protection provided where the building is constructed to the prescriptive DtS standard.

# ATTACHMENT 11.00
# FIRE DANGER RATING AND BUSHFIRE WARNINGS & ALERTS OVERVIEW

## Fire Danger Rating


### Fire Danger Rating (FDR)

The Fire Danger Rating (FDR) warns of the potential impact of a bushfire on any given day, based on forecast weather conditions. This summer the Fire Danger Rating will be widely publicised.

Categories **Severe, Extreme** and **Catastrophic** indicate a fire will be unpredictable, uncontrollable and fast-moving.

If a fire breaks out in these conditions, the safest option is to relocate to a safe place away from any fires.

Ratings above 50 occur in Tasmania around three times a year. Ratings above 75 have occurred only half a dozen times in Tasmania during the last 90 years. However, with the impact of climate change, the potential for such days is increasing.

**It is worth noting that the Fire Danger Rating on Black Saturday in Victoria on 7 February 2009 approached 200.**

**We strongly urge you take the time to review and understand the Fire Danger Ratings so you can react appropriately to any FDR forecast.**

Check the forecast FDR in your area

| FIRE DANGER RATING | RECOMMENDED ACTION AND POTENTIAL FIRE BEHAVIOUR AND IMPACT |
|---|---|
| CATASTROPHIC FDR 100+ | **ACTION: Leaving early is the safest option for your survival – regardless of any plan to stay and defend.**<br>• Most fires will be uncontrollable, unpredictable and fast moving. Flames will be higher than roof tops.<br>• Thousands of embers will be blown around.<br>• Spot fires will move quickly and come from many directions, up to 20 km ahead of the fire.<br>• Some people may die and be injured. Thousands of homes may be destroyed.<br>• Well-prepared, constructed and actively defended homes may not be safe during a fire unless firefighters have assessed them as defendable in the prevailing conditions. |
| EXTREME FDR 75-99 | **ACTION: Leaving early is the safest option for your survival. Only well-prepared, well constructed and actively defended houses are likely to offer safety during a fire.**<br>• Some fires will be uncontrollable, unpredictable and fast moving. Flames will be higher than roof tops.<br>• Thousands of embers will be blown around.<br>• Spot fires will move quickly and come from many directions, up to 6 km ahead of the fire.<br>• Some people may die and be injured. Hundreds of homes may be destroyed. |
| SEVERE FDR 50-74 | **ACTION: Leaving early is the safest option for y[illegible]l. Only stay if your home is well prepared and you [illegible]ely defend it.**<br>• Some fires will be uncontrollable and move quickly. Flames may be higher than roof tops.<br>• Expect embers to be blown around.<br>• Spot fires may occur up to 4 km ahead of the fire.<br>• There is a chance some people may die and be injured. Some homes will be destroyed.<br>• Well-prepared and actively defended houses can offer safety during a fire. |
| VERY HIGH FDR 25-49 | **ACTION: Only stay if your home is well prepared and you can actively defend it.**<br>• Some fires can be difficult to control. Flames may burn into the tree tops.<br>• Expect embers to be blown ahead of the fire.<br>• Spot fires may occur up to 2 km ahead of the fire.<br>• There is a possibility people may die or be injured. Some homes may be damaged or destroyed.<br>• Well-prepared and actively defended houses can offer safety during a fire. |
| HIGH FDR 12-24 | **ACTION: Know where to get more information and monitor the situation for any changes.**<br>• Fires can be controlled.<br>• Expect embers to be blown ahead of the fire.<br>• Spot fires can occur close to the main fire.<br>• Loss of life is highly unlikely and damage to property will be limited.<br>• Well-prepared and actively defended houses can offer safety during a fire. |
| LOW-MODERATE FDR 0-11 | **ACTION: Know where to get more information and monitor the situation for any changes.**<br>• Fires can be controlled easily.<br>• There is little to no risk to life and property. |

## Bushfire warnings & alerts

Alerts List | Alerts Map | ABC Radio

### Bushfire alert levels

Tasmania Fire Service will provide as much information about bushfires as possible, principally through its website www.fire.tas.gov.au and ABC Local Radio. It will use three levels of messaging to help people make the right safety choices.

However, remember that fires can threaten suddenly and without warning, so you should always be ready to act even if you don't receive an official emergency warning.

Tasmania Fire Service messages take into account the risk posed by fire, which will depend to some extent on the Fire Danger Rating and how quickly bushfires are spreading.

### There are three bushfire alert levels:

**Advice –**
A bushfire has started and general information is provided to keep individuals, households and communities up-to-date with developments.

**Watch and Act –**
A bushfire is approaching and conditions are changing. Individuals, households and communities need to monitor their development and start taking action to ensure safety should the threat escalate.

**Emergency Warnings –**
Individuals, households and communities will be impacted and are in imminent danger. Action must be taken immediately.

The three levels of alerts have taken into account concerns about over-warning people. These concerns, coupled with a tendency for people to act at the last minute, have determined the choice of message levels. While the intent is to inform people before fires directly threaten them, fires can break out suddenly and without warning, making it impossible to get messages out in time on all occasions.

You should be aware of the forecast Fire Danger Rating each day during summer, and remain alert to the potential for bushfires to break out suddenly and spread rapidly. You should not wait for an official emergency warning if you are threatened by a bushfire.

### National Emergency Warning System

Emergency Alert is a national telephone-based emergency warning system to warn the public in the event of major emergencies, including serious bushfires.

Using Emergency Alert, emergency warning messages may be sent by emergency services as recorded voice messages to fixed phones and as SMS text messages to mobile phones to people in affected areas.

If you receive an emergency warning about a bushfire or other emergency occuring near you on your fixed or mobile phone, act on the warning - it could save your life.

**Fires can break out suddenly andwithout warning. There may be no time for official warnings. You will need to use your own judgement.**

TAS ALERT

Tas ALERT is the Tasmanian Governments website that brings together information from emergency services and government agencies.

Information about current bushfires is available at www.fire.tas.gov.au and www.alert.tas.gov.au

Visit Tas Alert

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Tasmania Fire Service

Bushfire Risk Unit

File. AD3935/ AD3694

**Ross Murphy**

**Castellan Consulting P/L**

**By email: ross@castellan.com.au**

**Proposed Mount Wellington Cable Car**

**Draft Fire Protection Report, Revision 8, 11 May 2021**

Dear Ross
I am writing to confirm that Tasmania Fire Service accepts the alternate solution for the proposed cable car contained in the above Report which was received today.

The file provided is titled: <210511 Fire Report rev 8 - MWCC combined.pdf> and was placed in our records system with record number A 21/091980.

Included in the Report at Attachment 6.00 is the Bushfire Hazard Management Plan for the proposal. The proposed Hazard Management Areas around the Pinnacle and Base Stations are shown on the Bushfire Hazard Management Plan. The extent of the Hazard Management Areas is sufficient for bushfire management based on the alternate solution.

This information should be provided to Hobart City Council for consideration as part of the planning assessment of the proposal. Please contact me if there are any further queries about this proposal.

Yours sincerely

Mark Chladil
Bushfire Risk Unit

11 May 2021

# Geotechnical Study

Mount Wellington Cable Car

48982019001-261

Prepared for

Mount Wellington Cableway Company Pty Ltd

October 2018

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## Document Information

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# Table of Contents



# Appendices



## Tables

# Figures

# 1 Introduction

Cardno (NSW/ACT) Pty Ltd (Cardno) has been engaged by the Mount Wellington Cableway Company (MWCC) to undertake an observational geotechnical study at key locations along the alignment of the proposed Cable Car to Mount Wellington.

An assessment in accordance with AS1726 of near surface geological features (regolith) of Mount Wellington in the vicinity of the Pinnacle Zone, Tower 3 (natural zone) the Base Site, including Towers' 1 & 2 (recreation zone), and the surrounds are required to support MWCC's development application (DA) submission to council (Figure 1-1).

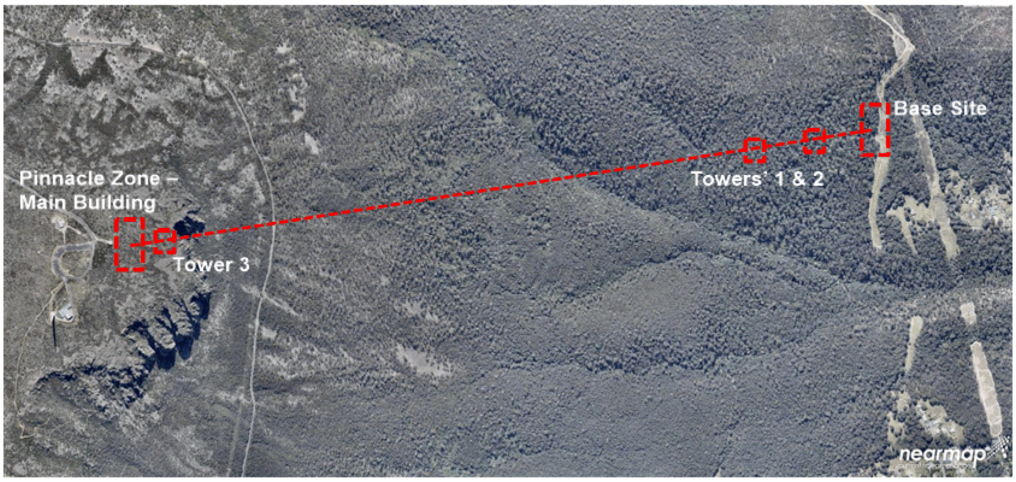



Figure 1-1 Wider investigation area with key site locations marked

## 1.1 General Site Description

The proposed cableway alignment begins at the Base Site, approximately 5km west – south west of the Hobart CBD situated on the lower foot slopes of Mount Wellington, within an existing fire trail, currently best accessed from the end of Old Farm Road. The alignment runs on a 261° bearing above the native eucalyptus forest canopy, through the Tower 1 and Tower 2 locations on the ascent up the Mount Wellington foothills. The alignment then reaches the rugged alpine escarpment, characterised by giant columnar dolerite cliffs locally known as the "Organ Pipes", whereby navigating through the bluff system, before passing through the Tower 3 location. Finally, traversing up and over the broad plateau of Dolerite outcrop and surrounding boulder fields to reach the Main Building site, situated just below the Mount Wellington summit, at the site known as the "Pinnacles".

## 1.2 Investigation Methodology

The primary source of information for the purposed of regolith assessment are geological and topographic maps, site observation and engineering geological judgement and experience. To address the requirements of the brief, Cardno undertook the following scope of services.

### 1.2.1 Desktop Study

> Collect and review available information including previous GHD reports, site photos, aerial photos, geological maps and geospatial data (e.g. LiDAR).

> Collate information in a GIS to provide the basis for interpretation, analyses and presentation of assessment.

### 1.2.2 Regolith Assessment

> Preparation of Documentation, including:
  - Health and Safety e.g. HaSEP and SWMS.
  - Site Plans and Base Maps.

> A two day site visit for inspection, including:
  - Engineering geological/geomorphological mapping of slope surfaces, soil and rock outcrop features within the vicinity of the Pinnacle Zone and Tower 3 Section 2 and wider slopes;
  - Identification of slope processes and products e.g. potential mechanisms for rock-fall

### 1.2.3 Deliverables

> A report outlining the findings of our assessment, including:
  - A site plan, presenting the outcome of the engineering geological/geomorphological mapping;
  - Illustrated sections;
  - Recommendations for conceptual management options for potential hazards, identified above; and
  - Recommendations and actions for MWCC for ongoing risk management.

Due to the site layout, and contrasting geological settings between the base site and the main building site, the reporting will be broken down into two separable portions:

1.) The Pinnacle Zone, including the Main Building Site and Tower 3 location, located atop Mount Wellington; and

2.) The Base Site and Tower 1 and 2 Locations, located on the lower foothills below Mount Wellington.

# 2 Previous Studies

MWCC provided a preliminary geotechnical investigation report for the Mount Wellington Cable Car completed by GHD in December 2016. It should be noted the current alignment differs from that of the GHD study. Specifically, the Base Site has been moved from the "Golden Gully" site to the west, closer to the Tower 2 Section 2 location, an additional Tower is included near to the Base Site, and the Tower 3 location appears to have been moved further to the west and up the plateau (Figure 1-1). As such, only those site locations relevant to the current investigation have been summarised below:

> **Pinnacle Zone and Tower 3 Section 2**
  - The published MRT Digital Geological Atlas 1:25,000 series map, Collinsvale map, indicates that the site is underlain by Jurassic dolerite as shown in Appendix B1;
  - Dolerite outcrops and large dolerite boulders encountered across the site with several 2-3m high cliffs, followed by low angled slopes below;
  - Exposed dolerite is generally fresh and very high strength with rock defects comprising six vertical joint sets associated with "columnar jointing", and a second set of sub horizontal joints spaced 0.5 to 1.0m;
  - Recent rock falls were noted at the cliff at the eastern edge of the site;
  - Review of MRT landslide hazard maps noted landslide hazard band "low" to the west, and eastern side of site "medium", being within a deep seated landslide setback and potential rock fall source area;
  - A preliminary number of geotechnical hazards are identified within the location as follows:
    - Rock fall impacting the cable car's cabins;
    - Bedrock under foundation footing becoming unstable with time; and
    - Blasting activities if required could potentially dislodge blocks of rock resulting in an unstable cliff edge.
  - Excavation likely to require rock breakers and blasting

> **Tower 2 Section 2**
  - The published MRT Digital Geological Atlas 1:25,000 series map, Hobart map indicates the site is underline a series of Permian – late Carboniferous aged series of fossiliferous glaciomarine sandstone, siltstone and limestone;
  - Low-angled slopes are located on the western area of the site, from where the ground surface slopes downwards towards the south-east at approximately 20° to 30°. The site is vegetated with a high density of mature eucalyptus trees;
  - Sandstone bedrock outcrops north of the Tower location were noted as generally slightly weathered and medium strength, with a bedding dip of 22° and strike of 20° with sub-vertical joint sets were resulting in a "blocky" rock mass;
  - In situ sandstone angular boulders as within residual soil were encountered at the proposed location;
  - No evidence of ground movement was noted, with reference made to "the smooth and straight condition of mature eucalyptus trees (approximately 100 years old) indicate that the area has been stable for at least 100 years"; and
  - Review of MRT landslide hazard maps indicate the Tower 2 location is not within any landslide hazard zone.

# 3 Pinnacle Zone & Tower 3 Geomorphology

## 3.1 Topography

The wider plateau, on which the Pinnacle Zone and Tower 3 sites are situated forms part of Mount Wellington / Kunanyi, with a defined summit point at approximately 1270m AHD marked by the "pinnacles". The plateau is largely undulating, dipping broadly down to the west, with a steeper eastern dipping section with which the investigation site is located. Situated on the eastern edge of the plateau the site steps down to the east from approximately 1240m AHD, down through a series of minor dolerite cliffs, smaller terraces and undulating boulder fields toward the main bluff system, which drops some 120m near vertically down to the foothills below.

## 3.2 Geology and Hydrogeology

The Pinnacle Zone, located at the summit of Mount Wellington, lies at the top of a thick sheet of dolerite, which intruded into the Parmeener sedimentary rocks during the Triassic Period, around 170 million years ago. Regional uplift through a period of regional block faulting events, some 150 million years ago then brought the sequence to the surface, creating the topography surrounding Hobart today (Department of Infrastructure Energy and Resources - Landslide Hazard Series, Hobart Geology Map 2 of 5, May 2006). This has influenced the erosional development of the size and form of the wider Wellington Range (Wellington Park Management Trust). The structures characteristic of the dolerite is a result of shrinkage cracks developed as the molten magma cooled, forming large vertical columns, with polygonal cross sections, commonly referred to a columnar jointing. Associated sub horizontal joints form a second set, characteristic of sheet intrusions (Figure 3-1).

Figure 3-1 Dolerite Columns Exposed at the Organ Pipes, Mount Wellington

Subsequent erosion has exposed the 350m thick horizontal sheet of dolerite influencing the morphology of the outcrops seen exposed in the area at present day. The existing eastern bluff system is thought to have been eroded back some 2 km since the escarpment was produced 10-15 million years ago.

The dolerite commonly appears a brown orange colour when exposed, largely due to oxidation of iron rich minerals contained within and is blue grey when freshly exposed, very hard and resistant to erosion.

Historically, the region is thought to have undergone up to six glacial stages within the past few million years, the most recent being the Pleistocene Ice Age (10,000 to 250,000 years ago). Although not thought to have been subject to large accumulations of ice or glaciers the dolerite were considerably eroded by the freeze thaw mechanism, as water freezes and expands within the columnar cracks repeatedly. This process resulted in the dolerite talus scattered across the site. Where soil and detritus has been washed from crevices, large block fields have been produced (Wellington Park Management Trust).

Thin localised accumulations of alpine peat soils are common interspersed within the dolerite outcrops and boulder fields, developed under saturated conditions, made up of decomposed and partially decomposed plant matter. Scattered native alpine shrubs, trees, lichen and moss take hold in between outcrops in crevices and thin alpine peat soil accumulations within depressions and void spaces.

#### 3.2.2 Groundwater and Hydrology

The site receives nearly 1000mm of rainfall, snow and ice on average per year, with large temperature fluctuations typical of an alpine environment.

The primary surface drainage of the wider plateau catchment area is overland flow to the west, originating from a broad swampy region surrounding "dead island" and then draining out via shallow gullies before joining the north-west bay river which flows broadly south west. Along the east facing edge of the plateau, where the site is located, surface water from rain, snow and ice melt appear to pond in isolated depressions to form small tarns, with surface flow likely to occur as sheet flow across the surface, within poorly defined drainage paths.

Exposed dolerite outcrops with large vertical joints provide a pathway for surface water to enter the rock mass, forming the regional groundwater table at some depth, before descending down to the lower slopes. The foothills are drained by a series of sub parallel creeks, which has incised down into the underlying sedimentary sequence before reaching the River Derwent.

Based on the available information and site observation, and depending on the prevailing weather conditions, there is likely to be two main aquifer systems across the region. A perched groundwater system may exist in the peat soils associated with plateau swamps, although is unlikely to be widespread at the investigation site due to the thin, sporadic nature of soils at this location. Secondly, a deep aquifer within the underlying dolerite, facilitated by flow through discontinuities. Recharge and subsequently flow through the dolerite is expected to be rapid where connectivity between joint sets is good.

### 3.3 Observations from Site Inspection and Mapping

An experienced Cardno Engineering Geologist undertook a site inspection on 25 September 2018 concentrated at the proposed Main Building and Tower 3 locations. An interpretative geomorphological site map referenced with site features photos can be found in **Appendix A** and an interpretive geological section is included in **Section 5**. Any additional photos from the site inspection are presented in **Appendix B.** A summary of the site walkover is included below:

> The proposed Main Building site is located on a terrace below the existing viewing shelter;

> The summit carpark ring road has been built up on sideling ground in parts using site won dolerite cobbles;

> The existing viewing shelter appears to have been founded on a typical dolerite outcrop and appears in good condition;

> The existing boardwalk posts have been founded by bolting directly onto outcrops of dolerite and appears in good condition;

> Slopes range from approximately less than 5 degrees on terraces to up to 20 degrees on intermediate slopes, with small sub vertical cliff up to 3m high;

- Abundant large outcrops of dolerite columns extend out of the ground, commonly with adjacent clusters of boulders (talus) which have been dislodged from the main rock mass through weathering (Figure 3-2);

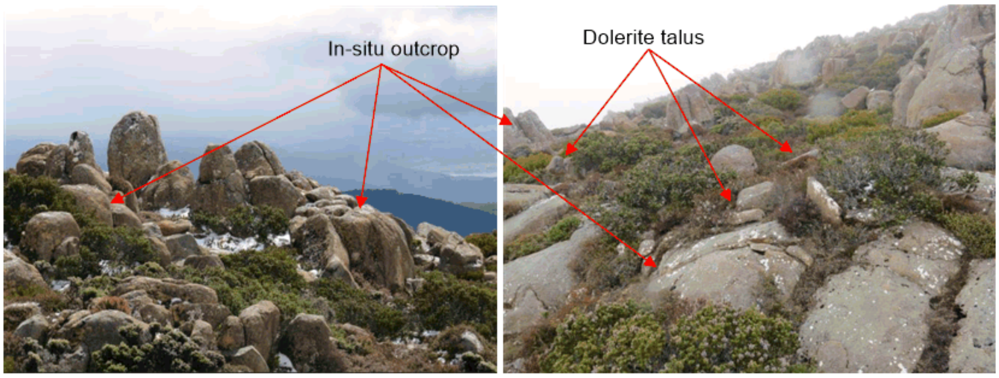



Figure 3-2 Typical Dolerite outcrops (as shown), and adjacent talus boulders

- Dolerite columns / boulders generally have polygonal cross sections, between 0.5 to 1.5m diameter and up to 4m length and display up to six vertical joints and one horizontal joint set created by cooling of the rock mass upon intrusion (Figure 3-3);
- Column / boulder shape is controlled by freeze-thaw weathering along joint surfaces with smaller “sheets” of dolerite form through weathering of larger blocks (Figure 3-3);
- Dolerite boulders continue to breakdown along joint surfaces once dislodged through impact during fall and continued freeze thaw weathering;
- Dolerite appears slightly weathered to fresh, medium to coarse grained, very dense, brown-orange to grey blue and very high strength;

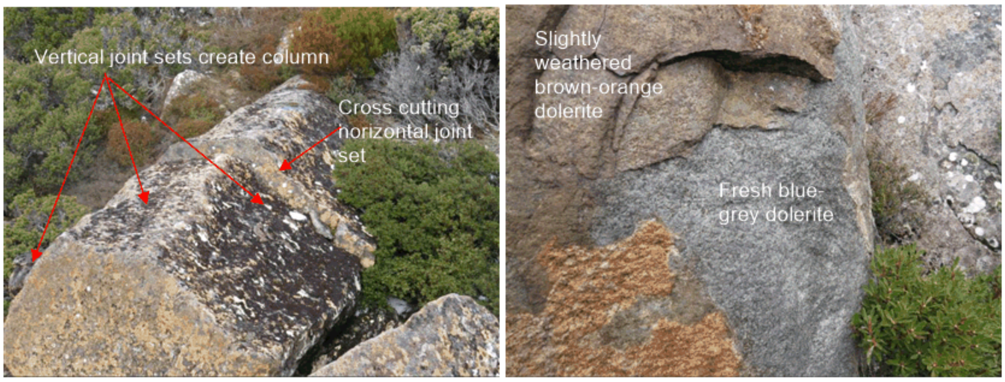



Figure 3-3 Typical dislodged dolerite column (left), in-situ dolerite (right) showing remnants of recently dislodged “sheet”, and weathered colouration (brown orange), with freshly exposed surface (blue grey)

- Weathering of dolerite has produced boulder ridges and fields (talus), pinnacle outcrops and small cliffs in an east dipping tiered arrangement (Figure 3-4);
- Thin alpine peat soils have accumulated in cracks, voids and small basins / terraces which have allowed native alpine shrubs, trees, moss and lichen to take hold(Figure 3-4);

Figure 3-4 Typical slope comprising dolerite ridges and outcrop with boulder talus accumulations (left), interspersed with thin alpine peat soils and scrubby vegetation (right)

> Minimal sign of active and recent rock fall was noted. “Boulder creep” is apparent within the boulder fields as a result of weathering processes and gradual downslope movement;

> Large boulders appear to form accumulations (talus) “near to source” following dislodgement from the in-situ outcrop (Figure 3-5);


Figure 3-5 Dolerite field (left), typical boulder talus at toe of outcrop (right)

> The crest of the main escarpment (origin pipes) is located downslope some 75 meters from the Tower 3 location.

## 3.4 Review of Landslide Hazard Maps

Review of MRT landslide hazard maps noted landslide hazards include:

> Slopes of between 10 to >40 degrees at the Main Site and Towers 3 locations;

> Neither site appears within a debris flow hazard zone, although the Tower 3 is located adjacent to a source area (escarpment);

> Neither site appears within a rock fall hazard zone;

> The Main Site is generally not within a deep seated hazard zone, whilst Tower 3 lies within a setback area (B)

> The Main Site is generally not within a landslide hazard band, whilst the Tower 3 lies within the low landslide susceptibility hazard band.

Review of these resources in light of observations from field mapping suggest rock fall at both the Main Site and Towers 3 presents a geotechnical hazard. Whilst the risk of debris flow or large deep seated slide is considered low.

# 4 Base Site and Tower 1 & 2 Geomorphology

## 4.1 Topography

The Base Site and Towers' 1 & 2 locations are situated on the foothills below Mount Wellington / Kunanyi, consisting of a broad steep slope, which runs down from the toe of the upper escarpment to meet a series of east trending ridge and valley systems. The proposed Base Site is located on an east sloping face, within a small depression, which forms the headwaters of a side tributary of the Guy Fawkes Rivulet. The slopes at the site are undulating, and generally, moderate to steeply dipping at 15 to 30 degrees. The site lies within an existing cleared fire trail, with the access road having been constructed by cut to fill on sideling ground. The fill embankment on the downslope side is relatively steep and has been scoured by erosion in parts. Up slope, to the west of the Base Site the two Tower locations are situated on a moderately sloping face, which dips at approximately 20° east, just below a terrace on the leading ridge.

## 4.2 Geology and Hydrogeology

The foothills are comprised predominantly of sedimentary sandstones and mudstones laid down during the Permian Period (230-280 million years ago). These are now visible in the foothills south and east of Mount Wellington. Creamy white to grey in colour these mudstones and sandstones are visible in horizontal or gently dipping layers, sometimes up to a metre thick. In some places, fossilised brachiopods and bryozoans may be seen. A thick accumulation of Talus and remobilised talus deposits, consisting of dolerite boulders and Lower Parmeener Supergroup quartzose sandstone overlie the Permian sediments on the upper foothills.

Whilst on the lower foothills in the vicinity of the Base Site, weathered, interbedded glaciomarine siltstone and sandstone of the Malbina Formation and Deep Bay Formations outcrop near to the surface with a thin, commonly 1-3m accumulation of finer grained colluvium soil (Department of Infrastructure Energy and Resources - Landslide Hazard Series, Hobart Geology Map 2 of 5, May 2006).

### 4.2.1 Groundwater and Hydrology

The primary drainage of the catchment area is overland flow to the east and south-east via the gullies and creeks, which have incised down into the underlying sedimentary rock sequence. At the time of walkover, the majority of the small un-named creeks were observed as dry, whilst the main creeks south and east of site contained consistent flow.

The Base Site is located within a small drainage gully in the headwaters of the Guy Fawkes Rivulet, a tributary of the Hobart Rivulet. Scour of the fill embankment on the south bank of this gully has led to the development of small steeply incised erosion gully (Figure 4-1). Recent upgrade to the road drainage through the installation of a spoon drain on the upslope side of the road appears to be cutting of some of the surface flow and directing it down the road to the south. Minor seepage was noted within the spoon drain, whilst the remaining drainage features were observed dry at the time of inspection,

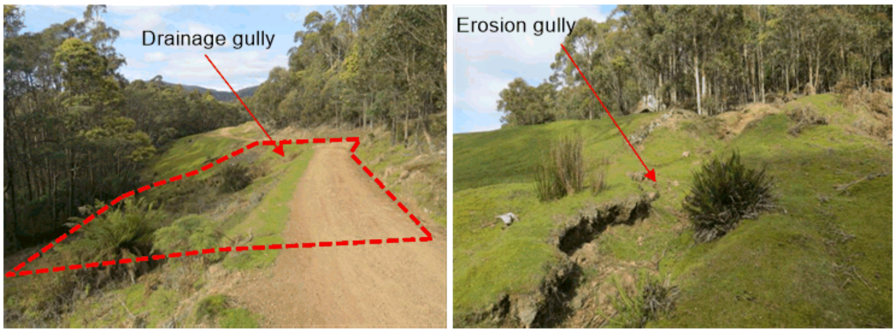


Figure 4-1 Base Site location in drainage gully (right), erosion gully along south bank of Base Site (right)

The local topography indicates that groundwater flows in a generally east to south-east direction toward the Guy Fawkes / Hobart Rivulet(s) and ultimately flows to River Derwent approximately 5.3 km to the east.

Based on the available information and site observation, and depending on the prevailing weather conditions, there is likely to be two main aquifer systems across the site. A perched groundwater system is likely to exist in the surficial colluvium soils associated with the drainage of the foothills, as indicated by seepage observed along the toe of the road cutting. A second deep aquifer is also likely to be present within the underlying rock, likely to be particularly evident in any fractured zones.

## 4.3 Observations from Site Inspection and Mapping

An experienced Cardno Engineering Geologist undertook a site inspection on 26 September 2018 concentrated at the proposed Base Site building and Tower 1 & 2 locations. An interpretative geomorphological site map referenced with site features photos can be found in **Appendix A** and an interpretive geological section is included in **Appendix B**. Any additional photos from the site inspection are presented in **Appendix C.** A summary of the site walkover is included below:

> The proposed Base Site is located within an existing cleared fire trail on a moderate to steep, slightly undulating east sloping face;

> The site is covered with low grass cover, with interspersed tussock and ferns, bordered by establish native eucalyptus forest;

> The existing road has been constructed by cut to fill on sidelong ground;

> Cut batters are steep, at 60-70 degrees and 1-2m high and show signs of scour and slumping;

> Fill batters are steep at approximately 45 degrees and vegetated;

> The site is located within a small drainage gully, although no surface flow or seepage was observed within at the time of inspection;

> A erosion gully has developed on the south bank;

> Soil exposed within cuts comprised Gravelly Clayey SAND and Clayey Sandy GRAVEL, pale cream, brown and orange, gravel fine to coarse grained, sub angular to angular, with sandstone cobbles and boulders up to 600mm, sub angular and medium dense to dense, weakly cemented in part (Figure 4-2);

> Bedrock exposed within the slope above the site comprised high to extremely weathered quartz-lithic sandstone, medium grained, pale grey and yellow, with closely spaced joints (10-20mm), and was of very low strength (Figure 4-3);

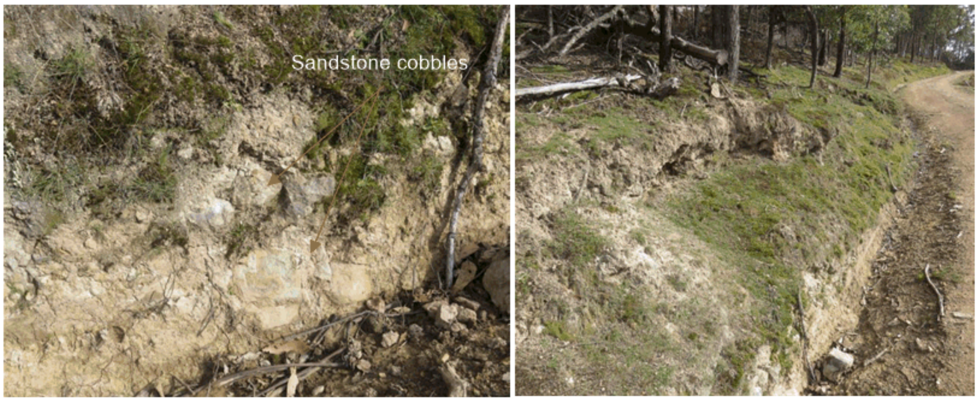



Figure 4-2 Colluvium soil profile exposed in cutting at upslope side of Base Site

Figure 4-3 Extremely weathered sandstone outcrop up-slope from Base Site

- Historic slope movement was noted just to the south of the site, above the existing road (Figure 4-4, 4-5);
- The feature was identified due to a hummocky accumulation of earth which appears to have slumped below an upper sub vertical scarp, up to 2m high and up to 10m wide;
- A clearing in the trees was noted below the scarp, whilst other trees within the lower hummocky material displayed bent trunks indicating downslope creep;
- Seepage was observed at the toe of the potential slip accumulating within the spoon drain along the road;
- Slip may have occurred within the colluvium profile / along the top of the weathered bedrock exposed adjacent to the toe;


Figure 4-4 Potential landslip up slope side of road, south of Base Site


Figure 4-5 Potential landslip head scarp

> Towers' 1 and 2 are located up slope from the Base Site to the west, within dense eucalyptus forest on a 15 – 20 degree east facing slope (Figure 4-6);


Figure 4-6 Approximate Tower 1 (left) and 2 (right) locations

> Tower 2 is located just below relatively flat plateau in the leading ridge;
> Scattered sandstone boulders (talus) generally between 60 – 200mm diameter, up to 600mm;
> Boulders are interpreted to be weathering out of the slope and slowly travelling downslope;
> Minor creep may be occurring within near surface soil profile indicated by bent tree trunks;

- Soil profile interpreted to consist of thin organic top soil overlying 1 – 2m of colluvium, similar to that exposed at the Base Site;
- Underlying bedrock expected to comprise highly to extremely weathered blocky sandstone and siltstone, dipping shallowly to the north;
- Surface flow downslope appears to occur through sheet wash during heavy rain as no clearly defined drainage paths.

## 4.4 Review of Landslide Hazard Maps

Review of MRT landslide hazard maps noted landslide hazards include:

- Slopes of between 10 to 30 degrees at the Base Site and Towers 1 & 2 locations;
- The Base Site appears to lie within/adjacent to a potential source / run out area for debris flow, the Tower sites are not within a debris flow hazard zone;
- The Base Site appears to lie within/adjacent to a potential source area for rock fall, the Tower sites are not within a rock fall hazard zone;
- Neither site appears within a deep seated landslide hazard zone;
- The Base Site is within adjacent to an area marked as low to moderate landslide susceptibility, for example, it may have known landslide features or is within a landslide susceptibility zones.

Review of these resources in light of observations from field mapping suggest the risk of rock fall at both the Base Site and Towers 1 & 2 is considered low. The risk of a large deep seated slide is considered low. Debris and/or shallow slides are also considered to present a low potential hazard.

# 5 Geotechnical Model and Analysis

For the purpose of this assessment, a geotechnical model has been developed for each location based on the current understanding of the regional geology and from site observations. An interpretive cross section has been developed for each site to assist with hazard identification, predicting future behaviour, impact on the proposed development and constructability considerations.

## 5.1 Pinnacle Zone to Tower 3

The Main Building site and Tower 3 location is best described as a rocky alpine plateau whereby hard, erosion, resistant columnar dolerite outcrops dictate the geomorphology of the site and surrounds. The dolerite rock mass which outcrops across the plateau displays a pervasive columnar habit, controlled by vertical joint sets cross cut by horizontal joints, formed as a result of shrinkage during cooling. Freeze thaw weathering provides the primary mechanism for dislodgment of large polygonal dolerite boulders. Talus ridges and boulder/scree fields form in amongst in-situ outcrops, as a result of progressive dislodgment and accumulation of boulders. Understanding of these mechanisms allows for the identification of the geotechnical hazards, which include:

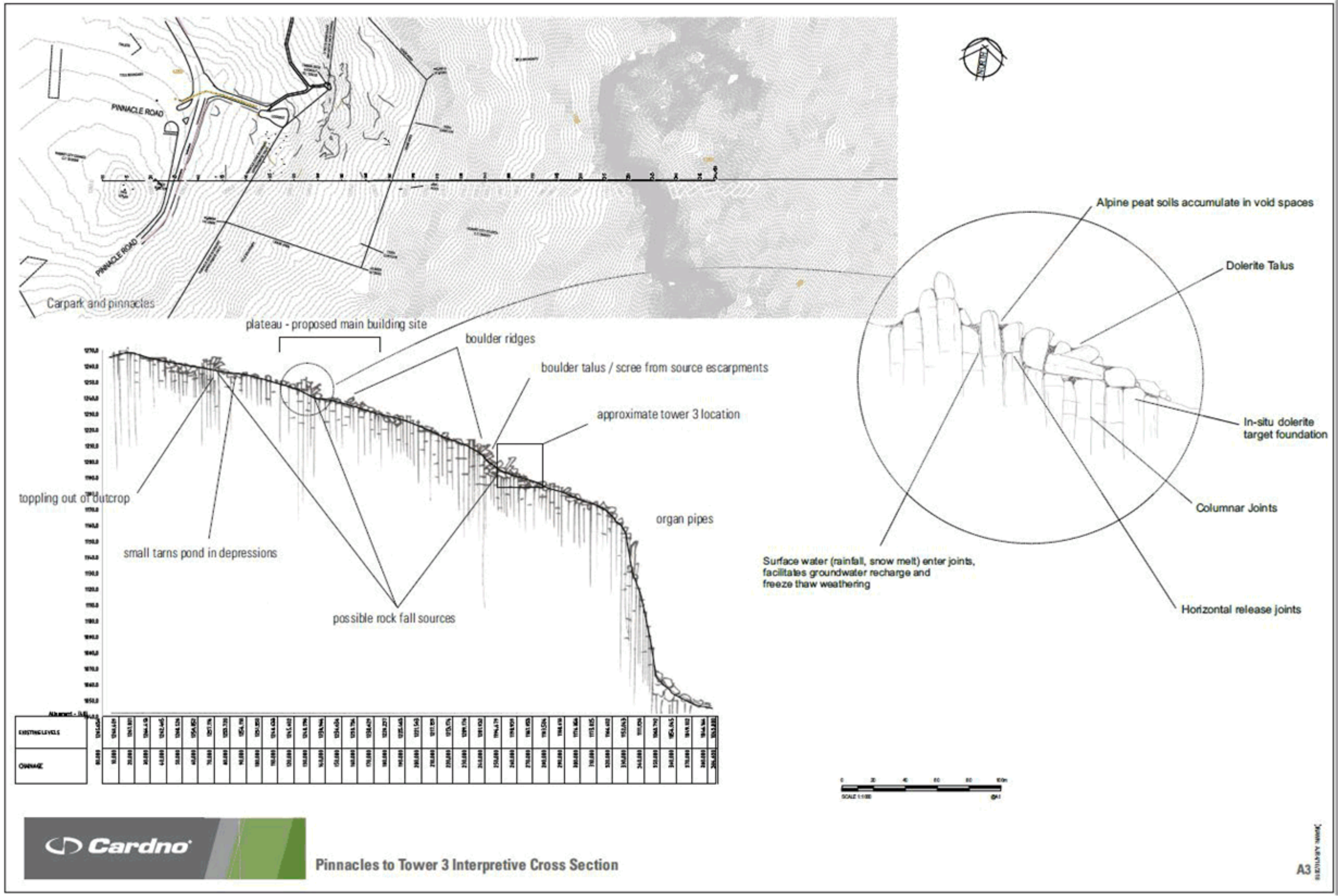
> Topple of large dolerite boulders from outcrops, facilitated by pervasive "open" vertical discontinuities with horizontal release joints;

> Slide of smaller dolerite slabs due to weathering;

> Creep of dolerite boulder talus due to weathering and build-up of material;

> Debris slide / large rock fall due to topple / undermining of cliffs.

The cross section provided overleaf presents an interpretive representation of these failure mechanisms.


PINNACLE ROAD
Carpark and pinnacles
plateau - proposed main building site
boulder ridges
boulder talus / scree from source escarpments
approximate tower 3 location
toppling out of outcrop
small tarns pond in depressions
organ pipes
possible rock fall sources
Alpine peat soils accumulate in void spaces
Dolerite Talus
In-situ dolerite target foundation
Columnar Joints
Surface water (rainfall, snow melt) enter joints, facilitates groundwater recharge and freeze thaw weathering
Horizontal release joints
EXISTING LEVELS
CHAINAGE
Cardno
Pinnacles to Tower 3 Interpretive Cross Section
A3

## 5.2 Base Site to Tower 1 & 2

Base Site and Tower 1 & 2 location are on the lower foothills of Mt Wellington, comprised of weathered, interbedded siltstone and sandstone. A relatively thin 1m to 3m accumulation of finer grained colluvium soil overlies the bedrock across the site. There is evidence of previous slope movement near to the site, comprising shallow soil creep and landslip Understanding of these mechanisms allows for the identification of the geotechnical hazards, which include:

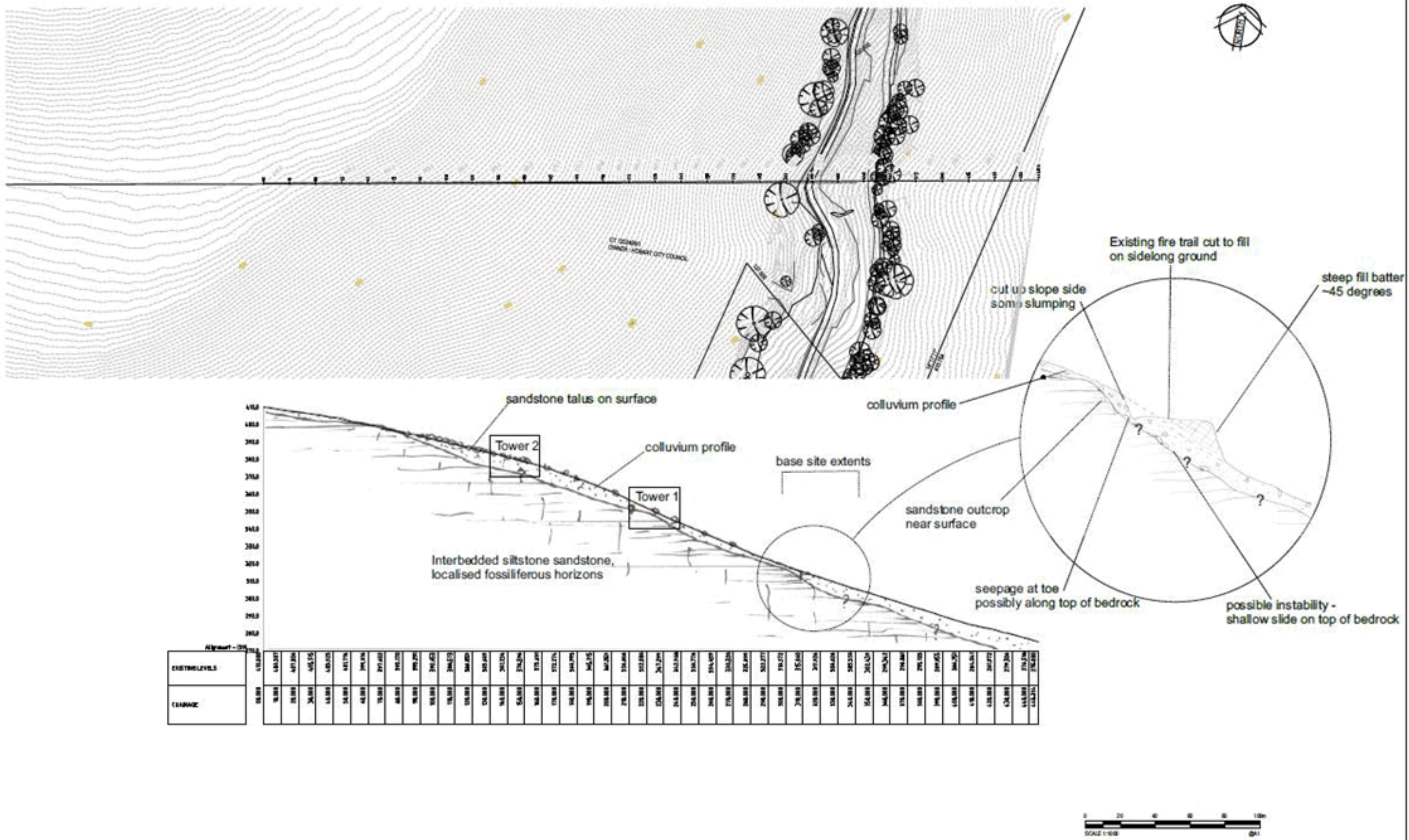
> Soil creep or shallow earth slide within natural soil profile.

> Flows or slides within fill profile.

> Deep-seated slide (rock and earth).

> Slide or topple (detachment of boulder) within excavations or cut batters.

The cross section provided overleaf presents an interpretive representation of these failure mechanisms.

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Base Site to Tower 1 & 2 Interpretive Cross Section

A3

# 6 Landslide Risk Assessment

The risk assessment procedure adopted herein is based on the AGS Journal and News of the Australian Geomechanics Society Volume 42 No 1 March 2007 *Practice Note Guidelines for Landslide Risk Management* (AGS 2007c) [2], AS/NZS ISO 31000:2009 *Risk Management – Principles and guidelines* [3] and *The RTA Guide to Slope Risk Analysis* [4]

## 6.1 Assessment Criteria

The AGS guidelines, 2007 [5], outline an approach that includes a qualitative risk assessment for risk to property and a 'semi-quantitative' assessment for risk to persons. A detailed semi-quantitative assessment for risk to persons from a landslide event has not been conducted as the control measures during design and construction that reduce the risk to property to 'low' will result in an environment with a low risk to persons from landslides.

The conditions that may result in nuisance slumps (minor slumps) or erosion are not included in this assessment.

As presented in AGS 2007c [5] the qualitative level of risk to property resulting from a landslide event is based on a measure of the likelihood of occurrence (Table 6-1) combined with the consequence to property (Table 6-2).

Table 6-1 Qualitative Measures of Likelihood

| Level | Descriptor | Description | Approximate Annual Probability |
|---|---|---|---|
| A | Almost certain | The event is expected to occur over the design life | $10^{-1}$ |
| B | Likely | The event will probably occur under adverse conditions over the design life | $10^{-2}$ |
| C | Possible | The event could occur under adverse conditions over the design life | $10^{-3}$ |
| D | Unlikely | The event might occur under very adverse circumstances over the design life | $10^{-4}$ |
| E | Rare | The event is conceivable but only under exceptional circumstances over the design life | $10^{-5}$ |
| F | Barely credible | The event is inconceivable or fanciful over the design life | $10^{-6}$ |

Table 6-2 Qualitative Measures of Consequences to Property

| Level | Descriptor | Description |
|---|---|---|
| 1 | Catastrophic | Structure(s) completely destroyed and/or large scale damage requiring major engineering works for stabilisation. Could cause at least one adjacent property major consequence damage. |
| 2 | Major | Extensive damage to most of structure, and/or extending beyond site boundaries requiring significant stabilisation works. Could cause at least one adjacent property medium consequence damage. |
| 3 | Medium | Moderate damage to some of structure, and/or significant part of site requiring large stabilisation works. Could cause at least one adjacent property minor consequence damage. |
| 4 | Minor | Limited damage to part of structure, and/or part of site requiring reinstatement stabilisation works. |
| 5 | Insignificant | Little damage. |

Likelihood and consequence are combined in the matrix shown in Table 6-3, resulting in risk level that can range from very low (VL) to very high (VH).

Table 6-3 Qualitative Risk Analysis Matrix

| Likelihood | | Consequence to Property | | | | |
|---|---|---|---|---|---|---|
| | | Catastrophic | Major | Medium | Minor | Insignificant |
| Almost Certain | $10^{-1}$ | VH | VH | VH | H | M or L |
| Likely | $10^{-2}$ | VH | VH | H | M | L |
| Possible | $10^{-3}$ | VH | H | M | M | L |
| Unlikely | $10^{-4}$ | H | M | L | L | VL |
| Rare | $10^{-5}$ | M | L | L | VL | VL |
| Barely Credible | $10^{-6}$ | L | VL | VL | VL | VL |

The standard definition of the risk levels from AGS 2007 [5] are presented in Table 6-4.

Table 6-4 Risk Level Implications

| Risk Level | | Example Implications |
|---|---|---|
| VH | Very High | Unacceptable without treatment. Extensive detailed investigation and research, planning and implementation of treatment options essential to reduce risk to Low; may be too expensive and not practical. Work will likely cost more than the value of the property |
| H | High | Unacceptable without treatment. Detailed investigation, planning and implementation of treatment options required to reduce risk to Low. Work would cost a substantial sum in relation to the value of the property. |
| M | Moderate | May be tolerated in certain circumstances (subject to regulator's approval) but requires investigation, planning and implementation of treatment options to reduce risk to Low. |
| L | Low | Usually acceptable to regulators. Where treatment has been required to reduce the risk to this level, ongoing maintenance is required. |
| VL | Very Low | Acceptable. Manage by normal slope maintenance procedures. |

## 6.2 Hazard Identification and Assessment Process

A number of landslide hazards as defined in AGS 2007 [5] have been considered for a landslide risk assessment based on the potential site disturbances from development at each site. Details and the interpreted likelihood of these hazards impacting the proposed development are outlined in the following sections.

## 6.3 Qualitative Assessment for Risk to Property at Pinnacle Zone to Tower 3

For the purposes of this study, elements at risk are considered to be the existing adjacent infrastructure and potential new development within the site, the Tower and foundation and the cableway as it crosses the escarpment. The qualitative risk assessment considers the probability and consequences of material being displaced and the probability that the displaced material, once mobilised, will impact or undermine the element at risk. The qualitative level of risk to property resulting from a landslide event is based on a measure of the likelihood of occurrence combined with the consequence to property.

- Boulder creep within talus profile
- Debris flow within talus profile
- Slide or topple (detachment of boulder) from small cliffs / outcrops
- Deep-seated slide (mainly rock)

Table 6-5 summarises the qualitative assessment of slope instability risk prior to any remedial works or engineering controls.

Table 6-5 Results of Qualitative Assessment of Risk to Property

| Potential Hazard | Likelihood | Consequence | Qualitative Risk |
|---|---|---|---|
| Boulder Creep | Likely | Insignificant | Low |
| Debris flow within talus | Rare | Major | Low |
| Slide or topple of boulder | Possible | Medium | Moderate |
| Deep-seated slide | Barely Credible | Major | Very Low |

Based on the Qualitative Risk Assessment conducted, the geotechnical constraint to the development arising from a landslide hazard has been identified as very low to moderate. It is envisaged that the landslide hazard may be further mitigated to no more than **low** by following the recommendations outlined within section 7.1.

## 6.4 Qualitative Assessment for Risk to Property at Base Site to Towers' 1 & 2

For the purposes of this study, elements at risk are considered to be the proposed Base Site, car park as and Towers' 1 & 2. The qualitative risk assessment considers the probability and consequences of material being displaced and the probability that the displaced material, once mobilised, will impact or undermine the element at risk. The qualitative level of risk to property resulting from a landslide event is based on a measure of the likelihood of occurrence combined with the consequence to property.

> Soil creep or shallow earth slide within natural soil profile;
> Small rotational slide;
> Deep-seated slide (rock and earth);
> Slide or topple (detachment of boulder) within excavations or cut batters.

Table 6-6 summarises the qualitative assessment of slope instability risk prior to any remedial works or engineering controls.

Table 6-6 Results of Qualitative Assessment of Risk to Property

| Potential Hazard | Likelihood | Consequence | Qualitative Risk |
|---|---|---|---|
| Soil creep or shallow earth slide | Likely | Insignificant | Low |
| Small rotational slide | Possible | Insignificant | Low |
| Slide or topple of boulder | Unlikely | Minor | Low |
| Deep-seated slide | Unlikely | Medium | Low |

Based on the Qualitative Risk Assessment conducted, the geotechnical constraint to the development arising from a landslide hazard has been identified as low to moderate. It is envisaged that the landslide hazard may be further mitigated to no more than **low** by following the recommendations outlined within section 7.2.

# 7 Recommendations

The following conclusions are provided given the available information, site walk over observations and our experience. Intrusive site investigation has not been undertaken at this stage of the development therefore the conclusions and recommendations in this report are preliminary in nature.

## 7.1 Pinnacle Zone to Tower 3

### 7.1.1 Construction Considerations

> The sub-surface profile is anticipated to comprise of fresh and very high strength dolerite bedrock. On the basis of the topography and site observations it is considered unlikely that groundwater will be encountered;
> Any excavation required into bedrock will likely require rock blasting or rock breaking;
> There was no major slope instabilities observed during the site inspection and slope stability is not expected to be of major concern to the development, given that appropriate engineering practices and designs are employed (refer to section 7.1.2);
> Minor rock falls as a result of disturbance during construction is possible and should be managed appropriately;
> An intrusive geotechnical investigation should be conducted in the proceeding stages of the development to confirm the interpretations made from this report and inform detailed design

### 7.1.2 Foundation Conditions

The Main Building and Tower 3 locations are located in low to moderately sloping and terraced terrain, with isolated steep sections. The sub-surface profile is anticipated to comprise of sporadic dolerite talus (boulders) up to 4m thick, with individual boulders up to 4m in length, overlying fresh and very high strength dolerite bedrock. The bedrock surface profile is expected to be highly variable due to the nature of weathering and as such, the foundation design should take this into consideration. The majority of the Main Building location is understood to require cut to fill into the existing dolerite plateau / talus. Removal / scaling of boulders within the design footprint is recommended, with the foundations of structures placed directly on in-situ, very high strength rock (dolerite).

It is understood that the construction of Tower 3 is required to be founded onto bedrock. Removal / scaling of boulders within the design footprint is recommended to remove any loose blocks, with the foundations of Towers' to be placed directly on in-situ, very high strength rock (dolerite) and anchored accordingly.

It should be noted that rock fall presents a possible geotechnical hazard to the development, during and post construction. Consideration of uncontrolled movement of boulders during construction is recommended, and any loose / hazardous boulders should be re-located appropriately. Work should not be undertaken below any unstable blocks, nor should construction activity undermine any boulders or outcrop. Rock fall barriers placed up slope of structures may be required to eliminate the risk of any boulder impacting the structure(s). Consideration of loose boulders above paths should be made to removes any potential hazard.

Detailed intrusive investigation is recommended in order to provide the geotechnical parameters to enable detailed design of the Main Building footings and foundation / rock anchors for the Tower.

## 7.2 Base Site to Tower 1 & 2

### 7.2.1 Construction Considerations

> During the wetter months of the year, particularly during winter and spring when evaporation rates are low, it is anticipated that it may be difficult to conduct earthworks at the site due to the exposure of shallow clayey soils. Where possible all earthworks should be scheduled during the drier months of the year;
> All near surface soils observed are expected to be excavated using conventional earthmoving equipment such as bucket type excavators. Moderate to hard ripping may be expected within the highly weathered rock. Hydraulic rock breakers or advanced excavation methods are likely to be required to break up higher strength rock for deeper excavation;

- The crest, soil face and toe areas of all slopes and retaining walls, the foundations to all footings and the subgrades to all pavements should be kept well drained at all times, to control the potential for slope instability and weakening and/or swelling of the surficial soils
- Previous slope movement in the vicinity of site was observed during the site inspection and detailed design of the structures will need to take such factors into consideration. Assuming that appropriate engineering practices and designs are employed, then slope stability is not expected to be of major concern to the development (refer to section 7.2.2 for further details);
- Specific attention will be required for any construction within the existing drainage paths to ensure adequate foundation preparation and long term performance is achieved and must take into account natural progression of groundwater into the creek(s);
- Sufficient sub-surface (e.g. coarse gravel drainage blanket) and surface drainage will need to be incorporated into designs within and adjacent to existing drainage channels;
- An intrusive geotechnical investigation should be conducted in the proceeding stages of the development to confirm the interpretations made from this report and inform detailed design.

#### 7.2.2 Foundation Conditions

The Base Site and Tower 1 and 2 locations are located in low to moderately sloping terrain. The sub-surface profile is anticipated to comprise of colluvium soil underlain by extremely weathered to highly weathered, interbedded sandstone and siltstone of low to medium strength.

There is some evidence of previous slope movement near to the site, comprising shallow soil creep / sliding. Given the shallow thickness of the colluvium and depth of movement, this type of hazard is expected to be readily mitigated by using standard footing design practice. The design solution should consider anchored gravity footings founded well into stable, competent bedrock.

It is understood that the construction of the Towers' is required to be founded into bedrock. As such, the foundation to the Towers' should be placed below the colluvium soil profile within competent sandstone / siltstone at depth. An intrusive investigation is recommended to determine the depth to suitable foundation horizons and provide parameters as part of the detailed design stage of the project.

### 7.3 Preliminary Lot Classification

**Pinnacle Zone and Tower 3 site**

Based on Cardno's experience with similar investigations and our understanding of the site geology, a preliminary site classification of CLASS **A** *('Most sand and rock sites with little or no ground movement from moisture changes'*) is achievable for the Pinnacle Zone and Tower 3 site.

Given the outcrop of high strength dolerite rock; the LOW to MODERATE risk of land instability and the anticipated ground preparation works required for the proposed structure, very little movement would be anticipated to occur, if any. Depending on the locations of the final design, some features of the proposed development may encounter some very shallow soils, as such free swell $Y_s$ values would generally be required in accordance with AS2870-2011 should the footprint of the structures not encounter rock. However, at worst a characteristic surface movement of less than 20mm would be expected due to the lack of reactive soils observed across the site, which is equivalent to a site classification of **S** *('Slightly reactive clay sites, which may experience only slight ground movement from moisture changes'*).

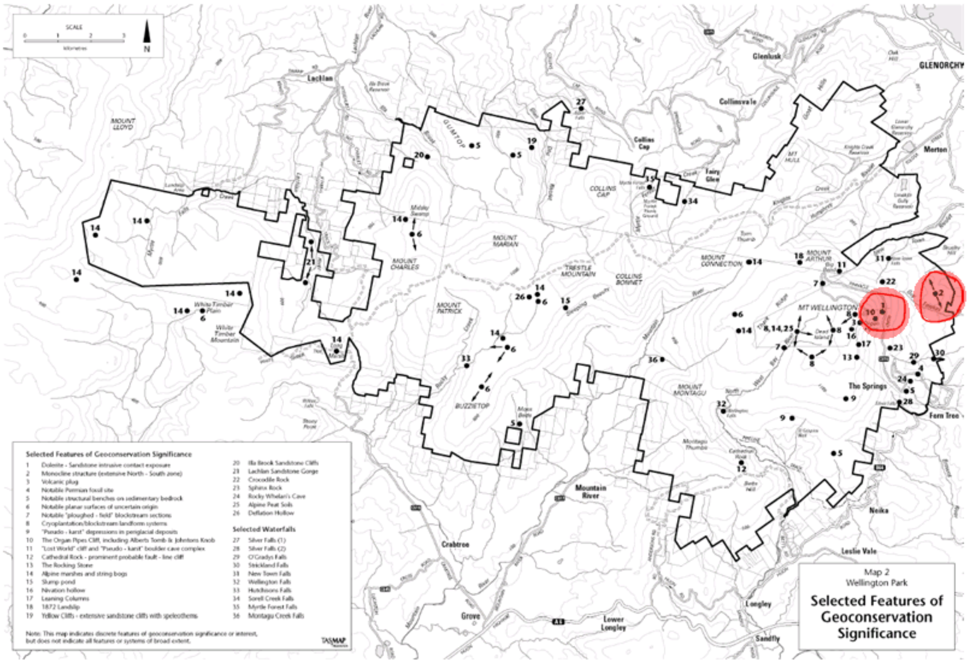
**The Base Site and Tower 1 & 2**

For the Base Site and Tower 1 & 2 locations in their current condition, including shallow rock and potential LOW to MODERATE risk of land instability; a surface movement of up to 400mm might be anticipated due to the moderately reactive soils observed across the site, which would be equivalent to a site classification of **M**. However, typical footings for cable car towers are non-standard and robust, therefore consequent levels of performance are not directly covered by AS2870-2011. As such, specific design parameters, can be sought during the detailed design phase to confirm performance.

## 7.4 Geoconservation Values

There are a number of features in the vicinity of the proposed development that are listed on the Tasmanian Geoconservation Database (Figure 7-1).

Figure 7-1 Features of Geoconservation Significance in the vicinity of the proposed development – highlighted in Red.




### Geoconservation sites within 1000 metres

| Id | Name | Statement of Significance | Geographical Significance | Status |
|---|---|---|---|---|
| 2217 | Organ Pipes Columnar Jointing | Notable example of type. | Sub-Region | Listed |
| 2227 | Wellington Range Periglacial Terrain | The most extensive and well-developed high altitude periglacial terrain in Tasmania without glacial influence. | Region | Listed |

The features of geoconservation significance termed ‘Organ Pipes Columnar Jointing’ and ‘Wellington Range Periglacial Terrain’ are broad/regional features – not specific or singular artefacts. These features are site wide (regional / sub-regional) that characterise almost the entire summit of Mt Wellington. These features are classified in the database as ‘listed’.

The above listed features are vast and are solid competent rock. Whilst the proposed development would interact with the rock (similarly to the existing tower, road and viewing infrastructure at the summit that are founded on the same listed features); the impact of the development would unlikely adversely affect these features. Moreover, it would allow enhanced viewing of the features and give the wider community visual access to Geoconservation in a controlled manner.

# 8 Closure

We appreciate the opportunity to work collaboratively with you on this project. Our team looks forward to bringing our high level of expertise to deliver successful outcomes in your future projects.

Your attention is drawn to the document titled *"Important Information about this Geotechnical Report"*, found in **Appendix C**. This document is intended to clarify to the reader what the realistic expectations of this report should be, and what is the correct use of the document. Misinterpretation of geotechnical information presents significant risk to projects: The document includes a discussion on general limitations of geotechnical services, which by nature, are based extensively on opinion and judgement.

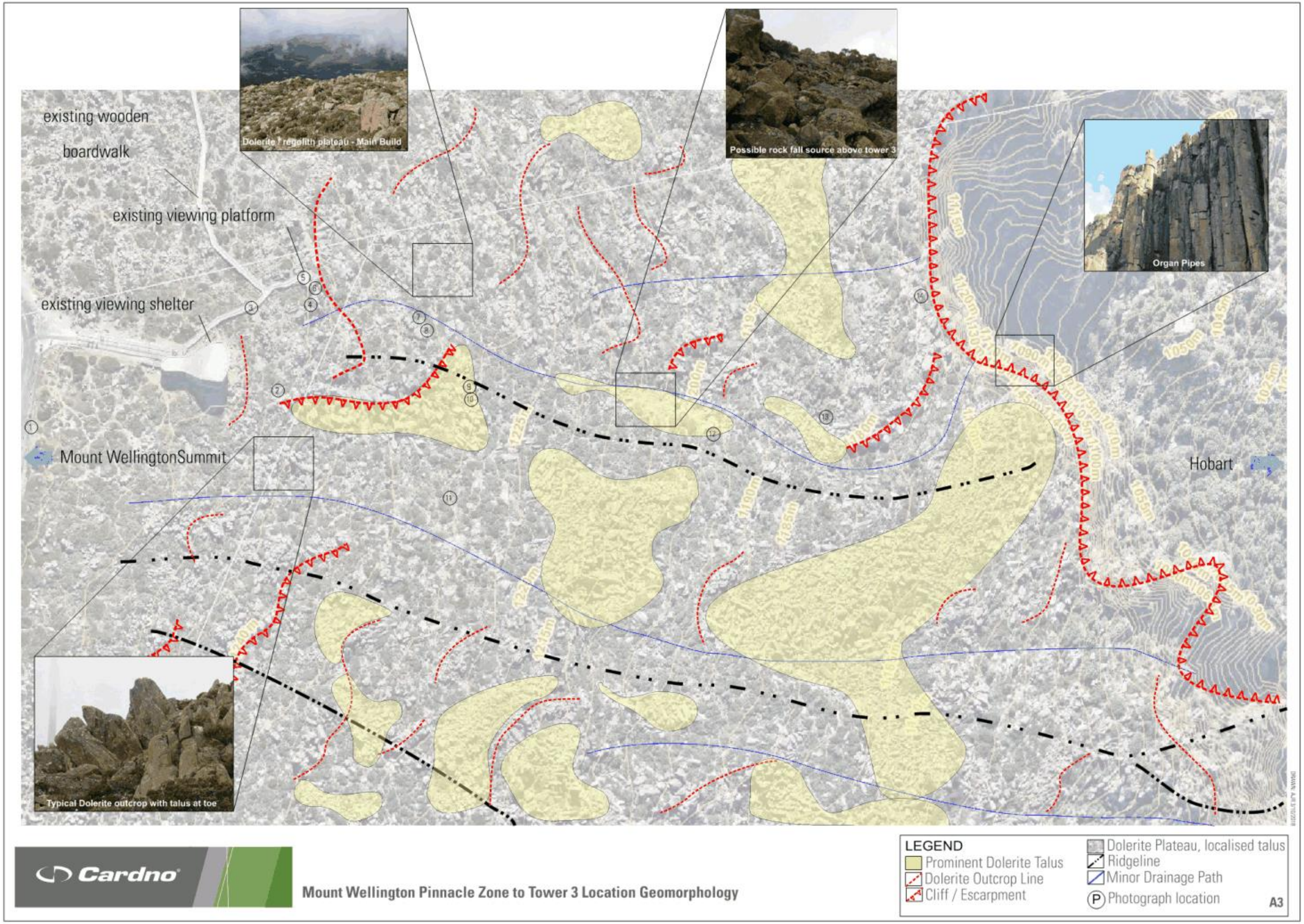
The statements included in this document are not intended to be exculpatory clauses or to reduce the general responsibility accepted by Cardno, but rather to identify where Cardno and our Client's responsibilities lie. The statements ensure that all parties that may rely on the report are aware of their respective responsibilities.

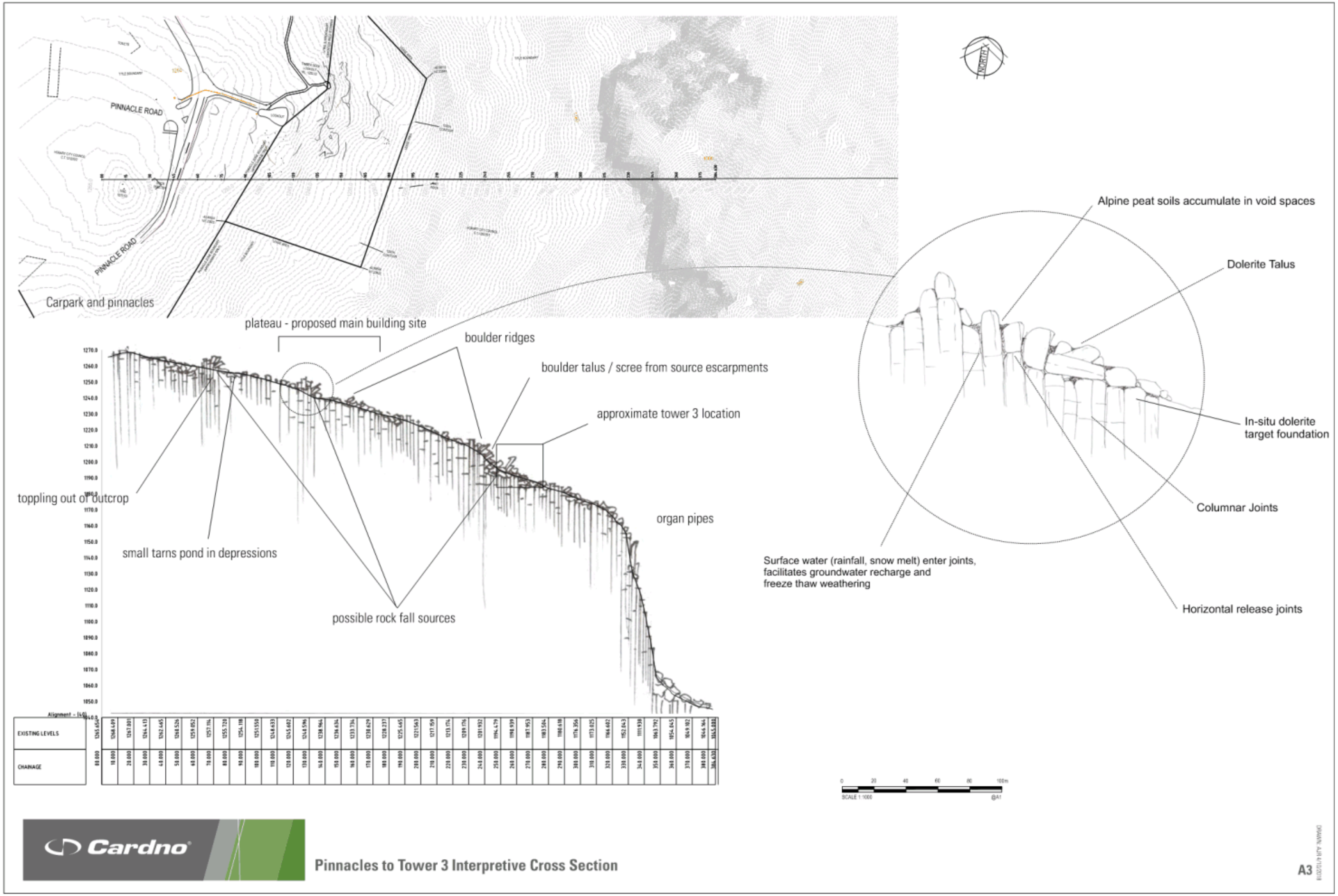
For further enquiries, please do not hesitate to contact Cardno on the information supplied.

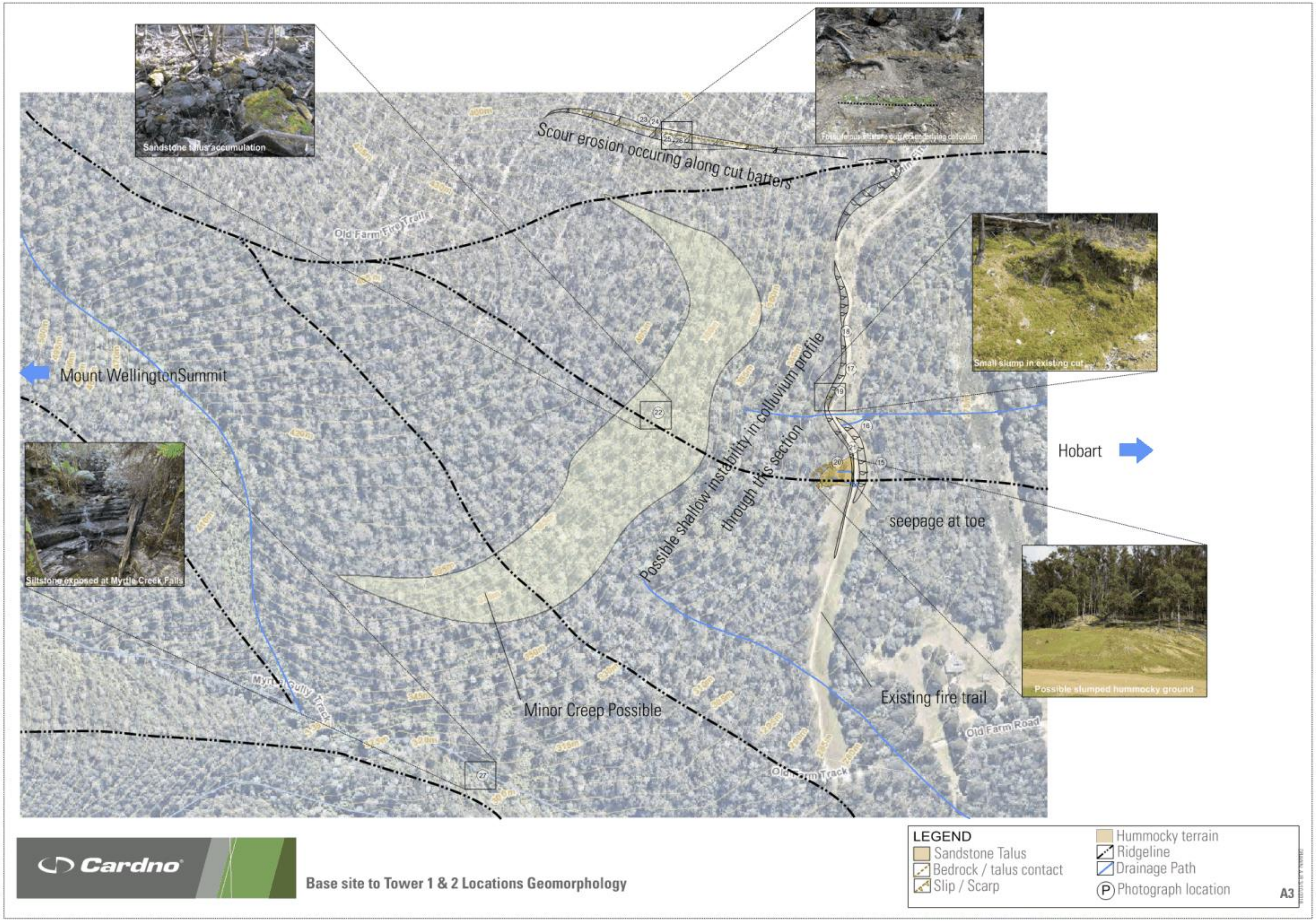
# APPENDIX A

## SITE FEATURES LOCATION MAP

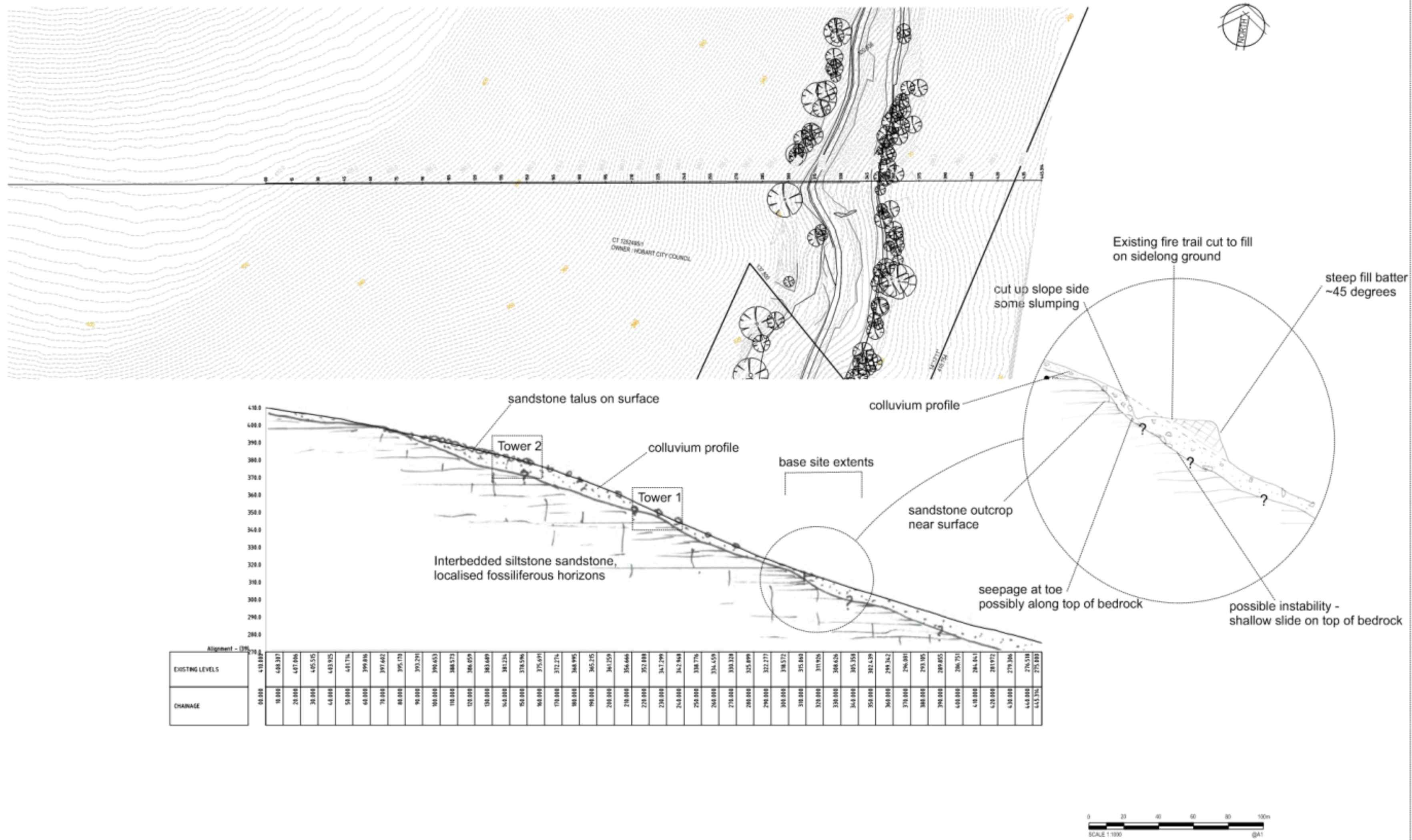
Cardno


existing wooden
boardwalk
existing viewing platform
existing viewing shelter
Mount WellingtonSummit
Hobart
Dolerite / regolith plateau - Main Build
Possible rock fall source above tower 3
Organ Pipes
Typical Dolerite outcrop with talus at toe
LEGEND
Prominent Dolerite Talus
Dolerite Outcrop Line
Cliff / Escarpment
Dolerite Plateau, localised talus
Ridgeline
Minor Drainage Path
P Photograph location
A3
Cardno
Mount Wellington Pinnacle Zone to Tower 3 Location Geomorphology


PINNACLE ROAD
PINNACLE ROAD
Carpark and pinnacles
plateau - proposed main building site
boulder ridges
boulder talus / scree from source escarpments
approximate tower 3 location
toppling out of outcrop
small tarns pond in depressions
organ pipes
possible rock fall sources
EXISTING LEVELS
CHAINAGE
Alpine peat soils accumulate in void spaces
Dolerite Talus
In-situ dolerite target foundation
Columnar Joints
Surface water (rainfall, snow melt) enter joints, facilitates groundwater recharge and freeze thaw weathering
Horizontal release joints
Cardno
Pinnacles to Tower 3 Interpretive Cross Section
A3




Base site to Tower 1 & 2 Locations Geomorphology




Cardno

Base Site to Tower 1 & 2 Interpretive Cross Section

A3

# APPENDIX B

## SITE FEATURES PHOTO REPORT

Photo 1 - Existing Ring Road at summit of Mount Wellington

Photo 2 -Typical Dolerite Outcrop at Pinnacle Zone

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| | | | |
|---|---|---|---|
| Client Mount Wellington Cableway Company Pty Ltd | | | |
| Project: Mount Wellington Cable Car | | | |
| | Project No.: | 48982019001261 | Size AA |
| Title Photo 1-2 | | | |

Photo 3 - Existing viewing shelter founded on Dolerite outcrop

Photo 4 -- Proposed main building site on plateau below summit looking east over Hobart city

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| Project | Mount Wellington Cable Car | | |
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| Title | Photo 3-4 | | |

Photo 5 - Slope above Main building site looking north, including existing pathway

Photo 6 - Viewing platform construction on dolerite outcrop

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| Title | Photo 5-6 | | |

Photo 7 - Example of weathering of Dolerite "slab"

Photo 8 - Typical Dolerite outcrop above main building site

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| Project | Mount Wellington Cable Car | Project No: 48982019001261 | Size A4 |
| Title | Photo 7-8 | | |

Photo 9 - Dolerite Talus at main building site looking south

Photo 10 - Breakdown of Dolerite post dislodgement from outcrop

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| | | Project No: 48982019001261 | Size A4 |
| Title | Photo 9-10 | | |

Photo 11 - Dome shaped Dolerite outcrop at surface

Photo 12 - Tower 3 location (center) looking east down slope to escarpment

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| Client | Mount Wellington Cableway Company Pty Ltd |
| Project | Mount Wellington Cable Car |
| Title | Photo 11 - 12 |
| Project No: | 48982019001261 |
| Size | A4 |

Photo 13 - Tower 3 location looking back up slope to talus field

Photo 14 - Organ pipes exposed at the escarpment

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| Project | Mount Wellington Cable Car | | | |
| | | Project No: 48982019001261 | Size | A4 |
| Title | Photo 13-14 | | | |

Photo 15 - Possible landslip south of Base Site, taken looking west

Photo 16 - Fill embankment along existing fire trail taken looking south

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| Project | Mount Wellington Cable Car |
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| Size | A4 |
| Title | Photo 15-16 |

Photo 17 - Base Site extents looking south

Photo 18 - Slumped cut in existing fire trail taken looking north

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| Project | Mount Wellington Cable Car | Project No: 48982019001261 | Size A4 |
| Title | Photo 17-18 | | |

Photo 19 - Sandstone boulder exposed in colluvium in trail cutting

Photo 20 - Colluvium exposed in scarp up slope from base site

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| Project | Mount Wellington Cable Car | | |
| | | Project No: 48982019001261 | Size A4 |
| Title | Photo 19-20 | | |

Photo 21 - Possible sip debris above fire trail looking south

Photo 22 -Sandstone talus accumulated adajcent to Tower 2 location

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| Project: Mount Wellington Cable Car | | |
| | Project No.: 48982019001261 | Size: AA |
| Title: Photo 21-22 | | |

Photo 23 - Extremely weathered Siltstone underlying colluvium exposed in cutting north of base site

Photo 24 --Bivalve fossil within siltstone north of base site

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| Project | Mount Wellington Cable Car | | |
| | | Project No: 48982019001261 | Size A4 |
| Title | Photo 23-24 | | |

Photo 25 - Colluvium overlying extremely weathered siltstone exposed in cutting north of site

Photo 26 - Shallow dipping sedimentary sequence exposed in cutting north of site

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| Client | Mount Wellington Cableway Company Pty Ltd |
| Project | Mount Wellington Cable Car |
| Title | Photo 25-26 |
| Project No: | 48982019001261 |
| Size | A4 |

Photo 27 -Shallow dipping siltstone exposed in Creek south west of base site

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| | | Project No: 48982019001261 | Size A4 |
| Title | Photo 27 | | |

# APPENDIX C

## IMPORTANT INFORMATION

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# Important Information about this Geotechnical Report

## Scope of Work

The purpose of this report and any associated documentation is expressly stated in the document. This document does not form a complete assessment of the site, and no implicit determinations about Cardno's scope can be taken if not specifically referenced. Whilst this report is intended to reduce geotechnical risk, no level of detail or scope of work can entirely eliminate risk.

The nature of geotechnical data typically precludes auxiliary environmental assessment without undertaking specific methods in the investigation. Therefore, unless it is explicitly stated in the scope of work, this report does not provide any contamination or environmental assessment of the site or adjacent sites, nor can it be inferred or implied from any component of the document.

The scope of work, geotechnical information, and assessments made by Cardno may be summarised in the report; however, all aspects of the document, including associated data and limitations should be reviewed in its entirety.

## Standard of care

Cardno have undertaken investigations, performed consulting services, and prepared this report based on the Client's specific requirements, data that was available or was collected, and previous experience.

Cardno's findings and assessment represent its reasonable judgment, diligence, skill, with sound professional standards, within the time and budget constraints of its commission. No warranty, expressed or implied, is made as to the professional advice included in this report.

## Data sources

In preparing this document, or providing any consulting services during the commission, Cardno may have relied on information from third parties including, but not limited to; sub-consultants, published data, and the Client including its employees or representatives. This data may not be verified and Cardno assumes no responsibility for the adequacy, incompleteness, inaccuracies, or reliability of this information.

Cardno does not assume any responsibility for assessments made partly, or entirely based on information provided by third parties.

## Variability in conditions and limitations of data

Subsurface conditions are complex and can be highly variable; they cannot be accurately defined by discrete investigations. Geotechnical data is based on investigation locations which are explicitly representative of the specific sample or test points. Interpretation of conditions between such points cannot be assumed to represent actual subsurface information and there are unknowns or variations in ground conditions between test locations that cannot be inferred or predicted.

The precision and reliability of interpretive assessment between discrete points is dependent on the uniformity of the subsurface strata, as well as the frequency, detail, and method of sampling or testing.

Subsurface conditions are formed by various natural and anthropogenic processes and therefore are subject to change over time. This is particularly relevant with changes to the site ownership or usage, site boundary or layout, and design or planning modifications. Aspects of the site may also not be able to be determined due to physical or project related constraints and any information provided by Cardno cannot apply following modification to the site, regulations, standards, or the development itself.

It is important to appreciate that no level of detail in investigation, or diligence in assessment, can eliminate uncertainty related to subsurface conditions and thus, geotechnical risk. Cardno cannot and does not provide unqualified warranties nor does it assume any liability for site conditions not observed or accessible during the investigations.

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## Verification of opinions and recommendations

Geotechnical information, by nature, represents an opinion and is based extensively on judgment of both data and interpretive assessments or observation. This report and its associated documentation are provided explicitly based on Cardno's opinion of the site at the time of inspection, and cannot be extended beyond this.

Any recommendations or design are provided as preliminary until verified on site during project implementation or construction. Inspection and verification on site shall be conducted by a suitably qualified geotechnical consultant or engineer, and where subsurface conditions or interpretations differ from those provided in this document or otherwise anticipated, Cardno must be notified and be provided with an opportunity to review the recommendations.

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## About Cardno

Cardno is an ASX200 professional infrastructure and environmental services company, with expertise in the development and improvement of physical and social infrastructure for communities around the world. Cardno's team includes leading professionals who plan, design, manage and deliver sustainable projects and community programs. Cardno is an international company listed on the Australian Securities Exchange [ASX:CDD].

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Our Ref: 48982019-001-0261:DL
Contact: David Laing

19 October 2019

**Cardno (NSW/ACT) Pty Ltd**
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**Phone +612 4228 4133**
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**Mr Adrian Bold**
Executive Director
Mount Wellington Cableway Company Pty Ltd.
Level 1, 160 Collins Street
**HOBART TAS 7000**

Dear Adrian,

**SUPPLEMENTARY RESPONSE TO HOBART CITY COUNCIL RE GEOTECH CONCERNS**

You have sought further advice in relation to the preliminary geotechnical study undertaken by Dr Chris Meikle and Mr Anthony Rayner mid last year. Unfortunately, both employees have since left Cardno but have been approached to provide this high-level response to questions raised by Hobart City Council.

In general, one might consider that what Council are asking for is beyond the level of detail typically included in the type of high-level tactile risk assessment Cardno undertook in 2018, which was carried out in accordance with the Australian Geomechanics Practice Note - *Guidelines* for Landslide Risk Management 2007.

Hobart City Council's assessors need to be aware that no intrusive investigations were undertaken, nor design elements assessed. Cardno's initial study was a high level risk assessment to identify and characterise potential broad scale geo-hazards that will require further assessment and verification (e.g. by intrusive investigation) during the detailed design phase of the project. It is not an exhaustive process, nor final in terms of allocation of risk. These matters would be further appraised as part of the normal design process.

Notwithstanding the above, we can proffer the following comments in the following table and map of existing access road alignment.

Further to the above, MWCC should primarily consider including a robust statement from Doppelmayr that outlines the global best practice for investigation and design of cable car infrastructure. It should be easy to demonstrate that Mt Wellington is a pretty benign geological environment compared to cable cars constructed in the alpine regions of Europe, that are affected by some seriously large scale geo-hazards (e.g. landslides and rockfalls). In response to the RFI, we believe it would carry weight if Doppelmayr reiterates the feasibility of the project direct to HCC.

Let me know what you think with this draft response and whether this will suffice. Going forward, our new geotechnical lead David Ronchi who has also recently attained RMS Accredited Slope Risk Assessor status, would be responsible for further advice on this project.

Yours sincerely,

**David Laing**
Senior Principal - Planning
**for Cardno**
Direct Line: +61 2 4231 9608
Email: david.laing@cardno.com.au

| Hobart City Council's Comments | Cardno Response |
|---|---|
| *(a) In Section 6: (i) provides a landslide characterisation for each identified hazard at each of the sites (Pinnacle building, base station and tower sites) in more detail as to type, material, history of movement, likely mechanism, size, volume, velocity, travel distance and other matters in Section 5.3 of AGS 2007a;* | Attainment of the detail requested in the RFI (item (a): (i) to (vi)) would not generate additional data that could otherwise be used to demonstrate that the project is unfeasible (even is the risk designation was increased to 'high') – as it is the purpose of the design to assess risk elements (hazards) and determine mitigation measures (e.g. structural elements) to ultimately lower the risk to an acceptable residual level. As such, RFI items (a): (i) to (vi) should be deferred to the detailed design phase of the project. Any level of risk can be address through appropriate design and engineering methods; however, given that the risk is low to moderate without mitigation, there should be limited concern about risk. |
| *(ii) comments in more detail on the likelihoods adopted from each hazard (the degree of belief approach needs to be justified. Commentary on accuracy of assessment and risk and a range of stated inputs (and hence risks) might better reflect the uncertainty;* | |
| *(iii) comments in more detail on the consequences adopted from each hazard;* | |
| *(iv) includes at least one risk to life assessment, which discusses risk to a group of people and potentially the worst-case geotechnical scenario (e.g. landslide at the base station or toppling boulder hitting a cable car). Consider including an event tree;* | |
| *(v) comments on the estimated risks in relation to acceptance criteria; and* | |
| *(vi) concludes whether the development is likely or not likely to cause instability on land outside of the development site;* | |
| *(b) In section 7.1 and 7.2 provides general comments on the scope, rationale and methodology of the detailed intrusive investigations at the Pinnacle building, Tower 3 and the presumably less detailed intrusive investigations at the base station and Towers 1 and 2;* | This is a moot point as no intrusive investigations were undertaken or deemed necessary by the designers at this stage of the project. |
| *(c) In Section 7.3 considers whether an AS2870 Class P might be more appropriate for the base station (Class M can remain as an appropriate guide for footing design in relation to expected ground surface movement); and* | This is not specifically a relevant standard for the proposed purpose but intended to be an initial appraisal of the anticipated ground conditions. As such, the nature of design elements and their structural configuration would be determined by intrusive investigation and detailed design – their 'Class' designation does affect feasibility and is more a consideration for the developer/designer, used to determine indicative costs. |
| *(d) In Section 7.4 considers the rarity of the features relating to the geo-conse significance of the Organ Pipe Columnar Jointing and Wellington Range Periglacial Terrain in a regional and Tasmanian context as well as the reversibility of* | In geoglogical terms, 'localised' with "sub-regional and regional significance" refers to the broad geographical extent of features. In the context of Mt Wellington, columnar jointing is a consistent geological characteristic present at ~500mm spacings. Therefore, within ~100 hectare extent |

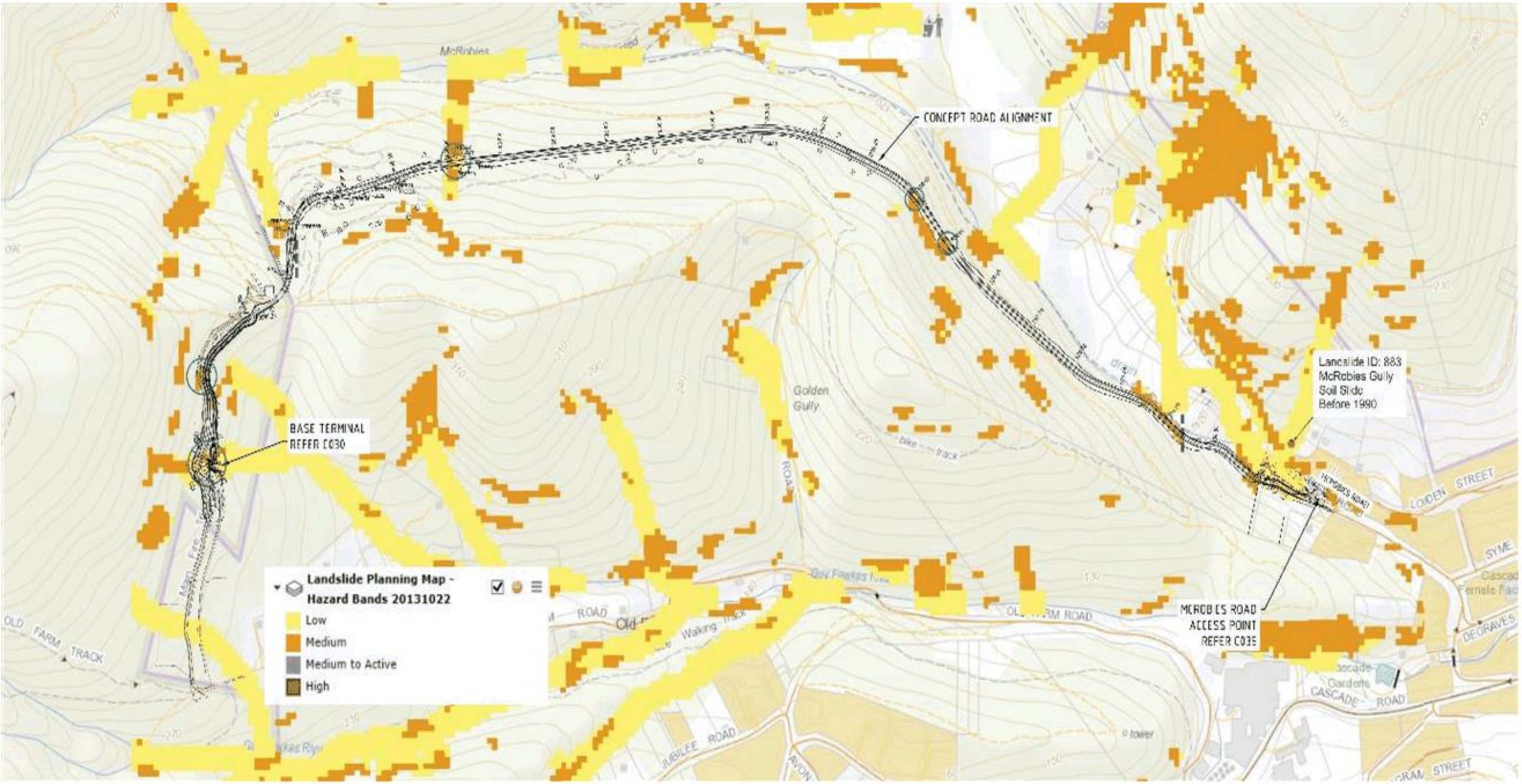
| | |
|---|---|
| *impacts/alterations proposed to these features. The assessment provided indicates that the features of geo-conservation significance are broad/regional features, however an initial review indicates that this is an incorrect interpretation of the listing and that the features are 'localised' with sub-regional and regional significance.* | there are >4,000,000 of these features. Furthermore, as indicated in Cardno's report 'Whilst the proposed development would interact with the rock (similarly to the existing tower, road and viewing infrastructure at the summit (that are founded on the same listed features); the impact of the development would unlikely adversely affect these features. |
| *Evidence that the Geotechnical Study prepared by Cardno has been prepared by a suitably qualified geomorphologist.* | Cardno's ISO accreditation, QA/QC protocols and insistence on the employment of suitable qualified staff ensures that we have appropriate specialists providing advice to our clients. Whilst assessment does not require a 'geomorphologist', it is common procedure undertaken by geologists and engineering industry wide (ref: AGS Guidelines for Landslide Risk Management 2007); it's possible to note that the report was reviewed by a chartered engineering geologist with 15 years' experience and who is also a NSW Roads and Maritime Services' Accredited Slope Risk Assessor. |
| *(e) provide an assessment of the access road.*<br><br>*"Where within the Wellington park boundary this should be against the relevant requirements of the Wellington park management plan. Where outside the Wellington park boundary it should be identified where the access road traverses the Landslide Hazard Overlay and an assessment made under the relevant provisions of Clause E3.0 Landslide Hazard Code"* | The purpose of the E3 land code is to ensure that use and development subject to risk from land instability is appropriately located and that adequate measures are taken to protect human life and property; and ensure that use or development does not cause, or have the cumulative potential to cause an increased risk of land instability.<br><br>Both E3.7.1 Buildings and Works, other than Minor Extension; and E3.7.3 Major Works require that buildings and works must satisfy all of the following:<br><br>• no part of the buildings and works is in a High Landslide Hazard Area;<br>• the landslide risk associated with the buildings and works is either:<br>• acceptable risk; or<br>• capable of feasible and effective treatment through hazard management measures, so as to be tolerable risk.<br><br>The Landslide Planning Report Version 5 – 19 August 2013 describes the planning zone risk as the following (noting that planning risk does not equate to geotechnical risk): |

| | |
|---|---|
| Acceptable Band | A landslide is a rare event in this area based on current understanding of the hazard, but it may occur in some exceptional circumstances.<br><br>Development and use is not subject to landslide controls.<br><br>The **acceptable** band includes 66% of the land area of Tasmania, 91% of vacant parcels and 92% of residential buildings. |
| Low Band | This area has no known landslides, however it has been identified as being susceptible to landslide by Mineral Resources Tasmania (MRT).<br><br>While non-construction requirements are not necessary for most use and development, controls may be necessary to reduce the risks associated with vulnerable and hazardous uses or post-disaster and catastrophic risk-based use to ensure that risks are tolerable (as recommended by AGS 2007a).<br><br>The ***low*** band covers 19% of the land area of Tasmania, 6% of vacant parcels and 5% of residential buildings. |
| Medium Band | The area has known landslide features, or is within a landslide susceptibility zone, or has legislated controls to limit disturbance of adjacent unstable areas.<br><br>Planning controls are necessary for all use and development to ensure that risks are tolerable (as recommended by AGS 2007a). Any vulnerable or hazardous use will only be allowed in exceptional circumstances.<br><br>The ***medium*** band covers 15% of the land area of Tasmania, 3% of vacant parcels and 3% of residential buildings. |

Overlaying the Access Road alignment on Tasmanian Mapping system 'the List' with the 'Landslide Planning Map – Hazard Bands 20131022' indicates that greater than 98% of the proposed access road alignment is with the 'Acceptable Band', with around 1% having minor coincidence with 'Low Band' and 1% having coincidence with 'Medium Band' designations of the "Landslide Planning Map – Hazard Bands 20131022. Only one 'Landslide Point' is listed (883) around 100m outside of the building envelope, which is a pre-1990 'soil slide' adjacent to a private property off McRobbies Road.

Due to low/med zoning a formal field-based assessment was not undertaken for the DA. As such the low to med areas will be investigated, assessed and managed as part of the detailed design process in accordance with the designation of risk in the 'Landslide Planning Map –

| | |
|---|---|
| | Hazard Bands 20131022 and AGS standards, such that any risks will be engineered to be tolerable (i.e. Low Risk).<br><br>As per the designation of risk in the 'Landslide Planning Map – Hazard Bands 20131022:<br><br>*Moderate Risk May be tolerated in certain circumstances but requires investigation, assessment and implementation of treatment options to reduce the risk to low; whereby Low Risk is typically acceptable to regulators. Where treatment has been required to reduce the risk to this low, ongoing maintenance is required.*<br><br>Based on observations in the Cardno report, of slope processes in the vicinity of the alignment, the proposed is 'capable of feasible and effective treatment through hazard management measures, to be tolerable risk'.<br><br>As per comments made for RFI items (a): (i) to (vi), the purpose of the design process is to assess risk elements (hazards) and determine mitigation measures (e.g. structural elements) to ultimately lower the risk to an acceptable residual level. As such, the road alignment is deemed feasible, due absence of 'High' and 'Medium to Active' hazard bands, whereby formal assessment of potential hazards should be deferred to the detailed design phase of the project, where if needed, they can be appropriately addressed by typical/common engineered solutions for access roads in this environment. |


CONCEPT ROAD ALIGNMENT
BASE TERMINAL
REFER C030
Landslide ID: 863
McRobies Gully
Soil Slide
Before 1990
MCROBIES ROAD
ACCESS POINT
REFER C035
Landslide Planning Map -
Hazard Bands 20131022
Low
Medium
Medium to Active
High
Golden
Gully
OLD FARM TRACK
CASCADE ROAD
JUBILEE ROAD

4 June 2020

660.20028-MWCC Geo1 Review L01-v1.0.docx

Mount Wellington Cableway Company Pty Limited
ABN 71 607 312 532
Level 1, 160 Collins Street,
Hobart TAS 7000

**Attention: Adrian Bold**

Dear Adrian

# MWCC GEO1 Review

## 1 Introduction

The Mount Wellington Cableway Company Pty Ltd (MWCC) has engaged SLR Consulting Pty Ltd (SLR) to provide assistance in responding to a Hobart City Council (HCC) Request for Information (RFI), relating to the recently submitted Development Application (DA) for the Mount Wellington Cable Car Project.

This scope of works as been completed in accordance with SLR proposal 660.20028 MWCC Geo1 Review dated 28 May 2020; and MWCC e-mail approval dated 28 May 2020.

## 2 Background

The HCC RFI references the Preliminary Geotechnical Assessment undertaken by Cardno in October 2018, which provided a high-level Landslide Risk Assessment in general accordance with AGS Journal and News of the Australian Geomechanics Society Volume 42 No 1 March 2007 Practice Note Guidelines for Landslide Risk Management (AGS 2007c).

We understand that the HCC RFI (GEO1) requirements can be summarised as follows:

***1. Desktop Hazard Risk Analysis***

*"Assess and mitigate risk in accordance with a hazard risk analysis as set out in the current Australian Geomechanics Society landslide risk management concepts and guidelines." This only needs to be 'desktop' level for each of the three sites i.e. building, towers and base station:*

*(a) in Section 6 (ref: Cardno report):*

*(i) provides a landslide characterisation for each identified hazard at each of the sites (Pinnacle building, base station and tower sites) in more detail as to type, material, history of movement, likely mechanism, size, volume, velocity, travel distance and other matters in Section 5.3 of AGS 2007a* [sic]*;*

*(ii) comments in more detail on the likelihoods adopted from each hazard (the degree of belief approach needs to be justified. Commentary on accuracy of assessment and risk and a range of stated inputs (and hence risks) might better reflect the uncertainty;*

*(iii) comments in more detail on the consequences adopted from each hazard;*

*(iv) includes at least one risk to life assessment, which discusses risk to a group of people and potentially the worst-case geotechnical scenario (e.g. landslide at the base station or toppling boulder hitting a cable car). Consider including an event tree;*

*(v) comments on the estimated risks in relation to acceptance criteria; and*

*(vi) concludes whether the development is likely or not likely to cause instability on land outside of the development site.*

***2. Outline of Subsequent Intrusive Investigations***

*"Provide general comments on the scope, rationale and methodology of the detailed intrusive investigations at the Pinnacle building, Tower 3 and the presumably less detailed intrusive investigations at the base station and Towers 1 and 2."*

## 3 Scope of Services

SLR has undertaken the following scope of services:

- A brief review of the latest background information, including recent comments from Doppelmayr-Garaventa.
- Prepared standalone tables that addresses HCC RFI GEO1 based on observations made in the 2018 Cardno report (in general accordance with AGS Guidelines).
- Provided a high-level commentary on the requirements for the next stage of intrusive investigations.
- Summarised the above in a short letter format report (this report).

## 4 Review

The risk assessment procedure adopted in the Cardno 2018 report is based on the AGS Journal and News of the Australian Geomechanics Society Volume 42 No 1 March 2007 Practice Note Guidelines for Landslide Risk Management (AGS 2007c)[1], AS/NZS ISO 31000:2009 Risk Management – Principles and guidelines[2] and The RTA Guide to Slope Risk Analysis[3].The AGS guidelines 2007c, outline an approach that includes a qualitative risk assessment for risk to property and a 'semi-quantitative' assessment for risk to persons (commonly referred to as risk to life).

The procedure is largely based on visual assessment of the slopes, as in most cases this is the only information that is available. When visual assessments are undertaken, there is generally insufficient information to undertake a formal quantitative probabilistic risk analysis. However, the procedure is based on an underlying quantitative structure which is expressed in a series of rating scales and associated definitions. This approach is typically the industry benchmark for Engineering Geologist and Geotechnical practitioners.

[1] Australian Geomechanics Society Practise Note Guideline for Landside Risk Management (AGS 2007c). Journal and News of the Australian Geomechanics Society Volume 42 No 1 March 2007.

[2] AS/NZS ISO 31000:2009 Risk Management – Principles and guidelines

[3] RMS Guide to Slope Risk Analysis. Version 4. July 2011, Road Pavements and Geotechnical Engineering Section Engineering Technology Services Branch Network Services, Roads and Maritime Services, New South Wales.

SLR has reviewed the relevant background information, geotechnical data and literature in light of the GEO1 RFI commentary and compiled a review of the qualitative risk to property for the Pinnacle Building and Tower 3 in **Table 1** and for the Base Station to Tower 1 and 2 zone in **Table 2** overleaf, following the relevant AGS Landslide Risk Management Guidelines.

A detailed semi-quantitative assessment for risk to persons (from a hazard risk) was not conducted in Cardno's 2018 assessment, as it was determined that if the residual risk to property is 'low', the subsequent risk to persons is also low. Nonetheless, SLR has undertaken a semi-quantitative risk to life for the three worst case risk scenarios conducted as part of this study is included in **Table 3**, completed in accordance with AGS 2007c.

**Table 1 Qualitative Assessment for Risk to Property at Pinnacle Zone to Tower 3 Desktop Review (AGS 2007c)[1]**

| Potential Hazard | Landslide Characterisation *(type, material, history of movement, likely mechanism, size, volume, velocity, travel distance)* | Likelihood* | Likelihood Description | Consequence | Description | Qualitative Risk* | Potential Mitigation Measures | Expected Residual Risk | Risk Level Implications |
|---|---|---|---|---|---|---|---|---|---|
| Boulder Creep | **Complex, successive, extremely slow, dry, downslope movement** of already loosened dolerite boulders, driven by weathering and build-up of material under gravitational forces and geometrical adjustment of boulders. Movement associated with creep mechanisms are typically very small, in the order of millimetres, over long periods of time (in the order of tens to hundreds of years).<br>In rare instances creep movement may trigger rock falls or rolling of boulders – refer below. | Likely | Ongoing and widespread mechanism that can occur intermittently over very long time periods (hundreds to thousands of years) on the majority of slopes in the region. The progress of the mechanism is evident but would require substantial disturbance relative to that which has already occurred before any measurable failure would be initiated. The event may or is expected to occur within a moderate period (from a few years to no more than about 30 years) although no measurable impact would generally be expected as a result. | Insignificant | Little damage to structures expected due to slow rate of movement and very small travel distances. | Low | Detailed geotechnical investigation and suitably engineered foundations / anchoring within in-situ rock. | Very Low | Acceptable. Manage by normal slope maintenance procedures. |
| Debris Flow | **Single, very rapid, wet, debris flow**, triggered by an extreme rainfall or storm event whereby an accumulation of material becomes saturated and becomes dislodged triggering movement. Given the general lack of fine debris relative to boulder volume and considering the shallow overall slopes and rough topography with boulder obstructions, the potential hazard is considered unlikely to comprise more than 5 m to 10 m³ of material which travels no more than 10 m to 20 m downslope. | Rare | The potential mechanism can be deduced from slope features or geological considerations although no evidence of previous failures having occurred are observed. Failure would typically require an extreme triggering event (i.e. >1:100 ARI event). The relatively shallow overall slope angles coupled with rough surface topography in the vicinity of the plateau significantly limits the ability of the mechanism to occur. Furthermore, numerous open joints below the relatively shallow debris cover is expected to maintain a relatively drained surficial mass, which effectively reduces the driving forces / triggering mechanism. | Major | Extensive damage to most of structure, and/or requiring significant stabilisation works would be expected due to the large size of boulders and potentially high impact velocities. | Low | Debris Flow Barrier, pre-emptive slope mapping and site selection. | Very Low | Acceptable. Manage by normal slope maintenance procedures. |
| Rock Fall or Topple | **Single or complex, extremely rapid, dry, rock fall**, triggered by weathering and/or kinematic loosening of dolerite boulders/columns from the in-situ rock mass or talus accumulations. Topple of large dolerite boulders (columns) from outcrops is structurally controlled along pervasive "open" vertical discontinuities with horizontal release joints. Individual columns / boulders are between 0.5 m to 1.5 m diameter and up to 4 m length. Due to the elongated and tabular shape of loosened blocks coupled with shallow (<4 m) height of potential rock falls coupled with relatively shallow overall slope angles in the vicinity of the plateau, the travel distance of rock falls is expected to be significantly limited and are considered unlikely to exceed 10 m under worst case scenarios (i.e. using the Finlay et al 1999[4] empirical relationship a ~5 m³ block falling from 4 m height would be expected to run out between 2.5 m to 10 m. Secondary rock fall may be triggered by instability of boulder accumulations. These 'loose' talus accumulations of smaller, angular cobbles and boulders were observed with an approximate maximum diameter of 1.0 m, whereby using the relationship from Copons et al[5] for a ~1 m³ block falling from 4m height a maximum run out distance of between 3 m to 6 m would be expected. | Possible – Likely | The potential mechanism can be identified but failure does not appear imminent. Evidence of old failures on surrounding slopes is evident. The principal triggering mechanism of weathering is comparatively very slow, typically occurring over hundreds to thousands of years (i.e. the event could occur under adverse conditions over the design life). Although substantial kinetic energy might be developed in the larger blocks, the roughness of the underlying slope and impacts with blocks already present on the slope is known to significantly reduce the run-out distance of boulders. The likelihood of loosening of blocks may well be in the likely range, although the in this case the block would most likely fall and stop at the toe of the outcrop and hence the consequence would be insignificant, therefore the less likely, but higher consequence event is considered as it provides a higher risk rating in this instance. | Medium – Minor | Moderate damage to structures would be expected if a large boulder with high velocity. | Moderate | Rock fall fence/barrier, pre-emptive slope mapping, treatment (e.g. bolting / mesh/ removal) and site selection. | Low | Usually acceptable to regulators. Where treatment has been required to reduce the risk to this level, ongoing maintenance is required. |

[4] Finlay, P. J., G. R. Mostyn, et al. (1999). Landslides: Prediction of Travel Distance and Guidelines for vulnerability of Persons. 8th Australian New Zealand Conference on Geomechanics. Hobart, Australian Geomechanics Society. 2: 105-113
[5] Copons I, Ramon & Vilaplana, Joan & R, Linares. (2009). Rockfall travel distance analysis by using empirical models (SolA d'Andorra la Vella, Central Pyrenees). Natural Hazards and Earth System Sciences. 9. 10.5194/nhess-9-2107-2009.

| Potential Hazard | Landslide Characterisation (*type, material, history of movement, likely mechanism, size, volume, velocity, travel distance*) | Likelihood* | Likelihood Description | Consequence | Description | Qualitative Risk* | Potential Mitigation Measures | Expected Residual Risk | Risk Level Implications |
|---|---|---|---|---|---|---|---|---|---|
| Deep Seated Slide | **Complex, extremely rapid, dry rock fall - rock slide**, triggered by kinematic topple of columns / undermining of the cliff face, resulting in significant regression of the cliff crest, with a very large amount of rock and debris becoming dislodged. Whilst predominantly a kinematic mechanism (rock toppling) the worst-case scenario which triggers mass movement of the cliff crest is considered whereby the event might be expected to result in >10 m³ of 'mass' material movement below the cliff line. The run-out distance below the failure may be large given the high potential energy generated by the cliff height, estimated between 60 to 400 m for a 120 m high rock fall using the Finlay et al 1999[4] empirical relationships. | Barely Credible – Rare | The most likely triggering of a large-scale complex rock fall / slide is associated with weathering of the cliff face which undermines a mass of rock above, triggering mass movement of rock from the cliff line. The principal triggering mechanism of weathering is comparatively very slow and typically occurs in the order of thousands to tens of thousands of years. Considering the strong structural control coupled with Cardno 2018 field observations made below the cliff line, progressive toppling of individual columns is considered most likely which is therefore unlikely to result in greater than 5m of crest loss. | Major | The edge of regression would have to reach the edge of the development footprint (minimum 75 m behind the cliff face) and it is therefore considered highly unlikely, even in the event of deep-seated failure of the cliff crest that the stability of the Tower 3 foundation would be impacted. Nonetheless, a 'major' consequence resulting in "extensive damage to most of structure, and/or requiring significant stabilisation works" is adopted as a worst-case scenario. | Low | Detailed Geotechnical Investigation and Risk Assessment to determine minimum set back distance from crest to reduce consequence, construction controls to reduce the likelihood of triggering instability within the cliff face. | Very Low | Acceptable. Manage by normal slope maintenance procedures. |

* Revised based on sensitivity analysis

**Table 2 Qualitative Assessment for Risk to Property at Base Station to Tower 1 and 2 Desktop Review (AGS 2007c)[1]**

| Potential Hazard | Landslide Characterisation (*type, material, history of movement, likely mechanism, size, volume, velocity, travel distance*) | Likelihood* | Likelihood Description | Consequence | Description | Qualitative Risk* | Potential Mitigation Measures | Expected Residual Risk | Risk Level Implications |
|---|---|---|---|---|---|---|---|---|---|
| Soil Creep | **Complex, successive, extremely slow, moist, downslope movement of colluvium/soil**, driven by weathering and build-up of material under gravitational forces. Movements are typically very small, in the order of millimetres, over long periods of time (i.e. tens to hundreds of years). | Likely | Ongoing, and widespread mechanism which occurs intermittently over very long periods and is often triggered by groundwater rise on the majority of slopes in the region. The progress of the mechanism is evident but would require substantial disturbance relative to that which has already occurred before any measurable failure would be initiated. The event may or is expected to occur within a moderate period (from a few years to no more than about 30 years). | Insignificant | Little damage to structures expected due to slow rate of movement and very small travel distances. | Low | Detailed geotechnical investigation and suitably engineered foundations / anchoring within in-situ rock. | Very Low | Acceptable. Manage by normal slope maintenance procedures. |
| Small Rotational Slide | **Single, moderate to very rapid, wet, debris slide**, triggered by an extreme rainfall or storm event whereby an accumulation of material becomes saturated and loss of shear strength triggers sliding. Typically expected within soil in over steepened slopes. Considering the Cardno 2018 field observations of relatively shallow soil cover in the vicinity of the proposed Base Station to Tower 1 and 2 locations coupled with relatively shallow overall topography the event is considered unlikely to comprise more than 5 m³ of material which travels more than 5 to 10 m downslope. | Possible – Likely | The potential mechanism can be identified but failure does not appear imminent. Evidence of old failures on surrounding slopes is evident. Failure would require an unusually severe triggering event or the presence of over steepened slopes (i.e. created due to slope modification such as those in the vicinity of the Base Station). Evidence of shallow slumping having occurred on over steep cut batters in the vicinity of the Base Station may suggests the likelihood may be 'likely'. | Insignificant | Little damage to structures expected due to small material volumes and limited travel distances. | Low | Detailed geotechnical investigation and suitably engineered foundations / anchoring within in-situ rock, suitably engineered excavations. | Very Low | Acceptable. Manage by normal slope maintenance procedures. |

| Potential Hazard | Landslide Characterisation (*type, material, history of movement, likely mechanism, size, volume, velocity, travel distance)* | Likelihood* | Likelihood Description | Consequence | Description | Qualitative Risk* | Potential Mitigation Measures | Expected Residual Risk | Risk Level Implications |
|---|---|---|---|---|---|---|---|---|---|
| Deep Seated Slide | **Single, complex, moderate to very rapid, wet, debris slide**, triggered by an extreme rainfall or storm event whereby an accumulation of material becomes saturated and loss of shear strength triggers sliding and/or modification to slopes triggers instability. Sliding is typically expected to occur along the top of bedrock or along weak bedding planes / unfavourably orientated discontinuities which dip out of the slope face. Considering the Cardno field observation of relatively shallow soil cover in the vicinity of the proposed Base Station and Tower 1 and 2 locations and considering the shallow overall topography the event is considered unlikely to comprise more than 20 $m^3$ of material which travels no more than 10 m to 20 m downslope. | Unlikely - Possible | The potential mechanism can be deduced from slope features or geological considerations. The relatively shallow overall natural slope angles significantly reduce the likelihood of instability, although modification of slopes may trigger instability under worst-case conditions. Possible evidence of sliding having occurred on over steep cut batters in the vicinity of the base station may suggests the likelihood may be 'possible'. | Medium | Moderate damage to some of the structure would be expected due to the potential for significant material movements. | Low - Moderate | Detailed geotechnical investigation and suitably engineered foundations / anchoring within in-situ rock, suitably engineered excavations. | Low | Usually acceptable to regulators. Where treatment has been required to reduce the risk to this level, ongoing maintenance is required. |
| Rock Fall or Topple (within excavations or cut batters) | **Single or complex, extremely rapid, dry, rock fall**, triggered by disturbance or excavation into the surrounding slopes where boulders occur in talus accumulations at the surface or within colluvium soils. Boulders are interpreted to be weathering out of the slope and slowly travelling downslope and were observed with an approximate maximum diameter of 0.6 m, whereby using the relationship from Copons et al[5], for a ~0.36 $m^3$ block falling from maximum 4 m height, a maximum run out distance of between 1 m to 4 m would be expected. | Unlikely | The potential mechanism can be deduced from slope features or geological considerations. The relatively shallow overall natural slope angles significantly reduce the likelihood of instability although modification of slopes may trigger instability under worst case conditions. | Minor | Limited damage to part of structure due to the relatively small boulder size. | Low | Pre-emptive slope mapping and site selection, suitably engineered excavations, selective scaling of slopes prior to excavation, temporary rock fall fence/barrier in extreme circumstances. | Very Low | Acceptable. Manage by normal slope maintenance procedures. |

* Revised based on sensitivity analysis

## Table 3 Semi-Quantitative Assessment for Risk to Life for *Worst-Case* Geotechnical Scenarios (AGS 2007c)[1]

| Scenario | Annual Probability of Landslide $P_{(H)}$ | Probability of Spatial Impact of the Landslide Impacting building (location) $P_{(S:H)}$ | Temporal Spatial Probability (e.g. of the building or location being occupied by the individual) $P_{(T:S)}$ | Vulnerability of Individual (probability of loss of life of the individual given the impact) $P_{(D:T)}$ | Risk (annual probability of loss of life (death) of an individual) $R_{(LOL)}$ | Comparison with Acceptance Criteria** |
|---|---|---|---|---|---|---|
| Toppling boulder travelling off edge of crest and impacts cable car at approach to Pinnacle Zone | 0.001<br>(possible) | 0.00001<br>(the likelihood that a falling/rolling rock might impact a cable car is highly unlikely [barely credible – rare] as cable car is 5 m (min) above the crest of the slope at the Pinnacle Zone) | 1.0* | 0.5<br>(may be injured but unlikely to cause death) | $5x10^{-9}$ | Acceptable |
| Deep Seated Landslide Failure at Base Station | 0.001<br>(possible - unlikely) | 0.001<br>(the likelihood that a landslide might impact the building is possible given the proposed hillside construction) | 1.0* | 0.1<br>(high chance of survival) | $1x10^{-7}$ | Acceptable |

* Assuming cable car/building is occupied at all times as a conservative measure as no temporal data is available.

** Acceptable risks are usually considered to be one order of magnitude lower than the Tolerable Risks i.e. Suggested Tolerable Loss of Life Risk for the person most at risk is $10^{-5}$/annum and Acceptable is $10^{-6}$/annum

# 5 Further Considerations

## 5.1 Adjacent sites

Assuming appropriate engineering design and hillside construction practise is adopted, the proposed development is unlikely to contribute to instability on land outside the development site.

Vibration effects may have minimal effect on the land outside of the development site. Vibration assessments based on the Australian Road Research Boards Special Report: Ground Vibrations, Damaging Effect to Buildings[6] can be used to assess the likelihood of impacts to any neighbouring structures or features.

If hydraulic rock breaking is required, it is expected to generate negligible vibration outside a 30 m radius from the activity and in the case of Tower 3 being located a minimum of 75 m back from the cliff edge it is considered unlikely that instability would be triggered by vibration. Localised movement of boulders may occur and should be appropriately managed during construction in the form of rock fall barriers or pre-emptive management (e.g. shoring) of loose blocks in the vicinity the works.

If blasting is required, a site-specific assessment is recommended to ensure associated ground movements do not trigger instability within the surrounding area. Impacts from blasting can be mitigated against by various techniques, including pre-splitting and precision blasting. There are also lower energy expansive products that can be used in lieu of explosives.

## 5.2 Detailed Intrusive Investigation

To determine foundation conditions and enable effective design, it is recommended that intrusive investigation be undertaken at the pinnacle zone, all tower locations and base station (including access road and carpark areas). Intrusive investigation will also assist verify assumptions made in the Desktop Risk Assessment regarding potential slope hazards and their relative mitigation methods (e.g. potential depth of anchoring for rock fall netting).

## 5.3 Pinnacle Zone and Tower 3

Intrusive investigation is recommended to comprise diamond core borehole drilling in rock including field and laboratory testing to assess the nature and strength of the rock mass, to determine the depth of surficial weathering and orientation and extent of open joints to facilitate foundation and anchor design. Furthermore, detailed mapping and measurement of orientated diamond core logging is recommended to close out assessment of potential slope instability. A conceptual intrusive investigation scope is summarised in **Table 4**.

[6] Tynan, A. E., Special Report Ground Vibrations - Damaging Effects to Buildings, Australian Road Research Board, 1973.

**Table 4 Intrusive Investigation Summary Pinnacle Zone and Tower 3**

| Location | Purpose | Investigation Measures | Equipment | Access | Site Controls |
|---|---|---|---|---|---|
| Pinnacle Zone | Verify foundation conditions and scope of building excavation | 3 No. Diamond Core Boreholes ~6 to 9 m depth within building footprint | Small tracked rig, water tank & hose, tarpaulin, silt socks | Drill crew access on foot with supply hose walked into each site. Rig and water tank moved between sites by track or lifted by helicopter if access difficult. Drill rig placed on temporary elevated wooden working platform if required | Barrier mesh & post perimeter up to 6 m radius around each borehole, safety signage on fence, pedestrian access limited momentarily to existing walkway & shelter during helicopter movements |
| Tower 3 | Verify foundation conditions and scope of rock anchoring | 2 No. Diamond Core Boreholes ~6 to 9 m depth within foundation footprint | Small tracked rig, water tank & hose, tarpaulin, silt socks | Drill crew access on foot with supply hose walked into each site. Rig and water tank moved between sites lifted by helicopter and placed on temporary elevated wooden working platform. | Barrier mesh & post perimeter up to 6 m radius around each borehole, safety signage on fence, pedestrian access limited momentarily to existing walkway & shelter during helicopter movements |

## 5.4 Base Station and Tower 1 and 2

Intrusive investigation at the Base Station and Tower 1 and 2 foundation footprints is recommended to comprise borehole drilling via auger / SPT in soil and diamond coring in rock to assess the depth to a suitable foundation and anchoring horizon (i.e. competent bedrock). Furthermore, assessment of potential weak planes either at the top of bedrock or along bedding planes should be included. Associated laboratory testing of soil and rock should be completed to assist with determination of the engineering properties of the materials to inform detailed engineering design. A conceptual intrusive investigation scope is summarised in **Table 5**.

**Table 5 Intrusive Investigation Summary Base Station and Tower 1 and 2**

| Location | Purpose | Investigation Measures | Equipment | Access | Site Control |
|---|---|---|---|---|---|
| Base Station | Verify foundation conditions and scope of building excavation | 3 No. Auger / SPT + Diamond Core Boreholes ~6 to 9 m depth within building footprint | Small tracked rig, water tank & hose, tarpaulin, silt socks | Drill rig and crew access via existing main fire trail | Barrier mesh & post perimeter up to 6 m radius around each borehole, safety signage on fence. Pedestrian/cyclist access on main fire trail restricted temporarily. |
| Access Road and Carpark | Verify Sub-grade conditions, scope for excavation and road design | 4 No. Auger / SPT Boreholes ~2 to 3 m depth along road alignment and carpark | Small tracked rig, water tank & hose, tarpaulin, silt socks | Drill rig and crew access via existing main fire trail | Barrier mesh & post perimeter up to 6 m radius around each borehole, safety signage on fence. Pedestrian/cyclist access on main fire trail restricted temporarily. |

| Location | Purpose | Investigation Measures | Equipment | Access | Site Control |
|---|---|---|---|---|---|
| Tower 1 and 2 | Verify foundation conditions and scope of rock anchoring | 2 No. Auger / SPT + Diamond Core Boreholes ~6 to 9 m depth within foundation footprint of each tower | Small tracked rig, water tank & hose, tarpaulin, silt socks | Drill crew access on foot with supply hose walked into each site. Rig and water tank moved between sites lifted by helicopter and placed on temporary elevated wooden working platform. Alternatively, temporary access track from main fire trail may be cut to facilitate tracking rig and water tank. | Barrier mesh & post perimeter up to 6 m radius around each borehole, safety signage on fence |

SLR would be please to work collaboratively with MWCC and Doppelmayr-Garaventa to develop a technically suitable whilst environmentally sensitive geotechnical investigation to address the requirements of the detailed design phase.

## 6 Closure

Thank you for the opportunity to assist you with your project. Should you require any additional information, please do not hesitate to contact us.

Yours sincerely

ANTHONY RAYNER
Associate Engineering Geologist

| |
|---|
| Checked/<br>Authorised by: CDM |

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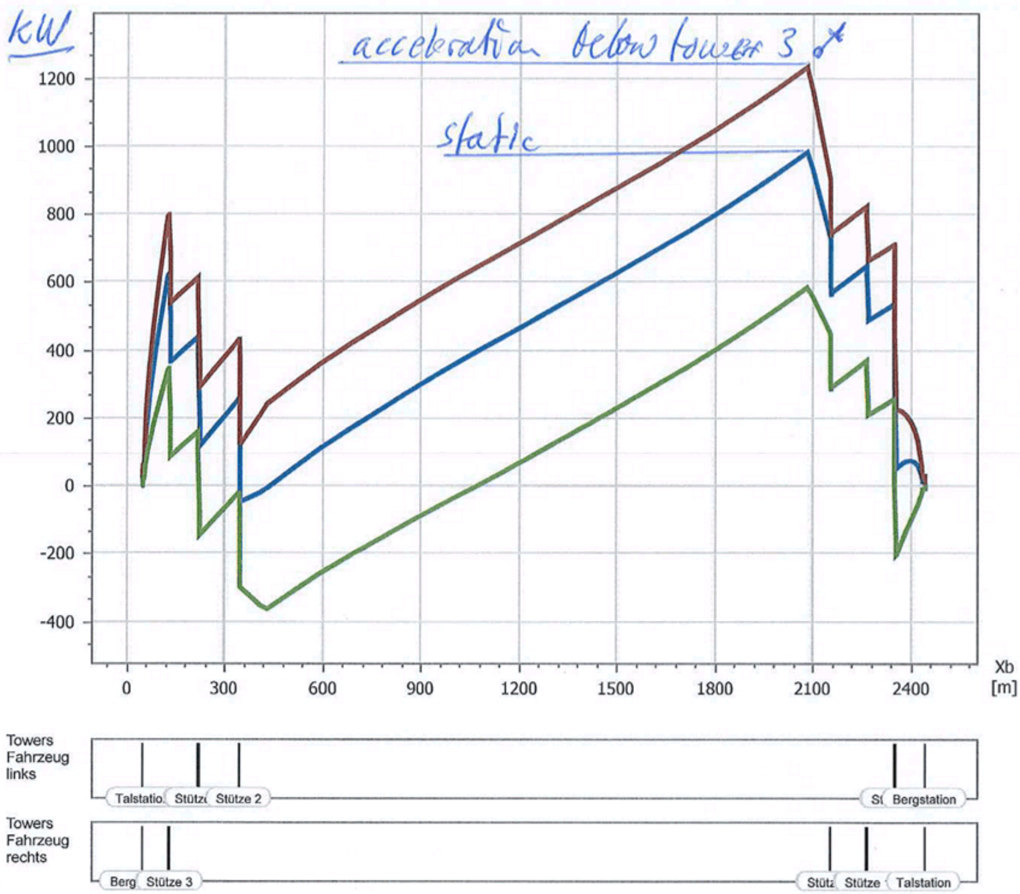
**80-ATW Mount Wellington** **Hobart / Australia**

**Motor power**




| | Min | Max | RMS | Unit |
|---|---|---|---|---|
| F001●↑○↓ stat & stat-br T=30 °C μ_TS↑ | -47 | 983 | 500 | [kW] |
| F009●↑○↓ anf a=0.25m/s² T=30 °C μ_TS↑ | 0 | 1'233 | | [kW] |
| F013●↑○↓ br3 a=-0.4m/s² T=30 °C μ_TS↑ | -362 | 585 | | [kW] |

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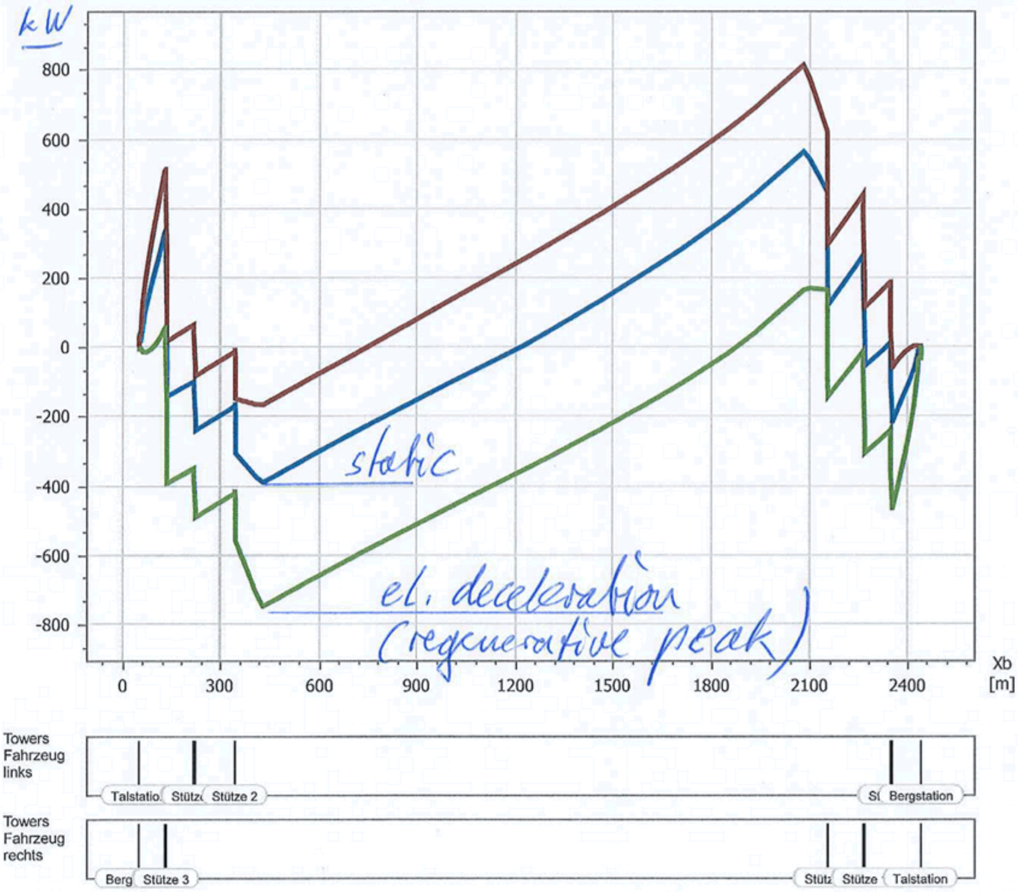
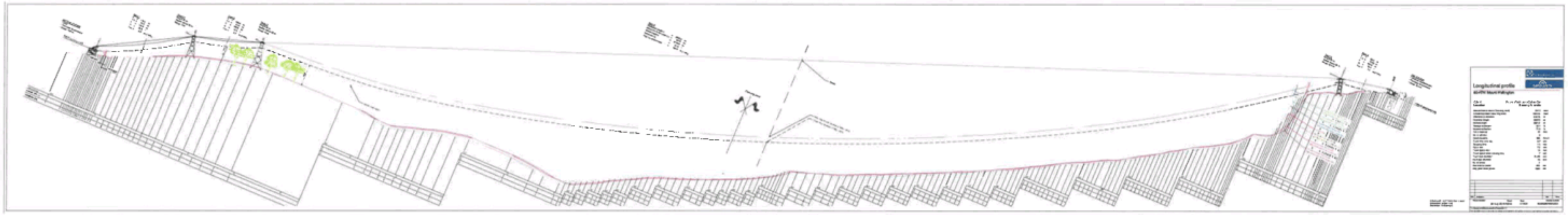
**80-ATW Mount Wellington** **Hobart / Australia**

**Motor power**




| | Min | Max | RMS | Unit |
|---|---|---|---|---|
| D001○↑●↓ stat & stat-br T=30 °C μ_TS↑ | -390 | 563 | 244 | [kW] |
| D009○↑●↓ anf a=0.25m/s² T=30 °C μ_TS↑ | -166 | 813 | | [kW] |
| D013○↑●↓ br3 a=-0.4m/s² T=30 °C μ_TS↑ | -748 | 170 | | [kW] |

ATTACHMENT Y



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# Proposed kunanyi/Mt Wellington Cable Car, Hobart

# Geomorphology Impact Assessment

Mt Wellington Cableway Company Pty Ltd
Adrian Bold
17 June 2020

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Appendix A - RFI-B extract (location map)


J. Giedl.

Prepared by ........ Date: 19/06/2020

**Josef Giedl – Principal Engineering Geologist**

Reviewed and authorised by: ........ Date: 19/06/2020

**Andrew Graeme-Evans – DIRECTOR**

GE Consulting Engineers
ABN: 17 609 545 940
Email: Andrew@gece.com.au
Mobile: 0412 705 240

# 1. Background

Mt Wellington Cableway Company Pty Ltd (MWCC) has submitted a development application PLN-10-345 (DA) to Hobart City Council (the Council) for the construction of a cable car to the summit of kunanyi/Mt Wellington in Hobart and related infrastructure. The DA is currently undergoing the Council assessment process. Only one element of the DA (at two broad locations) is addressed in this report, in response to the Council's Request for Further Information RFI-A and RFI-B. This report forms part of the due diligence activity of the Client and its interaction with the Council for the purposes of approval of the project. No warranty is expressed or implied as to the use of the information in this report, other than for the purpose of due diligence by the Client.

# 2. RFI's- Geoheritage considerations of construction

RFI's were communicated by the Council to MWCC in July 2019 and January 2020 seeking clarification about the potential impact of the Cable Car installation on geoheritage values at two broad locations -

- around the Pinnacle Building and Tower 3 located at the summit of kunanyi/Mt Wellington, and
- around the Base Station, Tower 1 and Tower 2 near Myrtle Gully at the base of the mountain.

An extract of the latest, RFI-B, is included in Appendix A.

# 3. Previous Geotechnical work

Cardno (NSW/ACT) Pty Ltd undertook an "observational geotechnical study at key locations along the alignment of the proposed Cable Car to kunanyi/Mt Wellington." The work encompassed assessment in accordance with AS1726 of near surface geological features to support the DA submission of MWCC. The report of this study, dated 11 January 2019, and two subsequent addenda dated 19 October 2019 and 4 June 2020 have been reviewed by this writer as part the scope of work for this report. The report and addenda are high level documents (as is typical of such submissions) supporting the DA and addressing key elements of Council requirements for the application. It is noted that at this stage no detailed geotechnical work or engineering has been undertaken and so the qualified opinions expressed therein pertain to the semi-quantitative analysis of a range of geotechnical aspects of the proposal. Substantial commentary has already occurred between Council, MWCC and Cardno around the Wellington Park Geoheritage values and the need for expert geomorphology opinion and geoengineering considerations in relation to likely impacts of construction on those values. That commentary is therefore not revisited in this report.

## 3.1 Council Concerns

Council has asked for more definitive opinion from an experienced geomorphologist about possible impacts on the Geoheritage values, as measured against specific criteria, for the broader summit geo-landscape including the 'Organ Pipes', the periglacial terrain and six specific geomorphic features within a 1 km radius of the Cable Car major infrastructure.

The concerns, as outlined by Council in the RFI-B, in relation to potential impacts of construction of the Cable Car on these Geoheritage values are what are addressed in this report.

# 4. Site Inspection

Inspections were undertaken on the 17 and 18 June 2020 to view the two locations of concern. Present at the inspection were Adrian Bold (Founder and Technical Director, MWCC), Josef Giedl (Principal Engineering Geologist, GECE) and Andrew Graeme-Evans (Principal Civil Engineer, GECE).

The purposes of the site inspection was -

- to enable Josef Giedl and Andrew Graeme-Evans to get an on-the-ground appreciation of the site conditions, as visible from surface observation, in relation to the larger scale Cable Car infrastructure as described in the DA, with Adrian Bold providing guidance on site locations and the nature and scale of the infrastructure proposed at each location, and
- to enable broad, low level discussions about the anticipated effects of the known geological conditions on detailed geotechnical investigations and construction methodologies.

# 5. Desktop review of Geoheritage

Additionally, a desktop review of the identified Geoheritage values was undertaken, including -

i. regional geological setting and prevalence;
ii. State based engineering geological data in the vicinity;
iii. definitions of Geodiversity, Geoheritage and Geoconservation;
iv. Council's Wellington Park Management Plan;
v. Tasmanian Department of Primary Industries, Parks, Water and Environment (DPIPWE) - Nature Values Conservation Branch Geoconservation aims;
vi. Tasmanian Geoconservation Database entries for the locations of interest;
vii. understanding community expectations for geoheritage;
viii. Council's DA requirements.

Additionally, recent site photography of the locations of interest and concept drawings of elements of the civil engineering were also examined.

# 6. Geoheritage Assessment

## 6.1 Regional geological setting and prevalence

The overall geological setting for the development is a massive plateau of Jurassic dolerite that was intruded into Permian sedimentary rocks, which is part of the very extensive series of dolerite intrusions around the state and which represents something in the order of 45% of the surface geology of Tasmania.

The geological features present on the eastern escarpment of Wellington Plateau are prevalent in many places in Tasmania and many of those are also listed in the Tasmania Geoconservation Database - Precipitous Bluff, Fluted Cape, the Tasman Peninsula (eg Cape Raoul and Cape Pillar), Ben Lomond and the Great Western Tiers among others.

The periglacial terrain of the Wellington Park plateau, which extends to the eastern escarpment is very extensive on the plateau and also found in and many elevated places throughout the Tasmanian Wilderness World Heritage Site.

## 6.2 State based engineering geological data

The writer could not discover sufficient quality information within the publicly available engineering geological data sets for the Hobart region which makes specific reference to the stability or sensitivity of the features of concern, other than a Tasmanian Geological Survey Record (2015/02) regarding a rockfall originating below the eastern escarpment. However, this one report does have a very useful precis of the very slow geomorphic processes that lead to instability on the slopes of kunanyi/Mt Wellington below the escarpment. It also alludes to the relatively greater stability of the columnar dolerite at the edge of the eastern escarpment (eg the 'Organ Pipes') due to their verticality compared with the geomorphic setting of the steeply sloping flanks of the mountain.

A very significant point of interest raised by the report is the seeming rarity of rock fall events (at a human scale at least) with very few examples being mapped where displaced vegetation had not regrown sufficiently to disguise the age of the rock fall.

## 6.3 Definitions of Geodiversity, Geoheritage and Geoconservation

The writer has condensed the meanings of Geodiversity, Geoheritage and Geoconservation into simple broad definitions to clarify the distinction between each term.

Geodiversity - the variety of landforms (geomorphology), rocks and soils (and their structure) as created, exposed and modified by geological and environmental processes.

Geoheritage - the natural occurrences of geodiversity and their inherent values that we consider worthy of conservation.

Geoconservation - the actions we take to limit the depletion of or to conserve those natural occurrences and values.

## 6.4 Wellington Park Management Plan

A cooperative assemblage of stakeholders including Council manages Wellington Park, within which the features of interest of this report are situated. The Park is administered in accordance with the Wellington Park Management Plan 2013 (amended October 2015). The remit of this management incorporates protection of Park Values including Geodiversity. Section 2.5 of the Management Plan identifies a number of Management Principles and Management Objectives for the Park and its use. The following wording is extracted from the Management Plan and highlights the balanced vision and administrative approach that these stakeholders have adopted for the Park -

> "
>
> The management principles adopted for this Management Plan complement the long term vision for the protection, use and enjoyment of the Park and its values. Management of the Park is based on two premises:
>
> - Protection of environmental values provides the basis for sustainable community use and enjoyment of the Park; and
>
> - The community derives enjoyment and benefits from cultural, tourism and recreational values which respect the Park's environmental and water catchment values."

"

> Consistent with purposes for which the Park was reserved, and to maintain Park values and meet the management principles, the primary management objectives are to:
>
> - Promote and provide high quality tourism and recreational opportunities and facilities consistent with the appreciation and enjoyment of the environmental, water catchment, and cultural values of the Park;"

This impact assessment for the geomorphic values has been made considering the merits identified in the Management Principles and Management Objectives, ie having regard to both the preservation of features of value and the promotion and enhancement of tourism enjoyment of those features.

## 6.5 DPIPWE Geoconservation Aims

DPIPWE states that -

> "Geoconservation aims to preserve the natural diversity of our non-living environment (our geodiversity). This means protecting significant examples of:
>
> - bedrock features
> - landforms
> - soil features and processes."

Included within this gamut is the protection of geomorphic features of uniqueness and significance. This report has examined the DPIPWE records of the six specific identified features of concern in RFI-B (part GEO 2) as listed in their Tasmanian Geoconservation database. It has then considered the salient characteristics of those features in the context of the Cable Car infrastructure and likely impact on those characteristics.

## 6.6 Tasmanian Geoconservation Database

The Tasmanian Geoconservation Database includes those six specific geomorphic features of concern identified in RFI-B (part GEO 2) as being within 1km of the major infrastructure of the Cable Car. This report addresses those features in particular as well as two broader geomorphic values.

This report has examined the Tasmanian Geoconservation database records of the features of concern. It has then considered the salient characteristics of those features in the context of the Cable Car infrastructure and assessed the likely impact on the stated characteristics. It has further examined the extent of occurrence of such features within a broader Tasmanian context.

## 6.7 Community Geoheritage expectations

Geoheritage is among a number of natural values of Wellington Park about which there are community expectations with regard to protection, access and use, as expressed in the Wellington Park Management Plan. There is a broad expectation that through regulatory settings, the tourism, education and recreation benefits of the geology and geomorphology of the Park can be continued and enhanced. However, at the same time, sufficient protections for geoheritage values, especially landforms which are a foundation of the Park's ecosystem are maintained. The aim is to conserve these values for the benefit of future generations. This is the backdrop for the impact assessment herein.

## 6.8 Council DA Criteria for Assessment

The following is extracted directly from Council's RFI-B (part GEO2) questions -

Objective: To conserve flora, fauna, geological and geomorphical values, and to protect natural processes.

Geoheritage

The proposal does not impact upon any sites which are listed as significant in this Management Plan or in a Trust endorsed scientific assessment, or listed on the Tasmanian Geoconservation Database.

Geoheritage

Any adverse impacts on any geoheritage values must be avoided, remedied or mitigated.

In RFI-B (GEO2) the Acceptable (A2.3) or Performance (P2.3) criteria apply to both the infrastructure of the Pinnacle area (Pinnacle Centre and Tower 3) and the Base area (Tower 1 & Tower 2).

## 6.9 Impact Assessment Method

The risk assessment matrix has been created on the basis of the following scale of impacts. The risk rankings have been tailored for geomorphic features (and described in those terms). This is a qualitative impact assessment presented as a three-digit ranking where the Impact Ranking (first digit in bold) = Effect (second digit) x Likelihood (third digit).

0- Nil — No short or long term risk/impact to the feature.

1 - Low — Slight risk/impact to the physical character or its contribution to the landscape and natural processes, or the permanence of the feature (in the context of its natural longevity).

> It is considered that impact rankings 0 and 1 are acceptable levels of risk and, if at all required, easily moderated by engineering or modified practices.

2 - Moderate — A pronounced risk/impact that may change the physical character of the feature and its influence on natural processes, or may greatly reduce the permanence of the feature.

> It is considered that impact ranking 2 is of sufficient risk to warrant mitigation through engineering or modified practices but where avoidance is not the only viable measure of protection.

3 - High — A certainty of significant, permanent, ie probably irreversible risk/impact that would change the feature and its role in the landscape and natural processes.

> It is considered that impact ranking 3 is an unacceptable level of risk where the feature has high values and or is rare or unique and where it may be difficult to avoid or mitigate the impact through engineering or modified practices, such that avoidance may be the only viable measure of protection.

It needs to be remembered with such analysis, that the scale of levels for both the effect and the likelihood are non-linear. Also, the scales of levels for effect and consequence are not at parity with each other. That is, a ranking of 3 does not imply three times the impact of a ranking of 1.

| (Probability) / (Consequence) | None or improbable 0 | Possible 1 | Probable or uncertain 2 | Highly likely 3 |
|---|---|---|---|---|
| No or imperceptible 0 | 00 | 01 | 02 | 03 |
| Negligible or minor 1 | 10 | 11 | 12 | 13 |
| Moderate 2 | 20 | 21 | 22 | 23 |
| Major 3 | 30 | 31 | 32 | 33 |

The overall Impact Ranking (first digit in bold) = Effect (second digit) x Likelihood (third digit)

## 6.10 Impact Assessment Results

The following table identifies the impact of the infrastructure on the geomorphic features of concern.

| | | | | | |
|---|---|---|---|---|---|
| Wellington Range Periglacial Terrain: 2227 | Most extensive and well-developed high altitude periglacial terrain in Tasmania without glacial influence; potentially threatened. | 12 | 11 | 13 | 12 |
| Organ Pipes Dolerite Jointing: 2217 | Notable example; potentially threatened. | 00 | 00 | 13 | 20 |
| Pinnacle Nivation Hollow | Transverse snowpatch nivation hollow with a terrace like shape cut into the side | 00 | 00 | 10 | 02 |

| | | | | | |
|---|---|---|---|---|---|
| | of east facing slope; robust geosite; least conservation concern. | | | | |
| Pinnacle Rock Fall | Dolerite boulder fallen from a dolerite column; robust geosite; least concern. | 00 | 00 | 00 | 00 |
| Pinnacle Road Sandstone Dolerite Contact | Contact interface between Permian sandstone layers and intrusive volcanic Jurassic dolerite; robust geosite; least conservation concern. | 00 | 00 | 00 | 00 |
| Pinnacle Volcanic Plug | Small hawaiite basalt volcanic plug approximately 100m in diameter; unknown geosite fragility; potentially threatened. | 00 | 00 | 10 | 02 |
| | | | | | |
| | | | | | |
| Rankin Falls | Small waterfall hidden in myrtle gully - which has developed small canyon-like feature through the erosion of sedimentary rocks; fragile geosite; potentially threatened. | 22 | 00 | 00 | 00 |

The following discussion elaborates on the report's impact assessment table. The results can easily be understood in terms of the primary attributes of the geomorphic features, such as -

- local geographic extent;
- widespread regional prevalence;
- gross physical characteristics;
- imposing visual scale; and
- robust nature.

The results also reflect the design of the Cable Car infrastructure, such as -

- minimal footprint at towers and no trafficable access to towers;
- small visual proportions against the colossal natural scale;
- Pinnacle infrastructure substantially concealed against the backdrop;
- lateral physical separation of features from works; and
- negligible influence on natural landform processes and groundwater activity.

The assessments have considered all of these aspects in concert.

## 6.11 Impact Assessments, Rankings and Responses to Planning Scheme Criteria

The following describes the impact assessments, rankings and responses to the Planning Scheme Criteria on a feature by feature basis.

### Wellington Range Periglacial Terrain

Physical character - Impact ranking (IR) 112

The periglacial terrain around the Summit Terminal and Tower 3 is a small portion of the several hundreds of hectares of this type of geomorphology across the Wellington Range. It is not unique in Tasmania, although it is extensively represented and well-developed on the elevated plateau behind the escarpment. The Summit Terminal and Tower 3 are small in bulk by comparison with the extent of the periglacial landforms, primarily extensive boulder fields and large dolerite tors. The ground conditions are massive, slightly weathered to fresh dolerite bedrock, underlying dolerite columns and tors and dolerite boulder fields. The impact of the structures on the surrounding terrain and natural geomorphic processes is negligible.

Groundwater - IR 011

The groundwater water movement in this terrain is multi-pathed and is recharged from the whole of the terrain through deep joints within the dolerite bedrock. The surface flow is also multi-pathed and extensive. The nature of the footings for the structures means that groundwater conditions are not going to be affected and natural geomorphic process of the surface flows will locally make a limited difference to flow paths.

Visual aesthetic - IR 213

The Summit Terminal and Tower 3 are small in bulk by comparison with the extent of the periglacial landforms, primarily extensive boulder fields and large dolerite tors. This infrastructure is also partly obscured from view within this space because it lies below the main plateau, just behind the escarpment and below the ridge upon which Pinnacle Rd is constructed. While the structures will be visible, they are not widely visible and are designed to limit the impact on the visual aesthetic of the landforms. The proposed structures are less pronounced than the existing observation shelter which is widely visible from most viewpoints. Part of this proposal is for partial removal of the existing shelter to further enhance/improve the visual aesthetic.

Construction sensitivity - IR 112

The massive nature of the landforms means that construction effects will be limited to the sites of the structures and the works areas associated with them. Ground conditions effectively limit the lateral effects of excavation, although the structures themselves will have an obvious impact on the ground covered by their footprints. The effects are therefore considered to be negligible, controlled and limited to the locations of the structures.

The writer's opinion is that the criterion *"P2.3 Any adverse impacts on any geoheritage values must be avoided, remedied or mitigated."* is satisfied.

### Organ Pipes Dolerite Jointing (including Johnstone's Knob and Albert's Tomb)

Physical character - Impact ranking (IR) 000

The Organ Pipes, a series of dolerite columns at the escarpment below the Summit Terminal and Tower 3, is a nearly 1km long geomorphic feature. It is not linear but highly indented and irregular in both horizontal and vertical directions. It is up to 120m high and near vertical for almost half this length. The columns themselves are massive, each being from a metre or so to many metres across separated by near vertical joints and irregularly cut by sub-horizontal joints. Weathering at the top of the feature has left what appear as massive boulders perched on some columns. Specific named features such as Johnstone's Knob and Albert's Tomb are not unusual in a geomorphic sense and are individually identified and named because of their visual character from certain viewpoints. Columnar dolerite is a common landform in Tasmania, although it is representative and well-developed on the edge of this escarpment. The ground conditions are massive, slightly weathered to fresh dolerite bedrock. Given the significant setback of the structures from the columns (Tower 3 being the closest, around 53m from the nearest columns and the Summit Terminal being some 85m further back) there is thought to be no impact of the structures on this geomorphic feature and natural geomorphic processes related to the feature.

Groundwater - IR 000

The groundwater water movement in the terrain above the escarpment is multi-pathed and is recharged from the whole of the terrain through deep joints within the dolerite bedrock. The existence of the structures will have no impact on the interaction (seepages and so forth) of groundwater at the columns.

Visual aesthetic - IR 213

The Summit Terminal and Tower 3 are small in bulk by comparison to the Organ Pipes which could be described as colossal in scale (Tower 3 being not even a third of the height of the dolerite columns near the cable crossing of the escarpment). The structures are also partly obscured from view within this space because they lie above the edge of the escarpment and are set well back. The dolerite columns are not visible from behind the escarpment in any case. While the structures will be visible, their scale, form and location mitigate the effect on the visual aesthetic and impact only a short segment of this geomorphic feature. Therefore, the overall effect is considered to be minor. Ironically, the structures will be most visible when travelling in the Cable Car approaching the summit, while at the same time providing the benefit of both wide and close proximity viewing of the Organ Pipes from an unusual perspective not otherwise available to most visitors. It will enhance the appreciation of the extent and scale of the feature for many visitors.

Construction sensitivity - IR 020

The massive nature of the landforms means that construction effects will be limited to the sites of the structures and the works areas associated with them. Ground conditions effectively limit the lateral effects of excavation and the effects are therefore considered to be negligible, controlled and limited to the locations of the structures and most unlikely to impact the Organ Pipes.

The writer's opinion is that the criterion *"P2.3 Any adverse impacts on any geoheritage values must be avoided, remedied or mitigated."* is satisfied.

## Pinnacle Nivation Hollow

Physical character - Impact ranking (IR) 000

The periglacial geomorphic feature of the Pinnacle Nivation Hollow is located in the terrain above the escarpment some 700m southwest of the Summit Terminal and Tower 3. It is a feature of about 200m length (perhaps 4 hectares in area). It is one of the extensive periglacial landforms near the summit of kunanyi/Mt Wellington. It is primarily low lying and surrounded by the massive dolerite landforms of the plateau. Given the lateral separation between this landform and the structures, there is no impact of the structures on this feature or its related natural geomorphic processes.

Groundwater - IR 000

The groundwater water movement in this terrain is multi-pathed and is recharged from the whole of the terrain through deep joints within the dolerite bedrock. The surface flow is also multi-pathed and extensive. The flow is unlikely to be from near the structures towards the feature in any case. The nature of the footings for the structures means that groundwater conditions are not going to be affected and so there is no impact.

Visual aesthetic - IR 010
The Summit Terminal and Tower 3 are completely obscured from view within this space because they lie below the main plateau, just behind the escarpment and below the ridge upon which Pinnacle Rd is constructed and separated from the Nivation Hollow by many hundreds of metres. The orientation of the hollow and its low-lying character also contribute to the significant visual separation from the structures. The structures would be all but invisible from this geomorphic feature and their scale and design form would result in a negligible impact on the visual aesthetic.

Construction sensitivity - IR 002
The scale of the landform and very significant lateral separation to the structures would mean that there would be no construction impact on this geomorphic feature or its related natural processes.

The writer's opinion is that the criterion *"A2.3 The proposal does not impact upon any sites which are listed as significant in this Management Plan or in a Trust endorsed scientific assessment, or listed on the Tasmanian Geoconservation Database."* is satisfied.

## Pinnacle Rock Fall

Physical character - Impact ranking (IR) 000
The geomorphic feature named the Pinnacle Rock Fall is located almost 1km south of the Summit Terminal and Tower 3. It is one of a number of such rock falls below the escarpment. This rockfall has occurred in living memory. However, the age of most other rock falls is not certain due to the vegetation damage along the rock fall path regrowing at a human rather than geological timescale. The prominence of the Pinnacle Rock Fall, in people's minds, is due to the close proximity of the fallen dolerite boulder to a walking track. The dormant nature of the feature and large lateral separation between it and the structures mean there is no impact by the structures.

Groundwater - IR 000
Groundwater water movement is unrelated to this feature so there is no impact.

Visual aesthetic - IR 000
The Summit Terminal and Tower 3 are virtually obscured from view from the location of the fallen boulder. The orientation, scale and design form of the structures would result in a negligible impact on the visual aesthetic.

Construction sensitivity - IR 000
The location of the feature (both vertically and laterally separated to the structures) would mean that there would be no impact by construction.

The writer's opinion is that the criterion *"A2.3 The proposal does not impact upon any sites which are listed as significant in this Management Plan or in a Trust endorsed scientific assessment, or listed on the Tasmanian Geoconservation Database."* is satisfied.

## Pinnacle Road sandstone Dolerite Contact

Physical character - Impact ranking (IR) 000
This feature, a road cutting exposure of the intrusive contact of Jurassic dolerite with Permian Sandstone, is located several hundred metres away from the Summit Terminal and Tower 3 (separated both laterally

and vertically). It is one of numerous such contacts in and around Hobart and across Tasmania. Whilst the exposure is easily visible and distinct and so good from an educational perspective, it is by no means an exemplar. In itself it is a geological not geomorphic feature and its exposure is man-made. On this basis there is no effect of the structures on the importance of this feature.

Groundwater - IR 000

There appears to be no specific relationship between groundwater and this feature so there is no impact.

Visual aesthetic - IR 000

The Summit Terminal and Tower 3 are obscured from view from the location of the feature and so there is no impact to the visual setting.

Construction sensitivity - IR 000

The location of the feature (both vertically and lateral separated to the structures) would mean that there would be no impact by construction.

The writer's opinion is that the criterion *"A2.3 The proposal does not impact upon any sites which are listed as significant in this Management Plan or in a Trust endorsed scientific assessment, or listed on the Tasmanian Geoconservation Database."* is satisfied.

## Pinnacle Volcanic Plug

Physical character - Impact ranking (IR) 000

This geomorphic feature is an ovoid exposure of a hawaiite basalt plug (that is thought to be a vertical pipe of basaltic magma that has cooled insitu). It has come up through a weak zone of the older dolerite. It is mostly massive, like the surrounding dolerite and most observers would not notice its existence even when at the boundary between the rock types. It is a geological curiosity and doesn't display geomorphic characters that are notably different from the dolerite. The Summit Terminal and Tower 3 are located nearly 700m north of the feature which sits at a slight low point at the edge of the escarpment. On this basis there is no effect of the structures on the importance of this feature or related geomorphic processes.

Groundwater - IR 000

The groundwater water movement in this terrain is multi-pathed and is recharged from the whole of the terrain through deep joints within the dolerite bedrock. The surface flow is also multi-pathed and extensive. The flow is unlikely to be from near the structures towards the feature in any case. The nature of the footings for the structures and groundwater activity that is not is specifically related to this feature means that there is no impact.

Visual aesthetic - IR 000

The Summit Terminal and Tower 3 are completely obscured from view within this space because they lie below the main plateau, just behind the escarpment and below the ridge upon which Pinnacle Rd is constructed and separated from the Volcanic Plug by many hundreds of metres. The feature's low-lying character at the edge of the escarpment also contributes to the significant visual separation from the structures. The structures would be all but invisible from this geomorphic feature and have no impact on the visual aesthetic.

Construction sensitivity - IR 000

The scale and massive nature of the landform and very significant lateral separation to the structures would mean that there would be no construction impact on this geomorphic feature or its related natural processes.

The writer's opinion is that the criterion *"A2.3 The proposal does not impact upon any sites which are listed as significant in this Management Plan or in a Trust endorsed scientific assessment, or listed on the Tasmanian Geoconservation Database."* is satisfied.

## Rankin Falls

Physical character - Impact ranking (IR) 222

This small, highly visited waterfall is just within 1km from the Base Terminal and Towers 1 & 2. It is a small feature typical of this type of geomorphology below the escarpment. It is not unique but is easily accessible and due to the softer nature of the sedimentary rocks (compared with dolerite) in which it has formed is sensitive to human (foot) activity. The structures are substantially separated from the feature and so do not have a direct impact on it. However, increased visitation (although to what extent is uncertain) due to the proximity with the Base Terminal could have a long-term impact on the condition of the feature due to people around it. There is presently no control on access and limited management of the effects of visitation, so the indirect additional impact of the Base Station is uncertain and is likely to be proportionate to how well or otherwise the site is promoted by way of signage, tour guides or marketing by the proposed Cable Car operator.

Groundwater - IR 000

The groundwater water movement in this terrain is recharged from well above the feature from within the dolerite talus on the flanks of the mountain and in any case unconnected to the Base Station and Towers 1 & 2 locations. It is considered that there is no impact.

Visual aesthetic - IR 000

The structures are completely obscured from view within this space because of the terrain and tree canopy. The feature's low-lying character within a valley contributes to the obscuring of any view of the structures. The structures would be all but invisible from this geomorphic feature and have no impact on the visual aesthetic.

Construction sensitivity - IR 000

Although less 'tough' than dolerite, none-the-less the solid nature of the rock in which the geomorphic feature has formed and the very significant lateral separation to the structures would mean that there would be no construction impact on this geomorphic feature or its related natural processes.

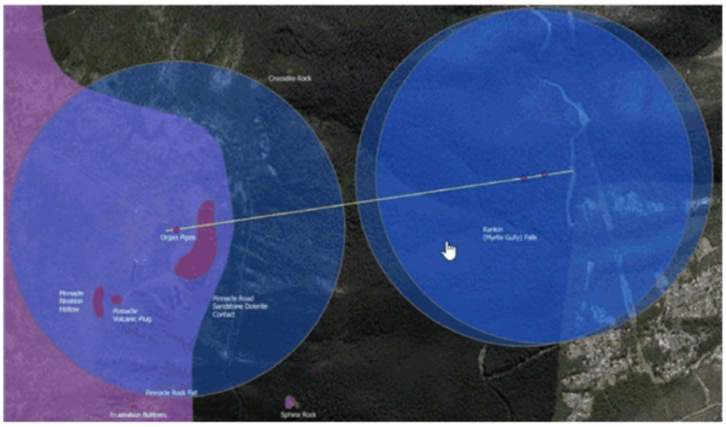
The writer's opinion is that the criterion *"P2.3 Any adverse impacts on any geoheritage values must be avoided, remedied or mitigated."* is satisfied, on the basis that the feature is outside the lease space for the Cable Car and would be expected to be managed by the State or the Council with respect to visitation numbers and physical protection measures to mitigate long term impacts (if they were at all increased from the current ongoing impacts of visitation).

**GEO 2 - 1 July 2019**
**Evidence that the assessment of impact upon sites of geoconservation significance contained at Section 7.4 of the Geotechnical Study prepared by Cardno and dated 11 January 2019 has been prepared by a suitably qualified geomorphologist.**

This request is not satisfied.

The additional information from Cardno has interpreted this request as being evidence of geotechnical expertise. Geoheritage/geoconservation falls within the purview of a geomorphologists expertise, hence why evidence that a geomorphologist has prepared Section 7.4 of the Geotechnical Study.

The map below shows the sites of geoconservation significance from both the Wellington Park Geosite Inventory and the Tasmanian Geoconservation Database in the context of the proposal. The blue areas show a 1km radius from each of the proposed built elements.




**Base Terminal, Access Road, Towers 1 and 2**

**One feature of geoconservation significance identified in the Wellington Park geosite inventory is within proximity - Rankin Falls (Myrtle Gully). The Base Station and Access Road are within 1km proximity of this feature and may only present a minor degradation risk. The assessment at Section 7.4 should however address this site and potential risks.**

**Summit Terminal and Tower 3**

The Summit Terminal and Tower 3 is within proximity of five features of geoconservation significance, two features are listed both under the Tasmanian Geoconservation Database and identified as a feature of geoconservation significance in the Wellington Park geosite inventory, being: Dolerite – Sandstone intrusive contact exposure and The Organ Pipes Cliff including Alberts Tomb & Johnstones Knob.

The other three features of geoconservation significance within proximity of the Summit Terminal and Tower 3 listed in the Wellington Park geosite inventory are Pinnacle Volcanic Plug, Pinnacle Nivation Hollow and Pinnacle Rock Fall.

There are concerns around potential impacts that the method of excavation for Tower 3 and the Pinnacle building - being the standard rock breaker and the possibility of blasting – will have. Although the Organ Pipes is mostly robust and on solid, competent rock, there are some fragile components of the organ pipes e.g. balanced rocks that could be dislodged during rocking breaking and blasting, altering the geoheritage values of the organ pipes.

It is noted that this may be more of a geotechnical question as to the extent of ground movement that could cause disturbance outside the area of development.

The other features of geoconservation significance, namely Pinnacle Volcanic Plug, Pinnacle Nivation Hollow, Pinnacle Rock Fall and Dolerite – Sandstone intrusive contact exposure, are made of solid, competent rock and the development would unlikely have adverse effects. The TGD also notes under the Organ Pipes listing that "Aesthetic integrity may be threatened by proposed development" so this needs to be considered.

The Summit Terminal and Tower 3 are directly within the boundary of the geoconservation feature Wellington Range Periglacial Terrain. It is vast and mainly on competent rock and many of the significant features within the polygon have been protected as individual geosites, however Section 7.4 should confirm that there is nothing of significance at the site of development for the Pinnacle Building and Tower 3 based upon inspection.

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+ CIVIL + STRUCTURAL + GEOTECH

19 June 2020

Mount Wellington Cableway Company Pty Ltd
c/o Adrian Bold
Level 3, 85 Macquarie St
Hobart TAS 7000

**Dear Adrian,**

**RE: Joe Giedl CV and Geomorphology Experience**

I write to supplement my CV with further information in support of the impact assessment of the Mt Wellington Cable Car on geomorphological values.

Firstly, I would like to say that it is extremely unusual (certainly in Australia) to become qualified as a geomorphologist. Most people choose parts of their university course to include geomorphology and typically this is in the area of fluvio-geomorphology and hydrology as there is increasing demand for geoexperts in river management and engineering. Experience of geomorphology as the study of physical landforms and processes is usually (after early years undergraduate subjects) gained by experience, typically in association with engineering geology to assist with the engineering of developments and managing georisks associated with these.

All geologists, certainly those with substantial field experience, have an appreciation of geoheritage values. They understand clearly the interplay between geological and geomorphological formative processes and surface geological exposures and the benefit this interplay provides for technical project knowledge, educational experience and the ongoing value of these features.

Now with respect to geoconservation, this is a more specialised field that focuses on the preservation of highly valued, often sensitive geological and geomorphological features. It is a very limited space in Tasmania and typically expert advice from outside Tasmania would be sought to satisfy such a need on a project. However, most projects do not require this input, certainly at the beginning. It is only after geoheritage impact assessment and once detailed design and management plans are required, and only if specific challenges arise for protection of geoheritage values, that such expertise would be engaged.

I would like to reaffirm that I have over 35 years of experience as an engineering geologist in Tasmania. I began work with the DMR, which became DoT and then DIER (DIER herein) as their only geologist. As such I undertook the field work, analysis and reporting of geological, geomorphological and other technical investigations on a very large number of road, quarry, rail and port development projects, plus a great number of site investigations of unstable landscapes effecting housing and residential land. The latter in particular required intensive geomorphological mapping. I have also mapped and analysed the geomorphology for large projects such as the Lake Burbury crossing and the Emu Bay rail line.

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One particular very large project that required such mapping, reconnaissance work, impact assessment and the development a georisk model for the whole project corridor was for the Tasmanian Natural Gas Pipeline. In my past role with DIER, I also consulted with Councils on much of their geologically challenged infrastructure, including for Hobart City Council on the geomorphology and instability of dolerite cuttings along the Pinnacle Road. I have recently completed a field study for Cardno relating to geological and geomorphological conditions along 7km of the Pinnacle Rd and the likely influence of these on a design and installation of a replacement road barrier. Few geologists in Tasmania would have as wide a knowledge of the engineering geology and geomorphology in a development context.

I have also undertaken a great many ground vibration investigations and analyses for projects where blasting could have an effect on structures, geomorphic features and building occupants. Part of my role as the engineering geologist for the DIER was to do noise and vibration studies relating to high energy construction activities and to determine mitigation strategies where required.

Lastly my extensive background in engineering geological investigations for major excavations has given me an enduring awareness of not only the effects of geology on the built environment but also the effect of the built environment and construction activity on the landscape and its inherent values.

I believe that my CV and this letter demonstrate my competence and capacity to undertake impact assessment of geoheritage values in particular geomorphological values.

**Kind Regards,**

J. Giedl.

Joe Giedl

Principal Engineering Geologist

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27/7/2020

Mount Wellington Cable Car Project

SUMMARY

1. The proposed Mount Wellington Cable Car project, meets the requirements of the amended 2015 Wellington Park Management Plan in that Leq and Lmax = 50 dB(A) is not exceeded at 50 m (from noise source both vertically, horizontally and 50 m horizontally along the ground), except for the following:

   a) 50 m from base station front façade, cable car leaving Lmax = 59.8 dB(A)
   b) Pinnacle station has similar noise levels or possibly less due to no motors
   c) 50 m from cable car on 35 m tower (hor. & vert.) Lmax = 53.7 dB(A)
   d) 50 m along ground from 35 m tower, cable car movement, Lmax = 54.6 dB(A)

2. The average of 22 day time and evening measurements at 5 sites gave the following
   Mean Lmax = 62.6 dB(A), sample std. devn. = 7.7 dB(A)

   The location adjacent to Pinnacle Road (climbers track car park) was not included in the sample because of vehicle pass by noise. The mean ambient Lmax noise levels exceed the Lmax noise levels generated by the cable car operation and are therefore unlikely to be intrusive in the day and evening hours.

3. Furthermore, our analysis, based on our day and night time measurements and the Gimmenwald Noise Measurement Report of 19 February 207 indicate that :

   A) The Tasmanian Environment Protection Policy (Noise) 2009 acoustic environment indicator levels are met at the nearest residence 236 m away.
   B) The Australian/New Zealand Standard AS/NZS 2107:2016 (Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors) requirements for noise in bedrooms in houses near minor roads is met at the nearest residence 236 m away.

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MAIN FINDINGS:

1. Night time ambient noise level at the base station is Leq (15.min) = 24.6 dB(A) and 40.2 dB(C). The background L90 = 22.6 dB(A). During the day, Leq = 44.2 dB(A) and L90 = 39 dB(A).

2. When the difference between the dB(C) - dB(A) noise levels is greater than 15 dB the low frequency noise components are regarded as annoying and the noise attracts a penalty of 5 dB. Hence the adjusted ambient (Leq) noise level is 24.6 + 5 = 29.6 dB(A) and the adjusted background L90 noise level is 22.6 + 5 = 27.6 dB(A).

3. Based on the measurements {19/2/2007 Gimmelwald Cable Car report, Page 5,where the noise level at the rear of the terminal building is 51.7 dB(A) at 4.5 m} the noise level at the nearest boundary (Cascade) 61.2 m away is calculated to be Leq = 29 dB(A). This noise level marginally exceeds the HCC Interim Planning Scheme night time permitted L90 + 5 dB noise level of 27.6 dB(A) at the Cascade boundary.

4. A difference of 29 – 27.6 = 1.4 dB is not noticed by members of the public and can only be discerned by a trained healthy ear in a laboratory.

5 Similar calculations yield a noise level of Leq = 20 dB(A) at the facade of the nearest house 236 m away. This meets the WHO guidelines for noise outside bedrooms with windows open. {Leq = 45 dB(A) and Lmax = 60 dB(A), in Tas. Environment. Protection Policy (Noise) 2009, page 11}. It is also likely to meet the HCC Interim Planning Scheme requirements.

6. Based on the Gimmenwald cable car survey, the calculated noise levels along the ground at 50 m from the towers and the main buildings (microphone at 1.5 m), are as follows:
   Tower 1 (45 m high) Leq = 48.7 dB(A)
   Tower 2 (55 m high) Leq = 47.8 dB(A) and
   Tower 3 (35 m high) Leq = 49.5 dB(A)
   Pinnacle (50 m) Leq = 42.6 dB(A) front, car leaving.
   Lmax = 59.8 dB(A)
   Base station (50 m) Leq = 42.6 dB(A) front, car leaving
   Lmax = 59.8 dB(A)

   Note, current day time and evening average Lmax level = 62.6 dB(A), std. devn = 7.7 dB(A) and n =22 when averaged over all sites except site 5.

7 For 50 m from the top of the towers,(source) both vertically and horizontally (but not along the ground) the following noise levels are calculated:
   All towers, cable car, Leq = 48.6 dB(A)
   Lmax = 53.7 dB(A)
   All towers, cable only Leq = 45.8 dB(A)
   Lmax = 50.6 dB(A)

8. The above noise levels meet the requirements of A.11.1, that is, “the noise from point sources must not exceed 50 dB(A) at any point within 50 m of the source” in terms of the Leq metric but marginally exceed the Lmax

metric by 3.7 dB(A). A 3 dB(A) change is a just noticeable change, meaning that out of 100 members of the public, 50 would discern a change while the others hear no change in noise level.

9. Indications are that attention to attenuation measures during the detailed design stage will enable the night time L90 + 5 dB criteria to be met at the Casdcade boundary near the base station. The marginal excess is only 1.4 dB(A) or so.

INTRODUCTION:

Noise annoyance depends on the following factors:

1. The existing noise level
2. The new noise level
3. Whether the new noise has tonal components
4. Whether the new noise has impulsive components
5. The time of the day the new noise occurs
6. Whether the new noise carries unwanted intelligence such as reversing alarm signals, public address announcements, amplified telephone ringing
7. Noise annoyance also depends on the listeners' perception of whether the noise is regretfully caused, imposed in ignorance or inflicted as an act of aggression.

Qi Li et al stated that "low frequency noise has been found to adversely affect human concentration and sleep". JASA, vol 135, part 5, May 2014, page 2718. The Tasmanian Noise Measurement Procedures Manual states that where the dB(C) - dB(A) difference is greater than 15 dB then an adjustment of 5 dB is made.

Noise measurements were conducted on numerous occasions during the day and at night time at locations shown on pages A 2, A 3 A4 and B 2 and B 3. Measurements were also conducted at night near the base station and at the pinnacle partly to see if there was any variation in the measured noise levels. Weather conditions were good for such measurements, that is, no rain and little or no wind. The attached appendices A and B give the results of our noise measurements and analysis.

RESULTS:

NOISE CLIMATE:

In the table on page B 9, column 9 (Loc 1, near the base station, 20:37 h) Ln is the noise level exceeded for n % of the sampling time. For example, for a measurement duration of 15 minutes, L90 = 22.6 dB(A). This means that for 90 % of the 15 minute sampling time, that is, 13.5 minutes,

the noise level was 22.6 dB(A) or more. L90 is a good descriptor of the background or base noise level.

Similarly, L10 = 26.0 dB(A). It means that for 1.5 minutes the noise level was 26 dB(A) or more. L10 is a good descriptor of the average of the higher noise levels encountered and is often used in traffic noise studies.

The last row shows Leq(A). This is the equivalent 'A' weighted noise level. A fluctuating noise level having an Leq = 24.6 dB(A) has the same acoustic energy as a steady noise of 24.6 dB(A).

Page B 11 shows statistical noise analysis of night time noise on 6/5/2019. The L10, L90 and Leq noise levels are almost identical indicating little variation in the noise levels.

NOISE POLICY, STANDARDS and PROVISIONS:

Par. A 6.1 Noise states "Noise from point sources of sound must not exceed 50 dB(A) at any point within 50 m of the source'.

The Hobart City Council Interim Planning Scheme requires that noise emissions measured at the boundary of a residential zone must not exceed the following:

a) 55 dB(A) ( LAeq) between the hours of 0700 and 7.00 pm;
b) 5 dB(A) above the background (LA90) level or 40 dB(A) (LAeq), whichever is the lower, between the hours of 7.00 pm and 7.00 am;
c) 65 dB(A) (LAmax) at any time.

In addition, the Tasmania Environment Protection Policy (Noise) 2009 document has in Table 1 – Acoustic environment indicator levels. These are indicative and not mandatory noise levels. For outside bedrooms (sleep disturbance, window open) the noise level is Leq = 45 dB(A) with a maximum noise level Lmax = 60 dB(A) over an eight hour time base. For inside bedrooms, the noise level is Leq = 30 dB(A) with Lmax = 45 dB(A).

For bedrooms in houses near minor roads, Australian /New Zealand Standard AS/NZS 2107:2016 has a recommended design sound level for steady or quasi steady noises of Leq = 30 dB(A) which is regarded as satisfactory and Leq =- 35 dB(A) which is regarded as the maximum design sound level.

Carter N.L, et al 'Overnight Traffic Noise Measurements In Bedrooms and Outdoors, Pennant Hills Road, Sydney – Comparisons With Criteria For Sleep', Acoustics Australia, Vol 20,No 2, page 52, presented a table (Table 2) where the mean outdoor/indoor attenuation was 17.0 dB(A) for bedrooms with windows slightly open and 21.5 dB(A) with windows closed.

The requirement of L90 + 5 dB = 27.5 dB(A) is stringent and is less than the AS/NZS 2107:2016 recommended design noise level for INSIDE bedrooms of 25 dB(A) to30 dB(A) for houses in rural areas.

SPECTRAL ANALYSIS:

Pages A 17, A18, A 19 and B 13 and B 14 19 show the spectral content of the noise at the various locations. Whereas the 1/3 octave band spectra do show some spectral features (for example 50.7 db at 63 Hz at Loc 5 on page B 18), there appear to be no strong tonal components that attract tonal penalties.

Noises having tonal and impulsive features attract a penalty of about 5 db(A) because a noise with a tonal component is judged to be more annoying than a similar level sound without a tone.

CALCULATIONS OF CABLE CAR NOISE LEVELS:

For example, consider Tower 3.

This tower is 35 m high. Assume the measuring microphone is at a height of 1.5 m. Hence the difference is 35 – 1.5 = 33.5 m. This is the vertical distance of as triangle whose base is 50 m. The hypothenuse of this right angled triangle is (33.5^2 + 50^2)^0.5 = 60.185 m

Page 2 of the Gimmenwald Cable Car report gives the noise level of the cable car movement across the tower as Leq = 56.5 dB(A) and Lmax= 61.6 dB(A) with the microphone at 26.95 m from the cable bar, attached to a tripod mounted on the ground.

The difference between Lmax and Leq = 61.6 – 56.5 = 5.1 db(A)

The measured noise level of 56.5 dB(A) consists of two components, the direct ray from the cable car above and the reflected ray that comes from above, hits the ground and is reflected off the ground into the measuring microphone. The reflected ray increases the measured noise level by 2.5 dB(A). For the vertical and horizontal (but not along the ground) noise level calculations, from the source, we use the direct ray level of 56.5 – 2.5 = 54 dB(A).

The cable car movement across the tower was the highest noise level recorded. The cable movement across the tower registered 53.7 dB(A), that is, a lower reading.

Hence the noise level at 50 m from the tower = 56.5 – 20 log (60.185/26.95) = 49.5 dB(A)

The maximum noise level would be 5.1 dB(A) higher making Lmax = 49.5 + 5.1 = 54.6 dB(A).

However, the noise level vertically or horizontally 50 m from the top of any tower, (the source), = 56.5 – 2.5 – 20 log (50/26.95) = 48.6 dB(A).

Similar calculations for towers 2 and 1 give noise levels of 47.8 dB(A) and 48.7 dB(A) respectively and hence all three towers generate noise levels less than 50 dB(A) at 50 m.

Noise levels at nearest residence to the base station

The night time L90 = 22.6 dB(A). See page B 9, Loc 1 starting at 20:37 h)
Page B 13 shows that at loc 1, the Leq noise levels were 24.6 dB(A) and 40.2 dB(C). The difference between dB(C) and dB(A) = 40.2 – 24.6 = 15.6 dB. Hence we can add a penalty of +5

dB(A) to the noise level. See par 6.5, page 24 of the Noise Measurement Procedures Manual, July 2004. Hence we add + 5 dB to L90 that is, 22.6 + 5 = 27.6 dB(A).

The nearest residence is some 236 m from the base station.
Hence if the noise is regarded as a point source as seen from 236 m, then the noise level at the nearest residence is:

$$51.7 – 20 \log (236/4.5) = 51.7 – 34.4 = 17.3\text{dB(A)}.$$

In addition there is some excess attenuation due to propagation over grass and through trees which might amount to 1 dB to 2 dB. Atmospheric effects (gentle breeze from base station to residence) might increase the noise level by a couple of dB.

The adjusted L90 + 5 = 27.6 dB(A).

The noise level from the base station could be Leq =17.3 + 2.5 dB (façade effect) = 19.8 dB(A) or say 20 dB(A). As mentioned, AS/NZS 2107:2016 recommends a noise level INSIDE bedrooms in rural areas of 25 dB(A) to 30 dB(A). The 27 dB(A) noise from the base station is a noise level that appears outside a bedroom. The L90 + 5 dB condition is met outside bedrooms.

RECOMMENDATIONS:

1. It is recommended that noisy and vibrating machinery be vibration isolated from the base and Pinnacle buildings, where possible, with inertia bases on vibration isolators. Pipes and cables to the units should have 360 degree loops in them to reduce vibration from being transmitted to the building envelope and be supported with clamps lined with neoprene.

2. It is also recommended that future equipment be selected with noise ratings in mind. For example, ‘ totally enclosed , fan cooled (TEFC) motors produce about 5 dB greater sound pressure level than equivalent sized drip proof (DRPR) electric motors.

CONCLUSION:

The noise requirements set by the Hobart City Council in the 2015 amended Wellington Park Management Plan using the Leq metric are met based on the measurements and technical data in the Grimmenwald Cable Car Noise Report of 19/2/2007. However, some Lmax noise levels exceed the 50 dB(A) requirement. This is a stringent requirement likely to be exceeded when people talk and birds sing their territorial or mating calls. The average ambient day and evening maximum noise level obtained from 22 noise samples = 62.6 dB(A) with a standard deviation of 7.7 dB(A). In this noise climate, the cable car maximum noise events that exceed 50 dB(A) are unlikely to be intrusive.

Pearu Terts

# Mt Wellington Cableway Co. cable car proposal, Hobart
# Field report for site visits February 2019
### Appendix A to be read in conjunction with main report

## General

The client, Mt Wellington Cableway Co. proposes to construct a restaurant complex atop kunyani/Mt Wellington in the vicinity of the existing lookouts and visitor shelter, to be serviced by a cable car system based from a reception/car park at the Main Fire Trail near Old Farm Rd, to be serviced by a new access road from Mc Robies Gully.
Residents at Old Farm Rd in particular have concerns at noise and other amenity factors arising from introduction of new commercial activity in the area. South Hobart residents are concerned at increased traffic. Bushwalkers have stated concerns about loss of natural tranquillity along the many trails on the mountain. There are many other controversial aspects of the project that fall outside the strict scope of noise assessment, some of which may have commonality. This part of the study has not addressed the proposed new access road or suburban traffic. Rather, focussing on ambient noise in the absence of any activity at the proposed base terminal complex, cableway, and pinnacle terminal/restaurant complex.
This report describes the findings of ambient noise monitoring and observations from numerous site visits; 10:00-11:15 Monday 18/2/2019, 20:15-21:15 Tuesday 19/2/2019, 12:45-13:30 Thursday 21/2/2019, 14:30-15:00, 16:55-17:30 and 22:00-23:00 Friday 22/2/2019, and 15:00-17:45 and 21:20-22:05 Monday 25/2/2019.

## Instruments used

- Brűel & Kjær Sound Level Calibrator Type 4230 s/n 1169836, Laboratory Certified May 2017;
- Norsonic Precision Sound Level Meter Nor131, s/n 1312829, Laboratory Certified May 2017;
- Weather Instruments (Aneroid barometer, Zeal Wet/Dry bulb Psychrometer, Suunto KB-14/360R compass, Kaindl Windmaster 2 wind speed meter);

## Location definitions

The locations for measurements were defined and described as follows:

| Designation | Definition/comments |
|---|---|
| Loc 1 | Main Fire Trail near Old Farm Rd, Cascades, at proposed base station site, microphone at 1.2 m height |
| Loc 2 | Old Farm Road, 3 m west of roadway in clearing easement under high voltage transmission lines, by bracken clump, microphone at 1.2 m height |
| Loc 3 | Mt Wellington pinnacle area, at site below observation shelter and lookout, corresponding with proposed south end of café, microphone at 1.2 m height |
| Loc 4 | Mt Wellington pinnacle area, half way between observation shelter and bus stop/rock shelter, corresponding with proposed walkway, microphone at 1.2 m height |
| Loc 5 | Opposite climbers track car park, Pinnacle Rd, microphone 2.5 m from edge of roadway at 1.2 m height |

Aerial photo and photographs are on the following pages.

[Last revised 12/3/2019]

A2

## Airphoto showing the study site and locale


Monitoring locations shown to good approximation. Image sourced from TheList 19/2/2019, note 500 m scale bar, tenures, 20 m contours and correct compass orientation.

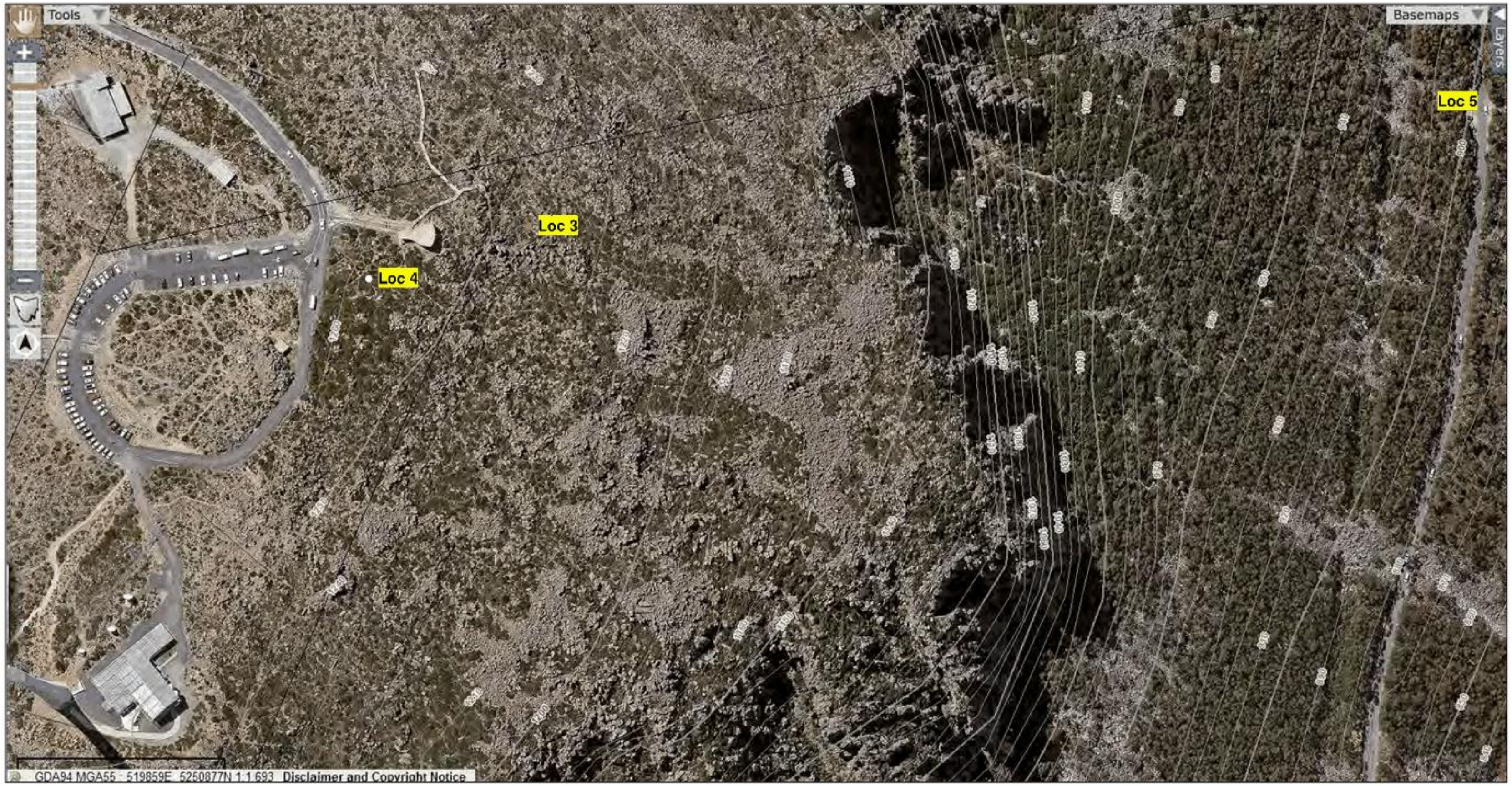
A3

## Airphoto showing the lower study site


Monitoring locations shown to good approximation. Image sourced from TheList 19/2/2019, note 100 m scale bar, tenures, 10 m contours and correct compass orientation.

A4

## Airphoto showing the upper study site




Monitoring locations shown to good approximation. Image sourced from TheList 12/3/2019, note 100 m scale bar, tenures, 10 m contours and correct compass orientation.

A5

## Site photographs

Location 1 noise measurement, Main Fire Trail, proposed base station/reception, 18/2/2019

Location 2 noise measurement, Old Farm Rd neighbourhood, 19/2/2019

A6

## Site photographs

Location 3 noise measurement, proposed south end of café, 25/2/2019

Location 4 noise measurement, proposed walkway, 25/2/2019

A7

## Site photograph

Location 5 noise measurement, climbers track car park, 25/2/2019

## Weather observations

Conditions were suitable for noise measurements, and most visits were purposely undertaken in relatively calm weather.

Weather observations

| Date | 18/02/2019 | | | 19/02/2019 | | | 21/02/2019 | | | 22/02/2019 | | 22/02/2019 | | | 25/02/2019 | 25/02/2019 | 25/02/2019 | 25/02/2019 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Loc 1 | | | Loc 2 | | | Loc 2 | | | Loc 2 | | Loc 2 | | | Loc 3 | Loc 4 | Loc 5 | Loc 5 |
| Time | 10:25 | 10:35 | 10:45 | 20:25 | 20:40 | 20:58 | 12:55 | 13:10 | 13:20 | 17:10 | 17:20 | 22:15 | 22:30 | 22:45 | 15:40 | 16:25 | 16:55 | 21:40 |
| Temp ℃ | 20 | - | - | 15 | - | - | 16 | - | - | 19 | - | 13 | - | - | 24 | - | 21 | 16 |
| Relative Humidity % | 59 | - | - | 71 | - | - | 63 | - | - | 58 | - | 79 | - | - | 31 | - | 46 | 54 |
| Pressure hPa | 972 | - | - | 987 | - | - | 992 | - | - | 997 | - | 1000 | - | - | 899 | - | 932 | 935 |
| Wind speed average m/s | 2.1 | 3.5 | 1.4 | 0.3 | calm | 0.6 | 1.6 | 1.6 | - | 0.2 | 0.1 | 0.1 | 0.4 | 0.9 | 1.5 | 4.1 | 0.2 | calm |
| Wind speed maximum m/s | 3.8 | 7.1 | 3.4 | 1.3 | calm | 1.9 | 4.5 | 3.9 | - | 1.9 | 1.3 | 1.1 | 1.3 | 2.3 | 3.4 | 7.7 | 1.1 | calm |
| Wind direction | SE | SE | SE | W | calm | WNW | NNE | SSE | - | SW var | var | W | W | W | W var | W | W var | calm |
| Cloud cover x/8 | 2 | - | - | 4 | - | - | 7 | - | - | 4 | - | 1 | - | - | 3 | - | 4 | 2 |
| Other | - | - | - | - | - | - | - | - | light rain | - | - | - | - | - | - | - | - | fog below |

Loc 1 and Loc 4 measurements included periods with significant wind gusts

## Noise descriptions

For each location, ambient noise by source noted during the site visit is listed (in descending order of significance by loudness, noticeability, duration and incidence):

**Location 1 and 2**

- Breeze in trees when gusty
- Bird calls, intensive at twilight, diversity of species and at various distances
- Rare local traffic events
- Occasional neighbourhood activity, such as brushcutter
- Distant traffic, such as Huon Rd
- Marsupials
- Insects

Noteable for low background noise levels in calm weather

**Location 3**

- Light aircraft event
- Voices at lookout
- Breeze
- Birds and insects

**Location 4**

- Breeze gusts
- Voices
- Traffic events
- Birds and insects

**Location 5**

- Traffic events passing in close proximity
- Background water in drain
- Birds
- Breeze gusts
- Birds and insects

## Comments

- Measurements were undertaken under suitable conditions.
- The proposed operating hours were not forthcoming from the client, *i.e.* times from earliest vehicle entry to last vehicle to leave. Other noise emitter details will be required, such as plant and equipment at both sites (refrigeration, air conditioning, exhaust fans), cable car motors, backup generators, security and gate closures, the list is not exhaustive.
- The Old Farm Rd neighbourhood ambient noise is essentially natural, dominated by birdsong and breeze in trees. The maximum noise level was during dusk bird chorus. The neighbourhood is for the most part a haven from man made noise sources, and as such likely valued highly by the residents. Local traffic events are rare (1 vehicle was encountered by Location 2 throughout all visits, during an instrument setup) and one visit on 22/2/2019 at 14:30-15:00 featured nearby use of brushcutter. The background noise levels in this neighbourhood are very low in calm or light winds, measuring as low as L90=21.4 dB(A).
- The pinnacle area is subject to discrete or localised noise sources: light aircraft events, voices from lookout and walkway areas, traffic events; and more generalised natural sounds (breeze, birds, insects)
- The climbers track car park area is subject to localised noise sources: traffic in close proximity, and water drain close by; and more generalised dispersed natural sounds (breeze, birds, insects)

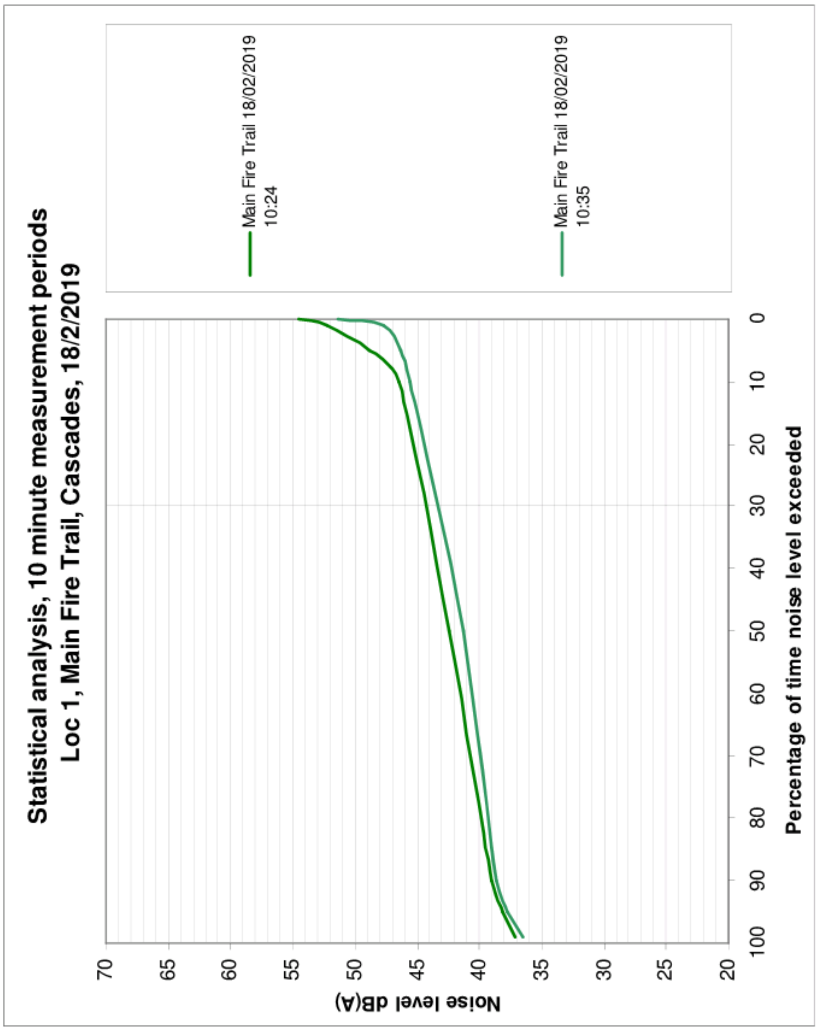
## Statistical analysis of 10 minute samples of noise levels dB(A) – Lower locations

| Location # | Loc 1 | | Loc 2 | | | | Loc 2 | | Loc 2 | | Loc 2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Main Fire Trail | | Old Farm Rd | | | | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | | |
| Date | 18/02/2019 | | 19/02/2019 | | | | 21/02/2019 | | 22/02/2019 | | 22/02/2019 | | |
| Time | 10:24 | 10:35 | 20:21 | 20:33 | 20:44 | 20:56 | 12:55 | 13:07 | 17:04 | 17:15 | 22:16 | 22:28 | 22:40 |
| Duration | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min |
| Samples | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 |
| Event | ambient | ambient | ambient | ambient | ambient | ambient | ambient | ambient | ambient | ambient | ambient | ambient | ambient |
| Comment | day | | evening | | | | day | | day | | night | | |
| Lmax | 55.9 | 71.9 | 64.6 | 69.9 | 71.8 | 44.8 | 54.2 | 54.1 | 56.6 | 70.5 | 46.3 | 34.5 | 40.7 |
| L0.1 | 54.5 | 51.4 | 55.6 | 66.4 | 57.3 | 43.9 | 52.2 | 51.8 | 54.4 | 64.8 | 39.1 | 32.4 | 38.8 |
| L1 | 52.3 | 47.7 | 47.4 | 57.9 | 44.7 | 42.6 | 46.2 | 47.4 | 44.4 | 53.4 | 36.6 | 29.6 | 36.0 |
| L5 | 48.9 | 46.3 | 40.0 | 49.2 | 38.6 | 39.9 | 41.2 | 43.3 | 39.1 | 45.5 | 32.7 | 27.2 | 32.1 |
| L10 | 46.5 | 45.6 | 38.0 | 42.9 | 36.7 | 37.0 | 39.2 | 41.6 | 37.1 | 41.8 | 30.7 | 25.4 | 28.4 |
| L50 | 42.4 | 41.3 | 28.5 | 26.4 | 28.1 | 25.2 | 34.7 | 35.5 | 31.0 | 31.7 | 24.4 | 22.4 | 23.8 |
| L90 | 39.0 | 38.6 | 23.8 | 23.4 | 26.3 | 22.5 | 30.5 | 29.4 | 28.2 | 27.5 | 21.9 | 21.4 | 22.1 |
| L95 | 38.1 | 37.7 | 23.4 | 23.0 | 25.9 | 22.2 | 29.5 | 28.5 | 27.7 | 26.9 | 21.6 | 21.2 | 21.9 |
| L99 | 37.1 | 36.5 | 22.7 | 22.5 | 25.2 | 21.8 | 28.3 | 27.7 | 26.9 | 25.9 | 21.2 | 20.9 | 21.6 |
| Lmin | 36.1 | 35.9 | 22.9 | 21.5 | 24.7 | 21.3 | 26.9 | 26.6 | 26.1 | 24.9 | 20.9 | 20.6 | 21.2 |
| Leq A | 44.2 | 43.3 | 39.2 | 45.4 | 37.9 | 32.4 | 37.0 | 38.3 | 35.0 | 43.3 | 27.5 | 23.5 | 26.5 |

## Statistical analysis of 10 minute samples of noise levels dB(A) – Upper locations

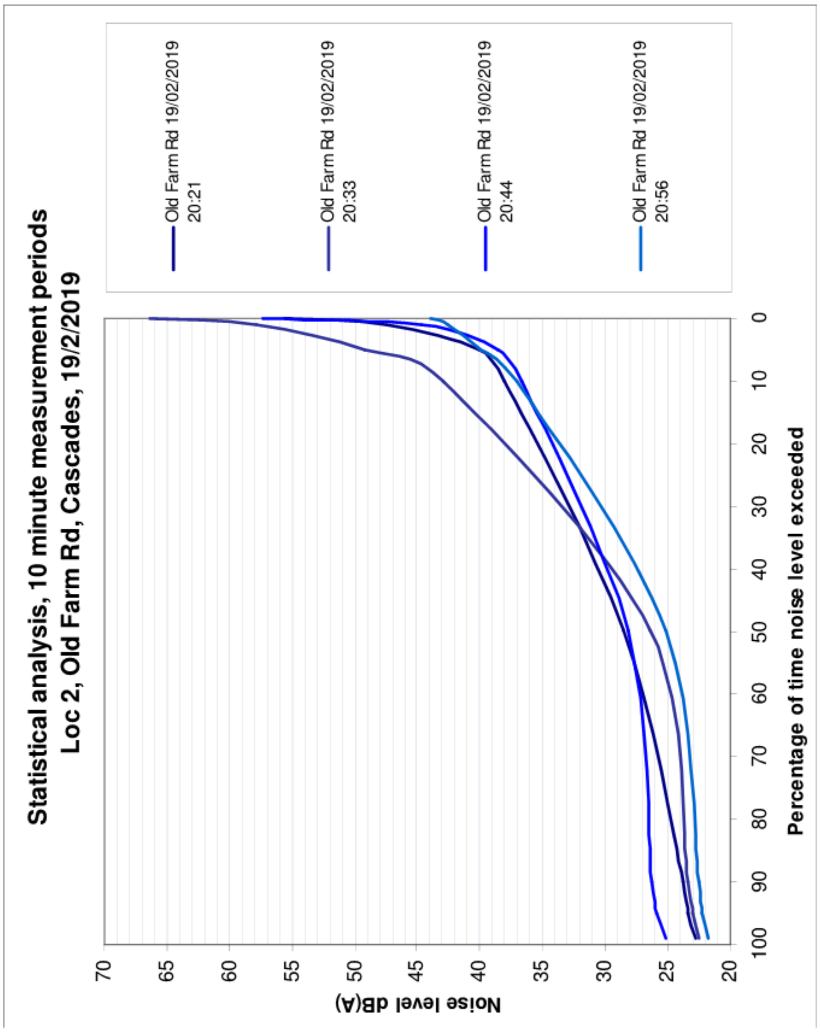
| Location | Loc 3 | | Loc 4 | Loc 5 | | Loc 5 | |
|---|---|---|---|---|---|---|---|
| Location | South Café | | South ramp | Climbers car park | | Climbers car park | |
| Date | 25/02/2019 | | 25/02/2019 | 25/02/2019 | | 25/02/2019 | |
| Time | 15:39 | 15:53 | 16:24 | 16:51 | 17:03 | 21:34 | 21:46 |
| Duration | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min | 10 min |
| Samples | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 |
| Event | ambient | ambient | ambient | ambient | ambient | ambient | ambient |
| Comment | day | | day | day | | evening | |
| Lmax | 53.6 | 59.7 | 63.0 | 86.3 | 73.7 | 73.5 | 78.5 |
| L0.1 | 52.0 | 45.0 | 59.4 | 85.4 | 72.2 | 72.8 | 78.1 |
| L1 | 47.0 | 36.2 | 54.5 | 77.3 | 68.1 | 63.7 | 68.1 |
| L5 | 43.7 | 32.2 | 49.9 | 62.1 | 61.1 | 49.6 | 55.7 |
| L10 | 42.0 | 30.9 | 47.4 | 55.8 | 54.9 | 38.7 | 47.4 |
| L50 | 32.5 | 27.3 | 39.2 | 37.1 | 38.7 | 33.8 | 33.9 |
| L90 | 27.2 | 25.5 | 33.3 | 34.9 | 34.9 | 33.4 | 33.5 |
| L95 | 26.5 | 25.2 | 31.9 | 34.6 | 34.5 | 33.3 | 33.4 |
| L99 | 25.4 | 24.7 | 29.9 | 34.1 | 34.1 | 33.1 | 33.2 |
| Lmin | 24.3 | 23.8 | 27.3 | 33.7 | 33.6 | 32.7 | 32.7 |
| Leq A | 37.9 | 29.8 | 44.1 | 63.2 | 54.5 | 50.4 | 54.8 |

A12



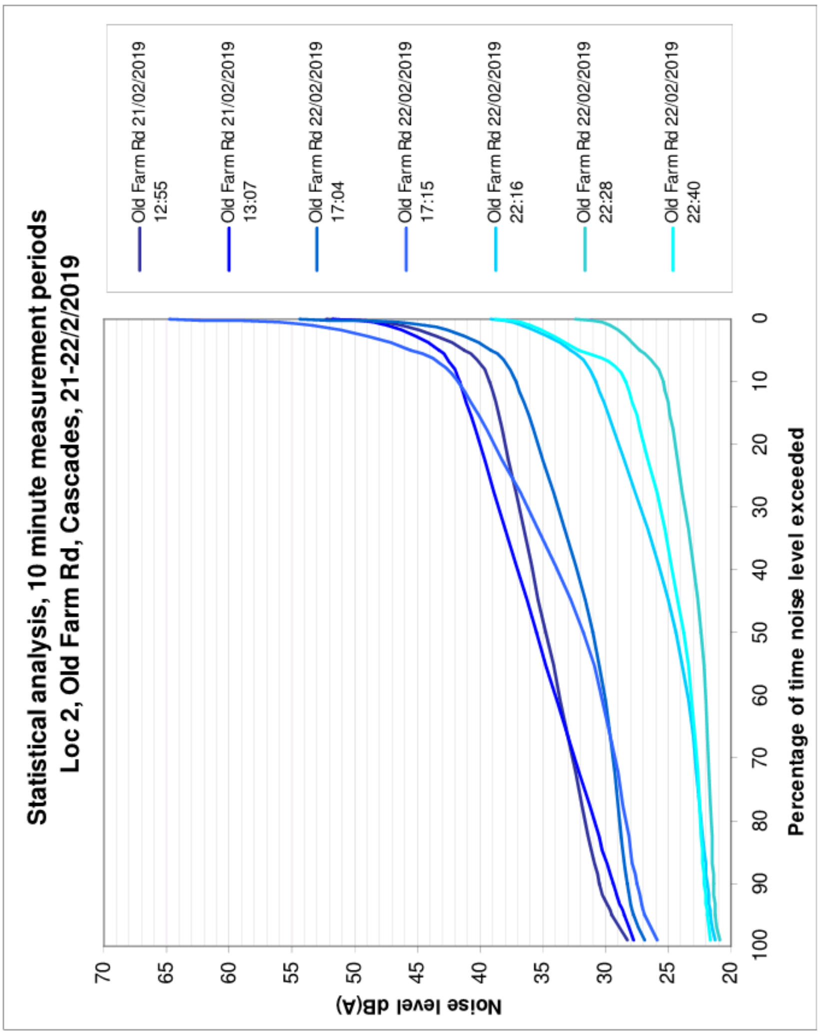

Wind in trees featured during these measurements

A13

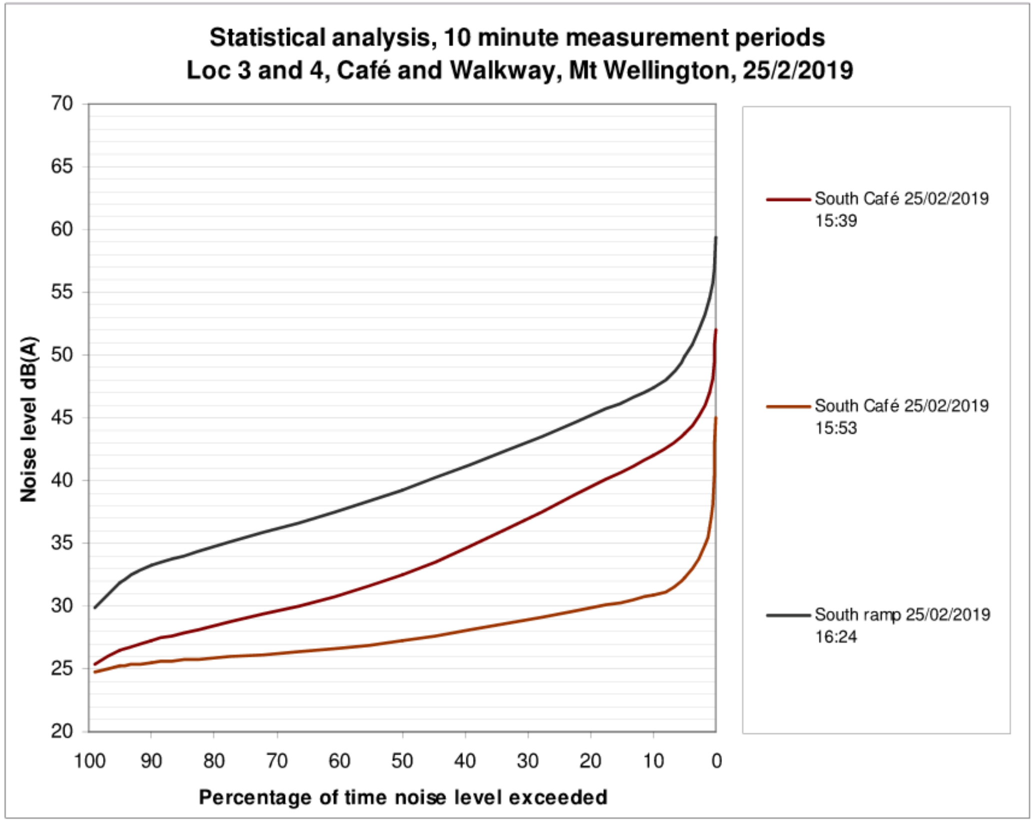



Notably low background levels.

A14

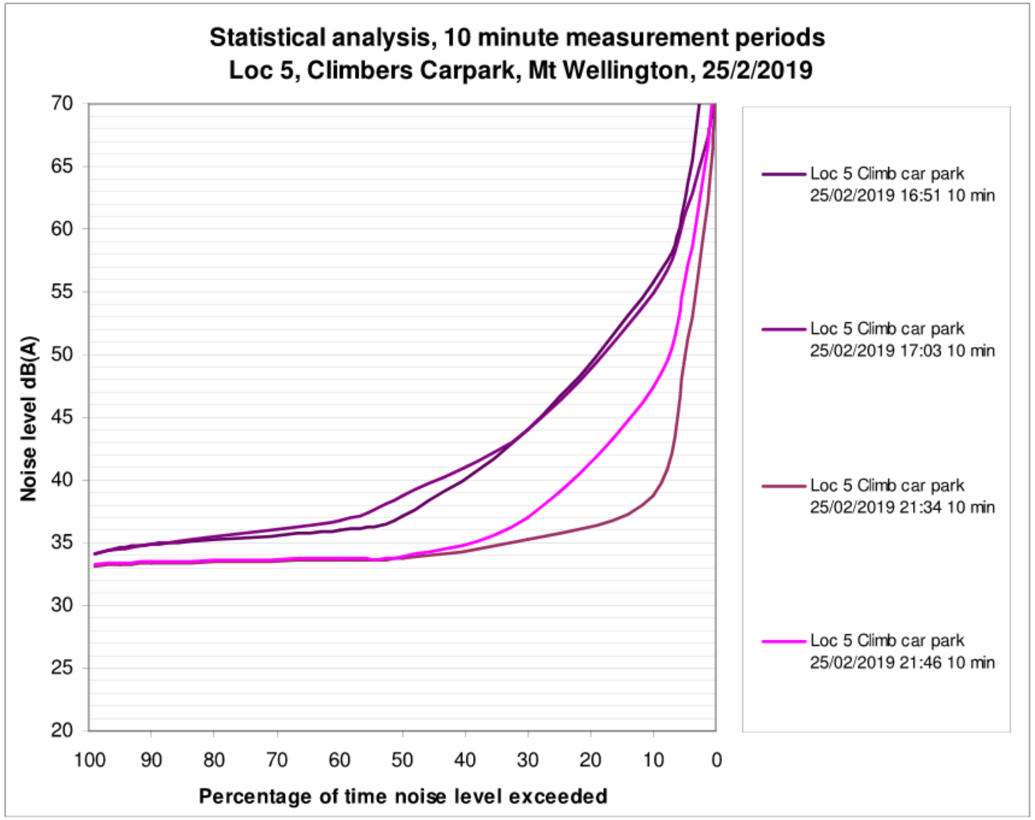



Notably low background levels.




The 15:53 measurement featured twin engine aircraft pass event
Location 4 was subject to wind gusts, voices and local traffic events

A16




Vehicles passed in close proximity.
Background featured nearby water drain.

A17

## Spectral distribution of measurements 18-21/2/2019 – Lower locations

| Loc # | Loc 1 | | Loc 1 | | Loc 2 | | Loc 2 | | Loc 2 | | Loc 2 | | Loc 2 | | Loc 2 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Main Fire Trail | | Main Fire Trail | | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | |
| Date | 18/02/2019 | | 18/02/2019 | | 19/02/2019 | | 19/02/2019 | | 19/02/2019 | | 19/02/2019 | | 21/02/2019 | | 21/02/2019 | |
| Time | 10:24 | | 10:35 | | 20:21 | | 20:33 | | 20:44 | | 20:56 | | 12:55 | | 13:07 | |
| Duration | 10 min | | 10 min | | 10 min | | 10 min | | 10 min | | 10 min | | 10 min | | 10 min | |
| Measure | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 |
| Thirds 25 | 61.4 | 39.3 | 57.0 | 38.1 | 36.5 | 21.8 | 28.0 | 21.5 | 51.6 | 23.6 | 44.7 | 23.5 | 48.2 | 29.9 | 43.1 | 30.3 |
| 32 | 59.1 | 39.5 | 54.8 | 37.6 | 33.8 | 21.7 | 26.8 | 20.9 | 53.1 | 23.5 | 41.6 | 22.8 | 45.4 | 27.6 | 39.3 | 28.3 |
| 40 | 57.3 | 37.2 | 52.8 | 36.3 | 30.5 | 21.1 | 25.7 | 21.1 | 51.9 | 23.8 | 38.6 | 22.6 | 42.3 | 27.7 | 36.2 | 27.6 |
| 50 | 54.8 | 36.3 | 49.1 | 35.4 | 31.1 | 26.3 | 29.1 | 25.8 | 48.6 | 26.5 | 35.8 | 26.8 | 40.1 | 30.1 | 35.8 | 30.4 |
| 63 | 52.0 | 36.1 | 45.7 | 35.3 | 27.6 | 22.1 | 26.0 | 22.0 | 44.2 | 24.6 | 32.5 | 24.1 | 38.5 | 29.2 | 34.7 | 29.4 |
| 80 | 48.1 | 36.0 | 43.1 | 35.0 | 26.5 | 21.8 | 25.8 | 22.0 | 41.8 | 23.4 | 29.2 | 22.8 | 35.7 | 28.3 | 32.4 | 28.0 |
| 100 | 44.4 | 34.6 | 40.5 | 33.8 | 23.6 | 19.9 | 22.5 | 19.9 | 36.9 | 21.4 | 26.9 | 22.0 | 32.7 | 26.4 | 30.0 | 25.7 |
| 125 | 41.4 | 32.8 | 38.3 | 32.5 | 21.7 | | 21.1 | | 34.1 | 19.9 | 24.0 | 19.9 | 29.1 | 22.6 | 26.8 | 22.7 |
| 160 | 38.9 | 31.4 | 36.6 | 31.3 | 21.0 | | 18.5 | | 31.5 | | 23.4 | | 28.5 | 21.9 | 25.6 | 21.7 |
| 200 | 37.1 | 31.1 | 35.6 | 31.2 | 20.8 | | 16.8 | | 29.4 | | 23.5 | | 26.3 | 20.0 | 24.5 | 20.0 |
| 250 | 36.4 | 31.8 | 35.6 | 31.7 | 21.2 | | 15.6 | | 26.2 | | 22.4 | | 25.2 | 19.9 | 24.0 | 19.9 |
| 315 | 36.8 | 32.3 | 36.3 | 32.3 | 20.6 | | 16.3 | | 24.8 | | 22.8 | | 26.9 | 21.1 | 25.0 | 20.9 |
| 400 | 36.8 | 31.7 | 36.2 | 31.8 | 19.5 | | 17.0 | | 24.0 | | 22.8 | | 25.7 | 20.2 | 24.2 | 20.0 |
| 500 | 35.5 | 30.3 | 34.9 | 30.6 | 20.3 | | 17.9 | | 23.5 | | 22.6 | | 25.0 | 20.0 | 23.9 | 19.9 |
| 630 | 34.4 | 29.3 | 33.8 | 29.8 | 21.1 | | 18.8 | | 22.5 | | 21.8 | | 24.5 | 19.9 | 23.7 | |
| 800 | 34.0 | 28.5 | 33.4 | 28.8 | 22.6 | | 16.4 | | 22.0 | | 20.8 | | 24.8 | | 25.0 | |
| 1k | 33.3 | 27.7 | 32.9 | 27.8 | 26.1 | | 18.2 | | 24.9 | | 20.1 | | 24.7 | | 26.2 | |
| 1.25k | 32.7 | 26.9 | 34.6 | 26.8 | 33.1 | | 21.6 | | 30.8 | | 21.2 | | 25.3 | | 30.7 | |
| 1.6k | 31.8 | 25.8 | 32.5 | 25.4 | 30.9 | | 24.9 | | 30.6 | | 19.9 | | 26.2 | | 29.0 | |
| 2k | 31.4 | 25.7 | 30.0 | 24.6 | 27.9 | | 35.0 | | 26.8 | | 21.4 | | 25.3 | | 28.8 | |
| 2.5k | 31.4 | 24.9 | 28.7 | 24.1 | 27.5 | | 40.6 | | 24.2 | | 21.3 | | 24.8 | | 27.5 | |
| 3.15k | 31.0 | 23.8 | 28.1 | 23.5 | 26.1 | | 39.0 | | 21.9 | | 20.8 | | 25.0 | | 26.6 | |
| 4k | 30.2 | 22.0 | 27.3 | 21.9 | 24.9 | | 28.4 | | 21.2 | | 20.6 | | 26.6 | | 25.5 | |
| 5k | 29.0 | 20.0 | 25.3 | 19.9 | 23.2 | | 30.6 | | 19.6 | | 19.8 | | 25.2 | | 22.8 | |
| 6.3k | 27.1 | 19.9 | 23.9 | 19.9 | 25.3 | | 29.0 | | 20.8 | | 18.0 | | 23.9 | | 21.4 | |
| 8k | 27.8 | 25.7 | 28.3 | 25.2 | 28.6 | | 16.7 | | 26.0 | | 15.5 | | 25.1 | | 18.6 | |
| 10k | 23.1 | 20.4 | 21.6 | 19.9 | 17.2 | | 12.7 | | 16.3 | | 12.2 | | 15.8 | | 14.8 | |
| Overall A | 44.2 | 39.0 | 43.3 | 38.6 | 39.2 | 23.8 | 45.4 | 23.4 | 37.9 | 25.9 | 32.4 | 22.5 | 37.0 | 30.5 | 38.3 | 29.4 |
| C | 65.5 | 49.0 | 61.4 | 47.7 | 43.1 | 33.7 | 44.5 | 33.4 | 57.7* | 35.0 | 49.9 | 34.3 | 53.0 | 39.7 | 52.4 | 40.4 |
| Octave 31.5 | 64.4 | 43.6 | 60.0 | 42.2 | 39.0 | 26.3 | 31.7 | 25.9 | 57.0 | 28.4 | 47.1 | 27.8 | 50.7 | 33.3 | 45.2 | 33.7 |
| 63 | 57.2 | 40.9 | 51.4 | 40.0 | 33.6 | 28.7 | 32.0 | 28.4 | 50.6 | 29.8 | 38.1 | 29.7 | 43.2 | 34.0 | 39.3 | 34.1 |
| 125 | 46.9 | 37.9 | 43.5 | 37.4 | 27.0 | | 25.8 | | 39.5 | | 29.8 | | 35.3 | 28.9 | 32.7 | 28.5 |
| 250 | 41.5 | 36.5 | 40.6 | 36.5 | 25.6 | | 21.0 | | 32.0 | | 27.7 | | 31.0 | 25.1 | 29.3 | 25.1 |
| 500 | 40.4 | 35.3 | 39.8 | 35.6 | 25.1 | | 22.7 | | 28.1 | | 27.2 | | 29.9 | | 28.7 | |
| 1k | 38.1 | 32.5 | 38.5 | 32.6 | 34.2 | | 24.1 | | 32.2 | | 25.5 | | 29.7 | | 32.8 | |
| 2k | 36.3 | 30.3 | 35.5 | 29.5 | 33.8 | | 41.7 | | 32.8 | | 25.7 | | 30.2 | | 33.3 | |
| 4k | 34.9 | 27.0 | 31.8 | 26.8 | 29.7 | | 39.9 | | 25.8 | | 25.2 | | 30.4 | | 30.0 | |
| 8k | 31.2 | 27.6 | 30.3 | 27.2 | 30.5 | | 29.3 | | 27.5 | | 20.6 | | 27.8 | | 23.8 | |

Third octave lower limit for L90 = 19.8 dB
Octave lower limit for L90 = 24.9 dB
*20:44 measurement anomalous 57.7 dB(C) due to moths near microphone

## Spectral distribution of measurements 22/2/2019 – Lower locations

| Loc # | Loc 2 | | Loc 2 | | Loc 2 | | Loc 2 | | Loc 2 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | |
| Date | 22/02/2019 | | 22/02/2019 | | 22/02/2019 | | 22/02/2019 | | 22/02/2019 | |
| Time | 17:04 | | 17:15 | | 22:16 | | 22:28 | | 22:40 | |
| Duration | 10 min | | 10 min | | 10 min | | 10 min | | 10 min | |
| Measure | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 |
| Thirds 25 | 33.7 | 26.9 | 33.3 | 24.3 | 28.9 | 23.6 | 27.4 | 22.4 | 33.0 | 24.8 |
| 32 | 34.1 | 26.6 | 30.1 | 24.4 | 26.8 | 22.0 | 27.2 | 22.6 | 31.3 | 23.9 |
| 40 | 34.1 | 26.9 | 31.1 | 25.0 | 28.2 | 23.7 | 28.3 | 24.0 | 31.1 | 25.2 |
| 50 | 33.3 | 28.8 | 35.4 | 29.3 | 31.1 | 25.9 | 31.2 | 25.8 | 31.3 | 26.5 |
| 63 | 34.6 | 29.3 | 34.1 | 27.1 | 30.9 | 25.7 | 29.5 | 25.1 | 29.4 | 24.7 |
| 80 | 34.4 | 27.7 | 30.0 | 25.5 | 32.0 | 25.8 | 31.6 | 24.7 | 28.6 | 23.3 |
| 100 | 30.2 | 25.5 | 27.2 | 23.4 | 32.1 | 24.3 | 30.1 | 23.0 | 26.8 | 22.0 |
| 125 | 28.6 | 24.0 | 25.4 | 21.1 | 29.8 | 20.8 | 25.3 | 20.0 | 24.5 | 20.1 |
| 160 | 26.0 | 21.8 | 26.0 | 19.9 | 26.1 | 19.9 | 23.8 | | 22.8 | |
| 200 | 22.2 | 19.9 | 20.0 | | 23.8 | | 18.4 | | 18.4 | |
| 250 | 20.1 | | 17.8 | | 21.4 | | 15.9 | | 17.3 | |
| 315 | 20.9 | | 20.2 | | 24.6 | | 19.6 | | 17.4 | |
| 400 | 22.4 | | 20.1 | | 23.4 | | 16.7 | | 16.1 | |
| 500 | 22.0 | | 21.1 | | 21.9 | | 15.3 | | 15.6 | |
| 630 | 21.7 | | 20.4 | | 19.5 | | 13.9 | | 14.6 | |
| 800 | 20.8 | | 21.6 | | 15.5 | | 12.1 | | 14.3 | |
| 1k | 20.1 | | 28.3 | | 12.8 | | 10.5 | | 13.1 | |
| 1.25k | 22.0 | | 32.8 | | 11.4 | | 9.2 | | 12.5 | |
| 1.6k | 21.6 | | 31.1 | | 10.6 | | 8.3 | | 14.0 | |
| 2k | 23.1 | | 33.0 | | 11.3 | | 8.0 | | 18.5 | |
| 2.5k | 26.4 | | 28.2 | | 11.0 | | 7.9 | | 15.5 | |
| 3.15k | 26.8 | | 29.3 | | 10.9 | | 7.8 | | 15.2 | |
| 4k | 23.6 | | 29.2 | | 10.1 | | 7.9 | | 13.8 | |
| 5k | 21.6 | | 38.9 | | 10.0 | | 8.0 | | 11.4 | |
| 6.3k | 23.0 | | 31.6 | | 10.0 | | 8.3 | | 10.3 | |
| 8k | 20.8 | | 27.7 | | 9.8 | | 8.4 | | 9.3 | |
| 10k | 11.5 | | 17.8 | | 9.1 | | 8.6 | | 8.8 | |
| Overall A | 35.0 | 28.2 | 43.3 | 27.5 | 27.5 | 21.9 | 23.5 | 21.4 | 26.5 | 22.1 |
| C | 42.1 | 39.0 | 44.1 | 37.2 | 39.6 | 35.4 | 37.9 | 34.6 | 40.1 | 35.6 |
| Octave 31.5 | 38.7 | 31.6 | 36.5 | 29.3 | 32.8 | 27.9 | 32.4 | 27.8 | 36.7 | 29.4 |
| 63 | 38.9 | 33.4 | 38.5 | 32.4 | 36.1 | 30.6 | 35.6 | 30.0 | 34.7 | 29.8 |
| 125 | 33.4 | 28.8 | 31.0 | 26.5 | 34.7 | 26.9 | 32.0 | 26.0 | 29.8 | 25.5 |
| 250 | 25.9 | | 24.2 | | 28.2 | | 23.0 | | 22.5 | |
| 500 | 26.8 | | 25.3 | | 26.7 | | 20.2 | | 20.2 | |
| 1k | 25.8 | | 34.4 | | 18.3 | | 15.5 | | 18.1 | |
| 2k | 28.9 | | 36.0 | | 15.7 | | 12.8 | | 21.2 | |
| 4k | 29.3 | | 39.8 | | 15.1 | | 12.7 | | 18.5 | |
| 8k | 25.2 | | 33.2 | | 14.4 | | 13.2 | | 14.3 | |

Third octave lower limit for L90 = 19.8 dB
Octave lower limit for L90 = 24.9 dB

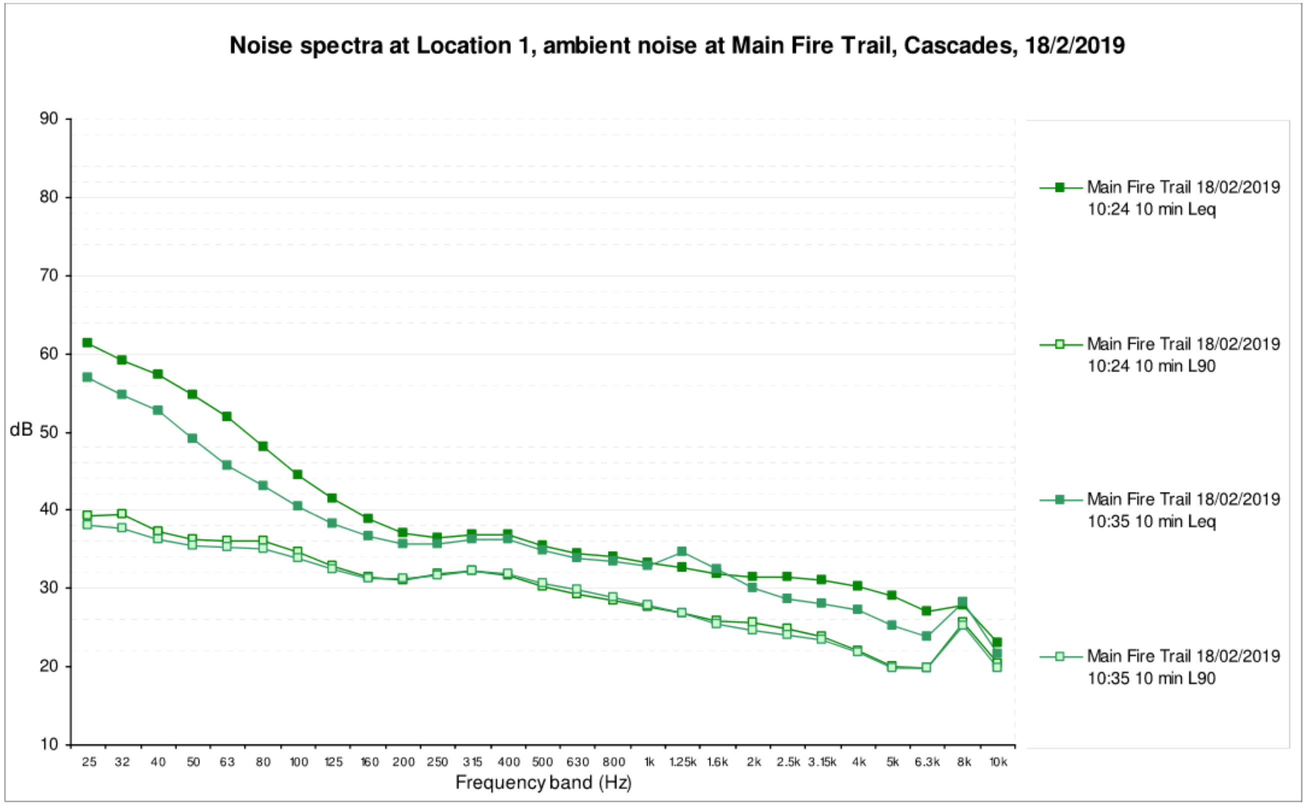
## Spectral distribution of measurements 25/2/2019 – Upper locations

| Loc # | Loc 3 | | Loc 3 | | Loc 4 | | Loc 5 | | Loc 5 | | Loc 5 | | Loc 5<br>Loc 5 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | South Café | | South Café | | South ramp | | Climb car park | | Climb car park | | Climb car park | | Climb car park | |
| Date | 25/02/2019 | | 25/02/2019 | | 25/02/2019 | | 25/02/2019 | | 25/02/2019 | | 25/02/2019 | | 25/02/2019 | |
| Time | 15:39 | | 15:53 | | 16:24 | | 16:51 | | 17:03 | | 21:34 | | 21:46 | |
| Duration | 10 min | | 10 min | | 10 min | | 10 min | | 10 min | | 10 min | | 10 min | |
| Measure | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 |
| Thirds 25 | 61.3 | 39.3 | 52.3 | 39.5 | 70.4 | 48.7 | 49.0 | 33.6 | 49.0 | 33.1 | 44.2 | 27.3 | 41.1 | 28.0 |
| 32 | 59.6 | 35.8 | 48.8 | 35.5 | 68.2 | 47.7 | 52.5 | 32.7 | 51.5 | 32.5 | 45.1 | 27.4 | 42.5 | 28.2 |
| 40 | 56.6 | 33.8 | 45.9 | 33.3 | 65.8 | 46.7 | 50.8 | 33.5 | 49.1 | 32.9 | 42.7 | 28.2 | 43.2 | 29.5 |
| 50 | 52.7 | 33.0 | 42.9 | 32.5 | 63.0 | 41.8 | 58.0 | 34.2 | 50.5 | 34.0 | 42.4 | 28.5 | 43.8 | 29.6 |
| 63 | 49.3 | 32.6 | 39.7 | 31.3 | 59.9 | 39.9 | 67.0 | 34.4 | 50.3 | 34.8 | 51.0 | 28.6 | 47.5 | 29.0 |
| 80 | 48.4 | 30.3 | 35.2 | 28.6 | 56.8 | 38.6 | 71.4 | 34.4 | 51.6 | 34.8 | 43.2 | 28.0 | 46.5 | 28.9 |
| 100 | 43.7 | 27.8 | 31.5 | 25.4 | 53.0 | 34.9 | 64.0 | 32.9 | 48.3 | 34.4 | 40.7 | 26.9 | 44.3 | 27.8 |
| 125 | 44.4 | 24.2 | 29.3 | 22.9 | 49.1 | 31.8 | 66.2 | 31.8 | 50.7 | 31.5 | 41.9 | 26.1 | 42.2 | 27.6 |
| 160 | 40.6 | 21.5 | 24.1 | 19.9 | 44.0 | 25.4 | 66.9 | 28.8 | 51.7 | 28.3 | 38.5 | 22.5 | 42.2 | 23.9 |
| 200 | 36.8 | 21.2 | 23.2 | 20.0 | 38.6 | 21.9 | 62.5 | 26.7 | 48.6 | 25.9 | 40.9 | 20.3 | 43.8 | 20.5 |
| 250 | 37.5 | 20.3 | 22.6 | 19.9 | 34.1 | 23.1 | 60.9 | 25.3 | 46.1 | 24.0 | 41.7 | 19.9 | 44.0 | 19.9 |
| 315 | 33.2 | 19.9 | 20.6 | | 31.1 | 23.0 | 58.4 | 23.3 | 43.7 | 22.2 | 39.5 | | 42.4 | |
| 400 | 31.6 | | 21.1 | | 29.9 | 22.4 | 58.2 | 22.5 | 42.5 | 21.1 | 38.3 | | 41.8 | |
| 500 | 28.9 | | 21.3 | | 30.7 | 22.8 | 59.1 | 22.1 | 44.3 | 21.2 | 40.0 | 19.8 | 43.6 | 19.8 |
| 630 | 26.0 | | 19.2 | | 31.2 | 22.5 | 53.5 | 24.7 | 45.7 | 24.4 | 40.4 | 22.0 | 45.0 | 22.0 |
| 800 | 22.9 | | 18.6 | | 31.4 | 21.4 | 50.4 | 22.4 | 46.3 | 22.1 | 41.5 | 19.9 | 47.5 | 20.0 |
| 1k | 20.5 | | 19.6 | | 31.6 | 20.4 | 48.7 | 21.7 | 46.5 | 21.4 | 44.0 | 20.8 | 49.7 | 20.9 |
| 1.25k | 20.3 | | 19.7 | | 29.6 | 20.0 | 47.4 | 22.4 | 45.5 | 22.1 | 42.0 | 21.9 | 46.2 | 22.1 |
| 1.6k | 19.0 | | 17.3 | | 31.3 | 19.9 | 46.6 | 22.6 | 44.2 | 22.5 | 40.5 | 21.7 | 44.7 | 21.8 |
| 2k | 18.2 | | 16.8 | | 29.0 | | 44.5 | 21.9 | 42.2 | 22.0 | 37.9 | 21.5 | 41.2 | 21.6 |
| 2.5k | 17.0 | | 13.3 | | 25.0 | | 43.4 | 22.5 | 39.8 | 22.8 | 34.9 | 22.2 | 37.5 | 22.1 |
| 3.15k | 16.2 | | 14.4 | | 23.4 | | 43.4 | 21.9 | 38.6 | 22.4 | 34.2 | 22.0 | 34.5 | 21.9 |
| 4k | 15.8 | | 15.7 | | 22.9 | | 42.6 | 22.2 | 36.7 | 22.8 | 31.6 | 22.1 | 32.1 | 22.2 |
| 5k | 15.5 | | 13.7 | | 20.3 | | 41.2 | 21.3 | 36.0 | 21.9 | 29.6 | 21.3 | 29.2 | 21.5 |
| 6.3k | 15.0 | | 13.3 | | 25.2 | | 39.6 | 19.9 | 33.3 | 20.3 | 27.3 | 20.2 | 26.4 | 20.4 |
| 8k | 14.1 | | 16.0 | | 24.9 | | 36.2 | | 29.3 | 19.8 | 23.5 | 19.8 | 23.4 | 19.8 |
| 10k | 12.2 | | 11.0 | | 16.8 | | 30.9 | | 25.1 | | 19.2 | | 19.6 | |
| Overall A | 37.9 | 27.2 | 29.8 | 25.5 | 44.1 | 33.3 | 63.2 | 34.9 | 54.5 | 34.9 | 50.4 | 33.4 | 54.8 | 33.5 |
| C | 65.7 | 45.4 | 56.5 | 44.3 | 74.0 | 56.6 | 75.4 | 44.5 | 60.9 | 45.2 | 56.1 | 39.6 | 57.6 | 40.3 |
| Octave 31.5 | 64.3 | 41.7 | 54.5 | 41.6 | 73.3 | 52.5 | 55.8 | 38.1 | 54.8 | 37.6 | 48.9 | 32.4 | 47.1 | 33.4 |
| 63 | 55.3 | 36.9 | 45.1 | 35.9 | 65.4 | 45.1 | 72.9 | 39.1 | 55.6 | 39.3 | 52.2 | 33.1 | 51.0 | 33.9 |
| 125 | 48.0 | 30.0 | 34.0 | 28.1 | 54.9 | 36.9 | 70.6 | 36.3 | 55.2 | 36.9 | 45.4 | 30.3 | 47.8 | 31.5 |
| 250 | 41.0 | 25.3 | 27.0 | | 40.5 | 27.5 | 65.7 | 30.1 | 51.4 | 29.1 | 45.6 | 23.1 | 48.2 | 23.2 |
| 500 | 34.2 | | 25.4 | | 35.4 | 27.3 | 62.3 | 28.0 | 49.1 | 27.3 | 44.4 | 24.1 | 48.4 | 24.1 |
| 1k | 26.2 | | 24.1 | | 35.7 | 25.4 | 53.8 | 27.0 | 50.9 | 26.7 | 47.4 | 25.7 | 52.8 | 25.9 |
| 2k | 22.9 | | 20.9 | | 33.9 | | 49.8 | 27.1 | 47.2 | 27.2 | 43.1 | 26.6 | 46.8 | 26.6 |
| 4k | 20.6 | | 19.5 | | 27.2 | | 47.3 | 26.6 | 42.0 | 27.2 | 37.0 | 26.6 | 37.2 | 26.6 |
| 8k | 18.7 | | 18.7 | | 28.4 | | 41.6 | | 35.2 | | 29.3 | | 28.7 | |

Third octave lower limit for L90 = 19.8 dB
Octave lower limit for L90 = 24.9 dB

A20

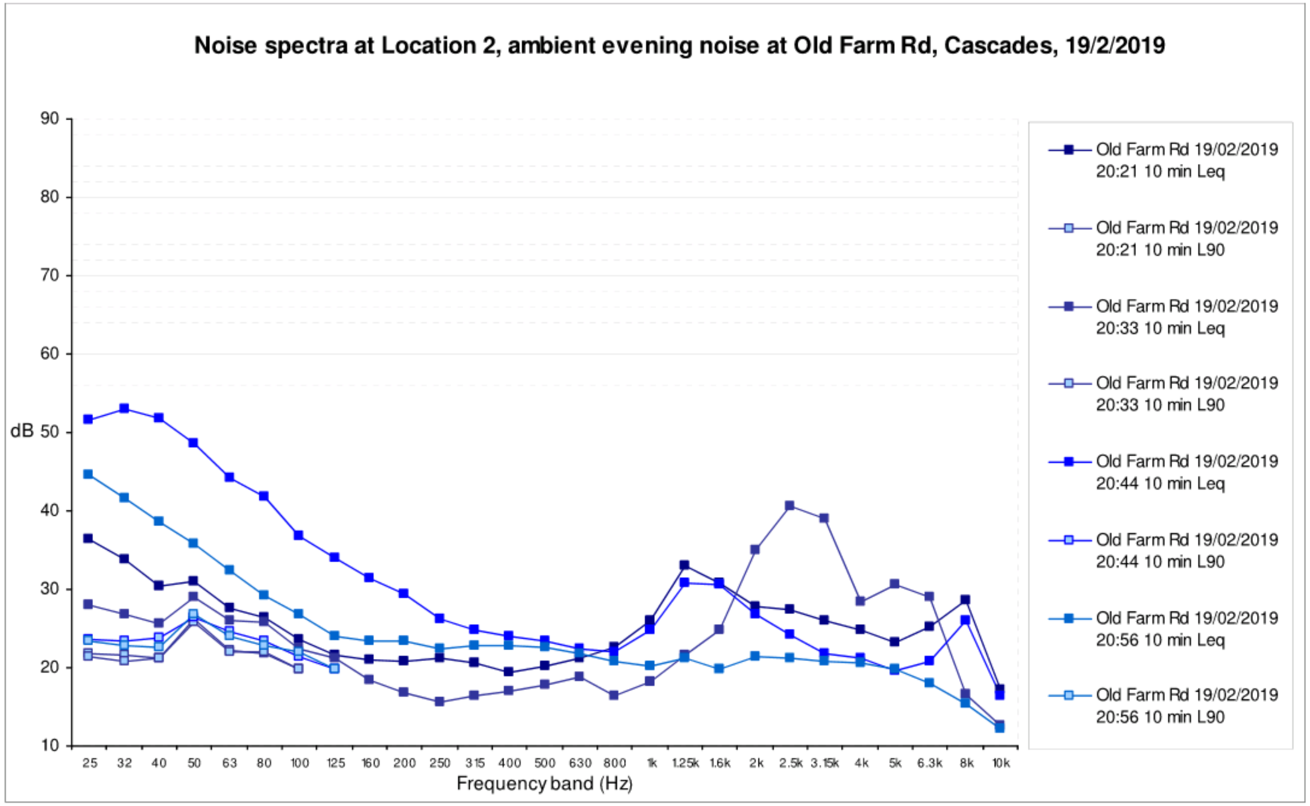
## Spectral analysis (third octaves)




Breeze in trees

A21

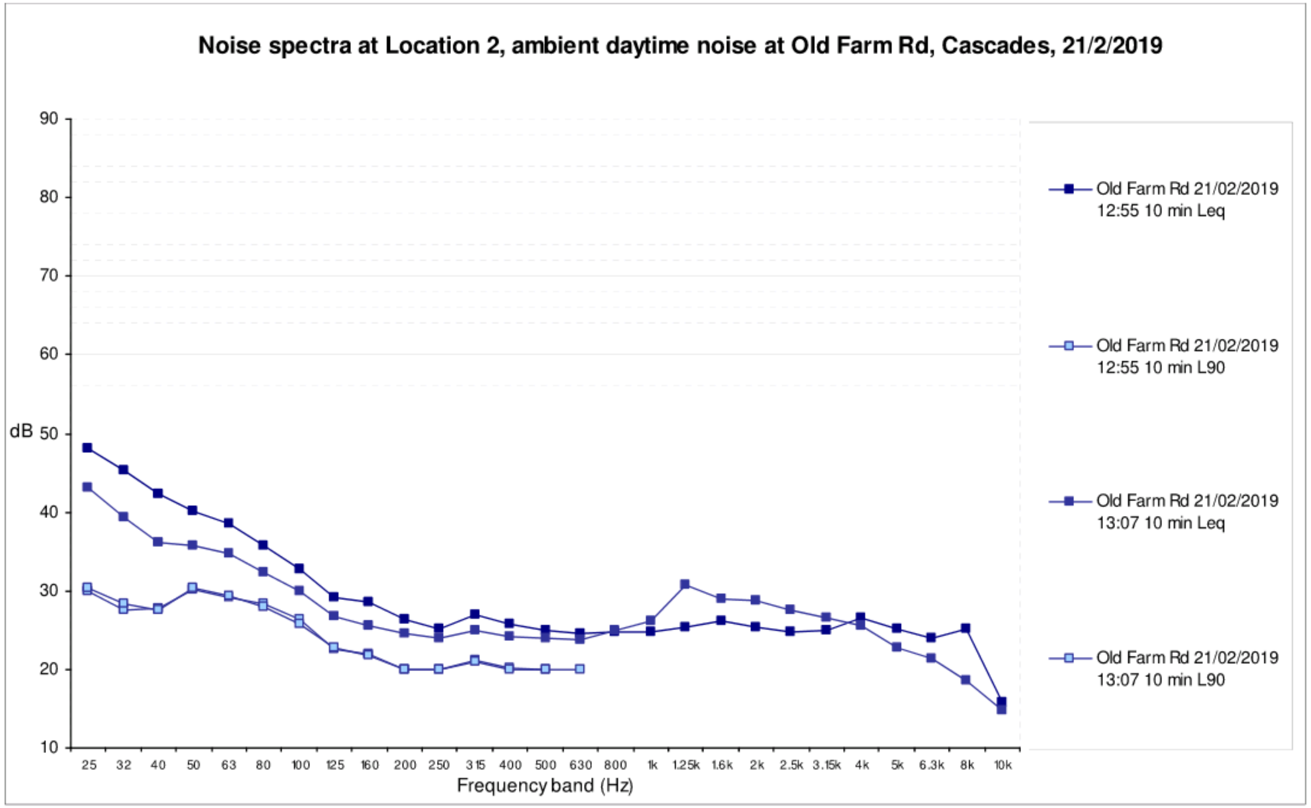
## Spectral analysis (third octaves)




Dusk bird chorus, faded by final measurement
The 20:44 measurement has anomalous elevated low frequency Leq's due to moths near microphone

A22

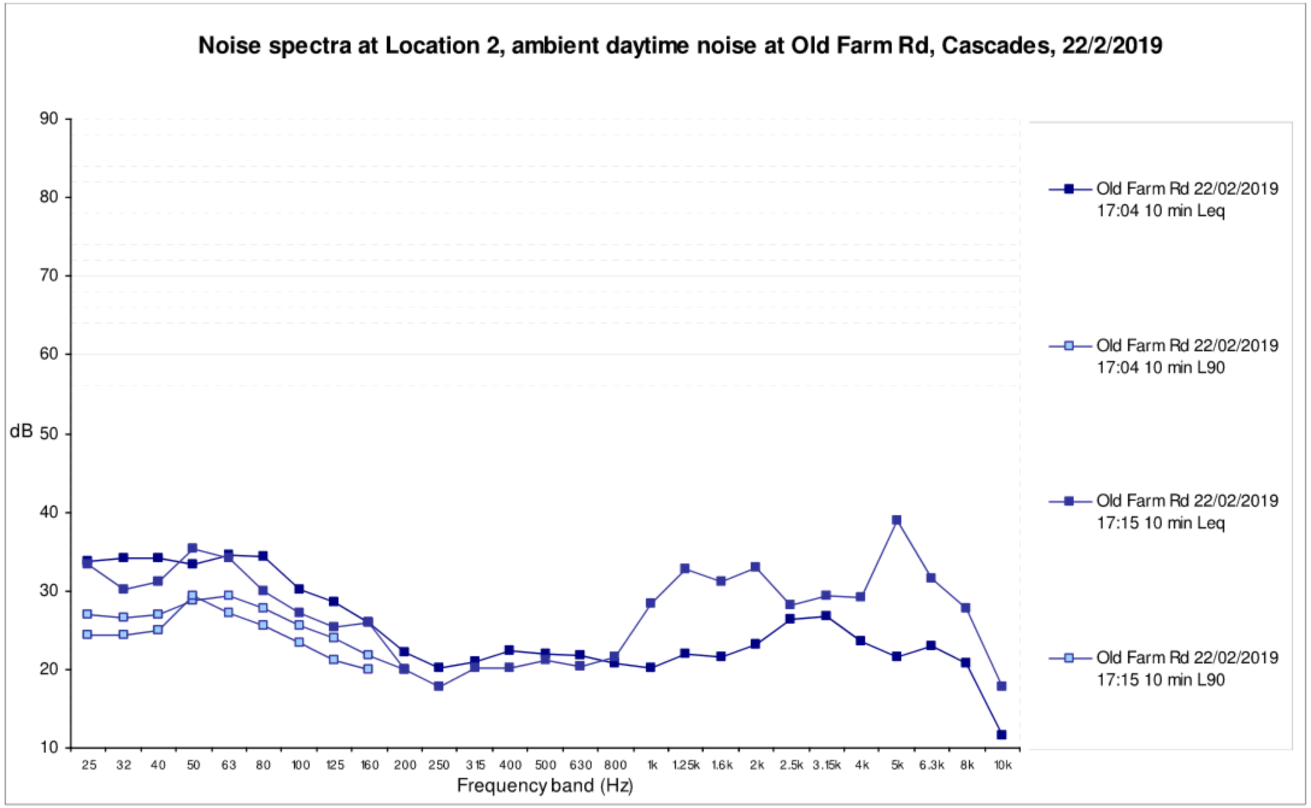
## Spectral analysis (third octaves)




Low daytime noise levels

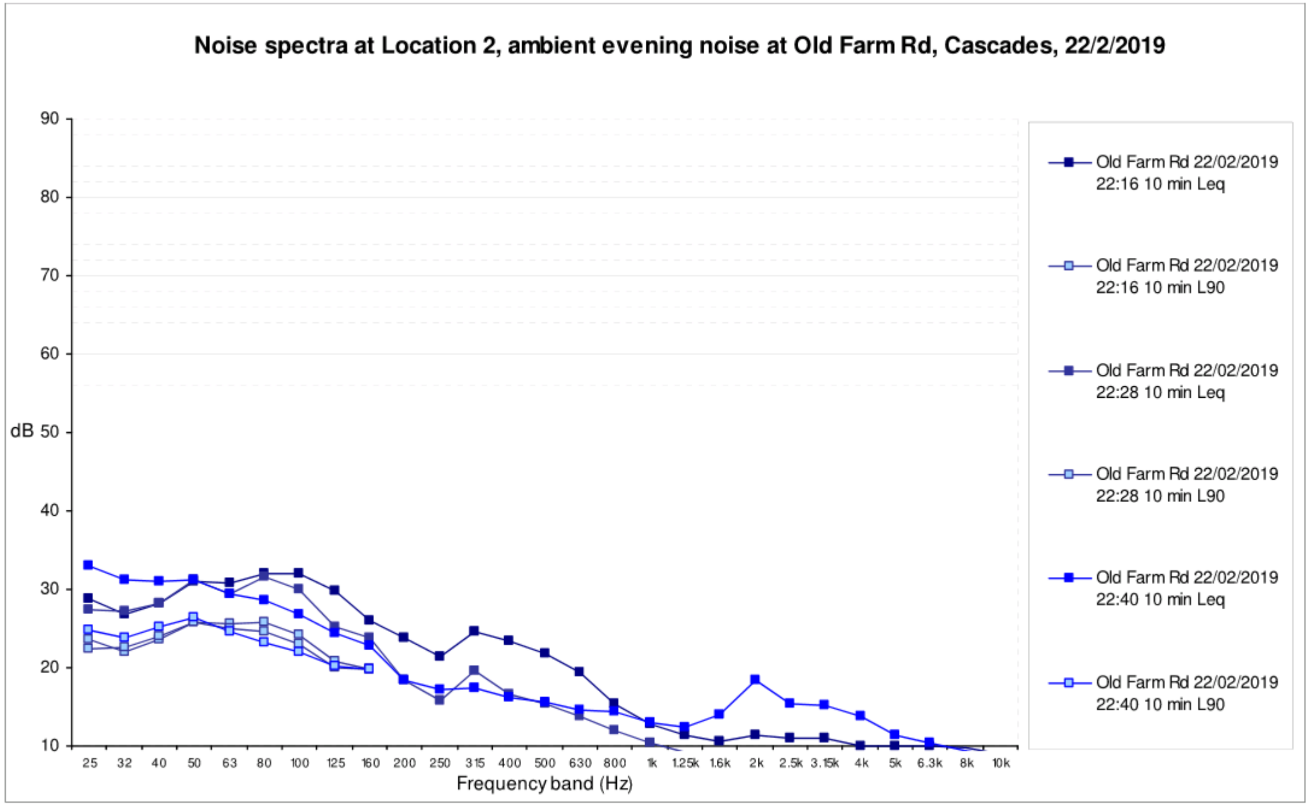
A23

## Spectral analysis (third octaves)



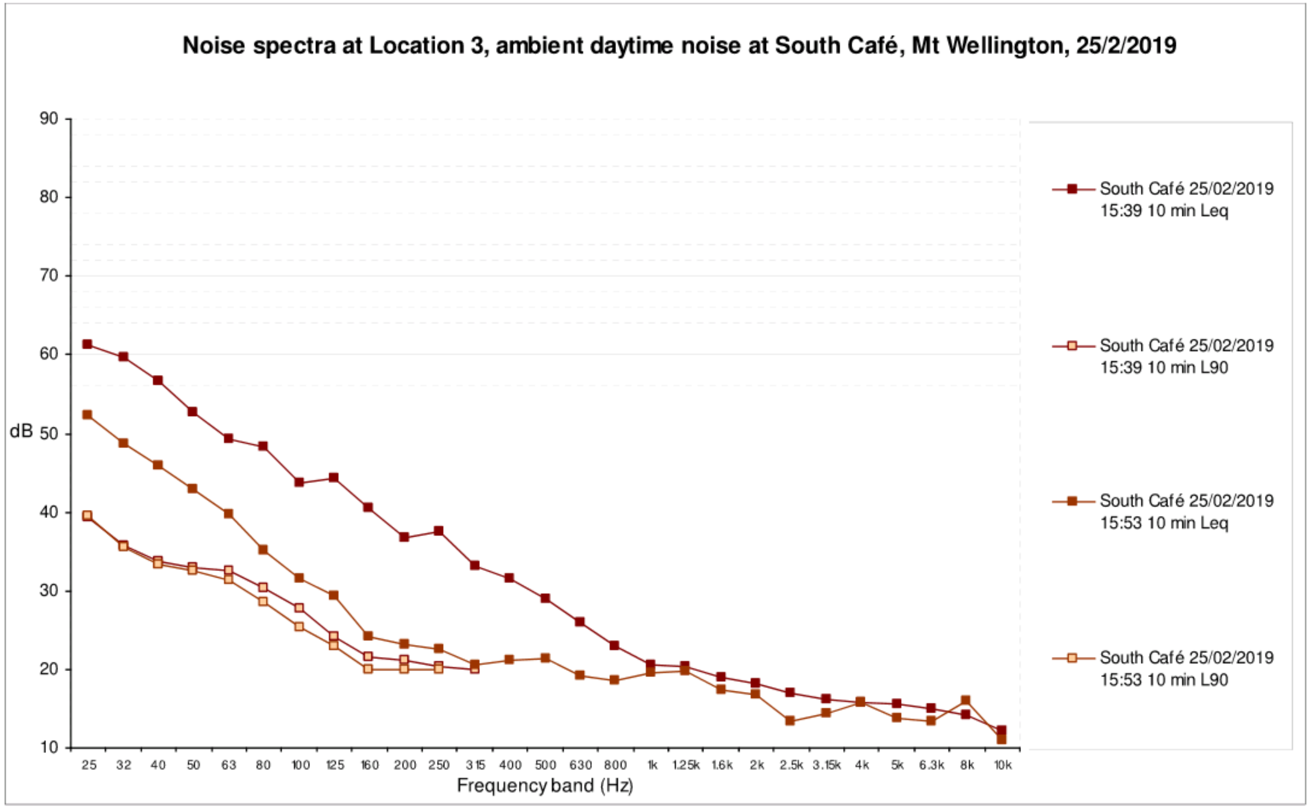

Some bird calls

## Spectral analysis (third octaves)




Low night time noise levels

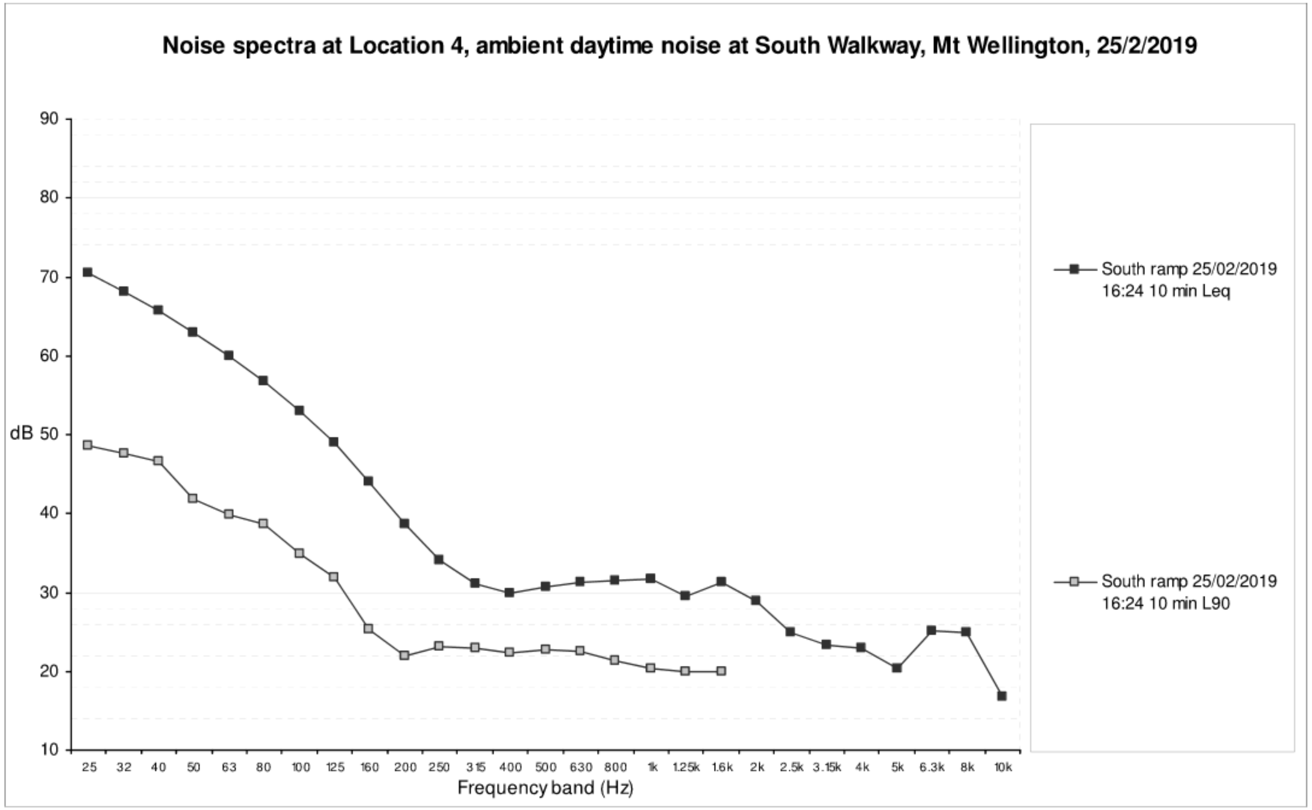
## Spectral analysis (third octaves)




The first measurement featured a twin-prop aircraft event

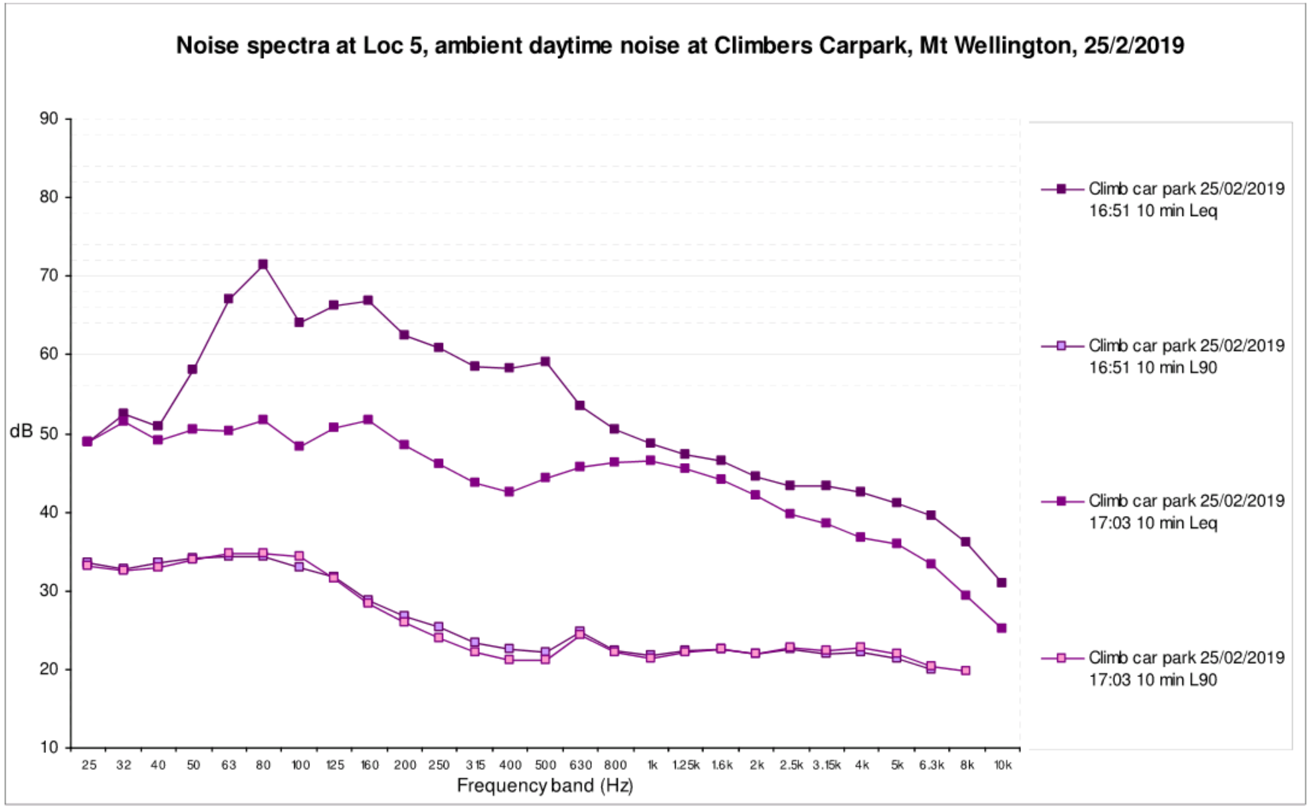
A26

## Spectral analysis (third octaves)



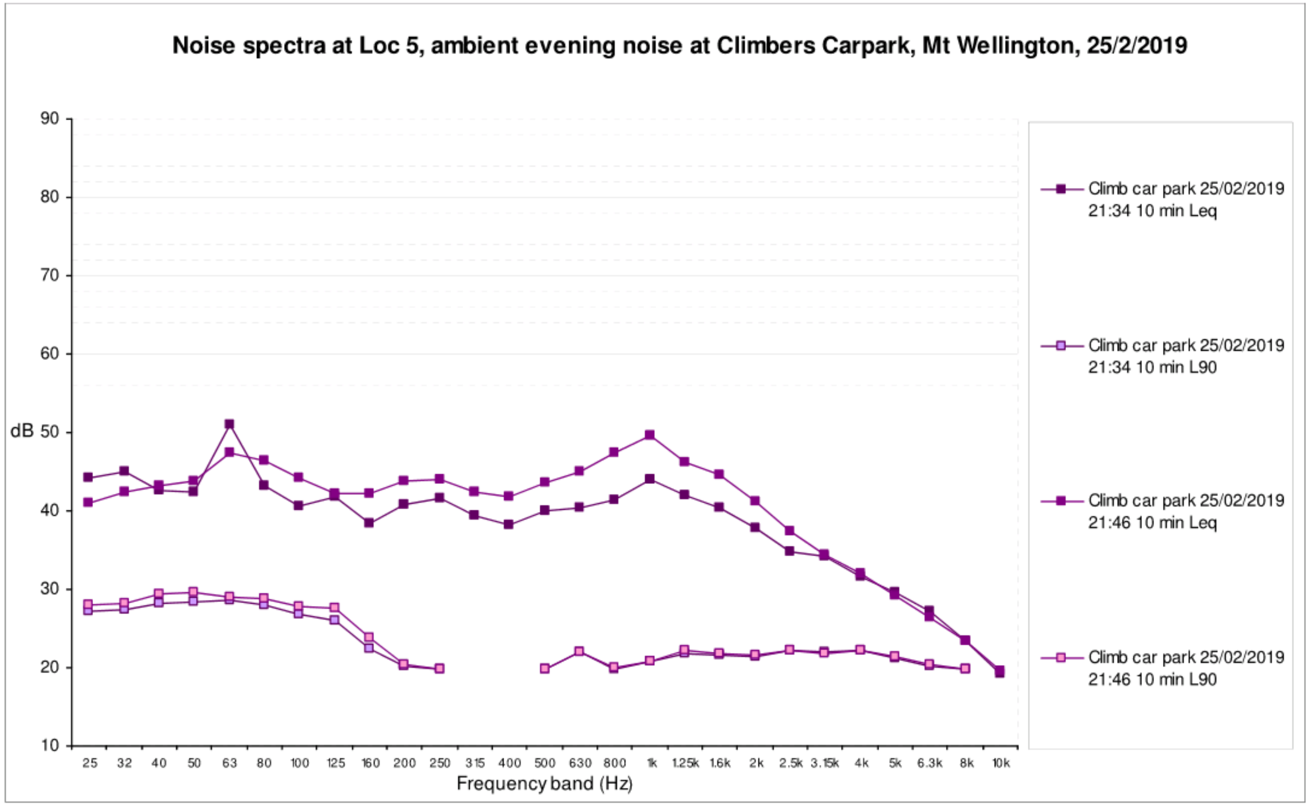

Wind gusts, with voices, traffic events, crickets and birds

## Spectral analysis (third octaves)



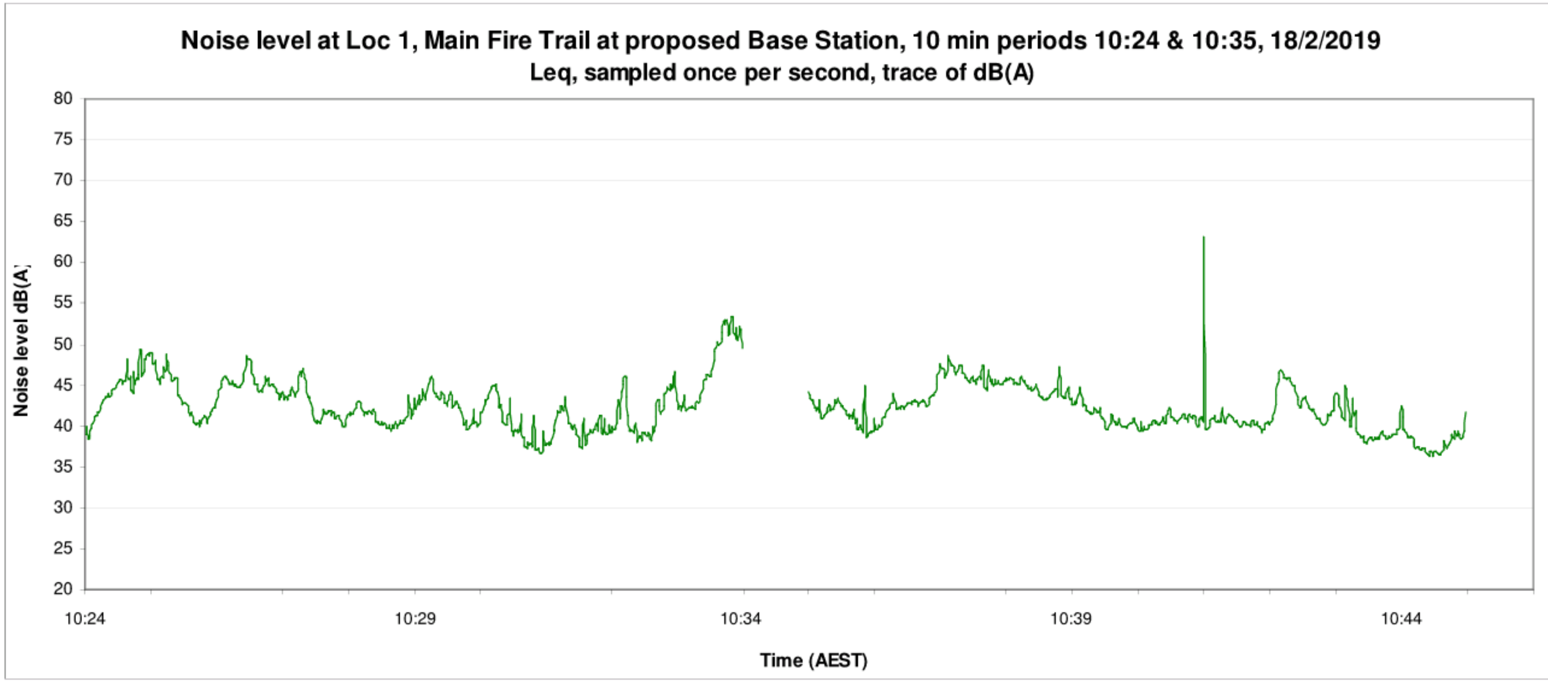

Traffic passing in close proximity, including 3 motorbikes during the first measurement
Background noise from nearby water drain

## Spectral analysis (third octaves)



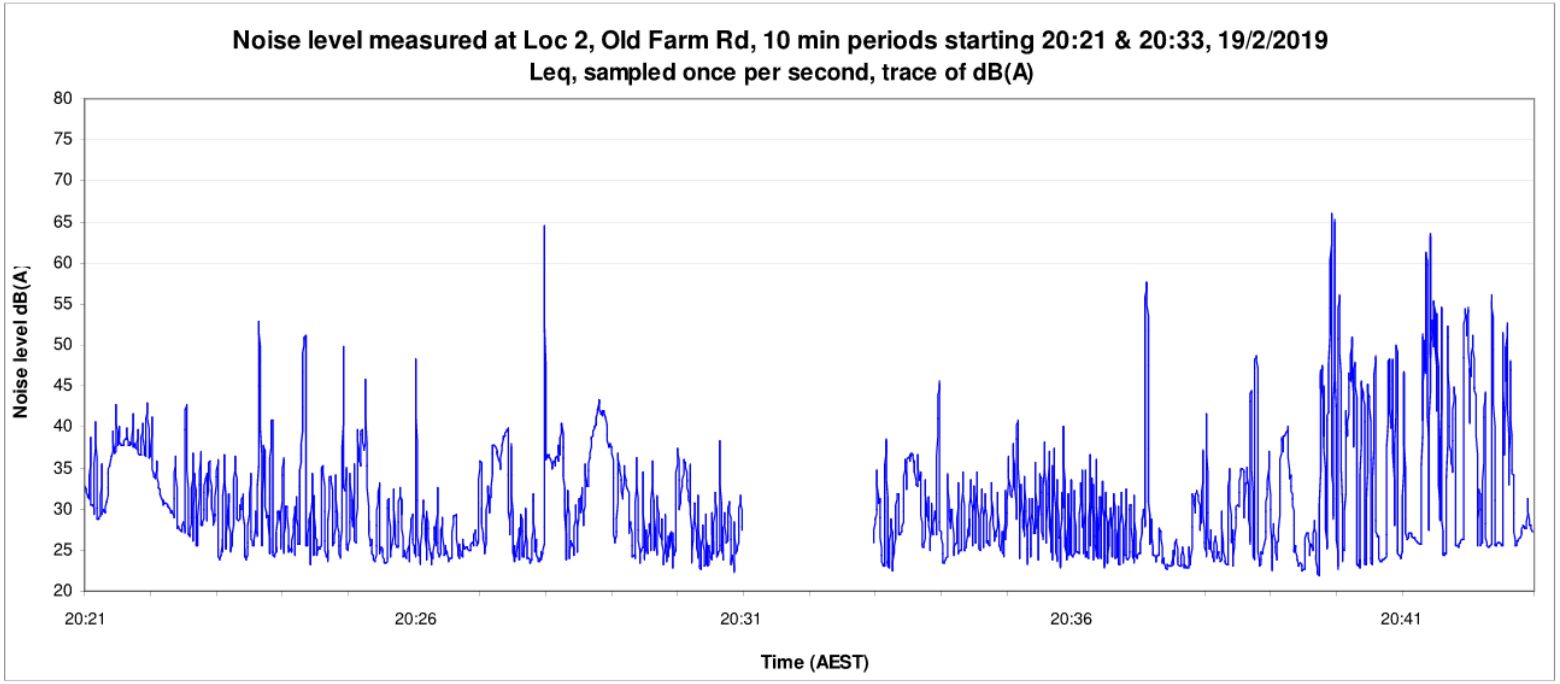

Occasional traffic events passing in close proximity raised the Leq well above background
Background noise from nearby water drain

**Monitoring trace of noise level at Location 1 over two 10 minute periods**



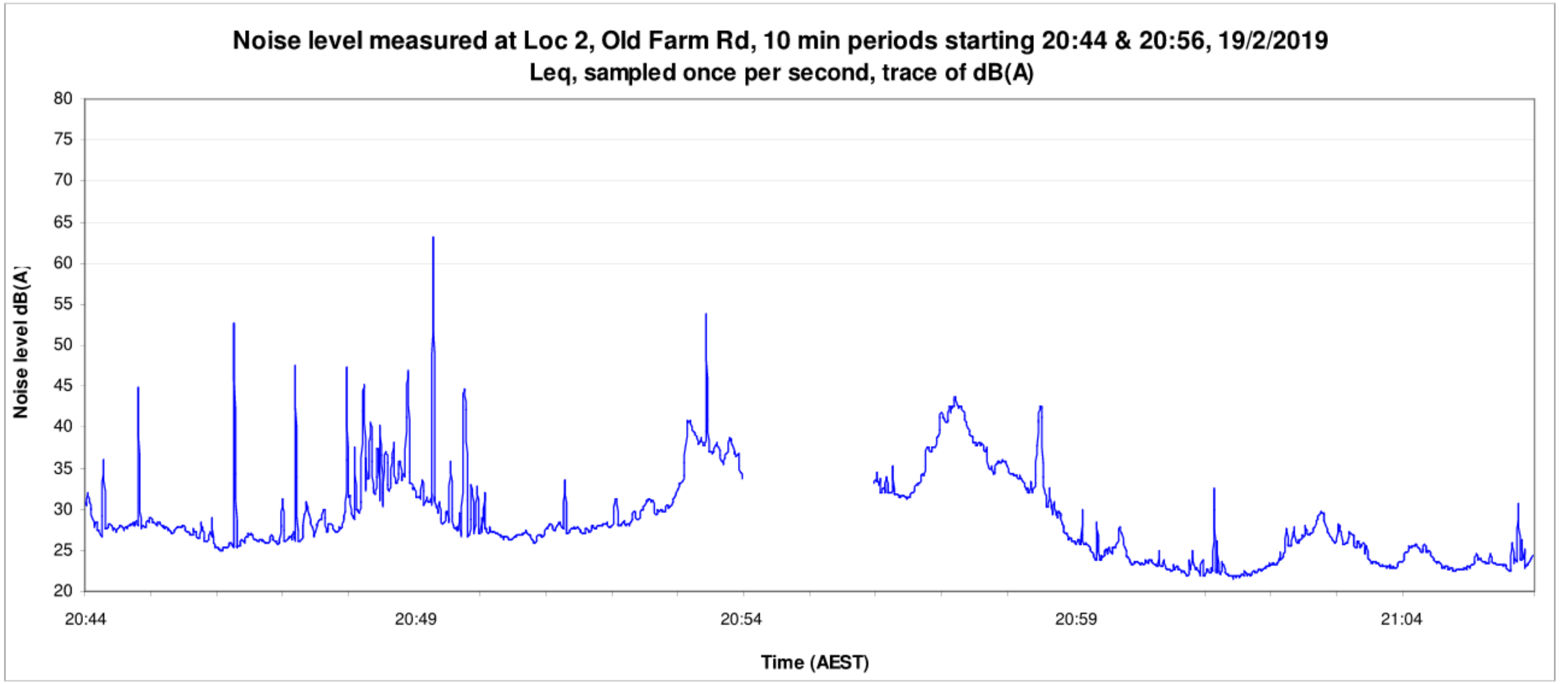

Note the undulation of background noise level due to varying breeze in trees.
Occasional bird calls

**Monitoring trace of noise level at Location 2 over two 10 minute periods**




Dusk chorus of birds; frequent outbursts of bird calls –many species from various distances
Note the occasional raised background noise level due to brief light breeze gusts in trees.

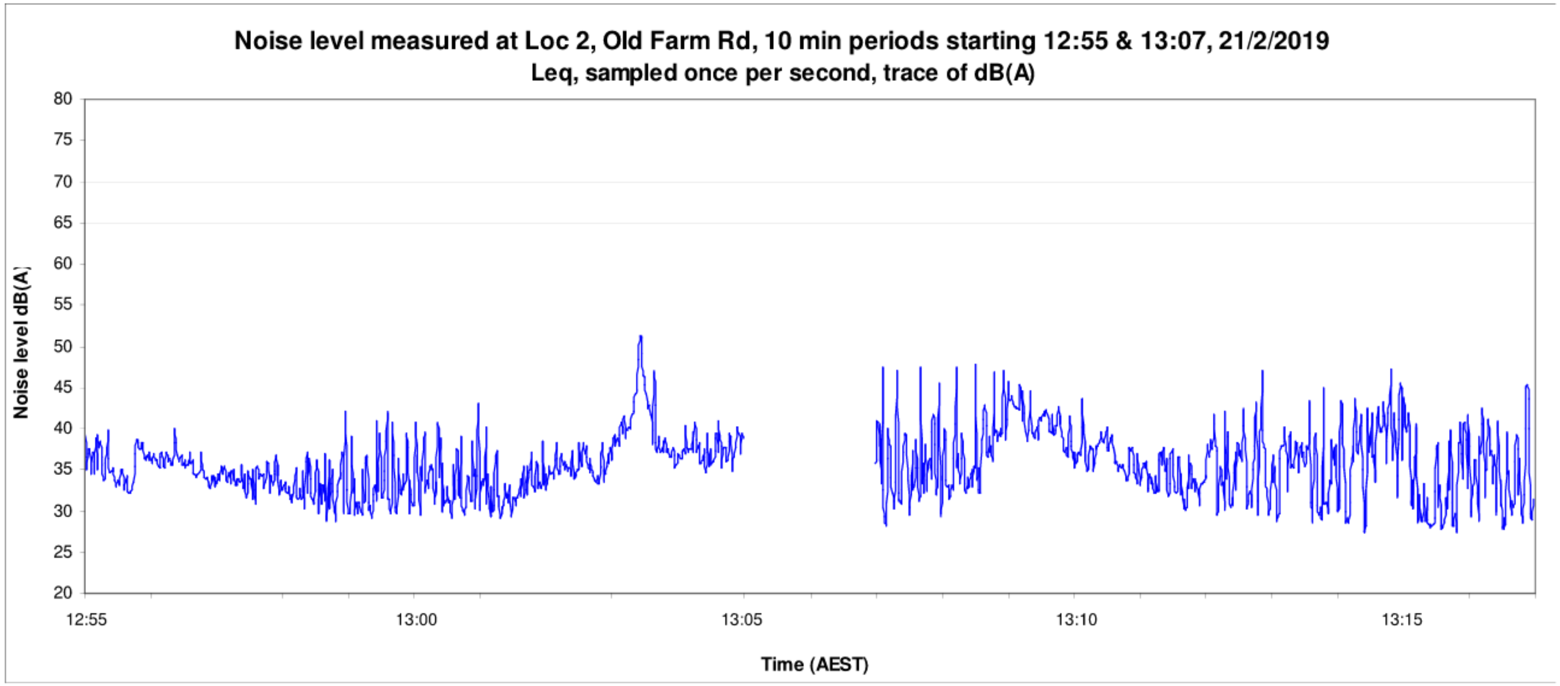
**Monitoring trace of noise level at Location 2 over two 10 minute periods**




Decline in dusk chorus of birds; rarer outbursts of bird calls –many species from various distances
Note the occasional raised background noise level due to brief light breeze gusts in trees.

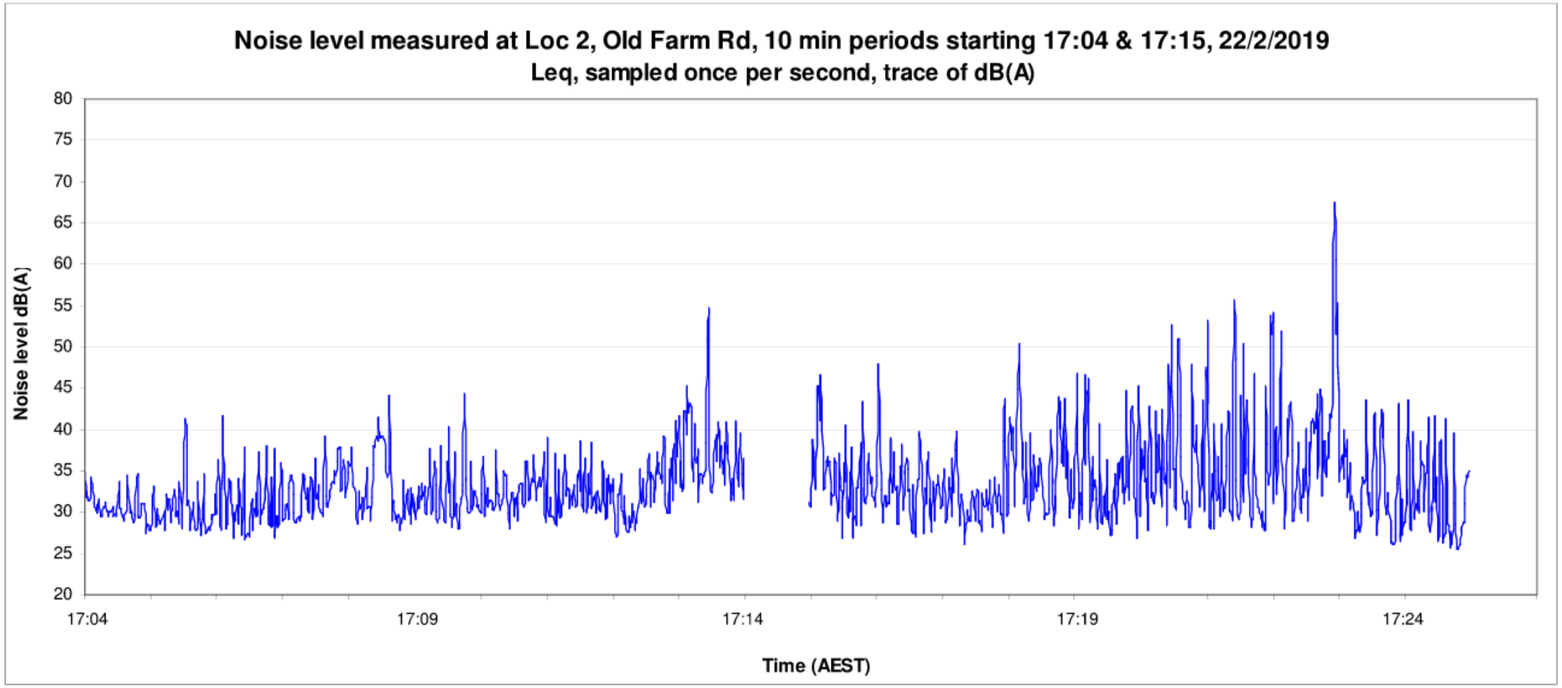
A32

Monitoring trace of noise level at Location 2 over two 10 minute periods




Bird calls –several species from various distances
Note the occasional raised background noise level due to brief light breeze gusts in trees.

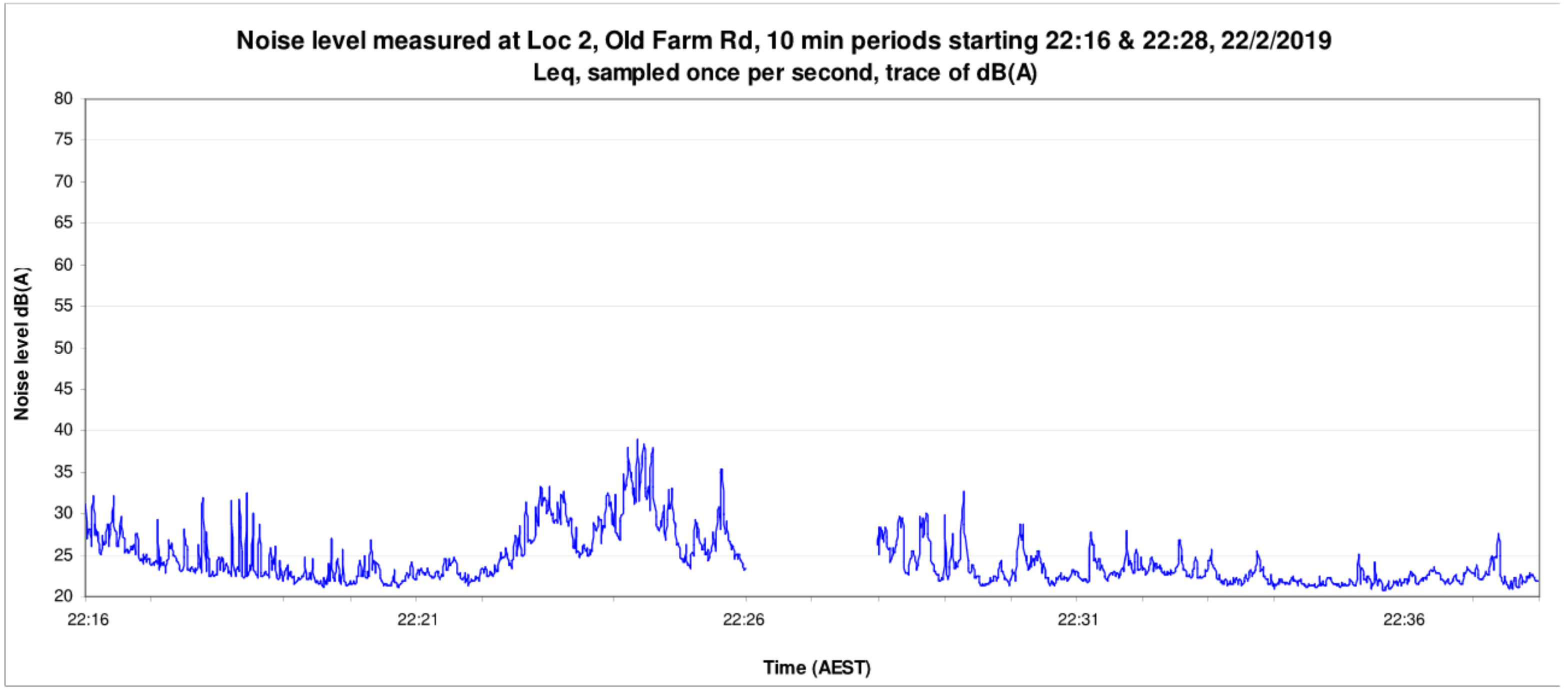
**Monitoring trace of noise level at Location 2 over two 10 minute periods**




Bird calls –several species from various distances. The loudest being a nearby crow.
Note the occasional raised background noise level due to brief light breeze gusts in trees.

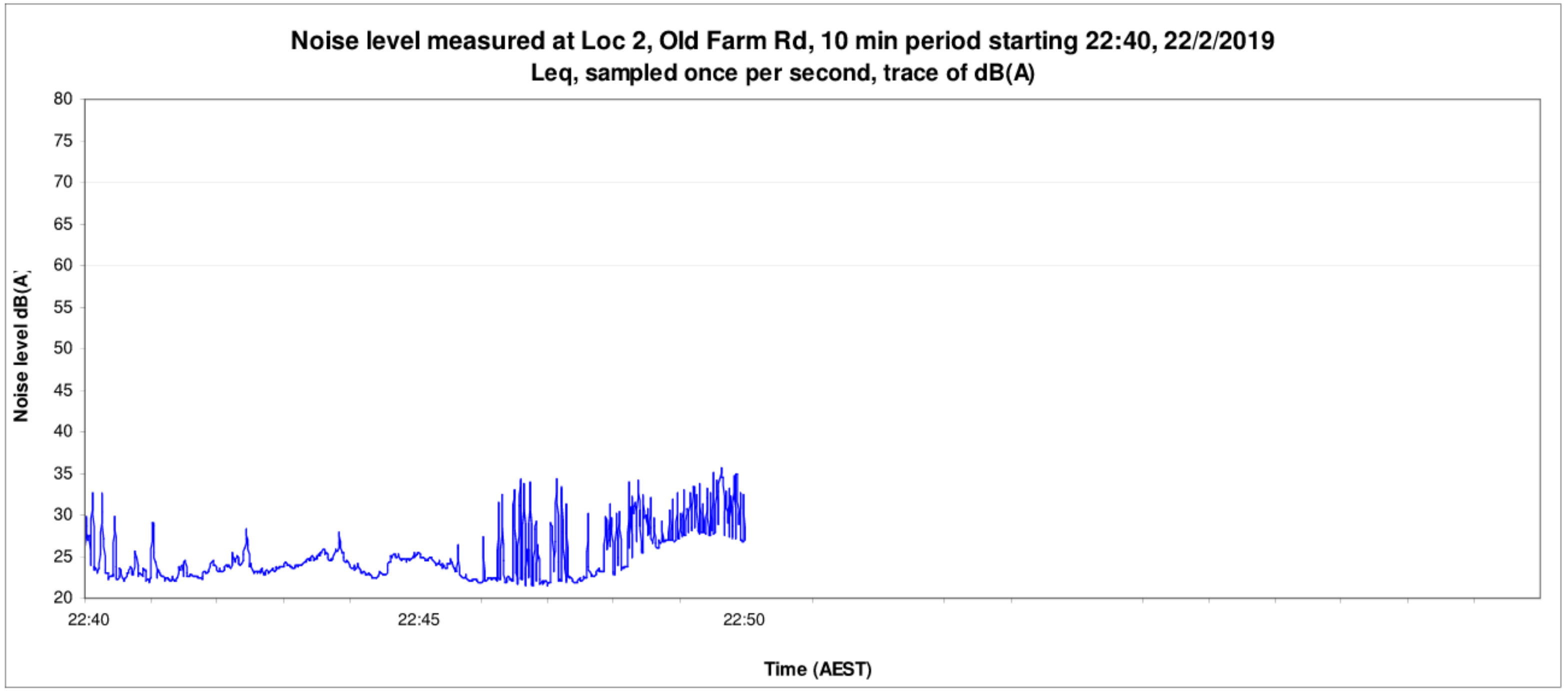
A34

Monitoring trace of noise level at Location 2 over two 10 minute periods



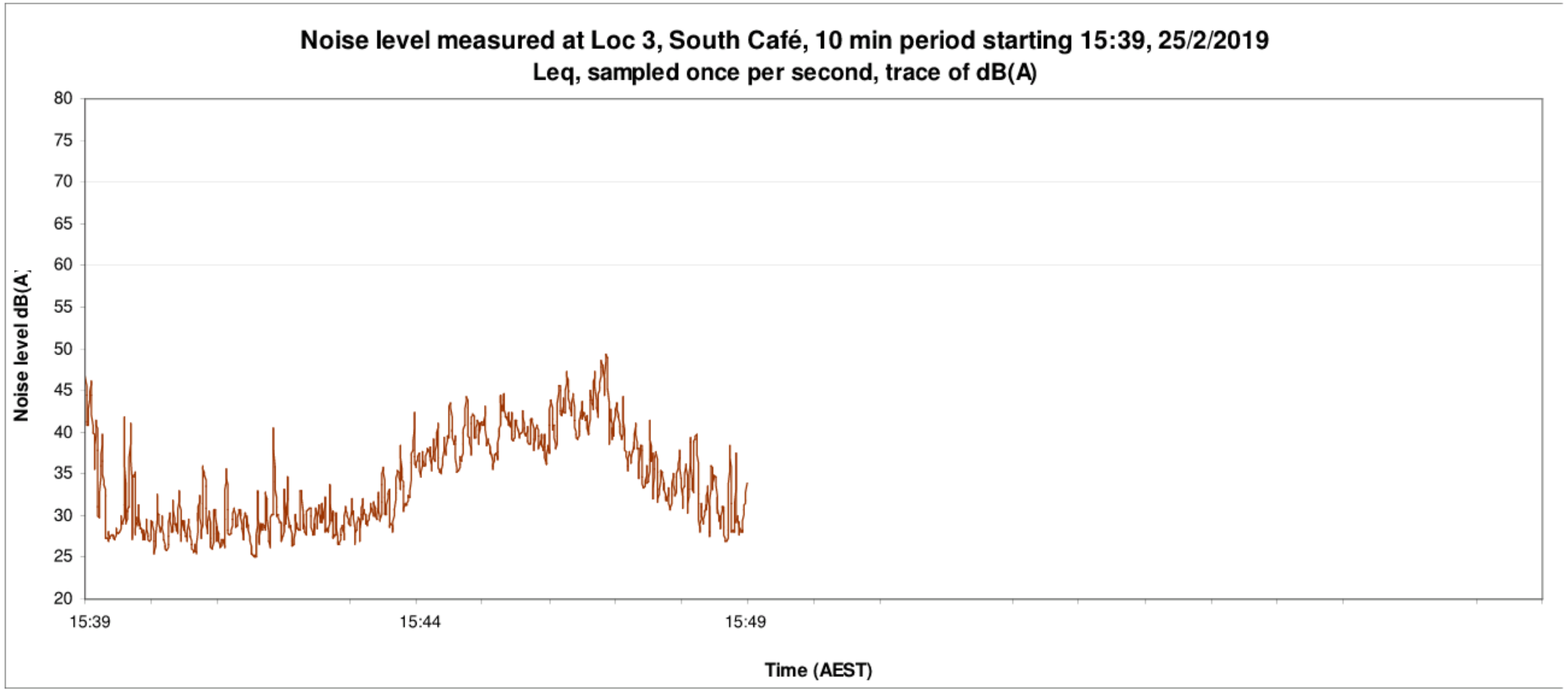

Bird calls –occasional calls from various distances.
Note the occasional raised background noise level due to brief light breeze gusts in trees.

Monitoring trace of noise level at Location 2 over a 10 minute period



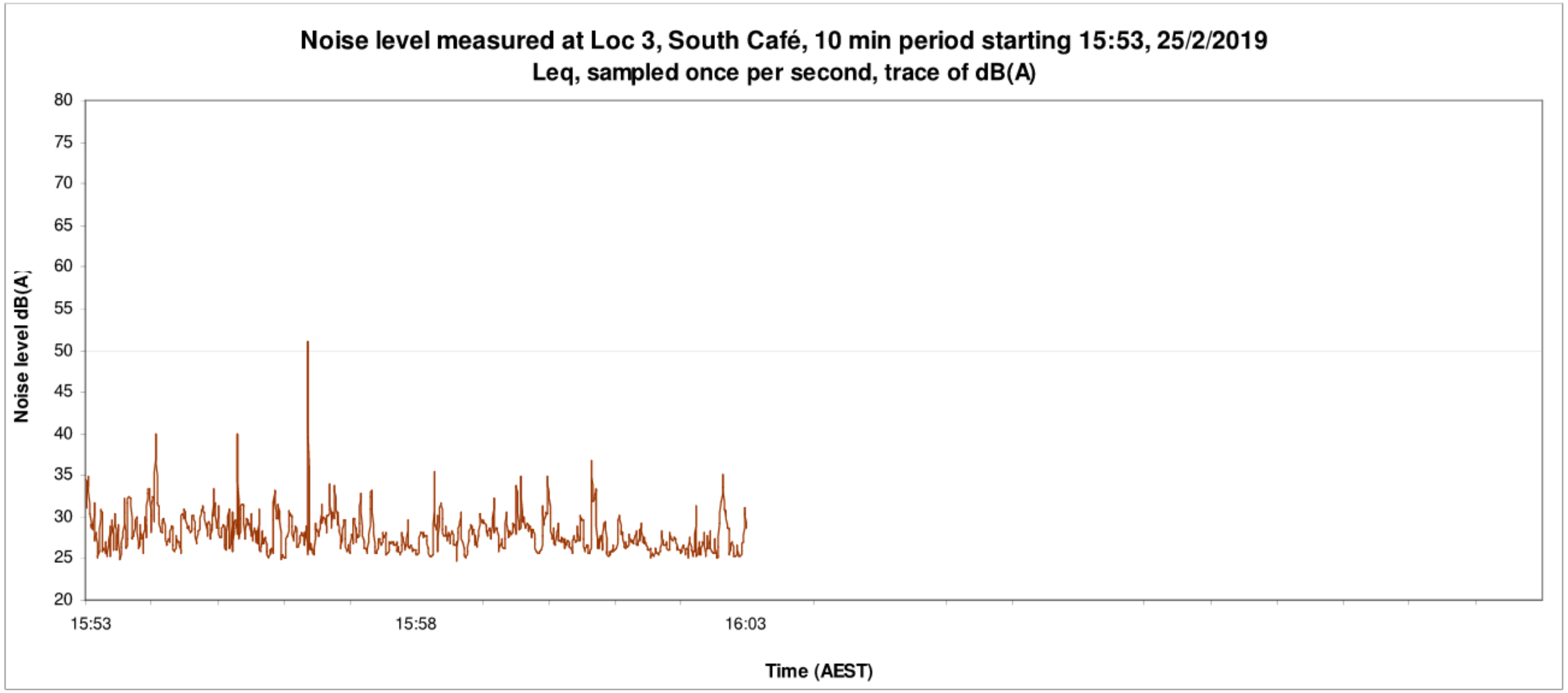

Bird calls –occasional calls from various distances.
Note the occasional raised background noise level due to brief light breeze gusts in trees.

Monitoring trace of noise level at Location 3 over a 10 minute period



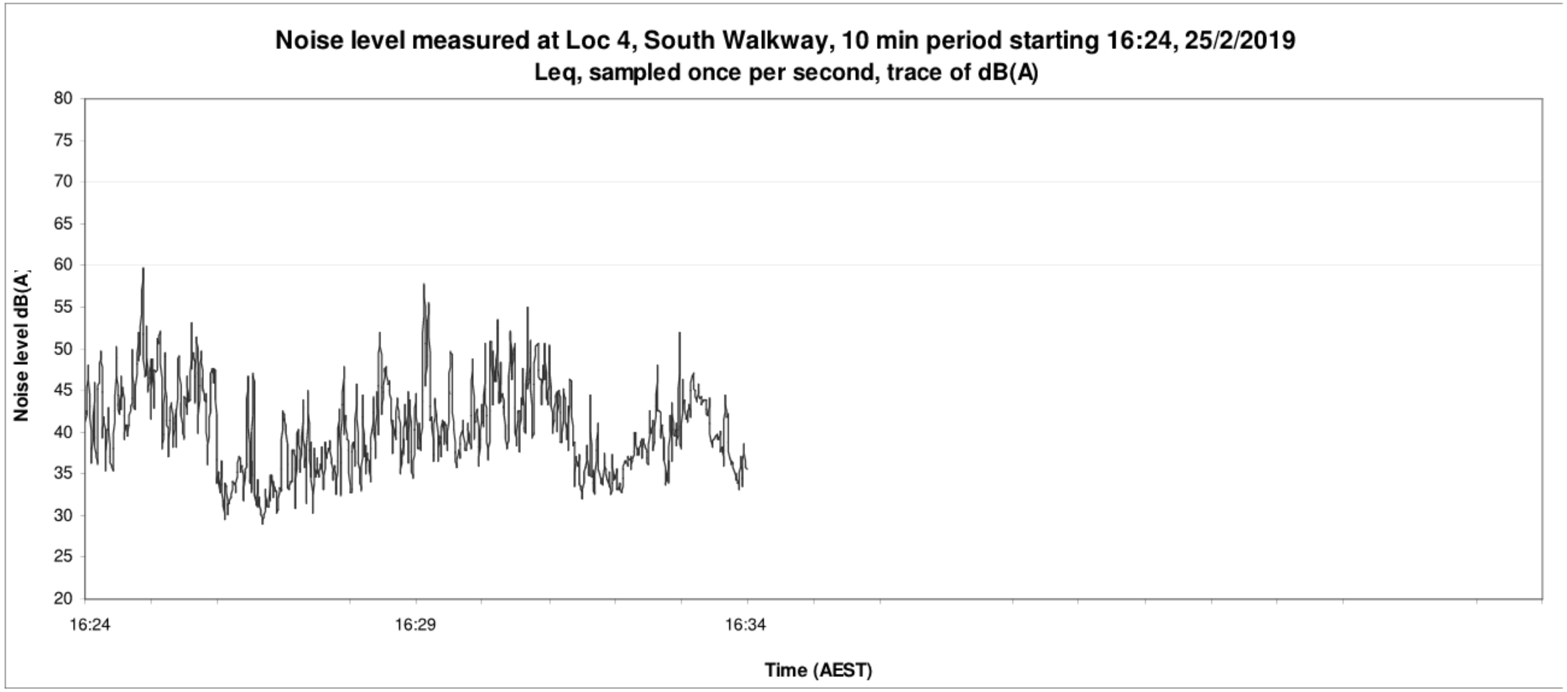

Initial feature is tail end of a light aircraft event. Main feature is from twin prop aircraft event.
Voices, mainly at lookout and occasional bird calls from various distances.
Note the occasional raised background noise level due to brief light breeze gusts.

Monitoring trace of noise level at Location 3 over a 10 minute period




Voices at lookout and occasional bird calls from various distances.
Note the occasional raised background noise level due to brief light breeze gusts.

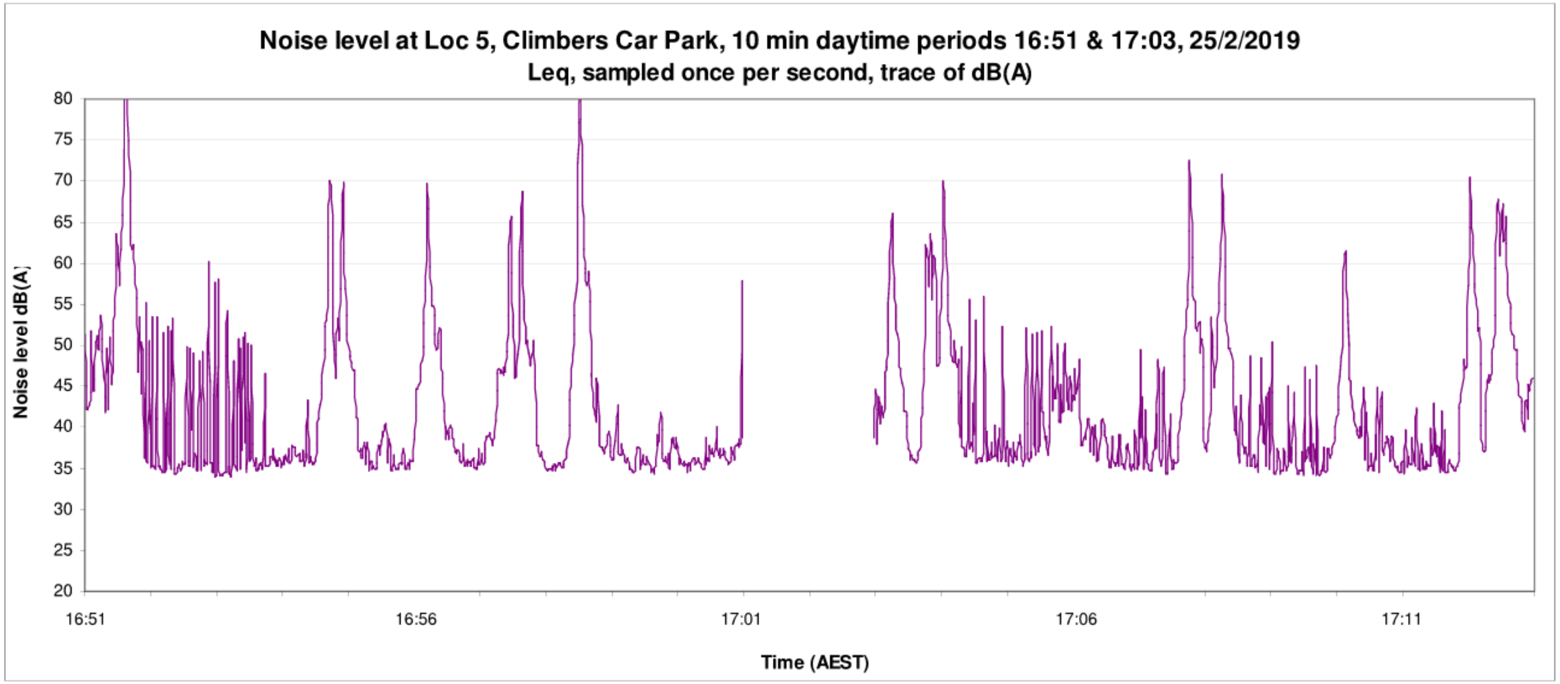
Monitoring trace of noise level at Location 4 over a 10 minute period




Note the erratic raised background noise level due to strong breeze gusts.
Voices, traffic events and occasional bird calls from various distances.

A39

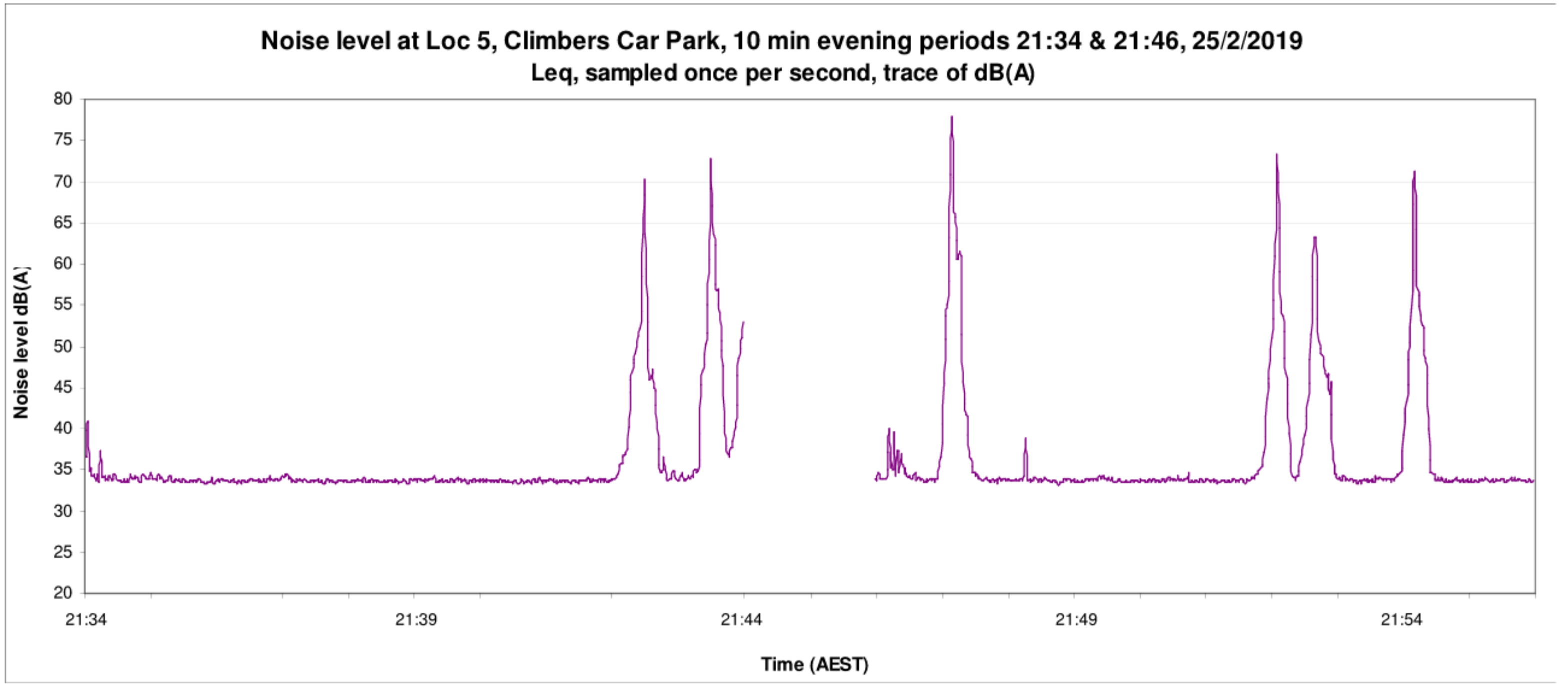
**Monitoring trace of noise level at Location 5 over two 10 minute periods**




Frequent traffic events passing at close proximity. Bird calls –several species from various distances.
Note the occasional raised background noise level due to brief light breeze gusts in trees.
Background lower limit was determined by continuous water flow in nearby drain.

A40

Monitoring trace of noise level at Location 5 over two 10 minute periods




Occasional traffic events passing at close proximity. Rare bird calls.
Background lower limit was determined by continuous water flow in nearby drain.

# Mt Wellington Cableway Co. cable car proposal, Hobart
## Field report for site visits May 2019
### Appendix B to be read in conjunction with main report

## General

The client, Mt Wellington Cableway Co. proposes to construct a restaurant complex atop kunyani/Mt Wellington in the vicinity of the existing lookouts and visitor shelter, to be serviced by a cable car system based from a reception/car park at the Main Fire Trail near Old Farm Rd, to be serviced by a new access road from Mc Robies Gully.
This part of the study has focussed on ambient noise in the absence of any activity at the proposed base terminal complex, cableway, and pinnacle terminal/restaurant complex.
This report describes the findings of ambient noise monitoring and observations from May 2019 site visits; 10:00-10:45, 15:25-16:25 and 18:20-21:35 Monday 6/5/2019, and 13:25-14:40 Tuesday 7/5/2019.

## Instruments used

- Brűel & Kjær Sound Level Calibrator Type 4230 s/n 1169836, Laboratory Certified May 2017;
- Norsonic Precision Sound Level Meter Nor131, s/n 1312829, Laboratory Certified May 2017;
- Weather Instruments (Aneroid barometer, Zeal Wet/Dry bulb Psychrometer, Suunto KB-14/360R compass, Kaindl Windmaster 2 wind speed meter);

## Location definitions

The locations for measurements were defined and described as follows:

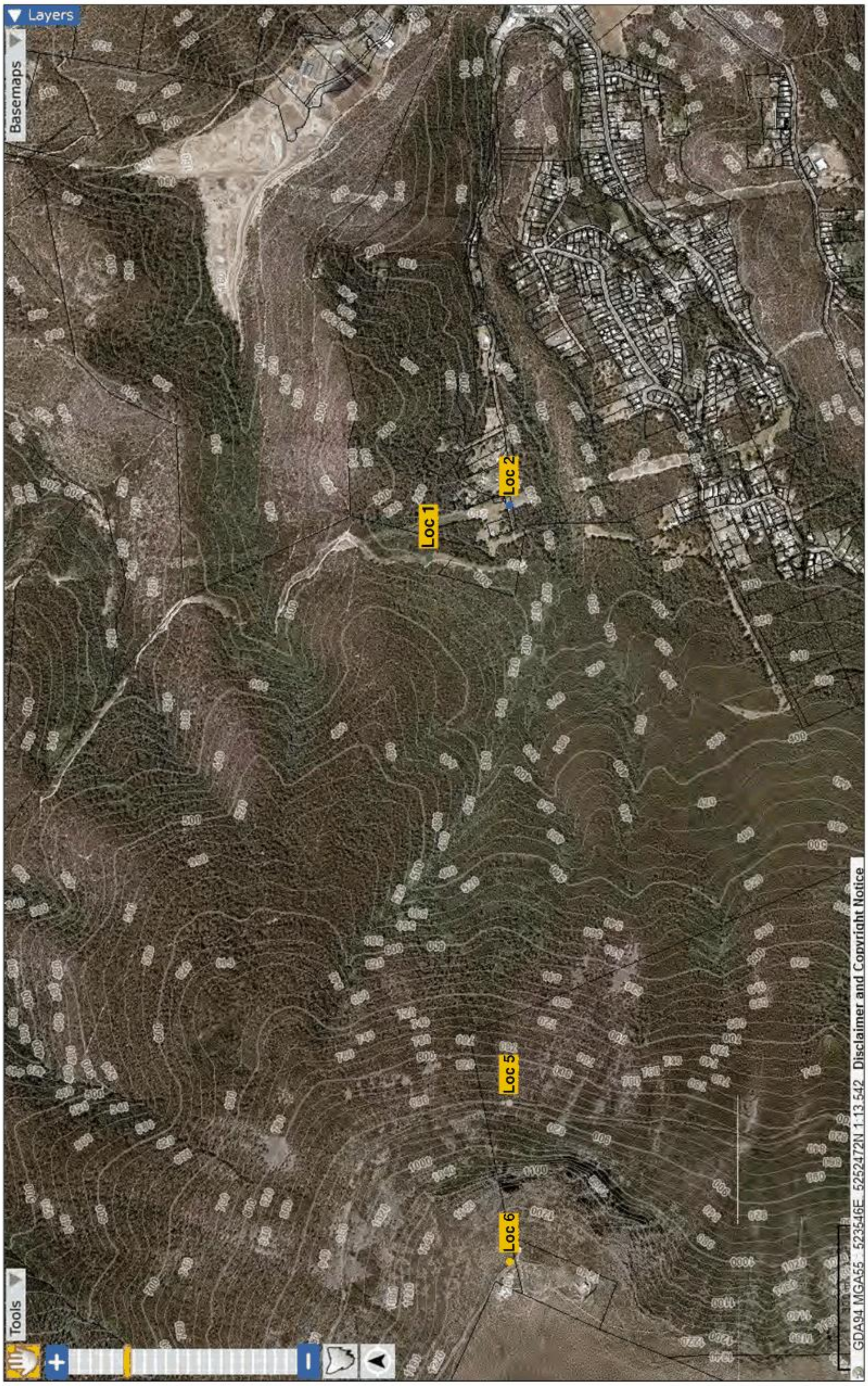
| Designation | Definition/comments |
|---|---|
| Loc 1 | Main Fire Trail near Old Farm Rd, Cascades, at proposed base station site, microphone at 1.2 m height |
| Loc 2 | Old Farm Road, 3.5 m west of roadway in clearing easement under high voltage transmission lines, by bracken clump, microphone at 1.2 m height |
| Loc 5 | Opposite climbers track car park, Pinnacle Rd, microphone 2.5 m from edge of roadway at 1.2 m height |
| Loc 6 | Mt Wellington pinnacle area, at NE corner of cement apron at doorway of the observation shelter, microphone at 1.2 m height |

Aerial photo and photographs are on the following pages.

[Last revised 14/5/2019]

B2

**Airphoto showing the study site and locale**




Monitoring locations shown to good approximation. Image sourced from TheList 19/2/2019, note 500 m scale bar, tenures, 20 m contours and correct compass orientation.

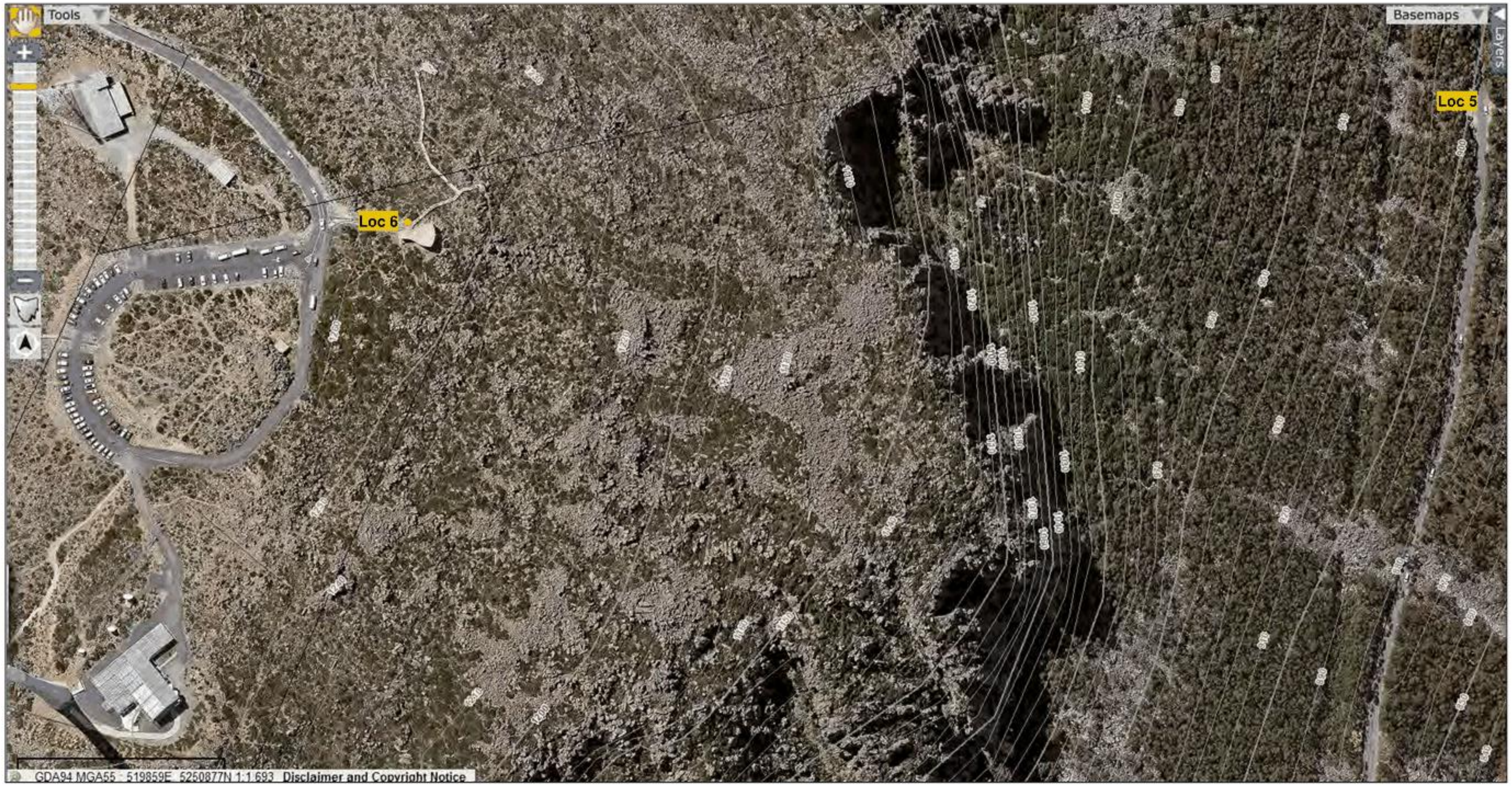
B3

## Airphoto showing the lower study site


Monitoring locations shown to good approximation. Image sourced from TheList 19/2/2019, note 100 m scale bar, tenures, 10 m contours and correct compass orientation.

B4

**Airphoto showing the upper study site**




Monitoring locations shown to good approximation. Image sourced from TheList 12/3/2019, note 100 m scale bar, tenures, 10 m contours and correct compass orientation.

B5

## Site photographs

Location 2 noise measurement, Old Farm Rd neighbourhood, note freshly resealed roadway,.6/5/2019


Notice of Inglewood Rd/Middle Island burnoff exclusion area,
which involved chainsawing and woodchipping on the morning of 6/5/2019

B6

## Site photograph

Location 6 evening noise measurement, by the pinnacle observation shelter, 6/5/2019

## Weather observations

Conditions were suitable for noise measurements, and most visits were purposely undertaken in relatively calm weather.

| Weather observations | | | | | | |
|---|---|---|---|---|---|---|
| Date | 6/05/2019 | | | | | 7/05/2019 |
| Location | Loc 2 | Loc 2 | Loc 6 | Loc 5 | Loc 1 | Loc 2 |
| Time | 10:10 | 15:35 | 18:50 | 19:50 | 20:55 | 13:40 |
| Temp °C | 9.5 | 10 | 5 | 3.5 | 2.5 | 13 |
| Relative Humidity % | 76 | 88 | 51 | 92 | 84 | 69 |
| Pressure hPa | 1001 | 995 | 892 | 927 | 990 | 986 |
| Wind speed average m/s | 1.9 | 0.9 | 2.1 | calm | calm | 0.6 |
| Wind speed maximum m/s | 6.1 | 4.9 | 4.2 | calm | calm | 1.8 |
| Wind direction | SE var | SE var | NW | calm | calm | WNW |
| Cloud cover x/8 | 7 | 2 | 0 | 0 | 1 | 4 |

## Noise descriptions

For each location, ambient noise by source noted during the site visit is listed (in descending order of significance by loudness, noticeability, duration and incidence):

**Location 1 and 2**

- Bird calls, intensive at twilight, diversity of species and at various distances
- Occasional local traffic events
- One occasion of tree clearing activity (woodchipper, chain saws)
- Distant traffic, such as Huon Rd
- Breeze in trees at times
- Marsupials
- Insects

Noteable for low background noise levels in calm weather

**Location 5**

- Traffic events passing in close proximity
- Background water in drain

**Location 6**

- Breeze gusts
- Voices (excluded)
- Traffic events
- Hum of shelter heater

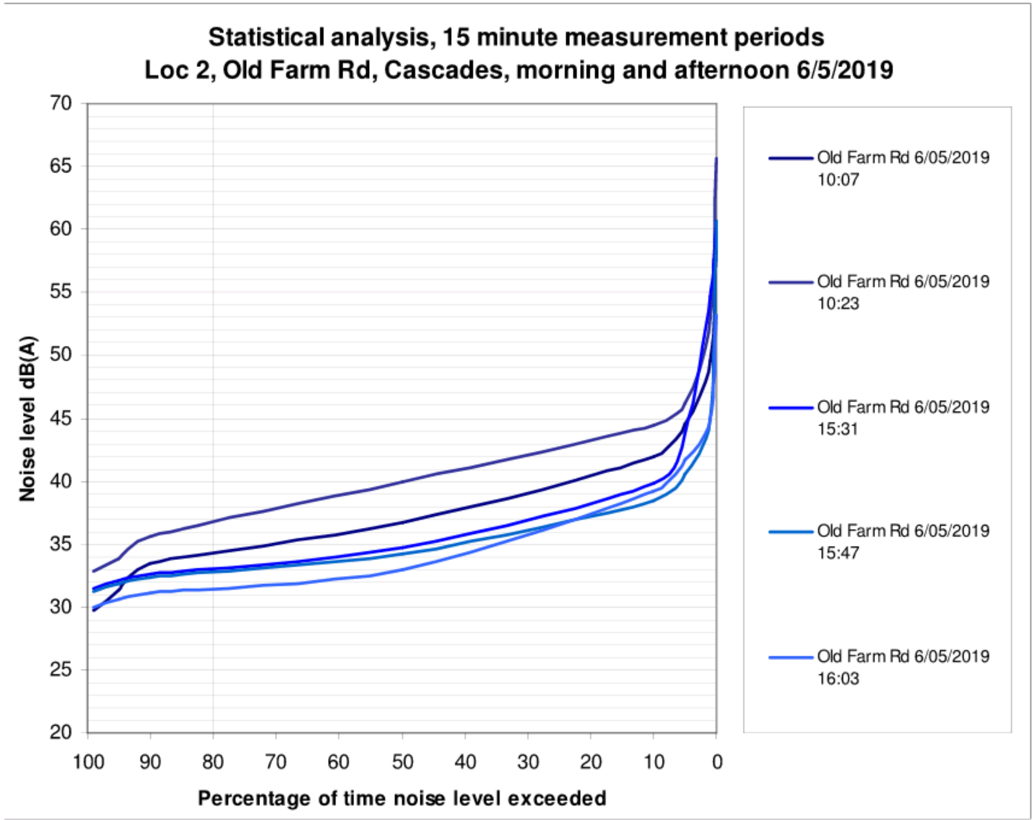
## Comments

- Measurements were undertaken under suitable conditions.
- The Old Farm Rd neighbourhood ambient noise is essentially natural, dominated by birdsong and breeze in trees. The maximum noise level was during dusk bird chorus. The neighbourhood is for the most part a haven from man made noise sources, and as such likely valued highly by the residents. A few local traffic events occurred during some measurements. One visit on morning 6/5/2019 featured a rare event; tree clearing operations (woodchipper and chainsaws) exact source location uncertain, but within 1 km. The background noise levels in this neighbourhood are very low in calm or light winds, measuring L90 dB(A) in the low 20s.
- Old Farm Rd has recently been repaired and resealed, perhaps encouraging visitor traffic to the walking/bike trail head at the end of the road. We also noted the Main Fire Trail between Old Farm Rd and Location 1 has been significantly widened and graded in the weeks since February.
- The pinnacle area is subject to discrete or localised noise sources: light aircraft events, voices from lookout and walkway areas, traffic events; and more generalised natural sounds (breeze, birds, insects)
- The climbers track car park area is subject to localised noise sources: traffic in close proximity, and water drain close by; and more generalised dispersed natural sounds (breeze, birds, insects)

## Statistical analysis of 15 minute samples of noise levels dB(A)

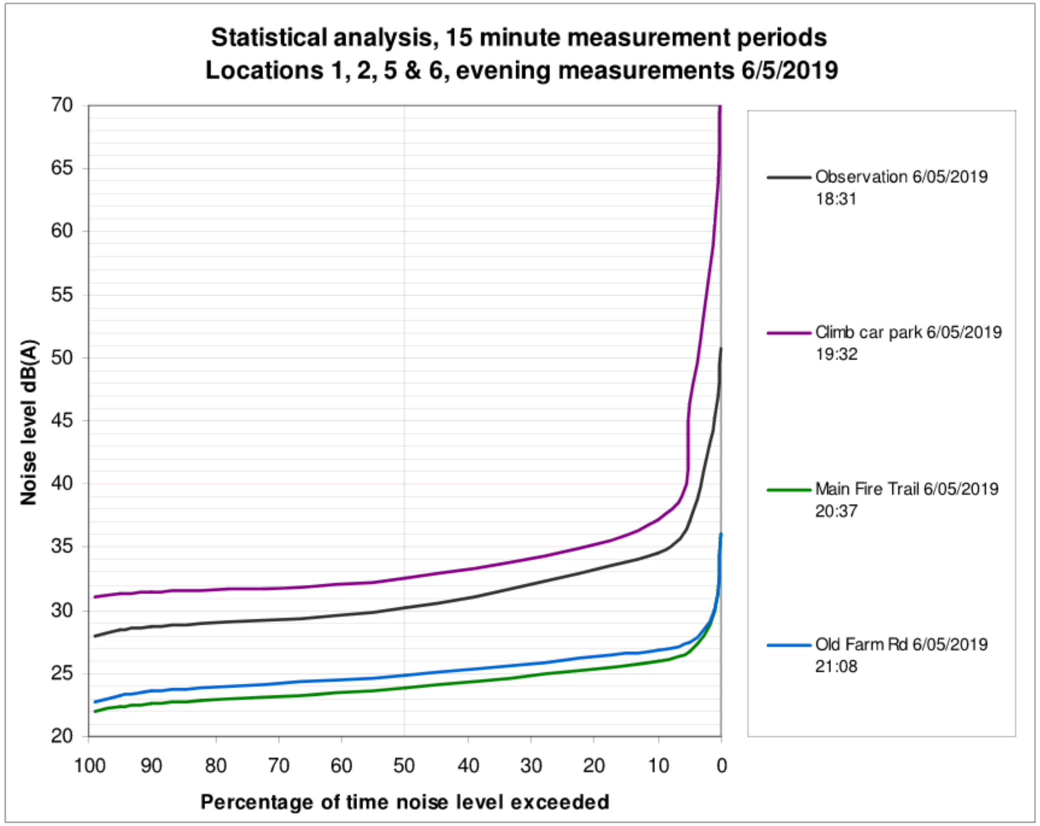
| Loc # | Loc 2 | | | | | Loc 6 | Loc 5 | Loc 1 | Loc 2 | Loc 2 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Old Farm Rd | | | | | Observation | Climb car park | Main Fire Trail | Old Farm Rd | Old Farm Rd | | | |
| Date | 6/05/2019 | | | | | 6/05/2019 | 6/05/2019 | 6/05/2019 | 6/05/2019 | 7/05/2019 | | | |
| Time | 10:07 | 10:23 | 15:31 | 15:47 | 16:03 | 18:31 | 19:32 | 20:37 | 21:08 | 13:30 | 13:46 | 14:02 | 14:20 |
| Duration | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min | 15 min |
| Samples | 9000 | 9000 | 9000 | 9000 | 9000 | 9000 | 9000 | 9000 | 9000 | 9000 | 9000 | 9000 | 9000 |
| Event | ambient | ambient | ambient | ambient | ambient | ambient | ambient | ambient | ambient | ambient | ambient | ambient | ambient |
| Comment | Tree clearing | | | | | | | | | | | | |
| Period | Morning | | Afternoon | | | Evening | Evening | Evening | Evening | Afternoon | | | |
| Lmax | 77.3 | 67.1 | 63.1 | 65.4 | 60.4 | 54.8 | 74.7 | 40.9 | 46.3 | 69.9 | 61.5 | 57.5 | 64.4 |
| L0.1 | 58.8 | 65.6 | 60.7 | 60.6 | 53.2 | 50.7 | 72.0 | 36.0 | 36.1 | 68.2 | 61.0 | 55.8 | 57.6 |
| L1 | 49.6 | 52.9 | 54.7 | 45.0 | 44.9 | 45.3 | 60.5 | 30.0 | 30.1 | 57.5 | 52.9 | 47.0 | 44.9 |
| L5 | 44.6 | 46.2 | 43.8 | 40.6 | 41.7 | 37.0 | 46.4 | 26.7 | 27.5 | 42.1 | 42.0 | 40.5 | 37.3 |
| L10 | 42.0 | 44.4 | 39.8 | 38.5 | 39.2 | 34.5 | 37.2 | 26.0 | 26.8 | 36.6 | 33.6 | 36.8 | 33.4 |
| L50 | 36.7 | 39.9 | 34.7 | 34.2 | 33.0 | 30.2 | 32.6 | 23.8 | 24.9 | 26.3 | 25.7 | 27.4 | 25.8 |
| L90 | 33.5 | 35.6 | 32.6 | 32.3 | 31.1 | 28.7 | 31.5 | 22.6 | 23.6 | 24.4 | 23.6 | 24.2 | 23.7 |
| L95 | 31.3 | 33.9 | 32.1 | 31.9 | 30.6 | 28.4 | 31.3 | 22.4 | 23.2 | 24.1 | 23.4 | 23.7 | 23.2 |
| L99 | 29.7 | 32.8 | 31.5 | 31.2 | 30.0 | 27.9 | 31.1 | 22.0 | 22.7 | 23.6 | 22.9 | 22.9 | 22.5 |
| Lmin | 28.6 | 31.6 | 30.3 | 30.2 | 28.9 | 27.0 | 30.6 | 21.2 | 21.9 | 22.9 | 22.1 | 21.7 | 21.8 |
| Leq A | 43.3 | 43.9 | 41.4 | 38.3 | 36.6 | 33.6 | 48.4 | 24.6 | 25.5 | 45.1 | 39.5 | 35.5 | 35.2 |

B10



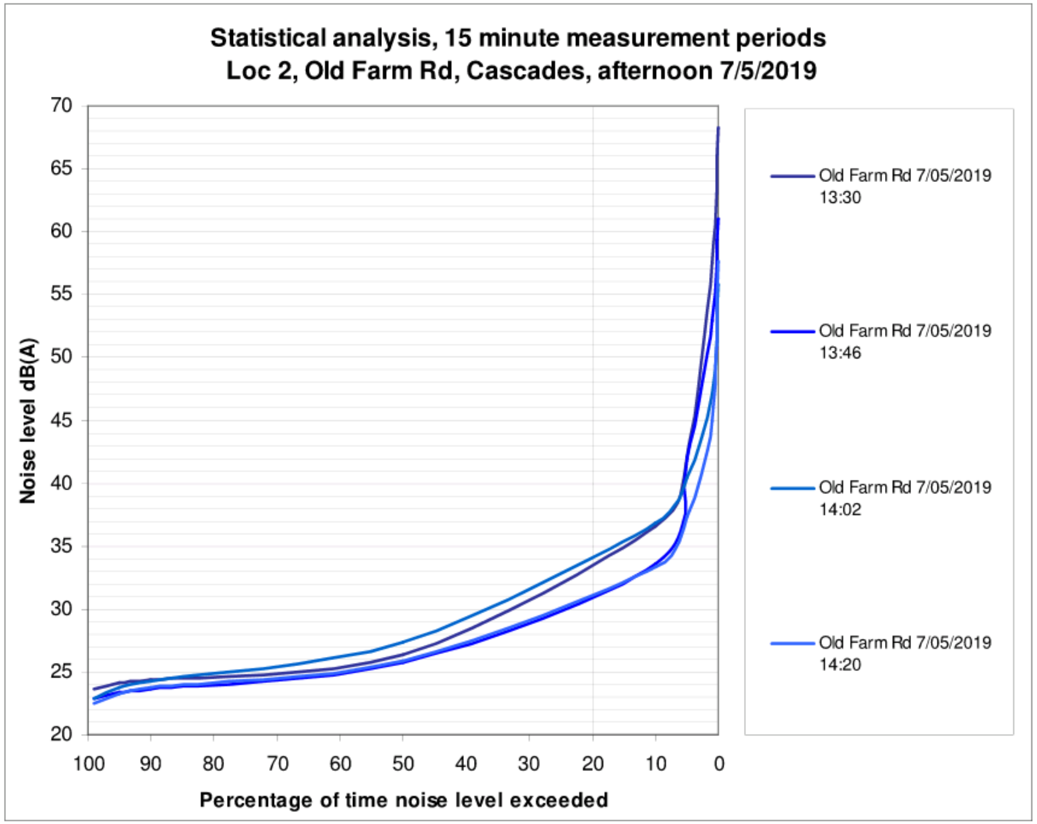

Morning measurements were elevated by tree clearing within 1 km
Afternoon measurements were during school traffic period

B11




Low to very low evening background levels.

B12




Notably low daytime background levels.

B13

## Spectral distribution of measurements 6/5/2019

| Loc # | Loc 2 | | Loc 2 | | Loc 2 | | Loc 2 | | Loc 2 | | Loc 6 | | Loc 5 | | Loc 1 | | Loc 2 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | | Observation | | Climb car park | | Main Fire Trail | | Old Farm Rd | |
| Date | 6/05/2019 | | 6/05/2019 | | 6/05/2019 | | 6/05/2019 | | 6/05/2019 | | 6/05/2019 | | 6/05/2019 | | 6/05/2019 | | 6/05/2019 | |
| Time | 10:07 | | 10:23 | | 15:31 | | 15:47 | | 16:03 | | 18:31 | | 19:32 | | 20:37 | | 21:08 | |
| Duration | 15 min | | 15 min | | 15 min | | 15 min | | 15 min | | 15 min | | 15 min | | 15 min | | 15 min | |
| Test | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 |
| Thirds Hz 25 | 57.2 | 31.3 | 58.2 | 34.8 | 48.8 | 31.2 | 49.0 | 32.5 | 53.2 | 31.3 | 56.4 | 40.4 | 42.2 | 31.4 | 32.5 | 27.5 | 35.0 | 29.2 |
| 32 | 55.4 | 32.6 | 57.1 | 35.1 | 47.8 | 32.0 | 46.0 | 32.0 | 50.3 | 30.5 | 53.4 | 35.9 | 41.4 | 30.8 | 33.7 | 28.5 | 34.2 | 28.9 |
| 40 | 53.0 | 33.1 | 55.6 | 35.5 | 45.1 | 32.8 | 43.5 | 33.1 | 47.7 | 31.2 | 50.4 | 35.6 | 39.3 | 31.3 | 33.4 | 29.0 | 33.9 | 29.8 |
| 50 | 50.4 | 33.9 | 53.4 | 35.7 | 41.2 | 34.4 | 42.0 | 34.9 | 45.1 | 33.5 | 49.5 | 37.1 | 42.2 | 33.1 | 33.3 | 29.2 | 35.3 | 31.3 |
| 63 | 48.2 | 35.5 | 51.6 | 38.0 | 43.3 | 34.1 | 40.0 | 34.5 | 41.9 | 33.8 | 44.8 | 36.9 | 50.7 | 33.6 | 32.4 | 27.9 | 34.1 | 29.5 |
| 80 | 47.8 | 35.1 | 50.3 | 36.3 | 39.4 | 33.2 | 39.9 | 34.6 | 39.8 | 33.3 | 40.2 | 33.9 | 41.7 | 32.9 | 31.3 | 25.8 | 32.5 | 28.7 |
| 100 | 47.3 | 32.2 | 49.1 | 33.9 | 36.1 | 31.2 | 37.7 | 32.0 | 37.8 | 30.7 | 38.1 | 29.3 | 38.0 | 31.0 | 28.8 | 24.3 | 33.0 | 27.2 |
| 125 | 38.9 | 28.6 | 41.2 | 31.3 | 39.3 | 28.9 | 33.6 | 29.4 | 34.7 | 28.7 | 33.4 | 27.2 | 39.8 | 29.3 | 25.8 | 21.7 | 27.4 | 22.9 |
| 160 | 39.7 | 26.0 | 41.5 | 30.1 | 34.6 | 27.0 | 31.3 | 27.1 | 32.7 | 26.1 | 32.1 | 26.8 | 40.3 | 28.1 | 23.7 | 20.0 | 21.7 | 19.9 |
| 200 | 31.9 | 23.3 | 37.4 | 27.5 | 32.5 | 24.5 | 28.7 | 24.2 | 28.6 | 23.0 | 31.2 | 26.7 | 39.6 | 26.7 | 22.5 | 19.9 | 20.7 | |
| 250 | 28.3 | 21.8 | 34.2 | 25.7 | 33.7 | 23.1 | 26.1 | 22.7 | 27.3 | 21.8 | 31.3 | 26.0 | 38.7 | 25.8 | 21.0 | | 20.4 | |
| 315 | 28.0 | 22.1 | 33.5 | 26.4 | 30.9 | 23.5 | 25.7 | 22.8 | 27.9 | 22.3 | 28.7 | 25.7 | 38.2 | 24.0 | 19.1 | | 20.0 | |
| 400 | 30.3 | 23.7 | 34.6 | 28.1 | 30.8 | 24.8 | 27.0 | 24.1 | 27.1 | 23.4 | 25.7 | 22.0 | 37.3 | 22.2 | 17.1 | | 19.2 | |
| 500 | 31.0 | 24.6 | 35.7 | 28.5 | 31.2 | 25.5 | 27.3 | 24.9 | 27.7 | 24.3 | 24.9 | 20.1 | 38.0 | 22.5 | 16.4 | | 17.8 | |
| 630 | 29.7 | 24.2 | 35.0 | 27.5 | 31.0 | 24.9 | 26.8 | 24.5 | 26.7 | 23.5 | 24.2 | 19.9 | 41.2 | 24.2 | 16.1 | | 16.0 | |
| 800 | 28.1 | 22.7 | 34.1 | 25.5 | 30.1 | 23.5 | 25.9 | 23.5 | 25.3 | 22.2 | 23.4 | | 42.6 | 20.3 | 15.0 | | 15.4 | |
| 1k | 30.5 | 21.8 | 33.0 | 24.6 | 31.1 | 22.4 | 27.9 | 22.7 | 25.1 | 21.2 | 21.7 | | 40.5 | 19.8 | 13.3 | | 14.4 | |
| 1.25k | 37.0 | 21.4 | 33.7 | 23.8 | 33.5 | 20.7 | 31.9 | 20.9 | 26.2 | 19.9 | 21.1 | | 38.5 | | 10.2 | | 11.6 | |
| 1.6k | 35.1 | 19.9 | 32.2 | 21.2 | 30.8 | 19.8 | 26.7 | 19.8 | 24.2 | | 19.8 | | 37.2 | | 7.5 | | 9.8 | |
| 2k | 31.0 | | 32.0 | 20.0 | 31.9 | | 29.3 | | 26.4 | | 17.3 | | 34.2 | | 7.0 | | 8.7 | |
| 2.5k | 27.9 | | 31.1 | 19.9 | 27.7 | | 25.5 | | 24.8 | | 16.9 | | 32.3 | | 7.2 | | 8.6 | |
| 3.15k | 27.6 | | 29.4 | | 27.4 | | 24.2 | | 24.5 | | 16.1 | | 31.3 | | 8.1 | | 9.4 | |
| 4k | 25.8 | | 27.6 | | 24.5 | | 19.2 | | 22.2 | | 16.1 | | 29.4 | | 9.1 | | 9.5 | |
| 5k | 23.3 | | 26.8 | | 23.6 | | 20.2 | | 20.8 | | 14.5 | | 27.1 | | 9.1 | | 9.6 | |
| 6.3k | 24.0 | | 25.2 | | 21.7 | | 16.9 | | 19.0 | | 13.3 | | 26.4 | | 9.0 | | 9.4 | |
| 8k | 33.9 | | 21.3 | | 17.7 | | 14.3 | | 15.8 | | 11.0 | | 30.9 | | 8.7 | | 9.0 | |
| 10k | 21.7 | | 17.6 | | 14.2 | | 10.0 | | 12.8 | | 10.4 | | 21.3 | | 8.5 | | 8.7 | |
| Overall A | 43.3 | 33.5 | 43.9 | 35.6 | 41.4 | 32.5 | 38.3 | 32.3 | 36.6 | 31.0 | 33.6 | 28.7 | 48.4 | 31.5 | 24.6 | 22.6 | 25.5 | 23.6 |
| C | 61.3 | 45.3 | 63.2 | 49.6 | 54.5 | 44 | 53.5 | 44.6 | 56.8 | 43.2 | 61.5 | 47.0 | 54.2 | 43.2 | 40.2 | 38.0 | 42.3 | 39.6 |
| Octave Hz 31.5 | 60.3 | 37.2 | 61.9 | 39.9 | 52.3 | 36.8 | 51.5 | 37.3 | 55.7 | 35.8 | 58.8 | 42.7 | 45.9 | 35.9 | 38.0 | 33.1 | 39.2 | 34.1 |
| 63 | 53.7 | 39.7 | 56.7 | 41.6 | 46.4 | 38.7 | 45.5 | 39.4 | 47.6 | 38.3 | 51.1 | 41.0 | 51.7 | 38.0 | 37.2 | 32.6 | 38.9 | 34.7 |
| 125 | 48.5 | 34.4 | 50.4 | 36.8 | 41.9 | 34.1 | 39.8 | 34.7 | 40.3 | 33.7 | 40.1 | 32.7 | 44.2 | 34.4 | 31.4 | 27.1 | 34.3 | 29.1 |
| 250 | 34.6 | 27.2 | 40.2 | 31.4 | 37.3 | 28.5 | 31.8 | 28.1 | 32.7 | 27.2 | 35.3 | 30.9 | 43.6 | 30.4 | 25.9 | | 25.1 | |
| 500 | 35.1 | 29.0 | 39.9 | 32.8 | 35.8 | 29.8 | 31.8 | 29.3 | 32.0 | 28.5 | 29.7 | 25.5 | 44.0 | 27.8 | 21.3 | | 22.6 | |
| 1k | 38.3 | 26.8 | 38.4 | 29.5 | 36.6 | 27.1 | 34.1 | 27.3 | 30.3 | 26.0 | 27.0 | | 45.6 | | 18.0 | | 18.8 | |
| 2k | 37.1 | | 36.6 | 25.2 | 35.2 | | 32.2 | | 30.0 | | 23.0 | | 39.8 | | 12.0 | | 13.8 | |
| 4k | 30.7 | | 32.8 | | 30.3 | | 26.5 | | 27.5 | | 20.4 | | 34.4 | | 13.6 | | 14.3 | |
| 8k | 34.6 | | 27.2 | | 23.7 | | 19.3 | | 21.4 | | 16.5 | | 32.6 | | 13.5 | | 13.8 | |

Third octave lower limit for L90 = 19.8 dB
Octave lower limit for L90 = 24.9 dB

B14

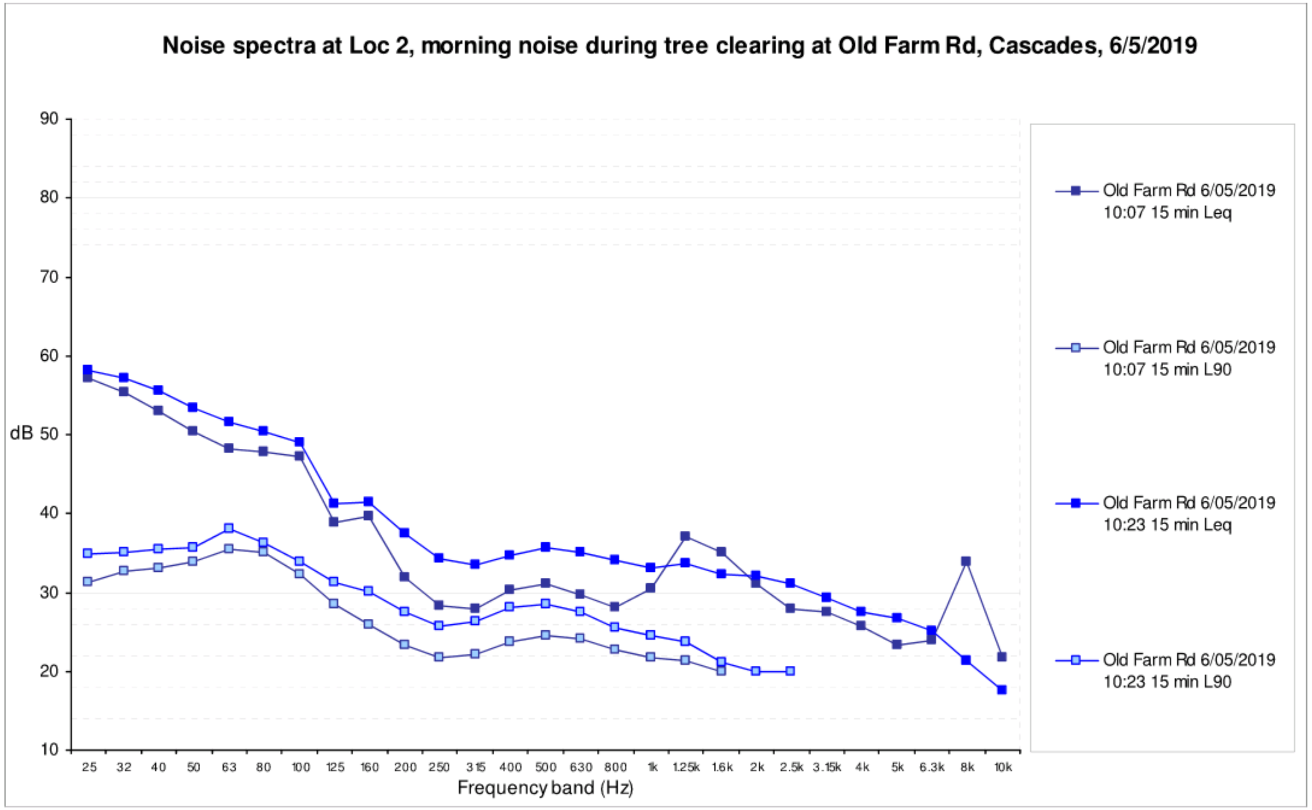
## Spectral distribution of measurements 7/5/2019

| Loc # | Loc 2 | | Loc 2 | | Loc 2 | | Loc 2 | |
|---|---|---|---|---|---|---|---|---|
| Location | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | | Old Farm Rd | |
| Date | 7/05/2019 | | 7/05/2019 | | 7/05/2019 | | 7/05/2019 | |
| Time | 13:30 | | 13:46 | | 14:02 | | 14:20 | |
| Duration | 15 min | | 15 min | | 15 min | | 15 min | |
| Test | Leq | L90 | Leq | L90 | Leq | L90 | Leq | L90 |
| Thirds Hz 25 | 40.2 | 25.9 | 39.2 | 25.0 | 43.9 | 24.6 | 30.1 | 24.6 |
| 32 | 40.2 | 25.5 | 49.7 | 24.8 | 35.2 | 25.2 | 31.7 | 25.7 |
| 40 | 36.4 | 25.2 | 43.3 | 24.2 | 32.5 | 25.0 | 30.7 | 26.0 |
| 50 | 50.9 | 26.2 | 46.1 | 26.5 | 34.3 | 29.3 | 32.4 | 28.2 |
| 63 | 57.5 | 26.1 | 48.9 | 27.2 | 31.9 | 26.8 | 32.4 | 27.0 |
| 80 | 48.4 | 24.6 | 40.2 | 25.4 | 31.9 | 25.3 | 31.4 | 24.6 |
| 100 | 37.7 | 22.2 | 31.7 | 22.2 | 28.5 | 22.7 | 26.7 | 22.3 |
| 125 | 40.6 | 20.0 | 38.2 | 20.0 | 27.2 | 19.9 | 24.2 | 20.2 |
| 160 | 37.7 | 19.8 | 36.0 | 19.8 | 26.8 | | 21.2 | 19.8 |
| 200 | 38.2 | | 33.3 | | 29.4 | | 18.7 | |
| 250 | 36.7 | | 33.1 | | 28.7 | | 16.7 | |
| 315 | 33.4 | | 30.2 | | 23.5 | | 16.2 | |
| 400 | 33.8 | | 29.1 | | 22.9 | | 16.4 | |
| 500 | 34.2 | | 28.8 | | 23.7 | | 18.3 | |
| 630 | 33.7 | | 29.0 | | 24.1 | | 17.9 | |
| 800 | 32.8 | | 29.6 | | 23.7 | | 18.1 | |
| 1k | 36.0 | | 28.7 | | 22.5 | | 23.5 | |
| 1.25k | 35.8 | | 28.5 | | 25.1 | | 26.6 | |
| 1.6k | 34.2 | | 28.8 | | 23.7 | | 24.2 | |
| 2k | 33.6 | | 28.0 | | 24.2 | | 26.2 | |
| 2.5k | 33.9 | | 27.7 | | 22.2 | | 20.7 | |
| 3.15k | 32.3 | | 26.6 | | 25.9 | | 23.4 | |
| 4k | 30.1 | | 24.7 | | 24.9 | | 21.5 | |
| 5k | 28.0 | | 23.5 | | 21.0 | | 22.2 | |
| 6.3k | 27.0 | | 22.2 | | 23.6 | | 27.1 | |
| 8k | 27.3 | | 21.9 | | 18.4 | | 22.9 | |
| 10k | 25.3 | | 18.1 | | 10.6 | | 14.9 | |
| Overall A | 45.1 | 24.4 | 39.5 | 23.6 | 35.5 | 24.2 | 35.2 | 23.7 |
| C | 58.5 | 36.1 | 53.0 | 35.9 | 43.9 | 36.6 | 40.1 | 36.8 |
| Octave Hz 31.5 | 44.0 | 30.3 | 50.9 | 29.5 | 44.7 | 29.7 | 35.7 | 30.2 |
| 63 | 58.8 | 30.5 | 51.1 | 31.2 | 37.6 | 32.2 | 36.9 | 31.6 |
| 125 | 43.7 | 25.6 | 40.8 | 25.6 | 32.3 | | 29.4 | 25.7 |
| 250 | 41.3 | | 37.2 | | 32.6 | | 22.1 | |
| 500 | 38.7 | | 33.7 | | 28.4 | | 22.4 | |
| 1k | 39.9 | | 33.7 | | 28.7 | | 28.7 | |
| 2k | 38.7 | | 33.0 | | 28.2 | | 29.0 | |
| 4k | 35.3 | | 29.9 | | 29.2 | | 27.2 | |
| 8k | 31.4 | | 25.9 | | 24.9 | | 28.7 | |

Third octave lower limit for L90 = 19.8 dB
Octave lower limit for L90 = 24.9 dB

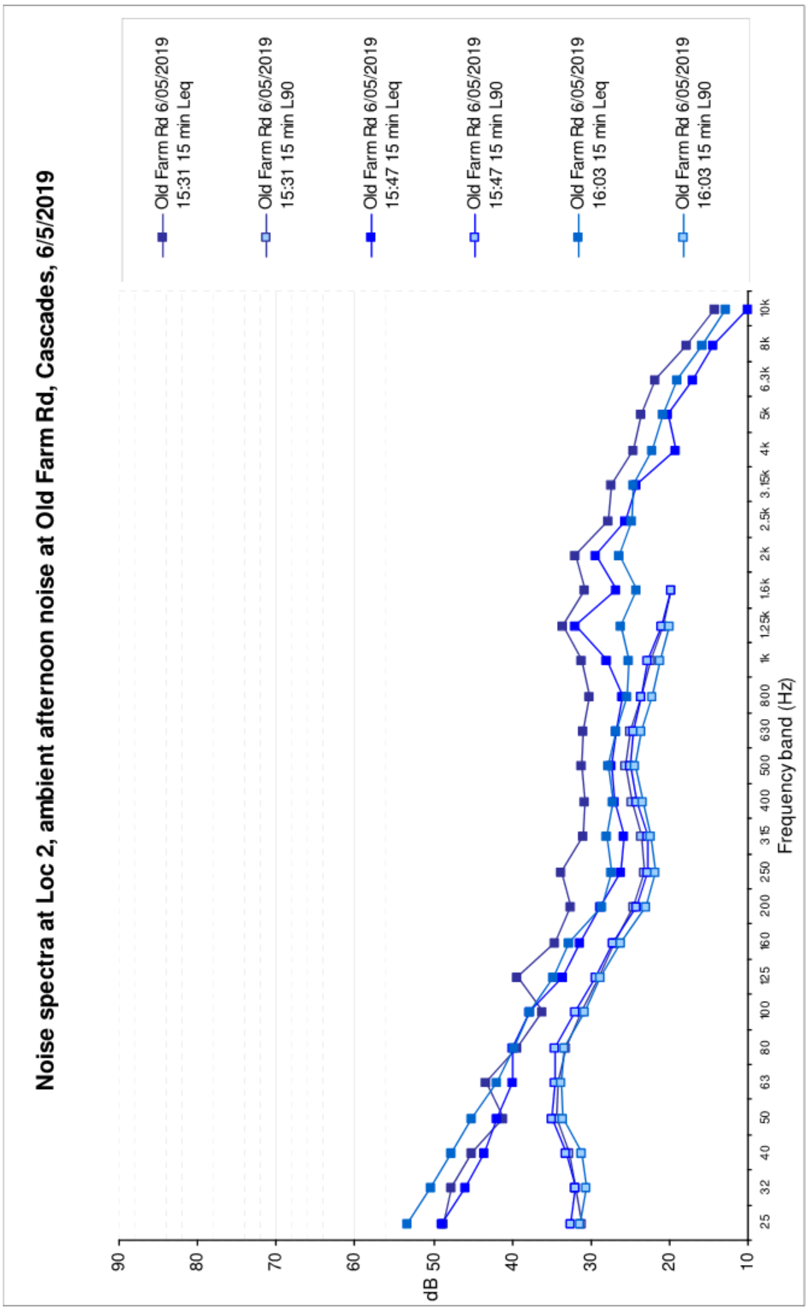
B15

## Spectral analysis (third octaves)

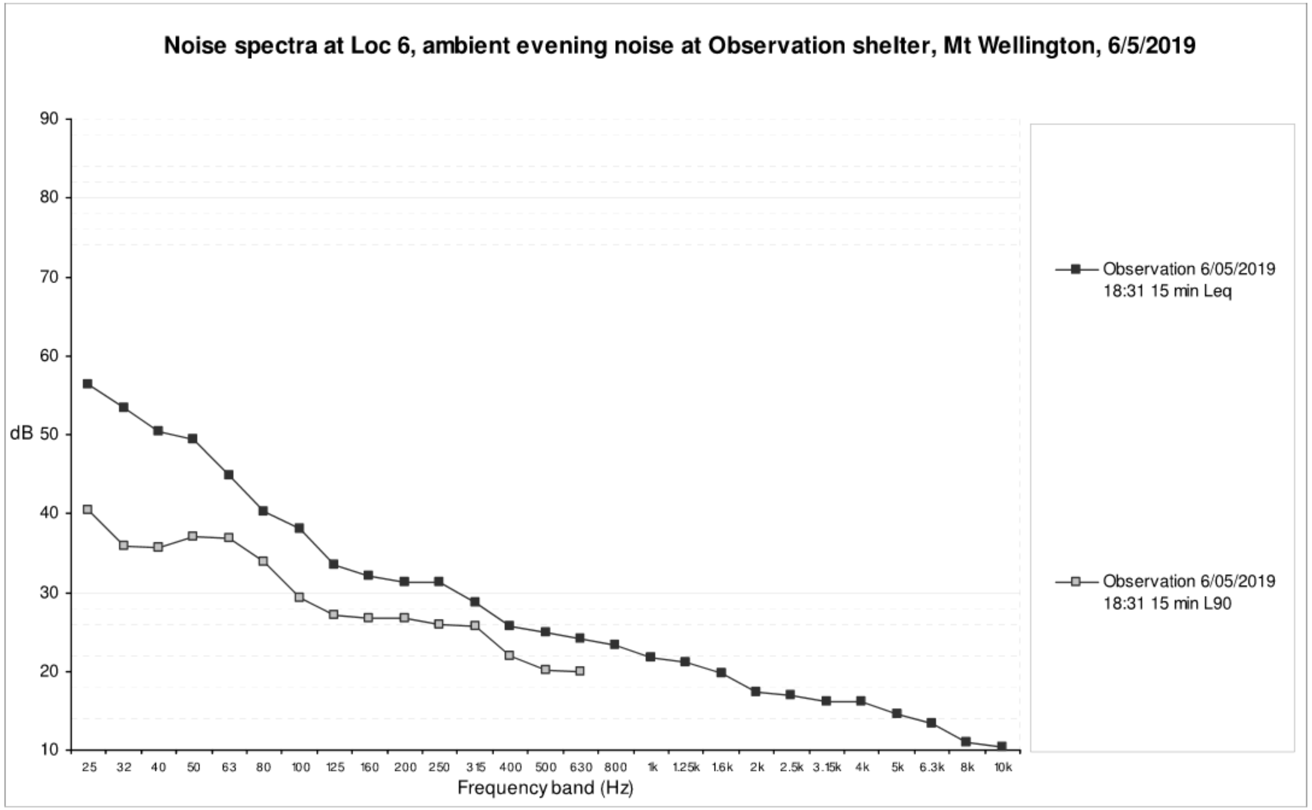


B16

## Spectral analysis (third octaves)

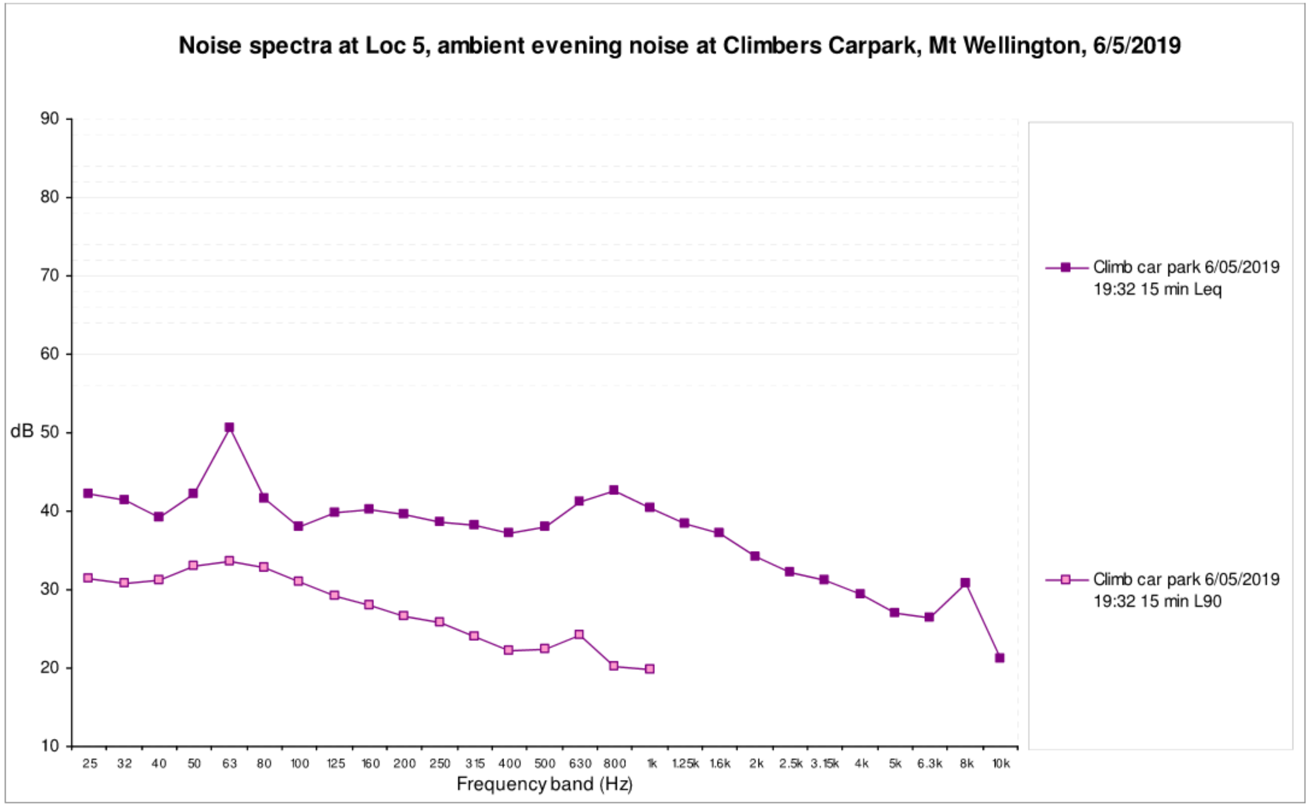


## Spectral analysis (third octaves)



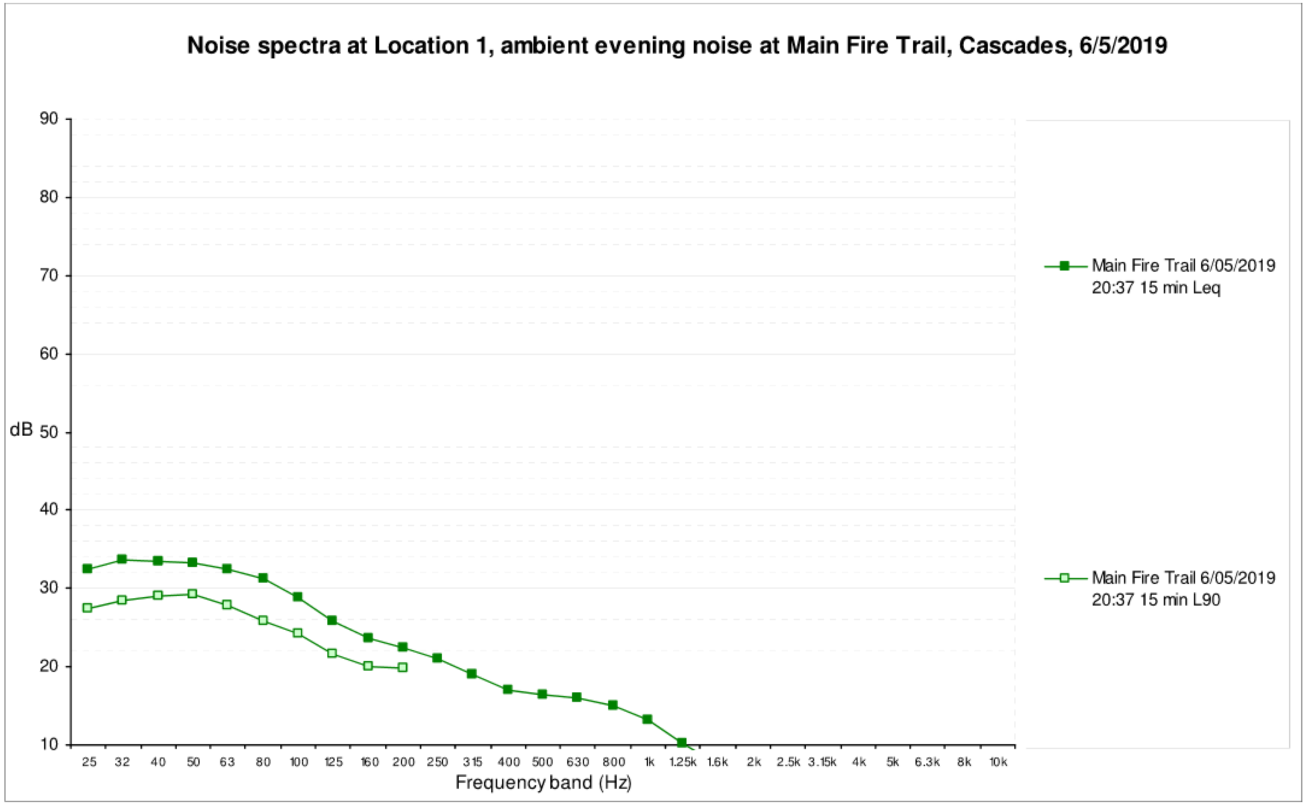
B18

## Spectral analysis (third octaves)




Traffic passes, water trickle background

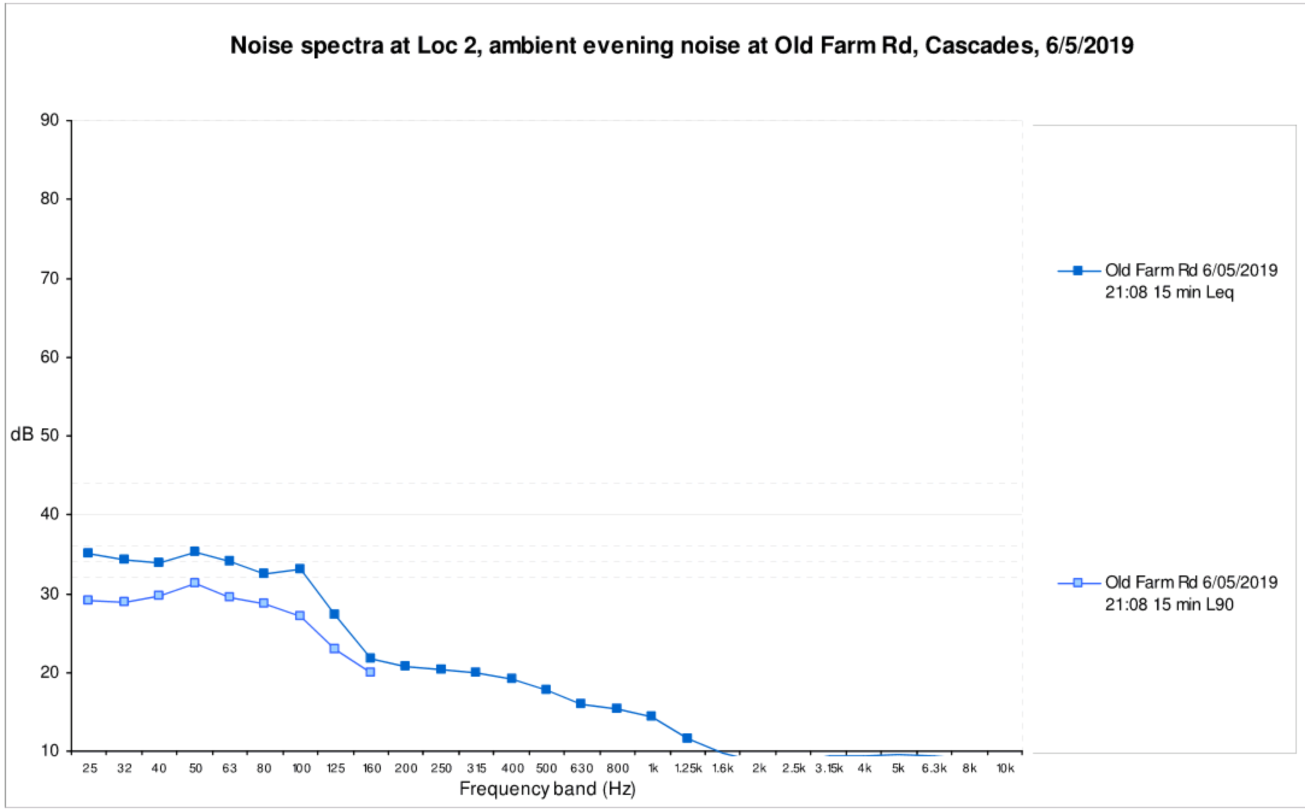
## Spectral analysis (third octaves)




Low evening noise levels

B20

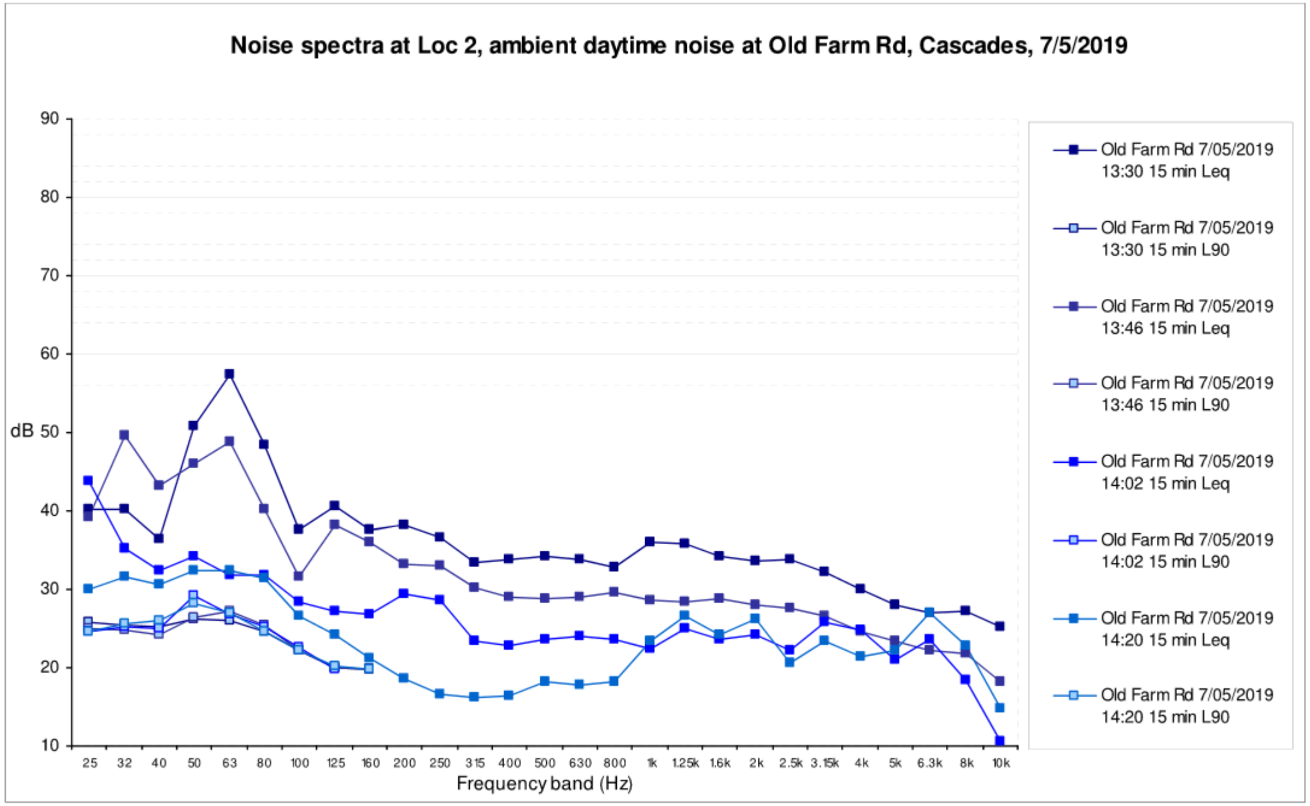
## Spectral analysis (third octaves)




Low evening noise levels

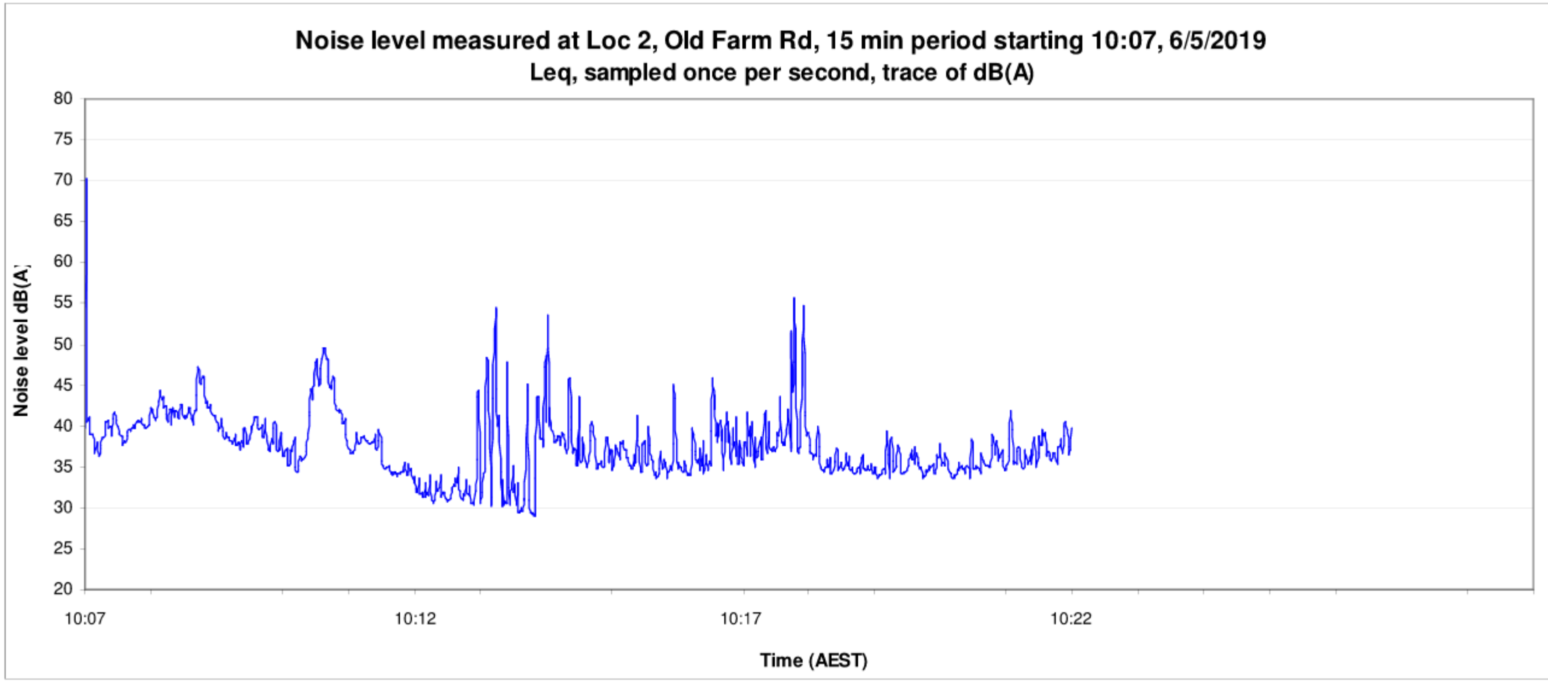
B21

## Spectral analysis (third octaves)



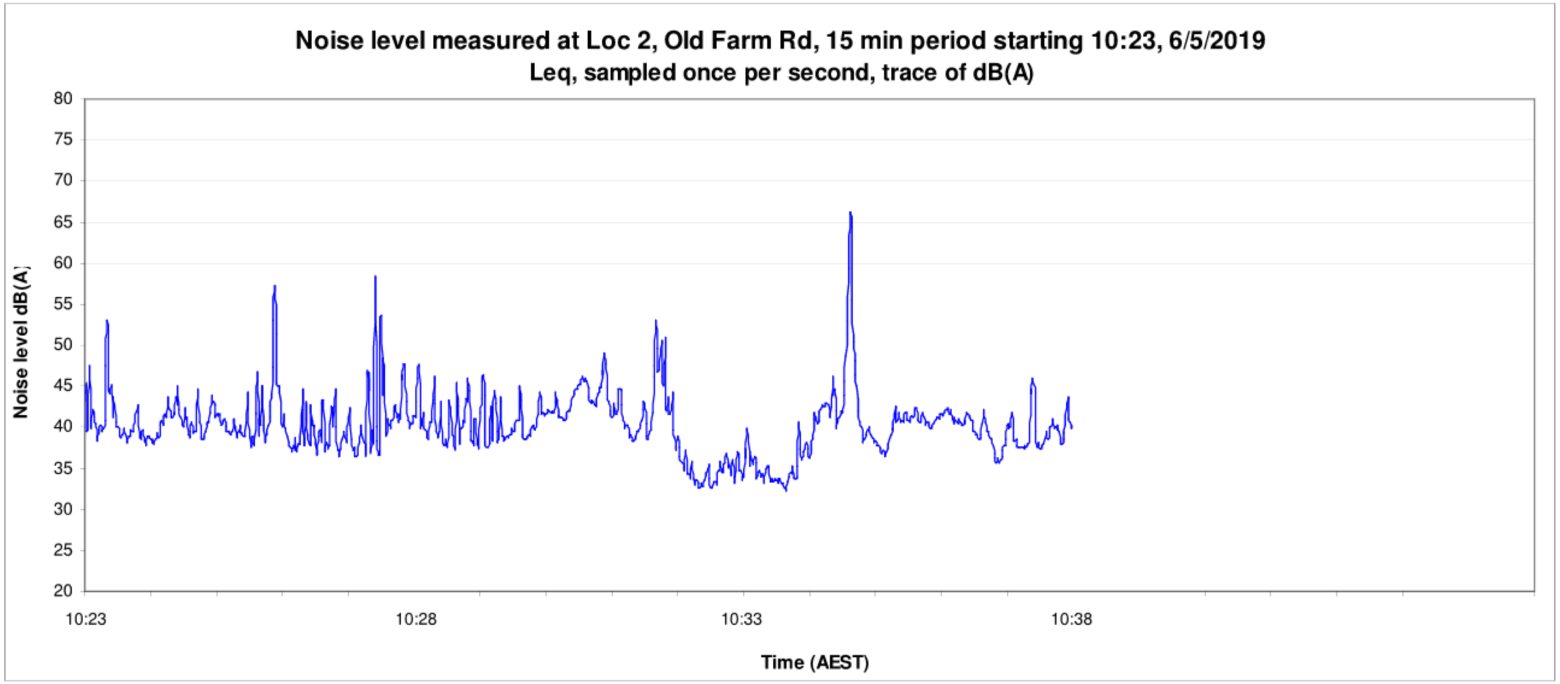

Traffic events featured during the first three measurements, and random bird calls

Monitoring trace of noise level at Location 2 over a 15 minute period



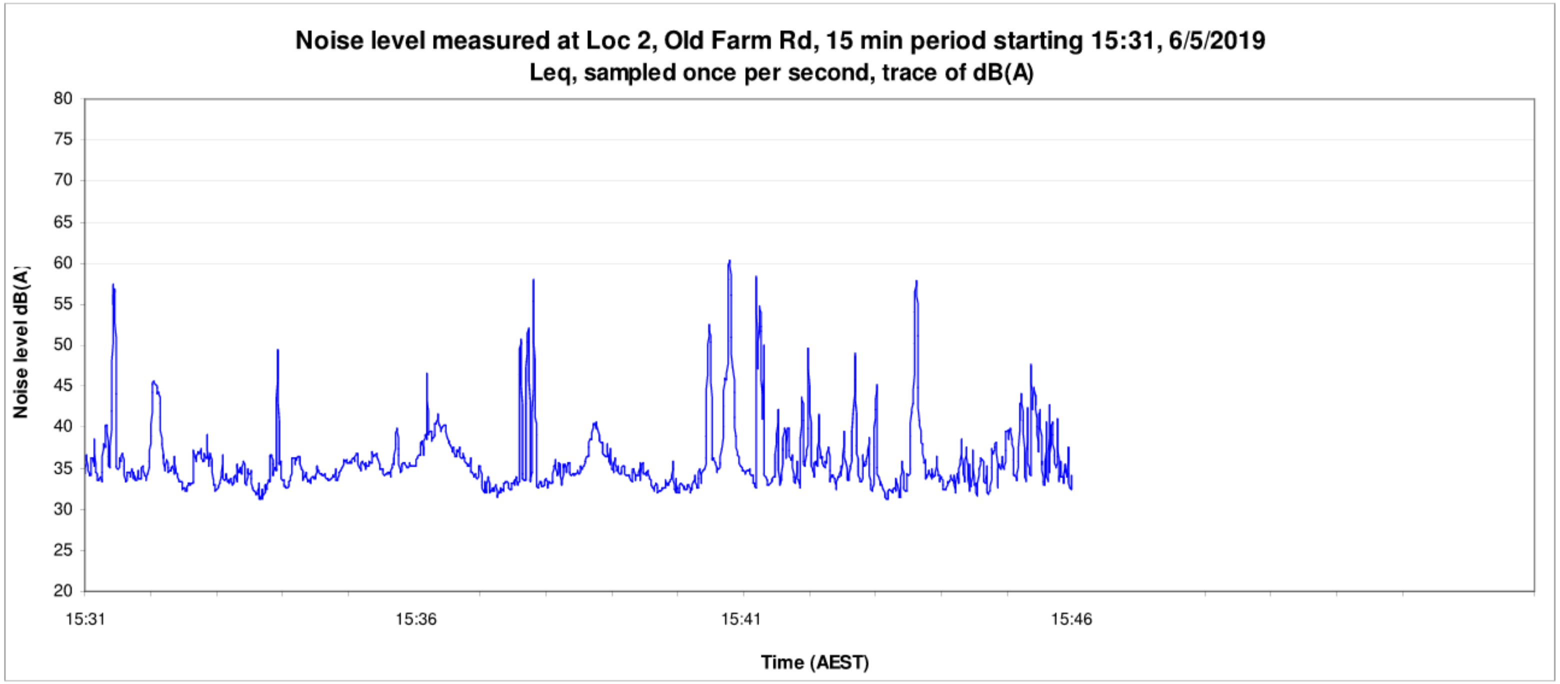

Bursts of chainsaw and wood chipper, few lulls, bird calls –many species from various distances

Monitoring trace of noise level at Location 2 over a 15 minute period



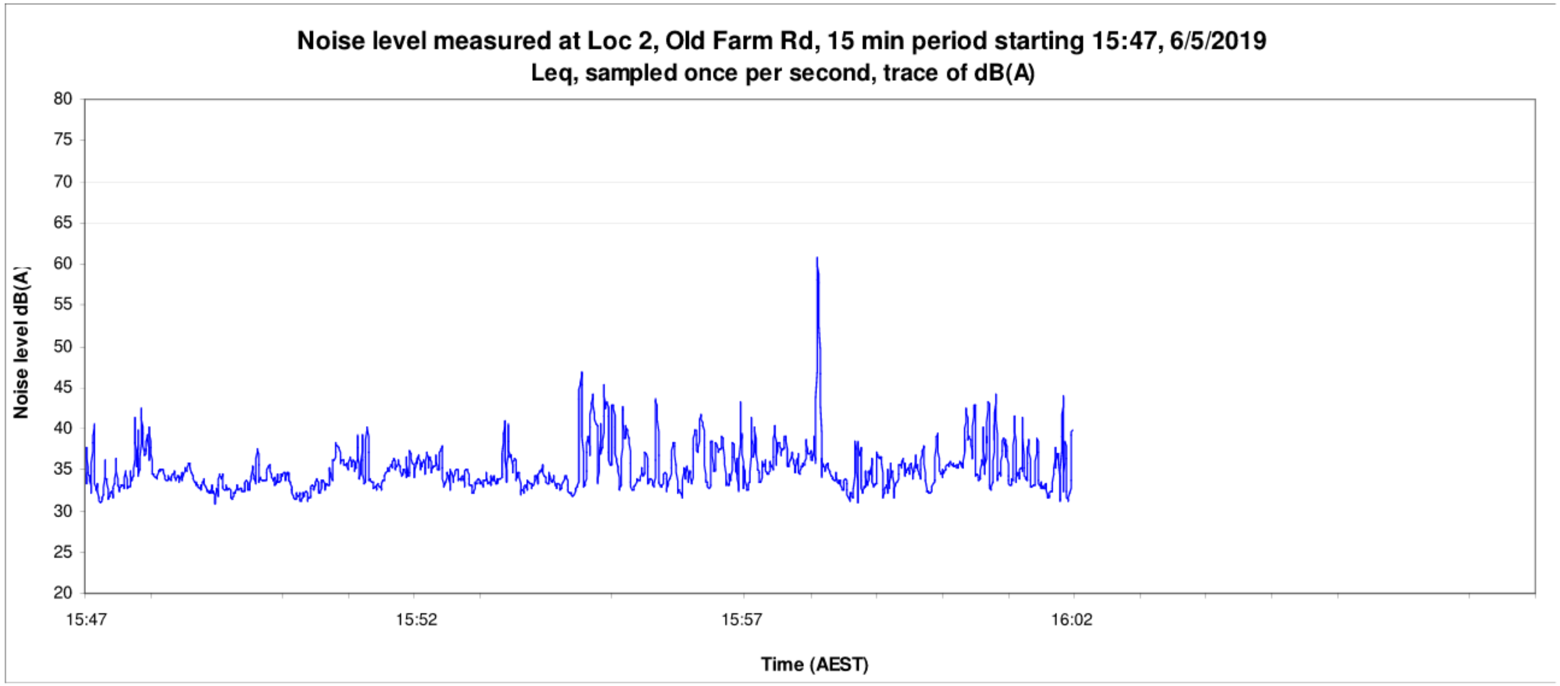

Bursts of chainsaw and wood chipper, few lulls, bird calls –many species from various distances
The 10:35 peak was from a car passing uphill

Monitoring trace of noise level at Location 2 over a 15 minute period




Bird calls –many species from various distances. Two car pass events.

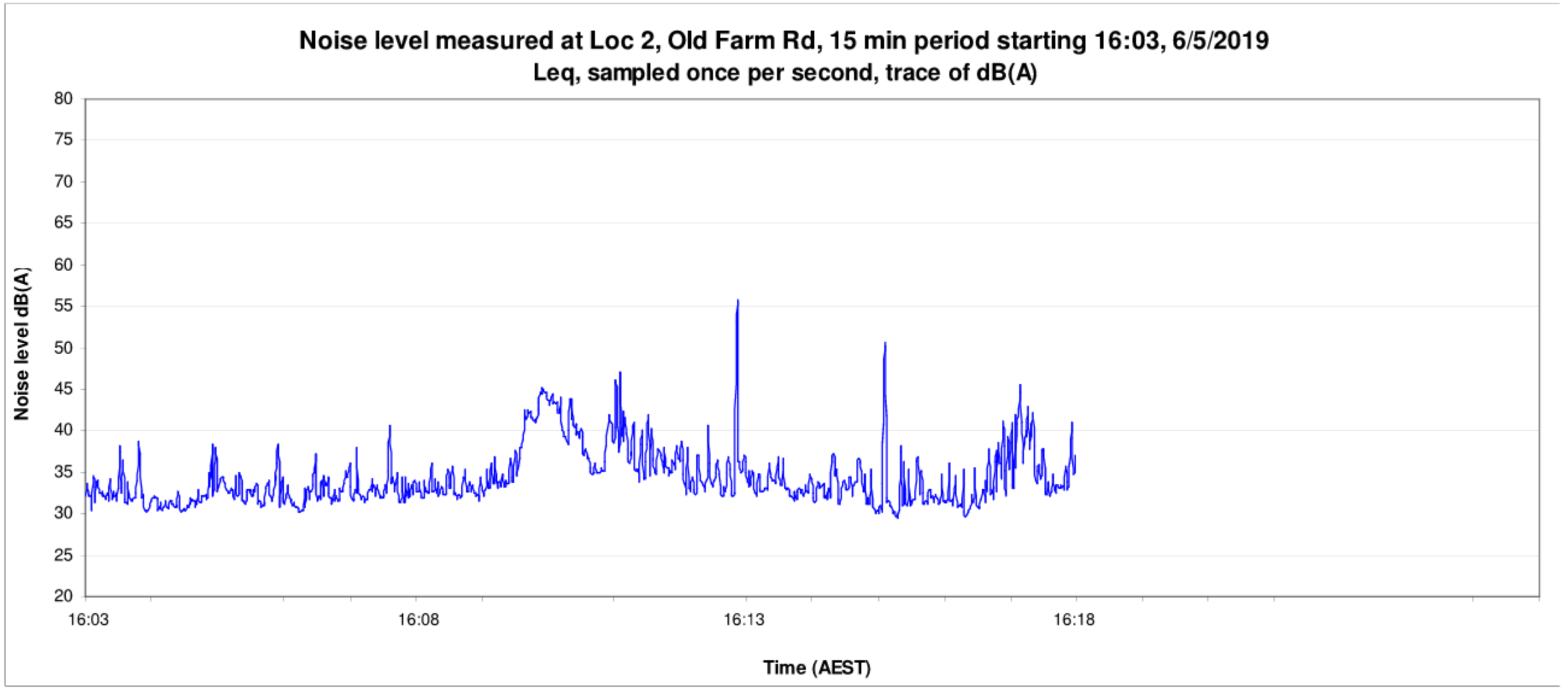
Monitoring trace of noise level at Location 2 over a 15 minute period




Bird calls –many species from various distances. Peak at 15:58 was due to a crow.

B26

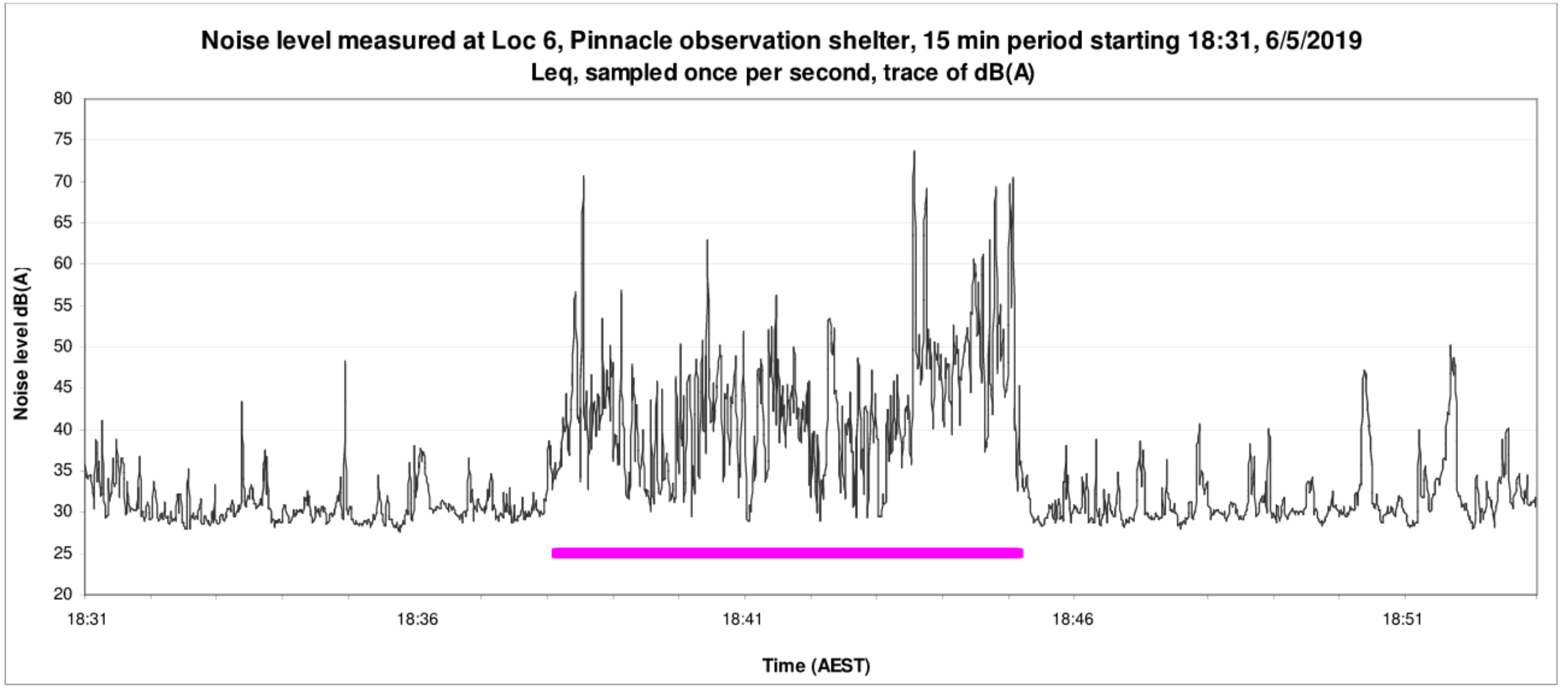
Monitoring trace of noise level at Location 2 over a 15 minute period




Bird calls –many species from various distances.

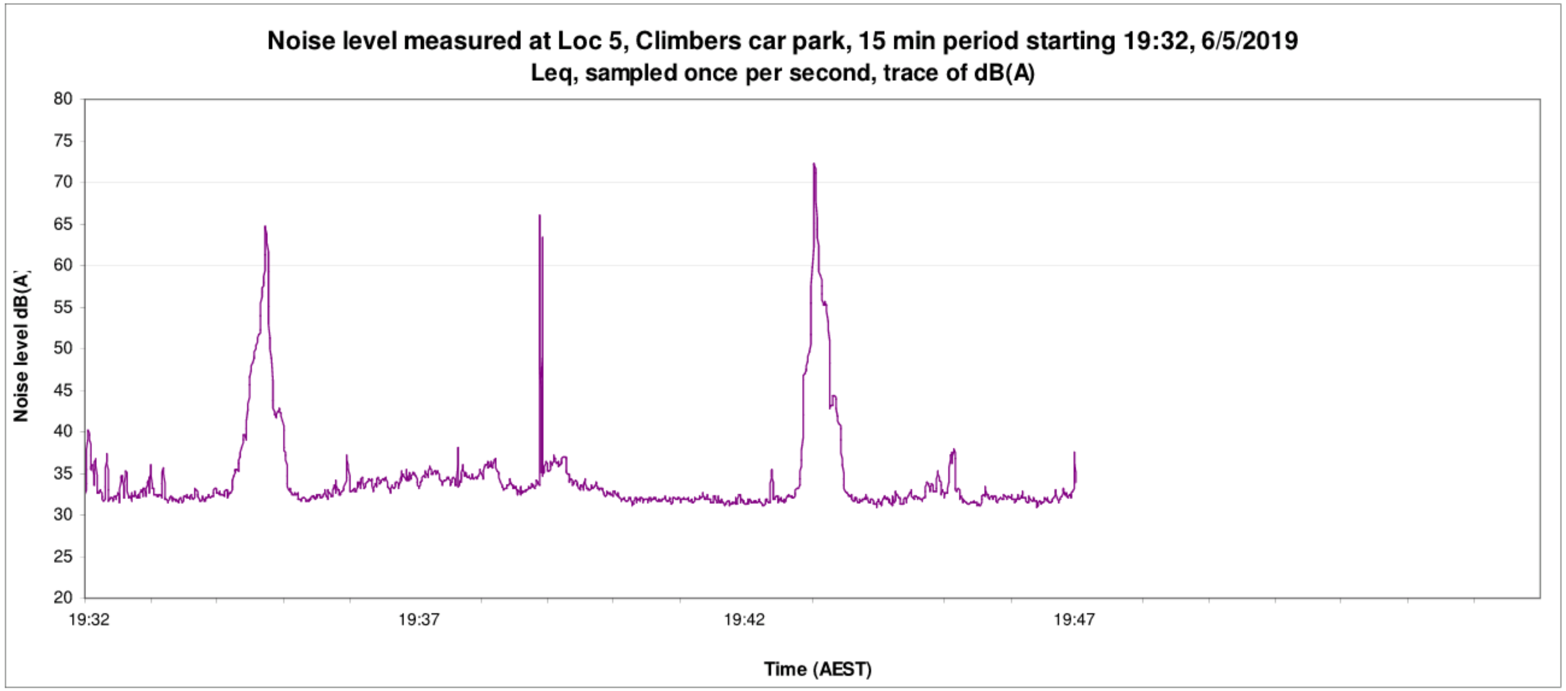
B27

Monitoring trace of noise level at Location 6 over a 15 minute period




Traffic and distant voices. Light wind gusts.
The pink bar indicates the period of excluded data, while tourists talked near the microphone

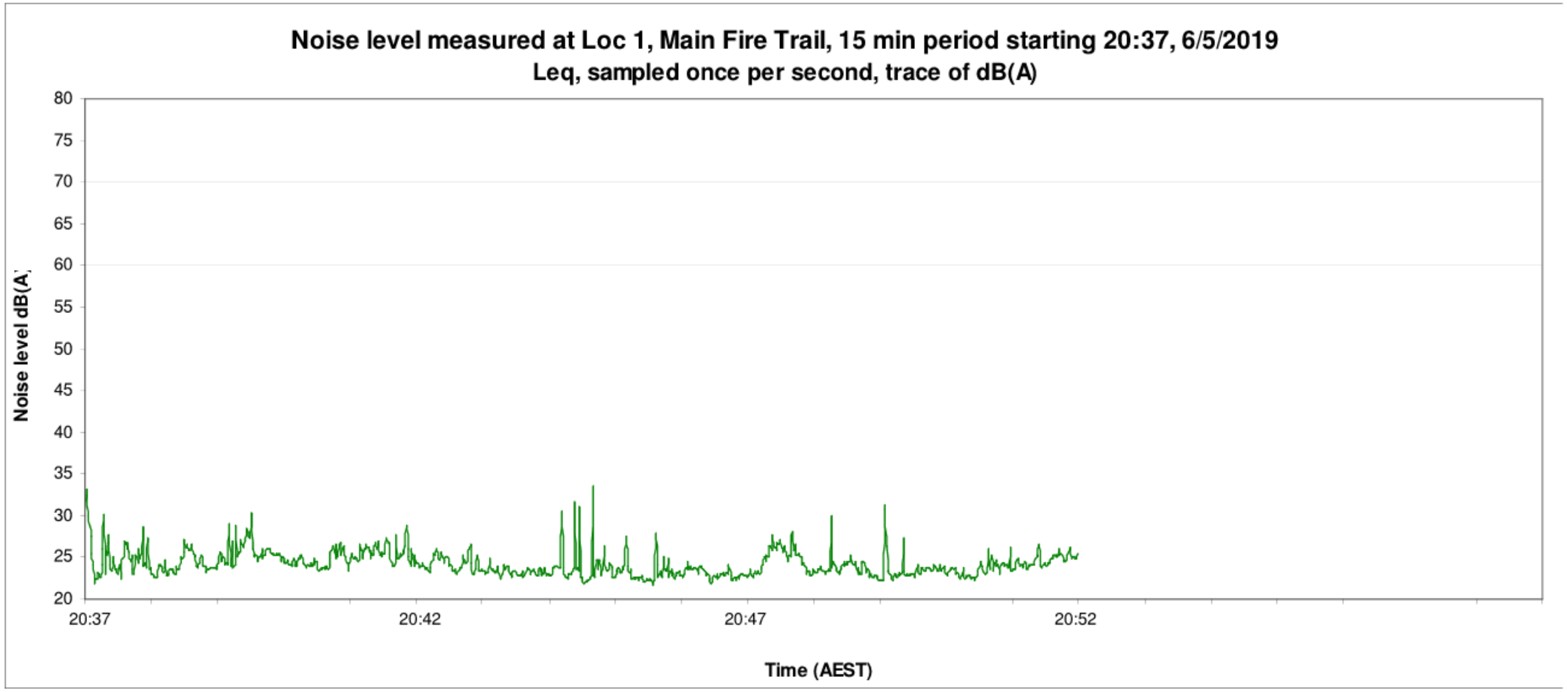
Monitoring trace of noise level at Location 5 over a 15 minute period




Two traffic events, background of trickling water in drain. The 19:39 spikes were a car door closing.

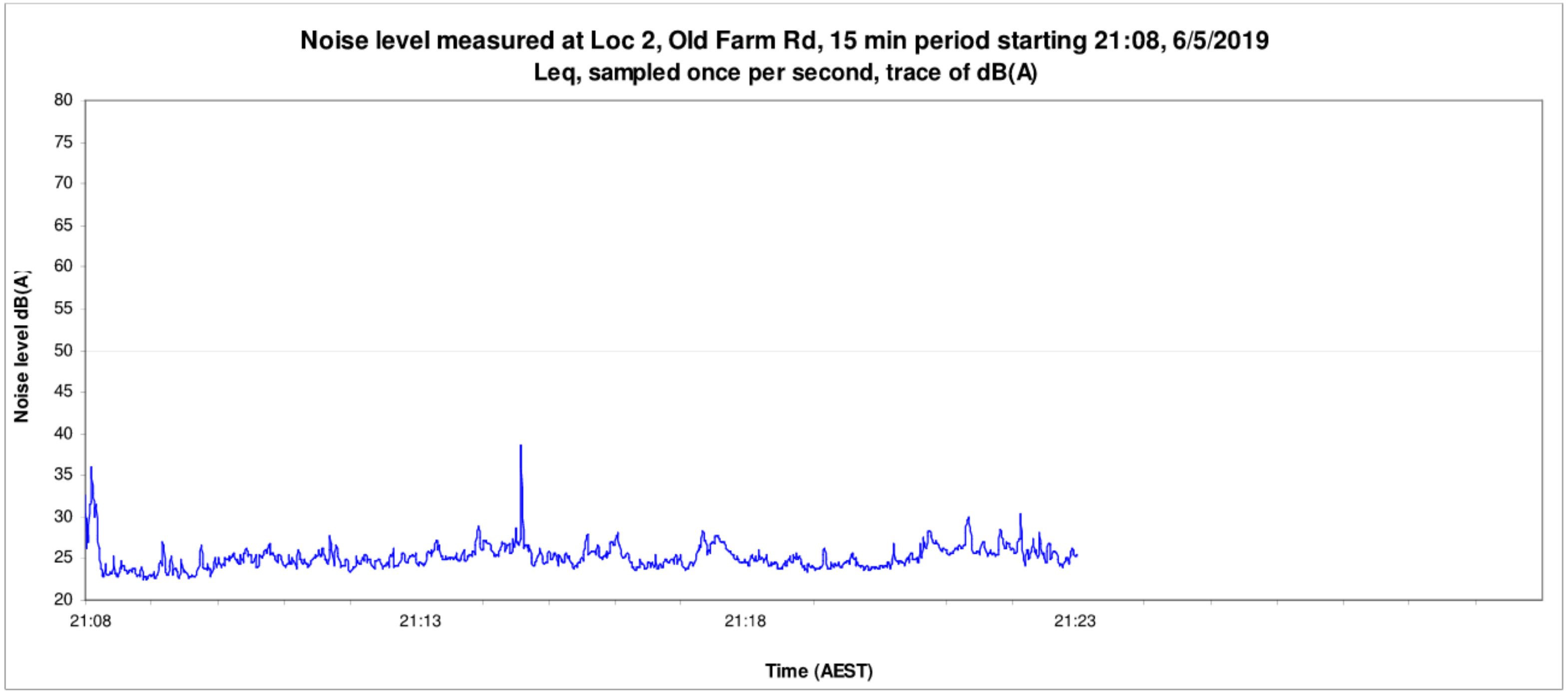
B29

Monitoring trace of noise level at Location 1 over a 15 minute period



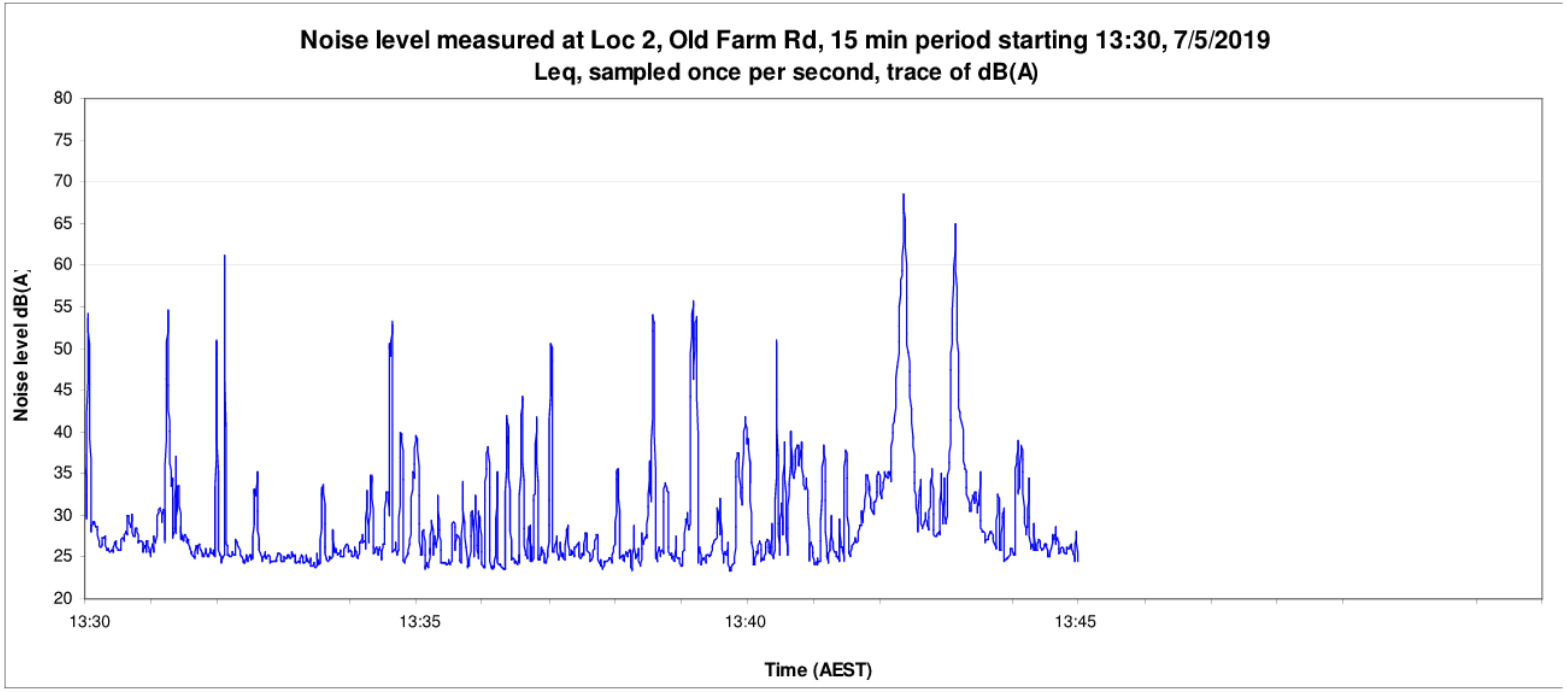

Tranquil evening.

Monitoring trace of noise level at Location 2 over a 15 minute period



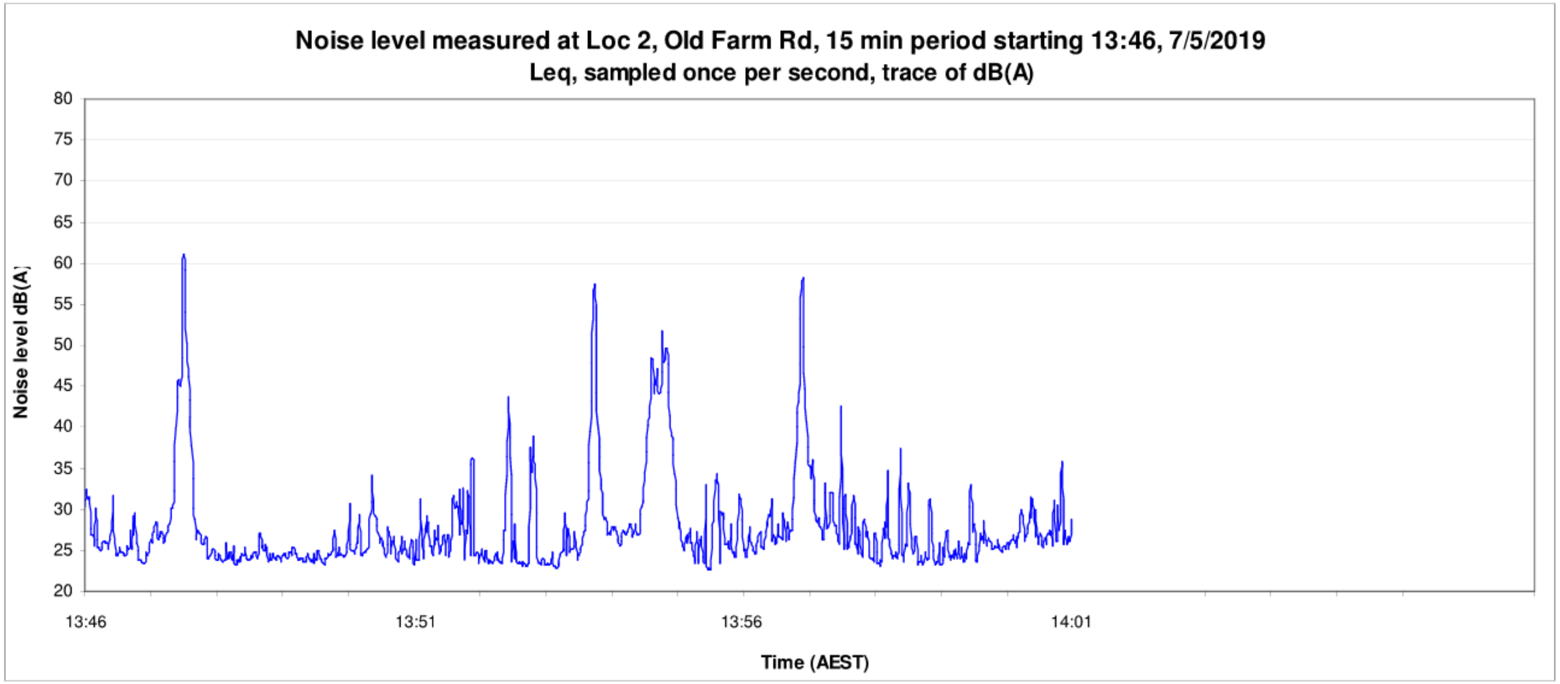

Tranquil evening.

Monitoring trace of noise level at Location 2 over a 15 minute period



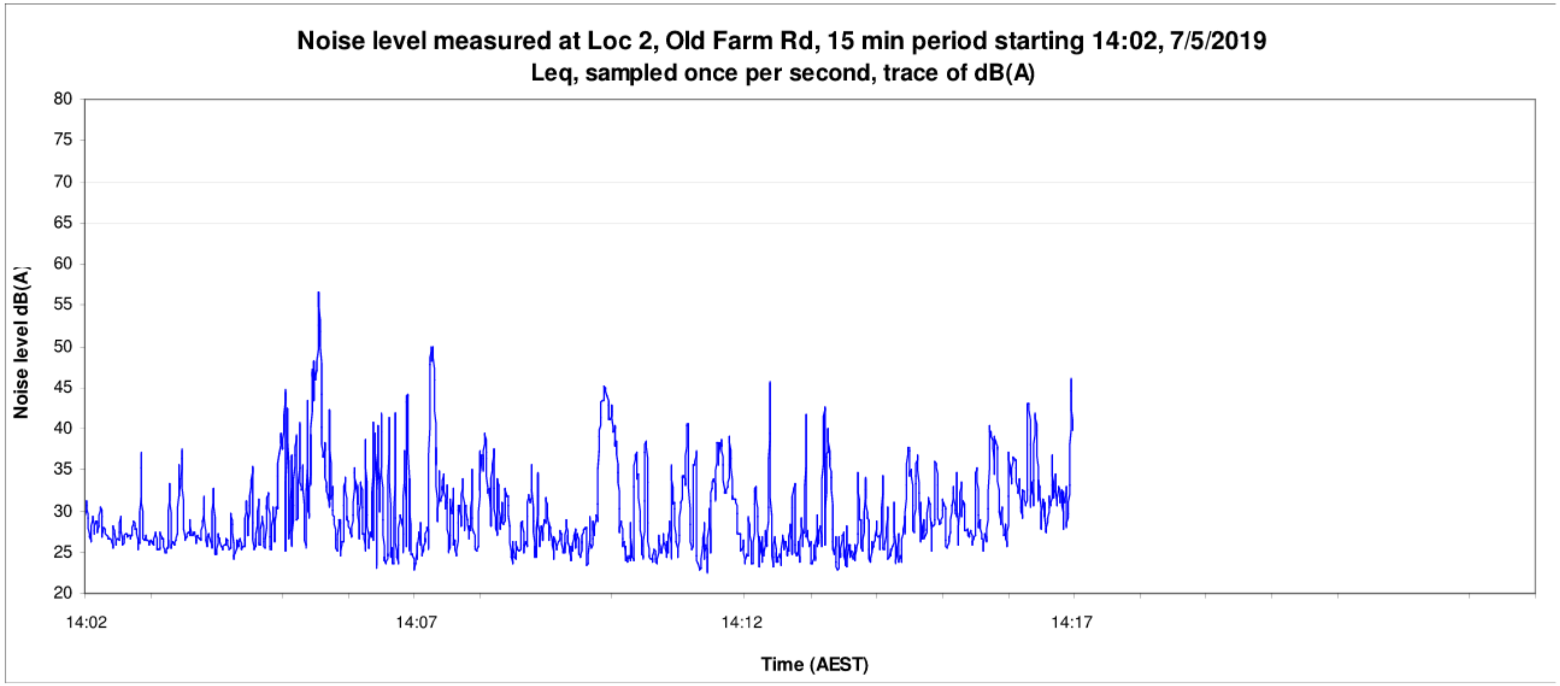

Mainly crows calling, The 13:42 and 13:43 peaks were a van passing up then down the hill.

Monitoring trace of noise level at Location 2 over a 15 minute period



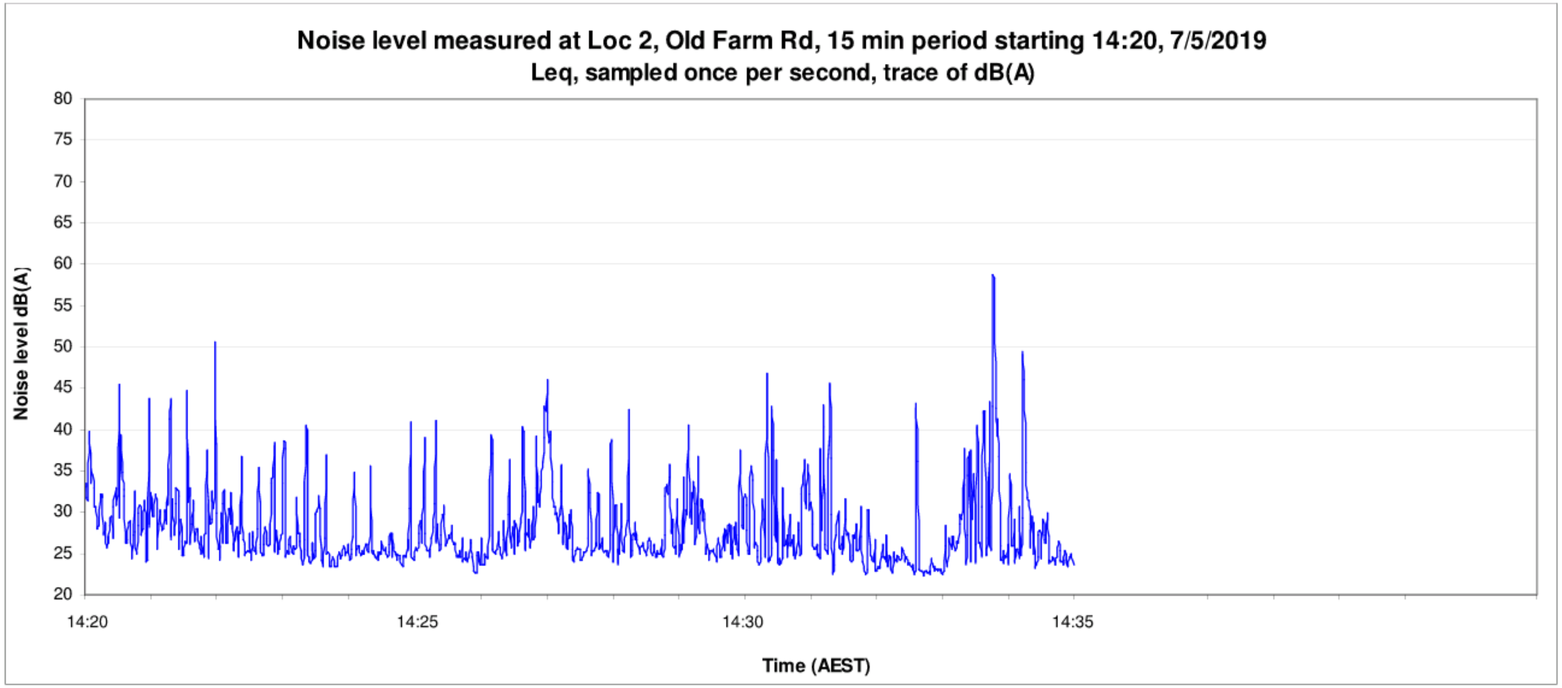

The four main peaks were traffic passes (2 cars, each went up then down the hill.

Monitoring trace of noise level at Location 2 over a 15 minute period




Bird calls, mainly crows. The 14:06 peak was a traffic event, and the 14:10 peak was from kookaburras.

**Monitoring trace of noise level at Location 2 over a 15 minute period**




Bird calls, mainly crows.
Low background levels.

# Cable car Gimmelwald - Mürren
# Noise Measurement-Report

February 19th, 2007

Planteam

**Customer:** Garaventa AG

Eisenbahnstrasse 62
CH-3645 Gwatt (Thun)

**Contractor:** Planteam GHS AG
Bahnhofstrasse 19a, 6203 Sempach-Station

Telefon 041 – 469 40 40
Fax 041 – 469 40 50

Internet www.planteam.ch
email ghs@planteam.ch

SQS-Zertifikat ISO 9001

**Author:** Thomas Minder, Dipl. Ing. FH/STV, Dipl. Akustiker SGA

**Order-Nr.:** 07 - 037

## Table of contents

# 1 Order

Garaventa AG, Thun (Switzerland), ordered noise measurements of a cable car. The methodology for those measurements was given by Dominic Parkinson from AWN Consulting Limited, Dublin.

As object to measure, Garaventa choose the cable car from Gimmelwals to Mürrren.

# 2 Noise measurements

## 2.1 Measuring equipment

For our measurements we used the following equipment:

- Norsonic Environmental Analyzer Type 121, SN 26420 (ICE 61260 Class 1)
- Norsonic Measuring-microphone Type 1225, SN 25112
- Norsonic Preamplifier Type 1201, SN 27272
- Norsonic Calibrator Type 1251, SN 27072 (ICE 60942-1997, Class 1)

The system has bean calibrated before and after the measurements at 114,0 dB (1000Hz).

All the equipment was verified by Norsonic Brechbühl AG, Grünenmatt, on January 04th, 2006.

## 2.2 Date and time of the measurements

The measurements took place:

- Date: February 15th, 2007
- Time: Tower: between 09:30 and 10:30
  Terminal building: between 11:00 and 12:45

## 2.3 Weather conditions

During our measurements the weather conditions were as follows:

- Partly cloudy / partly sunny
- Temperatures between -4 and 3° C
- No wind
- Dry
- Some cm of snow on the ground

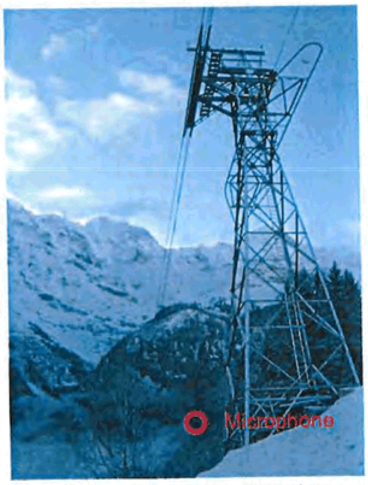
## 2.4 Measurement parameters

For all our measurements we used the same settings on the equipment. The following section describes the setting.

- Time vs. level recording with a period length of 125 ms
- Parallel recording of $L_{eqA}$, $L_{AFmax}$, $L_{eqfA}$, $L_{fAmax}$
- Marking of periods where the noise of the cable car was audible

## 2.5 Measurements at a tower

For the measurements at a tower, we choose the upper tower between Gimmelwald and Mürren. The following photography shows the tower and the placement of the microphone.





The distance between microphone and cable (bar) was measured with a laser-meter and was 26.95 m (measured in the middle of the bar). The microphone itself was at 2,1 m above terrain.

We measured 4 movements (2 upwards, 2 downwards) of the cable car over the tower as well as 2 movements of the cable without cable car. The following table presents the averages of the measurements and the background noise. The results in octave bands between 16 Hz and 16 kHz can be found in the appendix A.

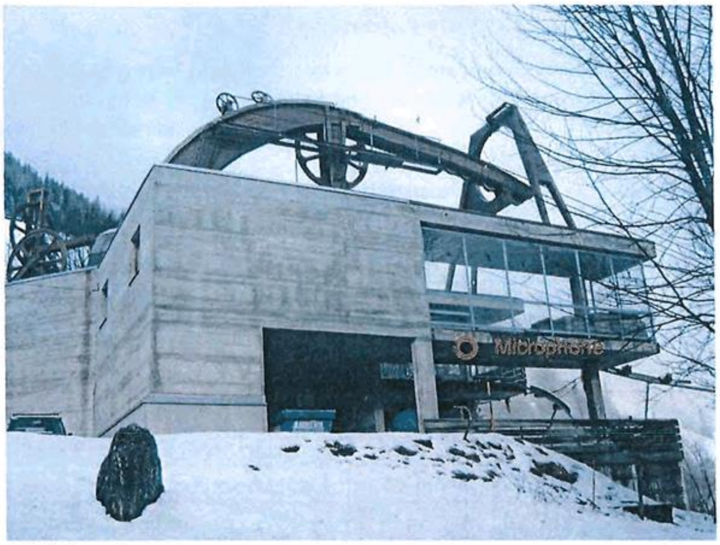
| | LeqA | LAFmax | Time | SEL |
|---|---|---|---|---|
| Cable car movement across tower | 56.5 | 61.6 | 15 sec | 68.3 |
| Cable movement across tower | 53.7 | 58.4 | 44.875 sec | 70.2 |
| Background noise | 36.6 | 43.2 | - | - |

## 2.6 Measurements terminal building

For the measurements of the terminal building, we choose the terminal Gimmelwald. The following photography shows the building and the placements of the microphone on all 4 facades.


*Front-Facade*


*Left Facade*



*Right Facade*

*Back-Facade*

For all the measurements the microphone was placed 2,0 m above terrain. At each position we measured the noise of two entrances and two leavings of the cable car and averaged the results. Also measured was the background noise around the terminal building.

The following table presents the averages of the measurements and the background noise as well as the distances between facades and microphones. The results in octave bands between 16 Hz and 16 kHz can be found in the appendix B.

| | *Distance* | *LeqA* | *LAFmax* | *Time* | *SEL* |
|---|---|---|---|---|---|
| Front-Façade, Entering cable car | 13.8 m | 49.3 | 57.3 | 14.5 sec | 60.9 |
| Front-Façade, Leaving cable car | 13.8 m | 53.8 | 71.0 | 28.4 sec | 68.3 |
| Left Façade, Entering cable car | 12.2 m | 40.0 | 44.7 | 10.0 sec | 50.0 |
| Left Façade, Leaving cable car | 12.2 m | 44.8 | 54.2 | 11.0 sec | 55.2 |
| Right Façade, Entering cable car | 13.8 m | 48.6 | 52.8 | 9.0 sec | 58.1 |
| Right Façade, Leaving cable car | 13.8 m | 46.0 | 52.1 | 14.5 sec | 57.6 |
| Back-Façade, Entering cable car | 4.5 m | 51.7 | 54.9 | 13.5 sec | 63.0 |
| Back-Façade, Leaving cable car | 4.5 m | 46.9 | 52.0 | 16.5 sec | 59.1 |
| Background noise | - | 32.3 | 40.5 | - | - |

The distances between facades and microphone positions could not be the same for all 4 positions because of the terrain and security reasons.

Sempach-Station, February 19th, 2007

T. Mi

Thomas Minder
Dipl. Ing. FH/STV, Dipl. Akustiker SGA

## Appendix

A Measurement-Reports Tower

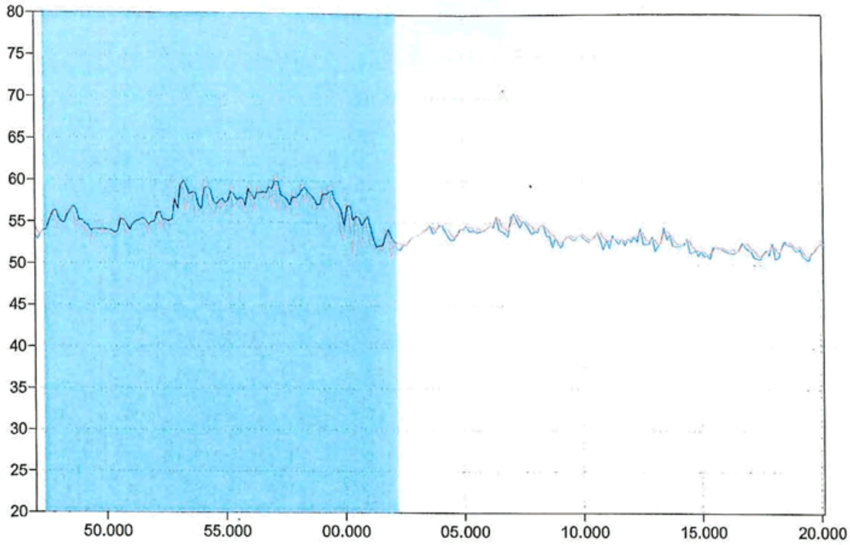
B Measurement-Reports Terminal Building

C Map / Drawings

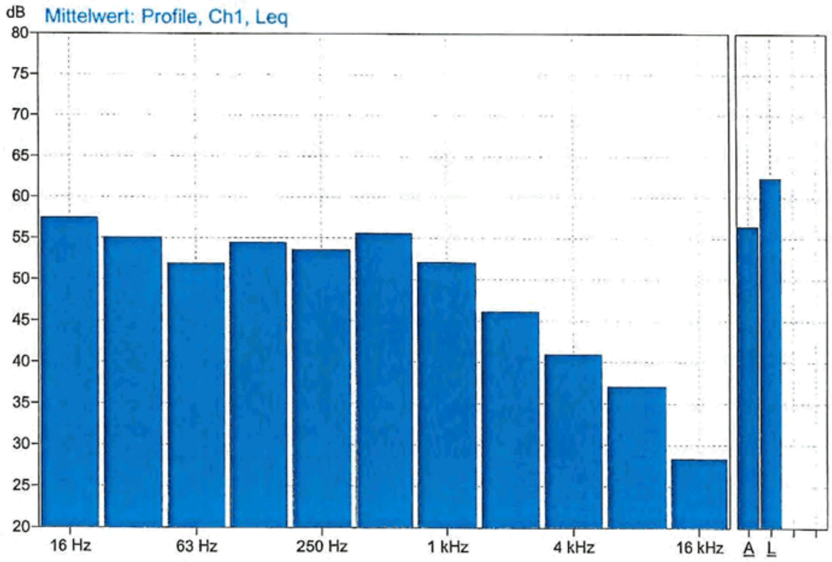
## Appendix A Measurement-Reports Tower

## Measurement Tower

Cable Car Movement across Tower




Total Duration = 15,00 sec

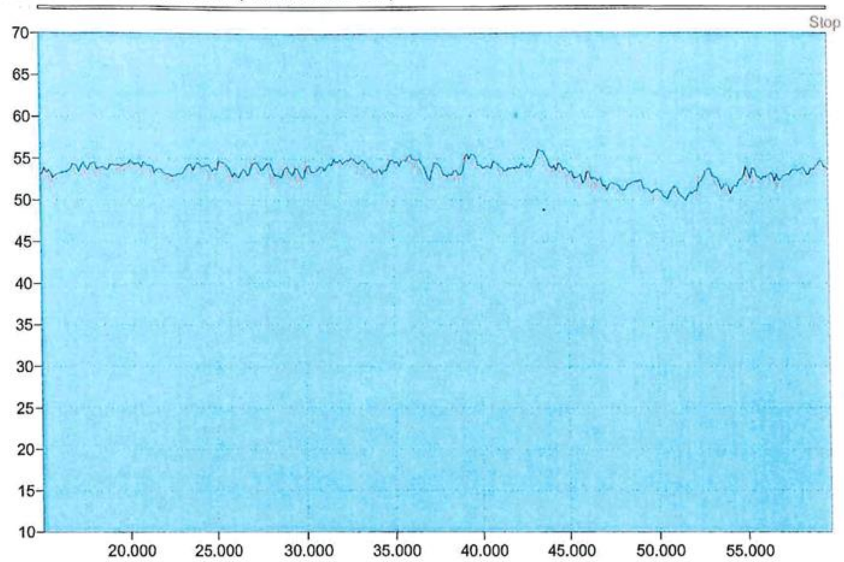



| | 16 | 31,5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $L_{eqA}$ | 57.5 | 55.1 | 51.9 | 54.4 | 53.6 | 55.6 | 52.0 | 46.1 | 40.9 | 37.0 | 28.3 | 56.5 |
| $L_{AFmax}$ | 66.8 | 64.5 | 58.1 | 62.1 | 58.1 | 60.0 | 57.6 | 51.5 | 47.2 | 46.5 | 36.8 | 61.6 |

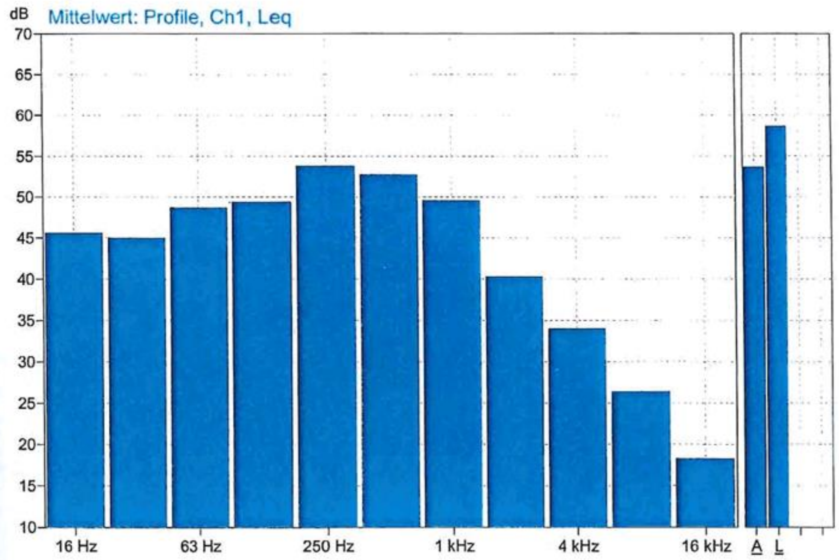
SEL = 68.3 dBA

## Measurements Tower

Cable Movement across Tower (without Cable Car)




Total Duration = 44,875 sec

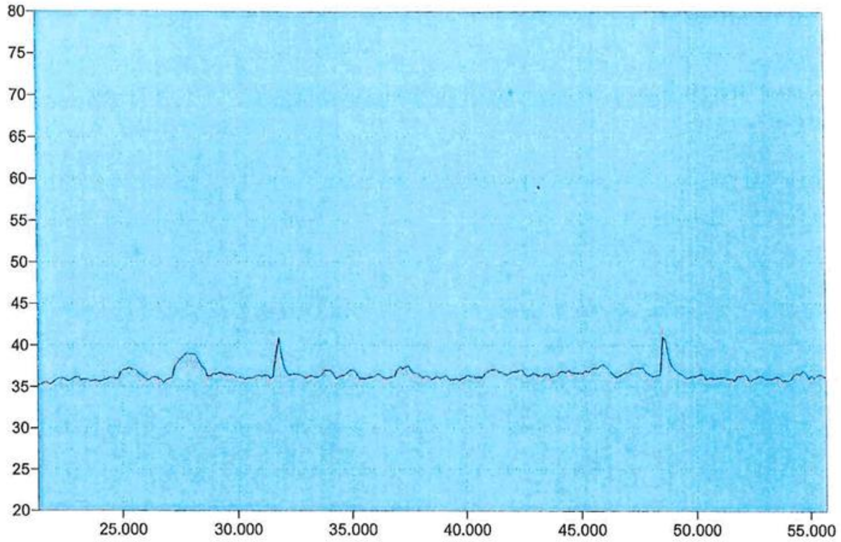



| | 16 | 31,5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $L_{eqA}$ | 45.6 | 45.0 | 48.7 | 49.4 | 53.8 | 52.7 | 49.6 | 40.3 | 34.0 | 26.4 | 18.3 | 53.7 |
| $L_{AFmax}$ | 50.2 | 50.5 | 55.4 | 56.1 | 59.4 | 57.5 | 53.6 | 45.0 | 41.2 | 37.3 | 28.1 | 58.4 |

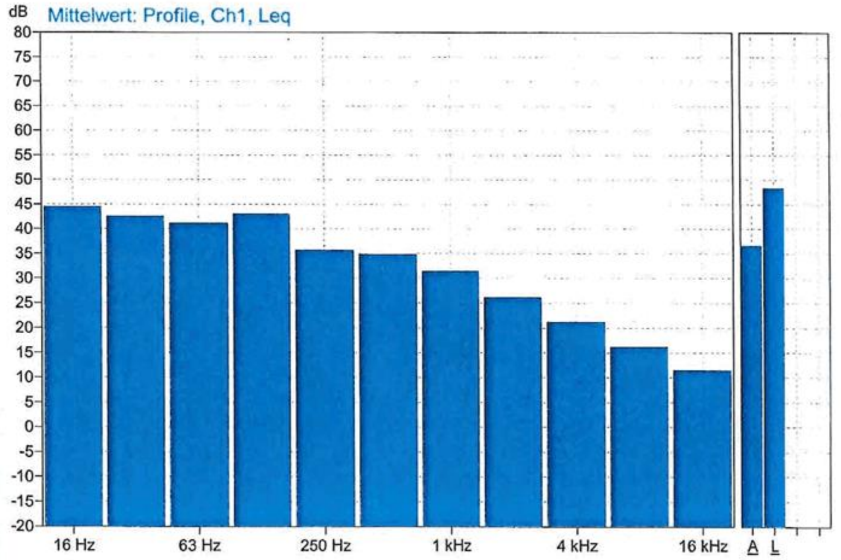
SEL = 70,2 dBA

## Measurements Tower

Background noise




Total Duration = 34,5 sec

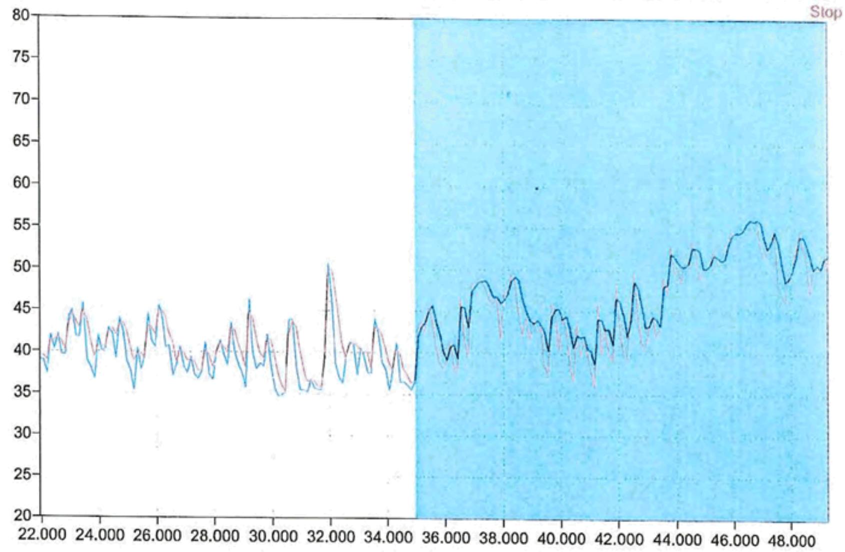



| | 16 | 31,5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $L_{eqA}$ | 44.4 | 42.5 | 41.1 | 43.0 | 35.6 | 34.8 | 31.3 | 26.1 | 21.2 | 16.1 | 11.4 | 36.6 |
| $L_{AFmax}$ | 51.2 | 47.1 | 45.2 | 48.2 | 39.0 | 36.5 | 34.2 | 35.3 | 37.5 | 32.7 | 20.7 | 43.2 |

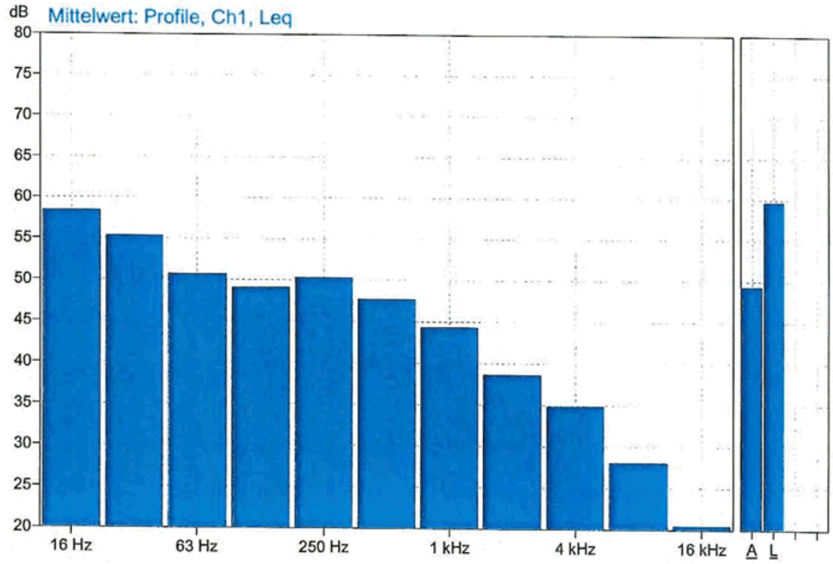
Appendix B Measurement-Reports Terminal Building

**Measurements Terminal Building**

Cable Car Entering, Front-facade




Total Duration = 14,5 sec

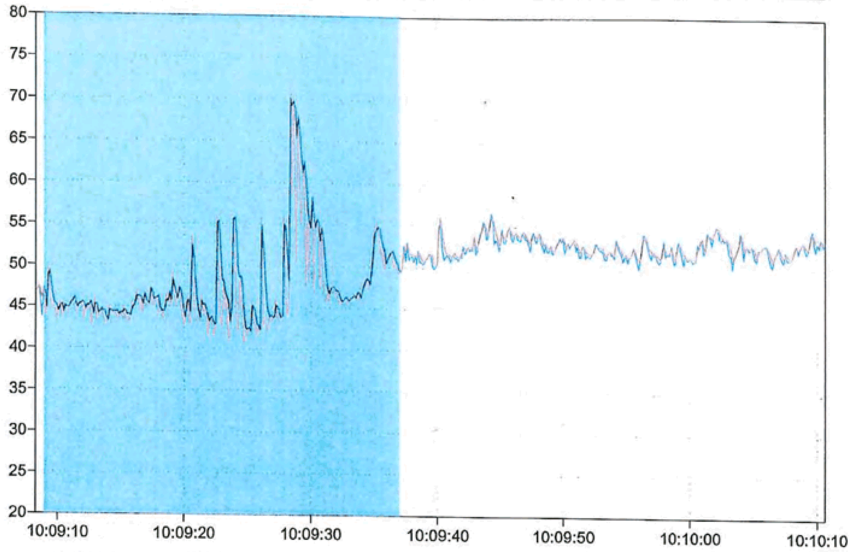



| | 16 | 31,5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $L_{eqA}$ | 58.4 | 55.3 | 50.7 | 49.1 | 50.3 | 47.7 | 44.3 | 38.6 | 34.8 | 28.0 | 20.4 | 49.3 |
| $L_{AFmax}$ | 70.3 | 66.1 | 61.1 | 58.2 | 59.2 | 54.9 | 52.4 | 46.4 | 41.8 | 35.7 | 29.8 | 57.3 |

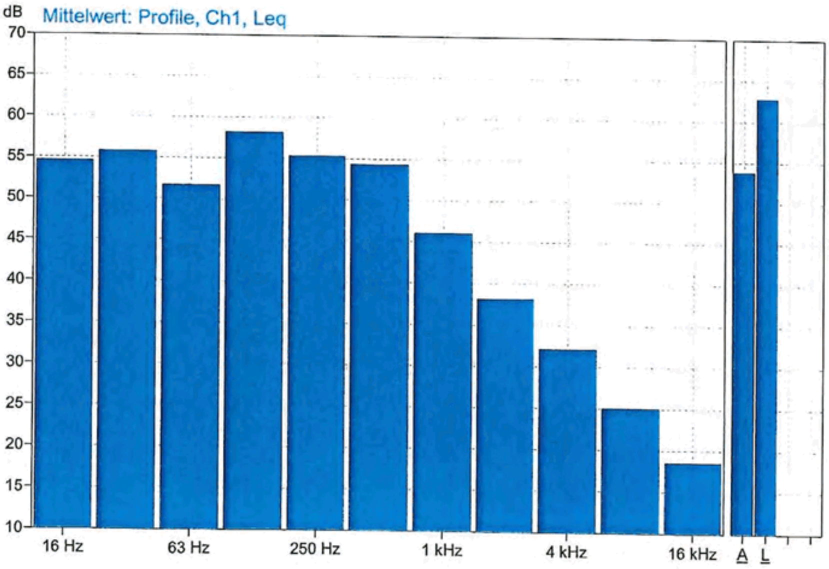
SEL = 60,9 dBA

## Measurements Terminal Building

Cable Car Leaving, Front-facade




Total Duration = 28,4 sec

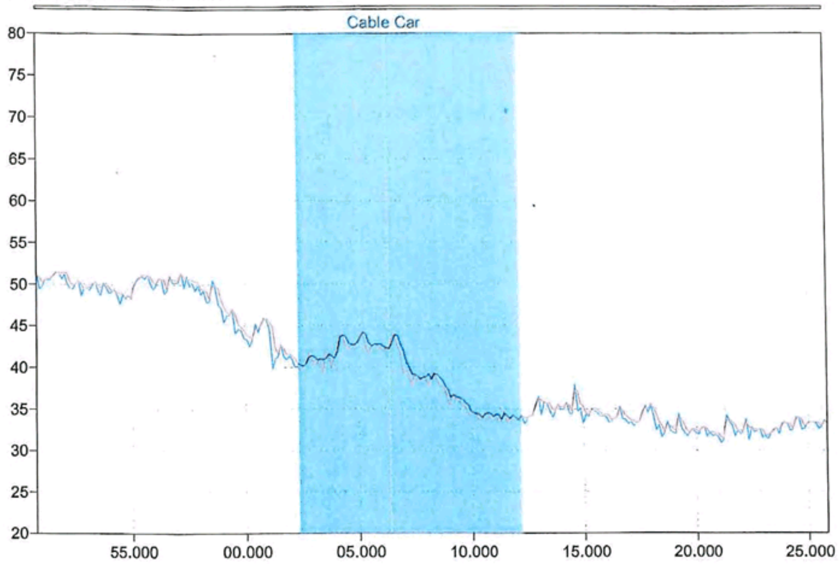



| | 16 | 31,5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $L_{eqA}$ | 54.5 | 55.7 | 51.7 | 58.1 | 55.3 | 54.3 | 46.0 | 38.1 | 32.1 | 25.0 | 18.6 | 53.8 |
| $L_{AFmax}$ | 62.5 | 64.2 | 57.8 | 70.2 | 70.6 | 72.3 | 63.8 | 55.4 | 43.5 | 34.0 | 27.2 | 71.0 |

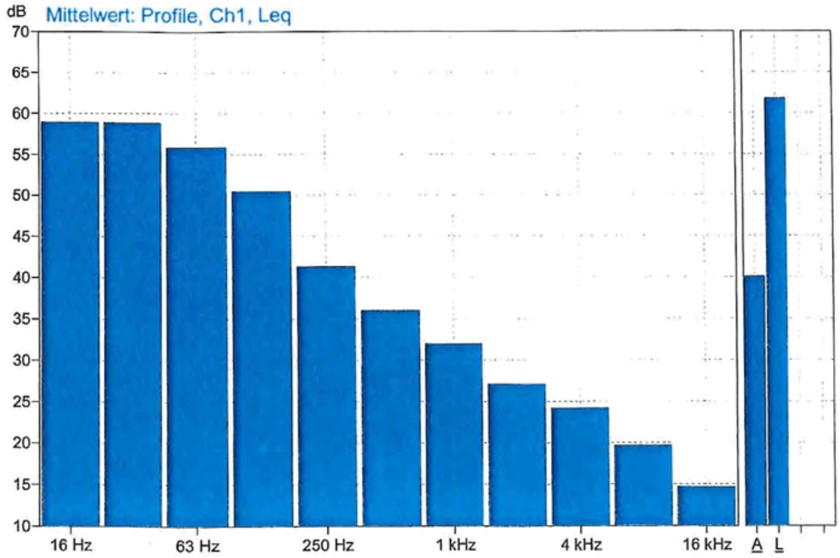
SEL = 68.3 dBA

## Measurements Terminal Building

Cable Car Entering, Left Facade



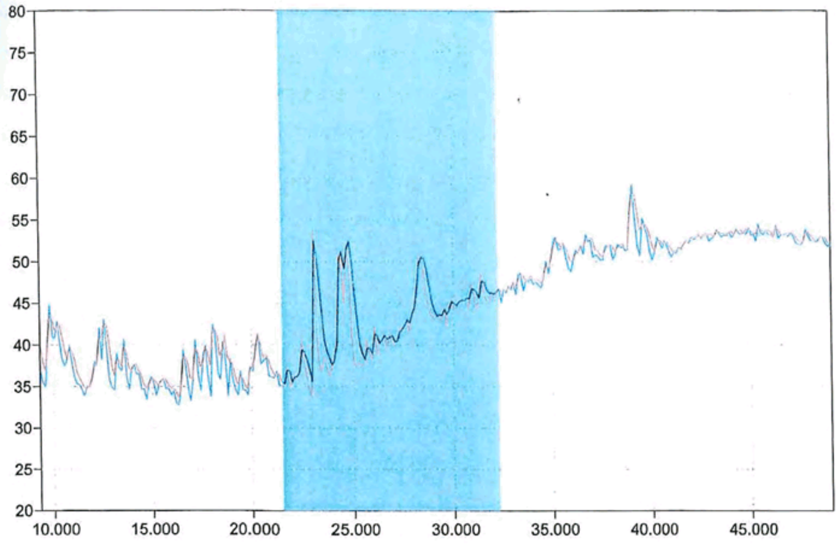

Total Duration = 10,0 sec



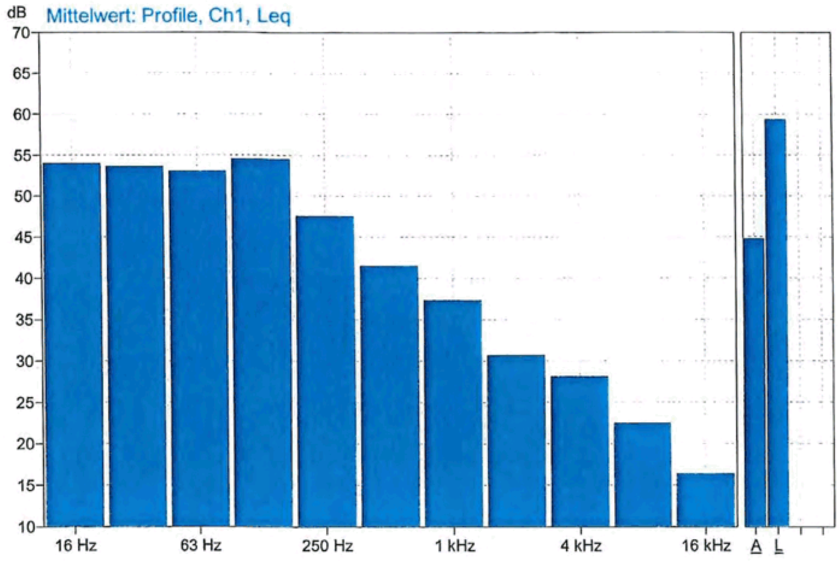

| | 16 | 31,5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $L_{eqA}$ | 58.9 | 58.9 | 55.9 | 50.5 | 41.3 | 36.0 | 31.9 | 27.1 | 24.2 | 19.7 | 14.6 | 40.0 |
| $L_{AFmax}$ | 64.4 | 64.1 | 62.3 | 55.1 | 45.8 | 40.2 | 36.1 | 30.9 | 28.4 | 27.0 | 20.7 | 44.7 |

SEL = 50.0 dBA

Measurements Terminal Building
Cable Car Leaving, Left Facade



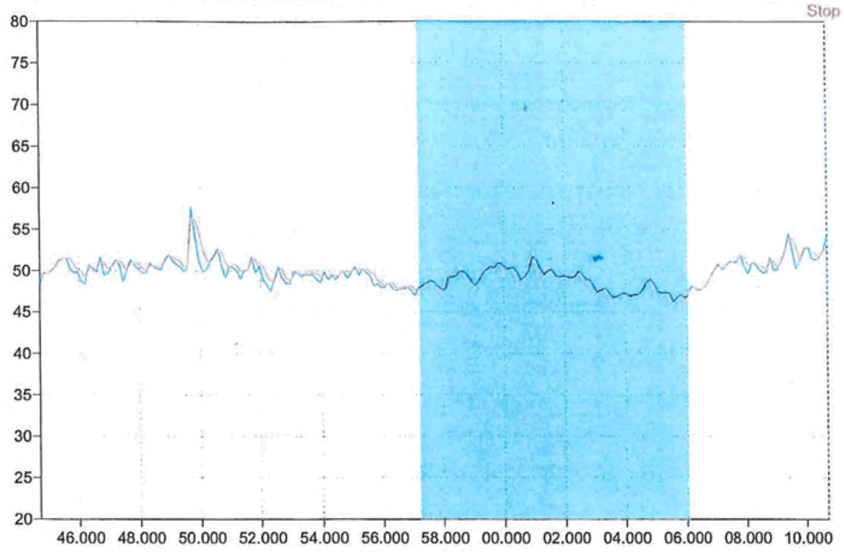

Total Duration = 11,0 sec



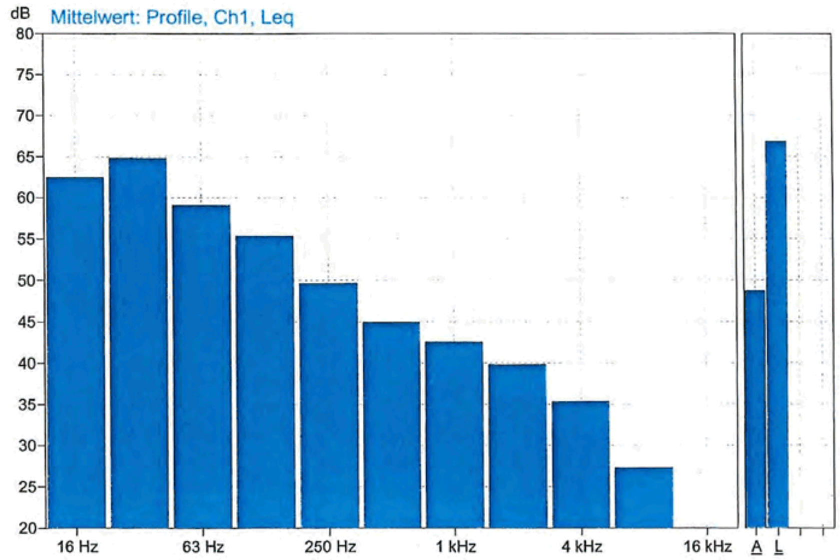

| | 16 | 31,5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $L_{eqA}$ | 54.0 | 53.6 | 53.0 | 54.5 | 47.6 | 41.5 | 37.3 | 30.7 | 28.1 | 22.5 | 16.3 | 44.8 |
| $L_{AFmax}$ | 61.6 | 59.2 | 60.2 | 61.9 | 58.0 | 50.9 | 47.8 | 39.0 | 35.3 | 28.8 | 24.7 | 54.2 |

SEL = 55,2 dBA

**Measurements Terminal Building**
Cable Car Entering, Right Facade



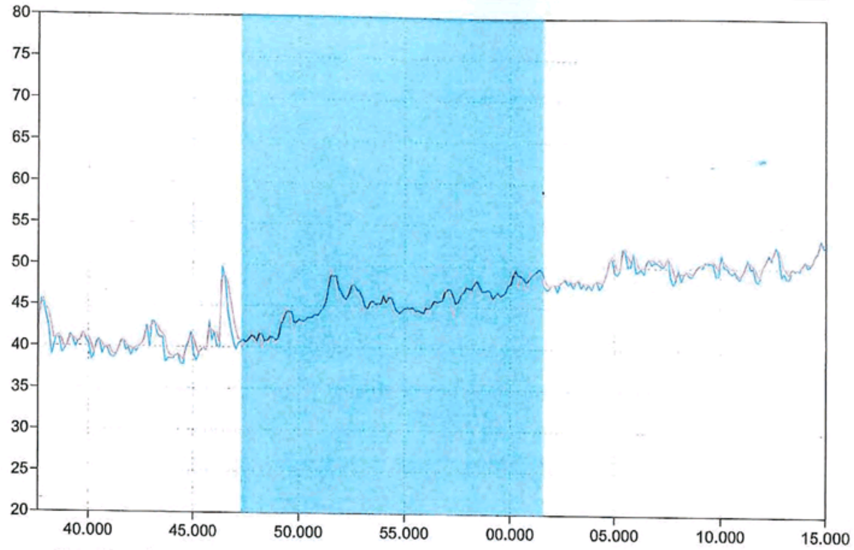

Total Duration = 9,0 sec



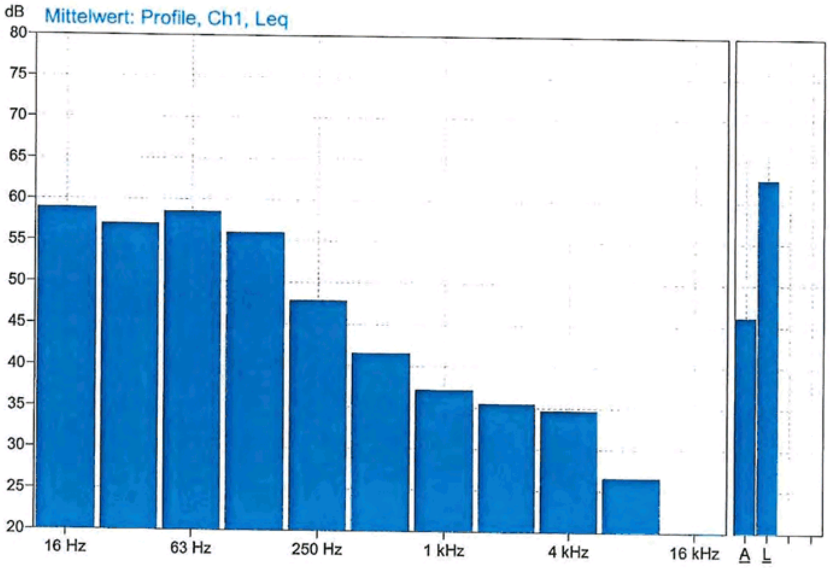

| | 16 | 31,5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $L_{eqA}$ | 62.5 | 64.8 | 59.1 | 55.3 | 49.6 | 44.9 | 42.5 | 39.8 | 35.3 | 27.3 | 18.6 | 48.6 |
| $L_{AFmax}$ | 67.5 | 72.8 | 63.3 | 59.8 | 54.7 | 47.6 | 46.4 | 44.2 | 40.3 | 35.2 | 27.3 | 52.8 |

SEL = 58.1 dBA

**Measurements Terminal Building**
Cable Car Leaving, Right Facade




Total Duration = 14,5 sec

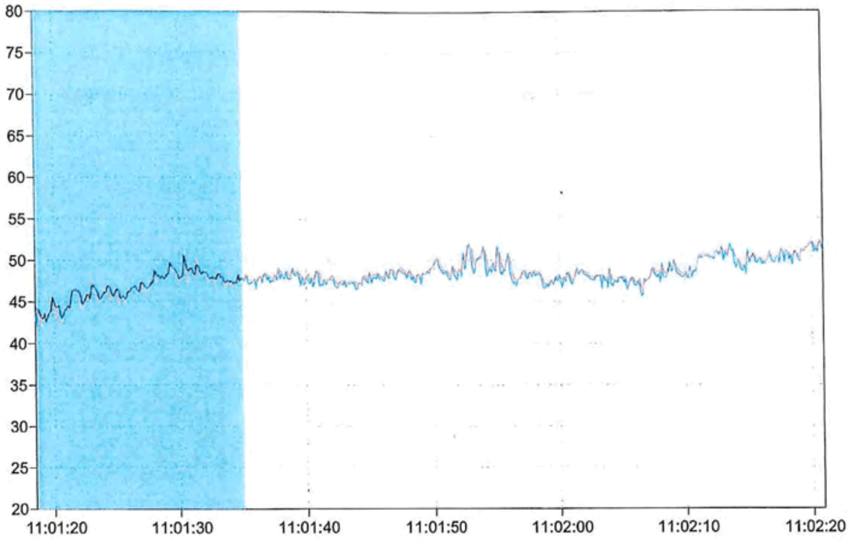



| | 16 | 31,5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $L_{eqA}$ | 58.9 | 57.0 | 58.5 | 56.0 | 47.8 | 41.5 | 37.1 | 35.5 | 34.7 | 26.6 | 18.0 | 46.0 |
| $L_{AFmax}$ | 66.4 | 63.3 | 66.4 | 61.9 | 55.5 | 47.2 | 42.7 | 38.7 | 38.5 | 31.1 | 21.1 | 52.1 |

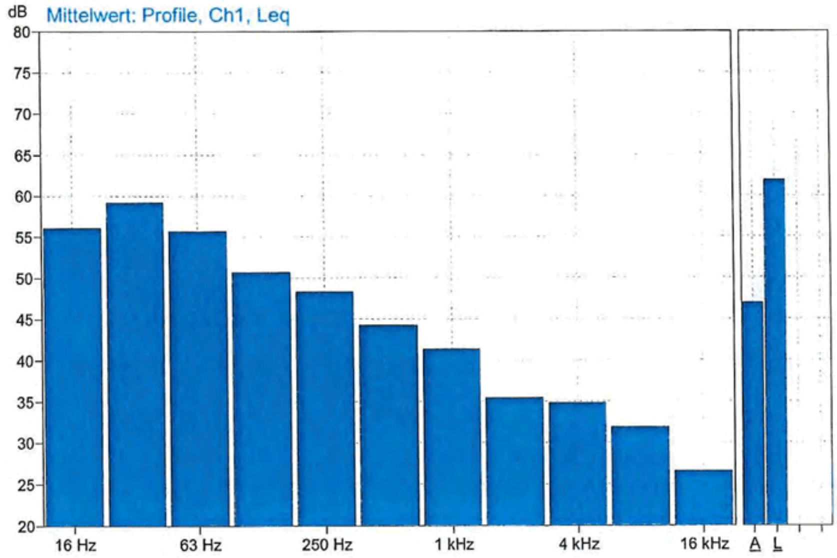
SEL = 57,6 dBA

## Measurements Terminal Building

Cable Car Leaving, Back-Facade




Total Duration = 16,5 sec

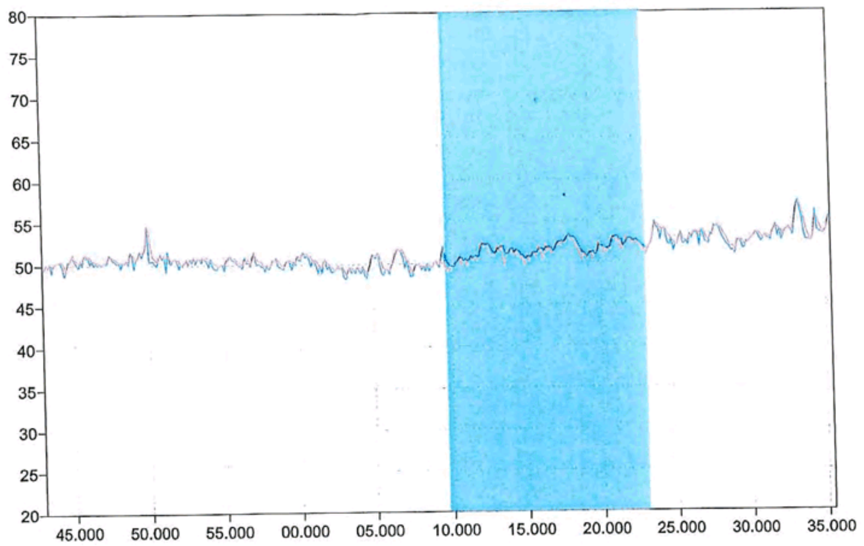



| | 16 | 31,5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $L_{eqA}$ | 56.1 | 59.2 | 55.7 | 50.7 | 48.3 | 44.2 | 41.3 | 35.4 | 34.8 | 31.9 | 26.5 | 46.9 |
| $L_{AFmax}$ | 61.7 | 66.4 | 61.5 | 56.7 | 52.4 | 47.9 | 44.6 | 41.4 | 44.6 | 39.4 | 30.1 | 52.0 |

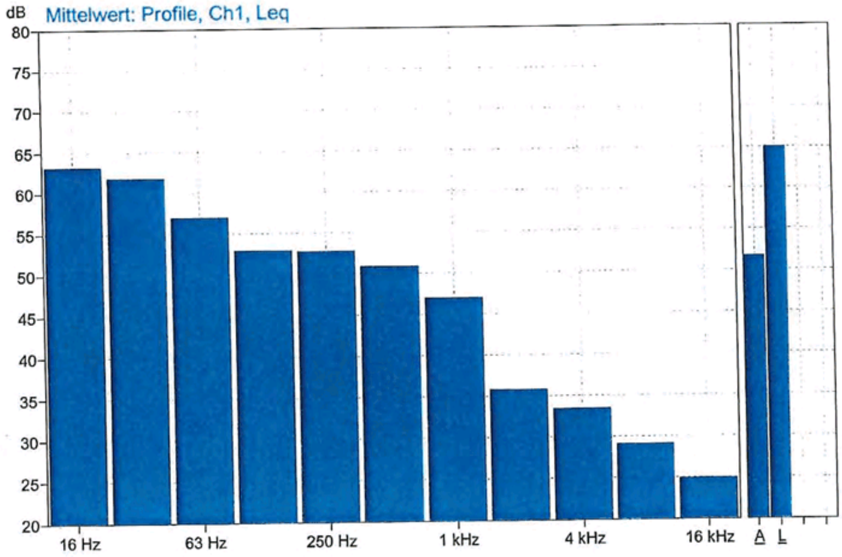
SEL = 59.1 dBA

## Measurements Terminal Building

Cable Car Entering, Back-Facade




Total Duration = 13,50 sec

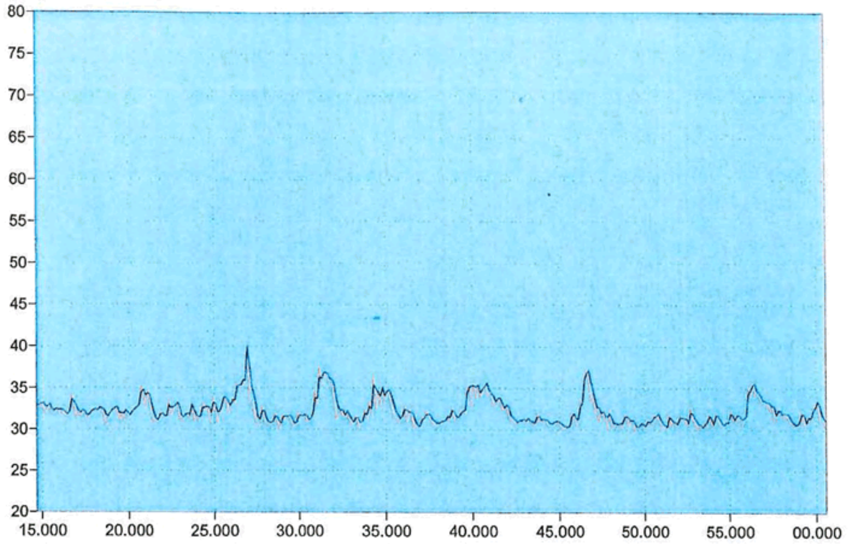



| | 16 | 31,5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $L_{eqA}$ | 63.2 | 61.8 | 57.0 | 52.9 | 52.8 | 50.8 | 46.9 | 35.8 | 33.4 | 29.1 | 24.9 | 51.7 |
| $L_{AFmax}$ | 68.6 | 66.7 | 62.7 | 57.9 | 56.4 | 54.2 | 48.9 | 39.0 | 39.6 | 35.7 | 35.7 | 54.9 |

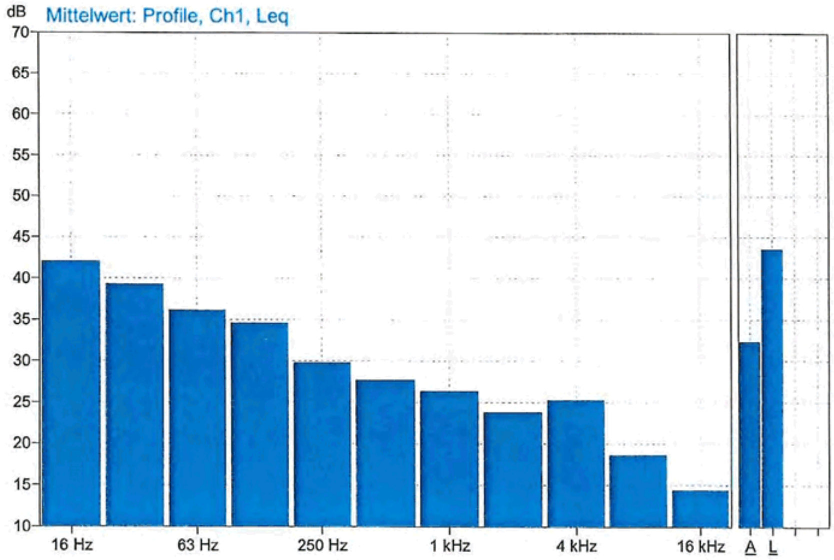
SEL = 63,0 dBA

## Measurements Terminal Building

Backgroundnoise

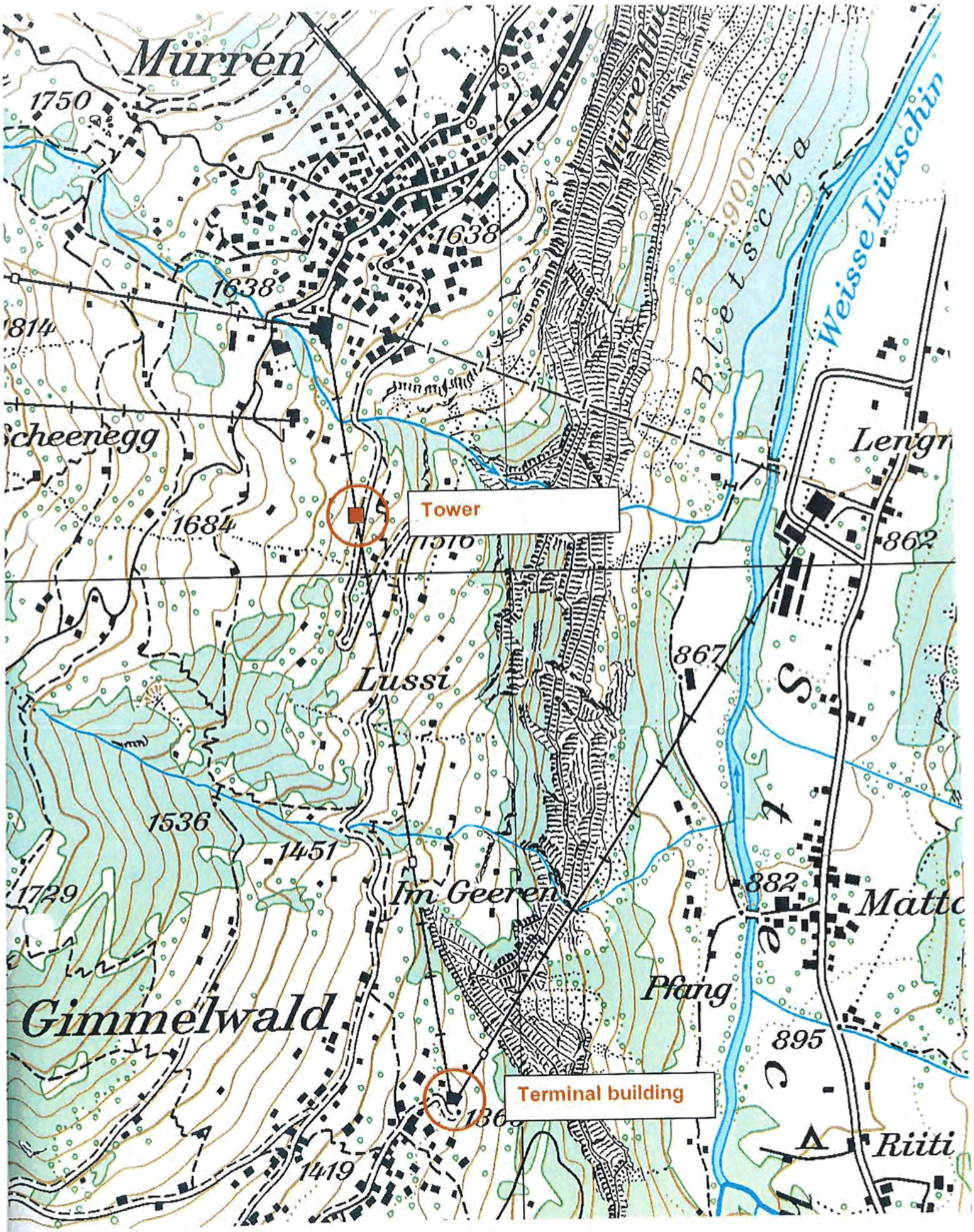



Total Duration = 46,0 sec

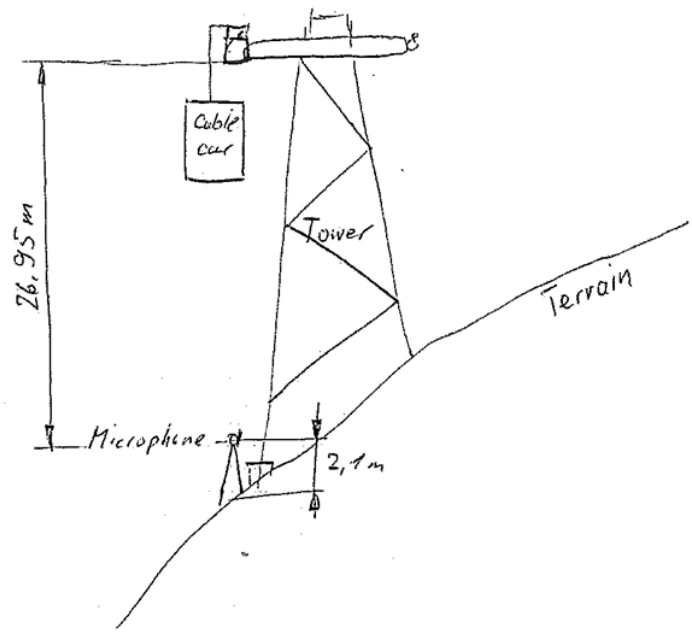



| | 16 | 31,5 | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | 16000 | A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $L_{eqA}$ | 42.0 | 39.3 | 36.1 | 34.5 | 29.8 | 27.6 | 26.3 | 23.8 | 25.2 | 18.6 | 14.4 | 32.3 |
| $L_{AFmax}$ | 47.6 | 49.7 | 40.4 | 41.2 | 36.9 | 31.2 | 30.8 | 31.5 | 36.6 | 30.4 | 23.9 | 40.5 |

Appendix C Map / Drawings

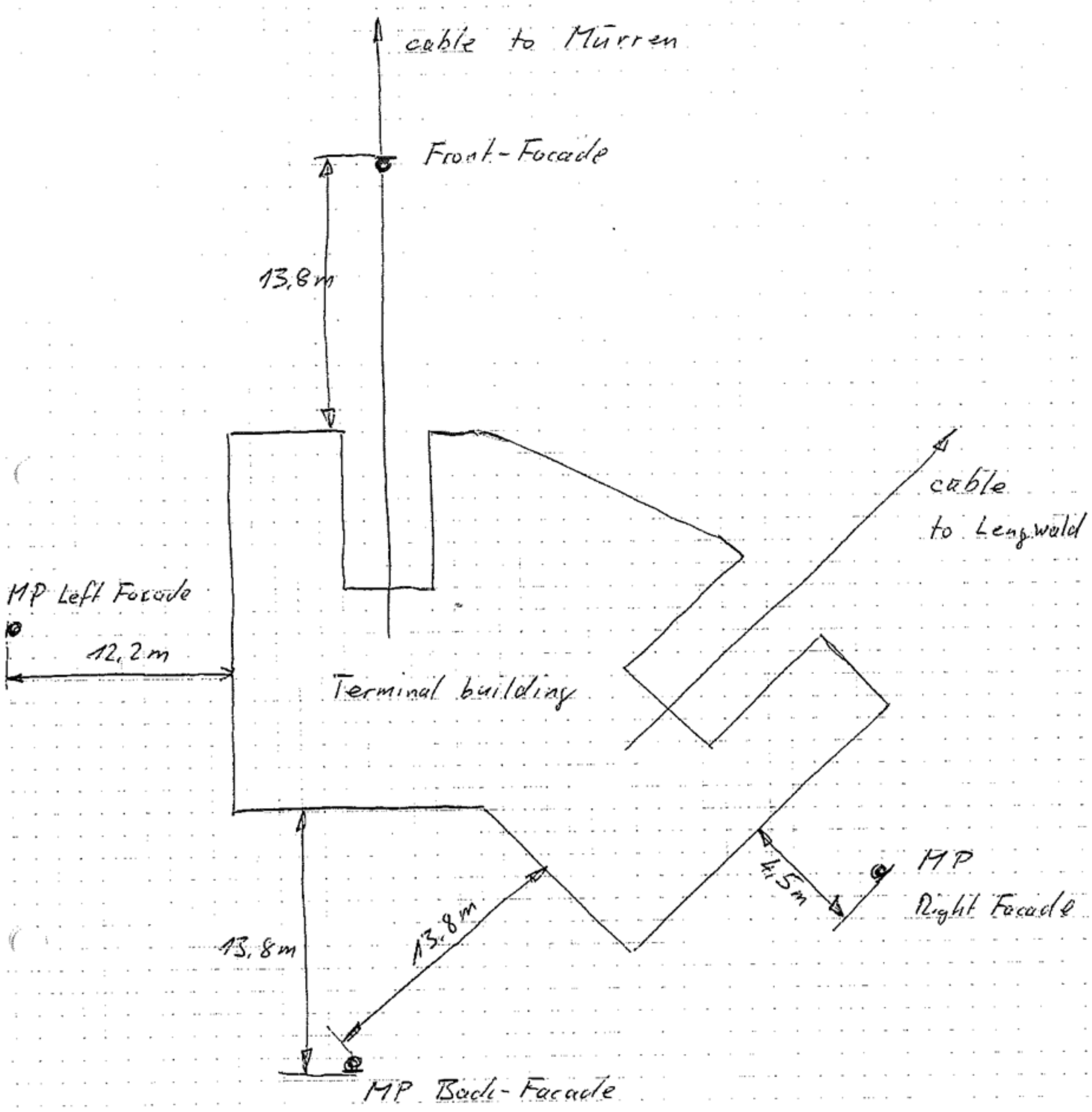

Mürren
1750
1638
1638
814
Scheenegg
Tower
1684
1516
Lussi
1536
1451
1729
Im Geeren
Gimmelwald
Terminal building
1419
Mürrenflue
Bletscha
900
Weisse Lütschine
Lengg
862
867
882
Matte
Pfang
895
Riiti

Tower measurements




20.07 07, mt

Terminal building




20.02.07, mt

Tarkarri Engineering

Air Quality • Acoustics • Environment • Vibration

# Technical Memo

10 September 2020

Mount Wellington Cableway Company Pty Limited
Level 3, 85 Macquarie St
Hobart TAS 7000

5451_AC_R
AJM

Attn: Mr Adrian Bold

Dear Sir,

RE: Mt Wellington Cable Car sewage transport and management odour review.

Please find below our report on potential for odour emission generation from the transport and management of sewage from the summit of Mt Wellington as part of the Mt Wellington Cable Car development.

## 1. INTRODUCTION

Tarkarri Engineering was commissioned by The Mount Wellington Cableway Company (MWCC) to conduct a review of sewage transport and management for the proposed Mt Wellington Cable Car development with regard for the potential of odour emission generation. This follows a Request for Further Information (RFI) from the City of Hobart as follows:-

> *"An assessment prepared by a suitably qualified odour expert on the likelihood of odour generation for sewage holding tanks for the Pinnacle building with the appropriate odour control measures identified given that detention times for sewage will be up to 12 hours"*

The relevant section of the Hobart Interim Planning Scheme 2015 is 7.2.2 (b) shown below:-

**Performance Criteria**

**P7.7** Sewerage
Sewerage facilities must be designed, perform and be managed to:
(a) Deliver an appropriate level of protection for human health and the environment;
(b) Minimise odour nuisance to acceptable levels;
(c) Minimise noise nuisance to acceptable levels;
(d) Not rely on the soils for absorption of any contaminated wastes; and
(e) Not cause landslip or erosion on the development site or other lands.

## 2. SITE DESCRIPTION

The Mt Wellington Cable Car development would be located at the pinnacle of Mt Wellington to the east of the existing facilities.

Figure 2-1 provides an aerial view of Mt Wellington and surrounds with the location of the pinnacle marked.

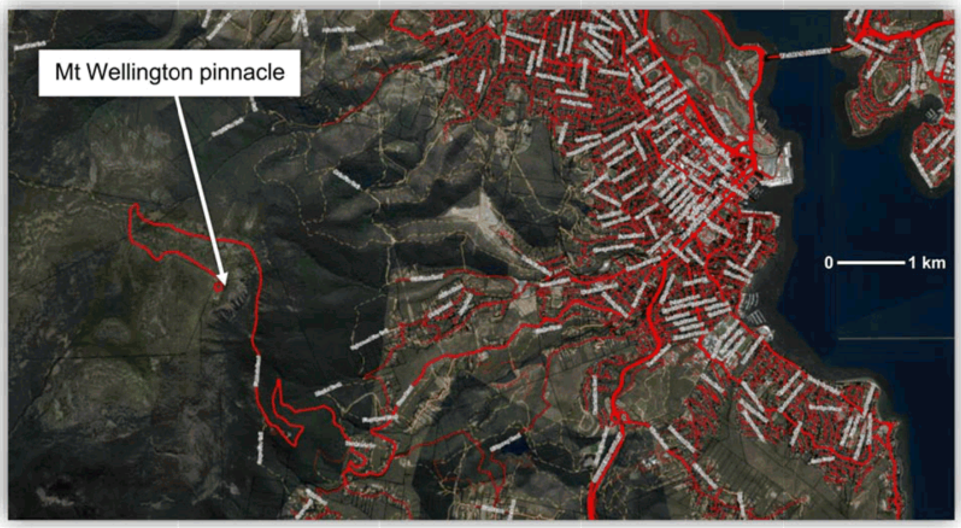



Figure 2-1: Aerial view of of Mt Wellington and surrounds.

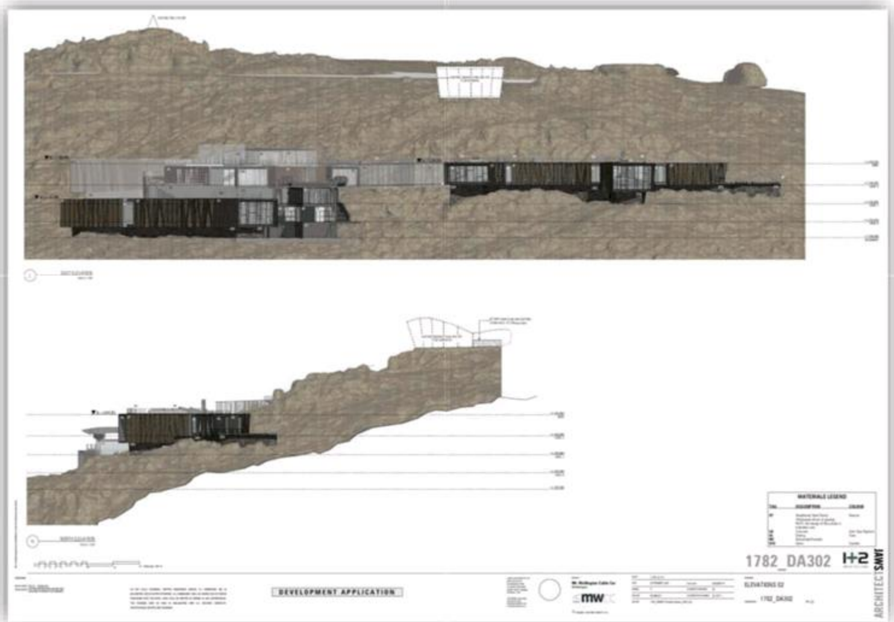
The Pinnacle Centre development would provide restaurant, cafe, viewing and amphitheatre spaces. Sewage generated at the development would be retained in a 100,000 L holding tank in the basement of the facility. Sewage would then be transported throughout the day via transportation tanks (5,000 L capacity) in selected cable cars to the cable car Base Terminal where it would be discharged to the terminals pump system and ultimately to the TasWater network.

Flow of wastewater to the storage tank at the Pinnacle Centre are expected to be 1.17 L/s on average with a maximum of 4.6 L/s. During pumping of material from the tank to transportation tanks material would discharge at 10 L/s with the vented air from the transportation tanks discharged back into the storage tank in the Pinnacle Centre.

The sewage storage tank would be vented to atmosphere at the height of the highest building at the centre, i.e. in a roof top garden area to the rear of the indoor lookout. Activated carbon canisters on the vent discharge is proposed to control odour emissions from the venting. The Pinnacle Centre holding tank would also be fitted with an automatic well washer to assist with odour and septicity control.

Figure 2-2 presents a site plan of the Pinnacle Centre development with Figure 2-3 providing elevation views of the development. Figure 2-4 presents a sewer drainage schematic layout and Figure 2-5 a roof level plumbing services plan.


Figure 2-2: Site plan (provided by MWCC).



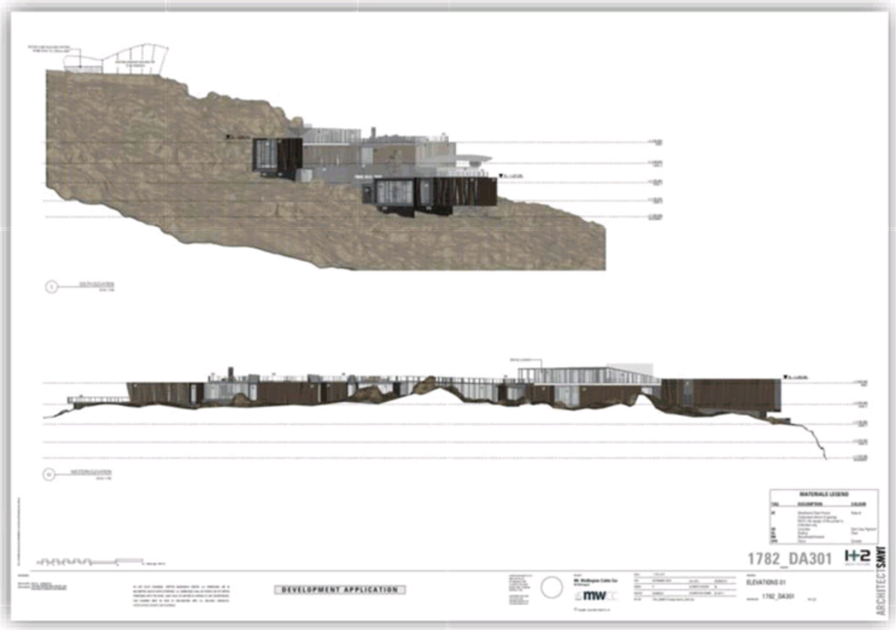



Figure 2-3: Elevations (provided by MWCC).

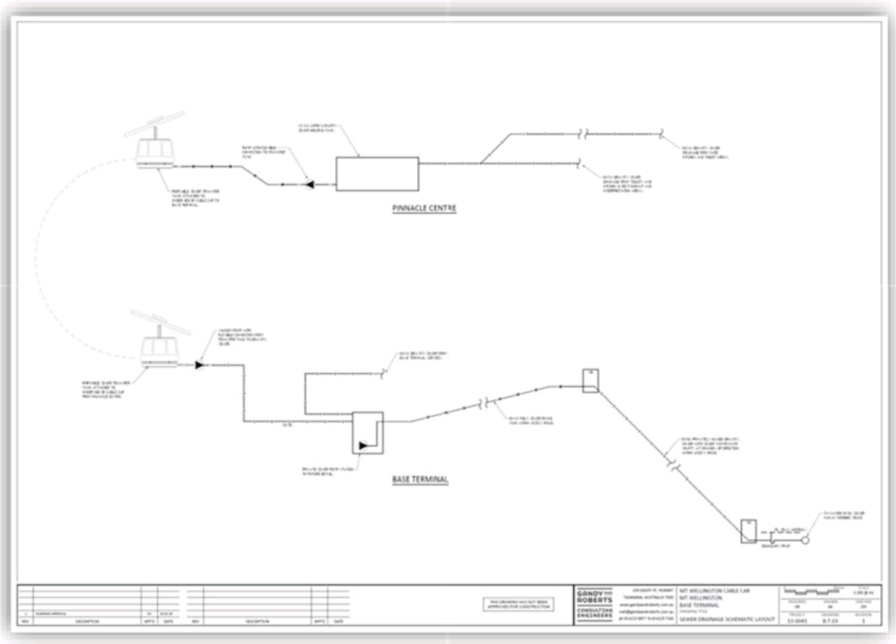



Figure 2-4: Sewer drainage schematic layout (provided by MWCC).

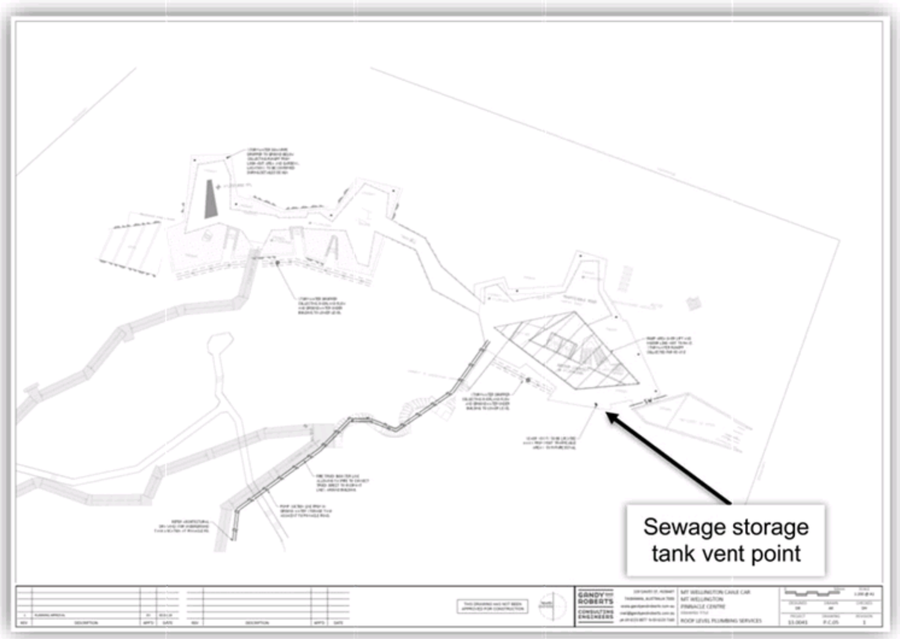



Figure 2-5: Roof level plumbing services (provided by MWCC).

## 3. ODOUR CRITERIA

Under Part 4 - MANAGING POINT SOURCES OF AIR CONTAMINANTS of the Tasmanian Environmental Protection Policy (Air Quality) 2004 the following applies to odour:-

**Odour**

**13.** (1) If a regulatory authority is satisfied that an odour from an activity is causing or is likely to cause an environmental nuisance or environmental harm, the authority should require that the odour emission from the source not exceed the odour criteria specified in Schedule 3, at or beyond the boundary of the land on which the source is located.

(2) If the activity that is the source of the odour is being carried out at the time that this Policy is made, the time frame for compliance with sub-clause (1) should be determined on a case-specific basis having regard to:

(a) the environmental impact associated with the pollutant being emitted;

(b) the economic cost of upgrading and the capacity of the relevant activity to support this cost; and

(c) the practicability of reducing emissions.

Under schedule three of the policy odour criteria are stipulated and are presented below. The relevant criterion for this study is highlighted in red.

***Table 1 – Odour criteria***

| Column 1 | Column 2 | Column 3 | Column 4 |
|---|---|---|---|
| | **Criterion** | **Averaging Period** | **Percentile** |
| Known pollutant(s) | See Schedule 2 | See Schedule 2 | 99.9[a] |
| Unknown mixture | 2 odour units[1,a] | 1 hour | 99.5[b] |

**1** "Odour unit" has the same meaning as in Australian Standard AS/NZS 4323.3 *Stationary source emissions – Determination of odour concentration by dynamic olfactometry*.

**a** Modelled 99.9 percentile concentration at or beyond the boundary of a facility (whichever is higher) in cases where local high-quality meteorological and emissions data are available. In cases where such data are not available, the 100 percentile concentration modelled at or beyond the boundary of a facility applies.

**b** Modelled 99.5 percentile concentration at or beyond the boundary of a facility (whichever is higher) in cases where local high-quality meteorological and emissions data are available. In cases where such data are not available, the 100 percentile concentration modelled at or beyond the boundary of a facility applies.

**NB**: In this review the prediction of potential odour emissions from venting of the Pinnacle Centre sewage storage tank (via a screening model, see section 5 of this review for further detail) will consider a 100 percentile concentration. Predictions will be made to nearby outdoor spaces (not the boundary of the facility).

## 4. LOCAL METEOROLOGY

Long term weather data for the local area has been obtained from the Bureau of Meteorology (BoM) meteorological station located at Kunanyi (Mount Wellington Pinnacle) (Site number 094087). Table 4-1 presents the Kunanyi data.

| Long term weather data, Kunanyi (Mount Wellington Pinnacle) BoM met station | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Month | Mean Temperature | | Mean Rainfall | | Mean cloud cover | | Mean 9 am Conditions | | | Mean 3 pm Conditions | | |
| | Max (°C) | Min (°C) | (mm) | No. of days ≥ 1 mm | No. of clear days | No. of cloudy days | Temp (°C) | RH (%) | Wind Speed (km/h) | Temp (°C) | RH (%) | Wind Speed (km/h) |
| Jan | 13.6 | 4.9 | 87.2 | 9.5 | 3.7 | 15.3 | 8.1 | 80 | 29.8 | 11.0 | 74 | 25.3 |
| Feb | 13.6 | 5.2 | 76.3 | 9.9 | 4.4 | 11.4 | 8.7 | 80 | 29.5 | 11.8 | 75 | 25.0 |
| Mar | 11.4 | 4.1 | 78.0 | 11.4 | 3.4 | 14.2 | 6.7 | 84 | 31.9 | 9.2 | 79 | 26.5 |
| Apr | 8.5 | 2.2 | 83.3 | 11.9 | 3.5 | 18.1 | 5.1 | 84 | 33.3 | 6.4 | 83 | 28.2 |
| May | 5.7 | 0.6 | 70.5 | 11.4 | 2.6 | 19.3 | 3.0 | 88 | 35.1 | 3.9 | 87 | 31.5 |
| Jun | 3.7 | -0.6 | 81.1 | 10.4 | 3.0 | 18.2 | 1.3 | 90 | 34.4 | 2.0 | 90 | 32.6 |
| Jul | 2.5 | -1.5 | 66.4 | 11.1 | 2.7 | 21.1 | 0.2 | 93 | 33.3 | 1.0 | 93 | 30.9 |
| Aug | 2.8 | -1.7 | 82.8 | 10.9 | 2.5 | 19.8 | 0.2 | 91 | 34.0 | 1.5 | 89 | 30.9 |
| Sep | 4.7 | -1.1 | 72.4 | 11.8 | 2.3 | 19.6 | 1.2 | 91 | 35.5 | 2.8 | 88 | 32.2 |
| Oct | 7.4 | 0.2 | 75.0 | 11.9 | 2.4 | 18.7 | 2.9 | 88 | 33.6 | 5.2 | 83 | 29.7 |
| Nov | 9.5 | 1.7 | 88.1 | 12.1 | 2.2 | 18.7 | 5.1 | 83 | 30.3 | 7.4 | 80 | 27.4 |
| Dec | 11.3 | 3.0 | 88.2 | 12.0 | 2.5 | 18.5 | 6.2 | 83 | 30.2 | 9.1 | 76 | 27.2 |
| **Annual** | **7.9** | **1.4** | **873.6** | **134.3** | **35.2** | **212.9** | **4.1** | **86** | **32.6** | **5.9** | **83** | **29.0** |

Table 4-1: Long Term weather data for the BoM Kunanyi (Mount Wellington Pinnacle) meteorological station. (source: BoM http://www.bom.gov.au/climate/averages/tables/cw_094087.shtml).

From the above:-

- The long term mean temperature range is between -1.7 and 13.6 ˚C with the coldest months being July and August and the hottest months being January and February.
- Rainfall is relatively uniform across the year. Most rainfall and days of rain are in late Spring and early Summer winter with a mean annual rainfall of 873.6 mm.
- Wind speeds are high throughout the year, tending to be higher in the morning.

The above suggests that while temperatures at the pinnacle of Mt Wellington would not encourage air dispersion this is counteracted by the strong wind conditions, indicating a generally dispersive environment with regard to air emissions.

Figure 4-1 presents long term average annual 9 am and 3 pm windroses for the Launceston, Kunanyi BoM meteorological station.

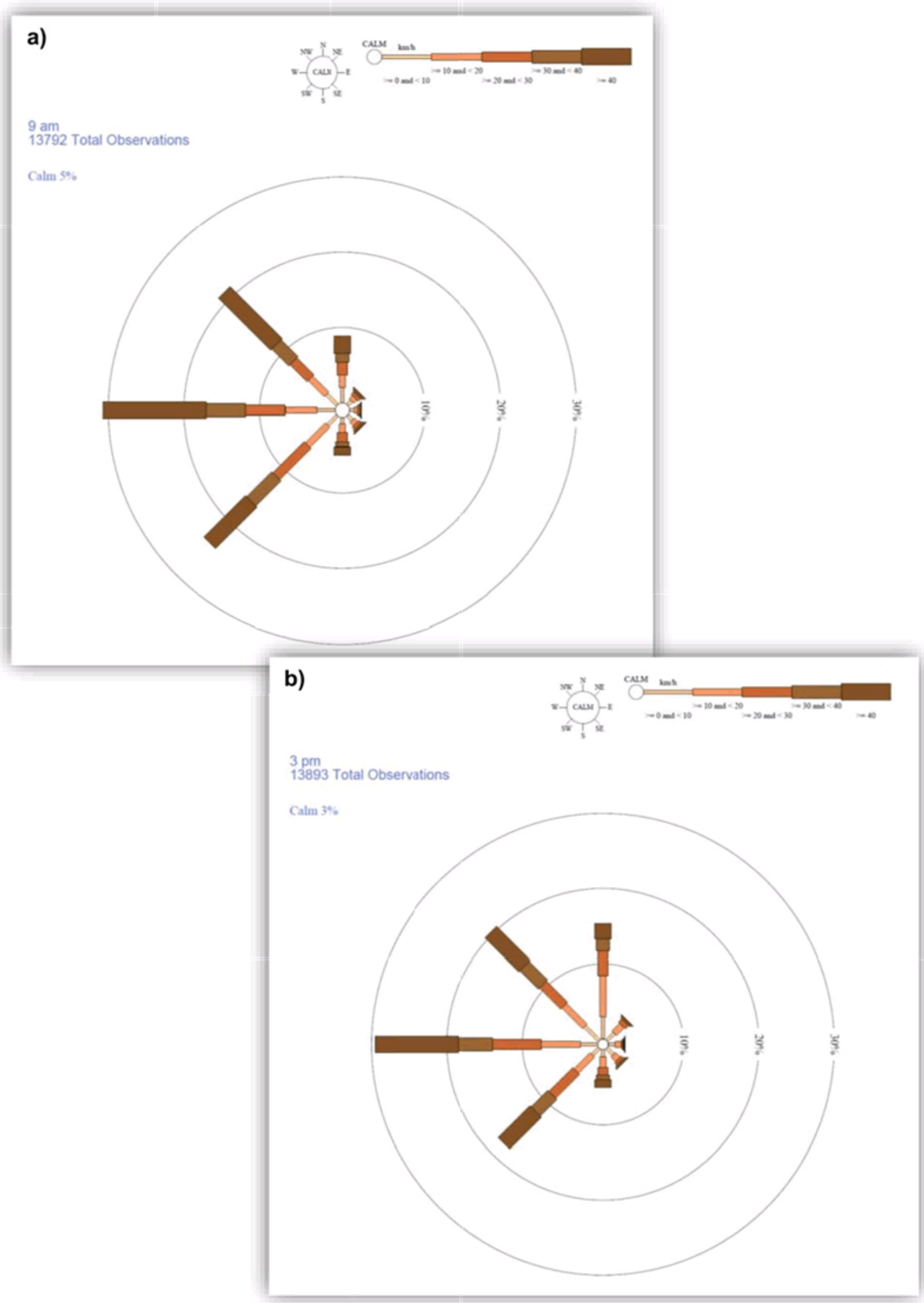



Figure 4-1: BoM Kunanyi long term average annual windroses, a) 9 am; and b) 3 pm.

From the above:-

- Winds are predominantly from the west, north-west and south-west.
- Winds from the south, south-east, east and north-east are very rare.
- Calm low wind speed conditions are rare.
- High wind speeds predominate.

The above suggests that emission dispersion would consistently be away from frequented areas at the Pinnacle Centre and that the strong wind speeds would act to provide high dispersion conditions.

## 5. ODOUR EMISSIONS

Where odour bearing air is made up of a complex mix of odourant compounds there is no clear relationship between constituent concentration and the response of the human olfactory system. Given this odour is then assessed on the basis of olfactometry with pollutant concentration defined in terms of odour units (ou). Under *AS/NZS 4323.3 Stationary source emissions Part 3: Determination of odour concentration by dynamic olfactometry* and ou is defined as follows:-

> *One odour unit (ou) is that concentration of odorants at standard conditions that elicits a physiological response from a panel (detection threshold) equivalent to that elicited by one Reference Odour Mass (ROM), evaporated in one cubic metre of neutral gas at standard conditions.*

As noted in the Site Servicing Report for the project 'sewage may reside in the system for periods of more than 5 hours' and could be up to 12 hours. Retained sewage can utilise available dissolved oxygen (and any nitrates) within 4 hrs leading to the development of anerobic conditions and critically the breakdown of sulphur bearing compounds to sulphides (i.e. development of septicity). These resulting conditions typically see a significant increase in odour concentration in the retaining space (i.e. the sewage storage tank). Available literature, with regard to odour concentration in spaces were sewage is present in environments that don't encourage the presence of dissolved oxygen (e.g. rising mains with long hydraulic retention times, pumps station wet wells, treatment plant inlets... etc), indicates that concentrations between 3,000 and 9,000 ou are not uncommon. In extreme cases concentrations of 80,000 ou have been measured, however, this typically involves complex commercial and industrial inputs to a sewer network in combination with domestic inputs. The Pinnacle Centre sewage storage tank would only retain domestic waste (no trade waste), as such the risk of such extreme odour concentrations is considered very low.

## 6. SCREENING MODEL

Screening models typically use conservative modelling techniques for predicting extreme upper bound concentrations. These estimates use simplified assumptions/representations of source-receptor geometries. The main purpose is to quickly assess air emission sources where impacts are likely to be low such that they are highly likely to be well below ambient air quality criteria. Additionally, such models help to assess whether more refined modelling analysis is required to demonstrate compliance.

The screening air dispersion model SCREEN3 was used to provide conservative odour glc values from the storage vent pipe. SCREEN3 uses a Gaussian plume model that incorporates source related factors and meteorological factors to estimate pollutant concentration from continuous sources.

The following model settings were used:-

- Point source.
  - Height (above roof garden level): 2 m
  - Internal diam: 100 mm
  - Exit velocity: 1.2 m/s
  - Volumetric flow: 0.01 $m^3/s$ (equivalent to 10 L/s, i.e. rate at which venting from transportation tanks to storage tank would occur during filling. This is considered conservative with the liquid volume in the space decreasing during this process. This would also short duration event when considered in regard to a 1-hour averaging time as applies under the air EPP)
  - Temperature: 274 °K (equivalent to minimum mean monthly 3 pm air temp)
  - Air temperature: 274 °K (equivalent to minimum mean monthly 3 pm air temp)
  - Emission rates of 30 and 90 ou/s modelled (based on concertation's of 3,000 and 9,000 ou)

    **NB**: Emission reduction from the proposed activated carbon cannister was not considered in the predictions.
- Rural dispersion coefficient.
- Receptors at ground level.
- Complex and simple flat terrain.
- Full meteorology (i.e. all stability classes and wind speeds considered. **NB**: This uses the most conservative met condition for predictions. This is conservative, particularly given the predominance of strong north-west, west and south-west wind conditions at the site).
- Building downwash from lookout structure (2 m high).

The resulting predicted ground level concentrations (glc's) at distances from 15 m (nearest rooftop observation area) to 100 m were between the following values:-

- 30 ou/s emission rate: 0.5 to 2.2 ou
- 90 ou/s emission rate: 1.4 to 6.6 ou

**NB**: Prediction to a location above the vent location (i.e. car parking area at the pinnacle) was also considered with the resulting predicted level negligible.

The above predicted levels indicate that an unreasonable risk of excessive odour emission from the venting of the Pinnacle Centre sewage storage tank is present when the air is untreated. The use of an appropriate activated carbon canister on the venting of the storage tank with a reduction efficiency of 90 % or greater (efficiencies greater than 99 % are typical) reduces predicted levels to below 0.6 ou.

## 7. CONCLUSIONS AND RECOMMENDATIONS

The above assessment of potential odour emissions from Mt Wellington Cable Car, Pinnacle Centre sewage storage tank demonstrates that odour nuisance is highly unlikely with the current proposed controls in place. The environment at the pinnacle tends to high dispersion conditions and the proposed activated carbon canister capture on the venting of the sewage storage tank is likely to provide the control of odour emissions such that odour concentrations in the surrounding environment would be at acceptable levels. In addition, the installation of an automatic well washer would assist with odour and septicity control.

**NB**: Tarkarri Engineering recommends that a system for the washing out of sewage transportation tanks is incorporated at the Base Terminal to minimise the build-up of materials in the tanks that have the potential to putrefy.

I hope this information meets your immediate requirements.

Please contact me directly if you have any questions concerning this work.

Yours faithfully,
**Tarkarri Engineering Pty Ltd**

Alex McLeod

**Dr. Alex McLeod**
*Principal Consultant*

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Tarkarri Engineering
Air Quality • Acoustics • Environment • Vibration

ALEX MCLEOD

**Principal Consultant/Director**

QUALIFICATIONS

Ph.D
Monash University, 2007

B.Sc (environmental) (Hons)
Monash University, 2000

SUMMARY

Alex McLeod is a Principal Consultant in Tasmania and is located in Launceston. He is experienced in a wide range of sampling, monitoring and analytical methods and also has extensive experience in the use and application of GIS software. Since January 2008 Alex has been involved in a wide range of acoustic, air quality and vibration related activities

Alex is a Member of the Australian Acoustical Society (MAAS) and Clean Air Society of Australia and New Zealand (CASANZ).

KEY SKILLS AND AREAS OF EXPERTISE

Environmental Acoustics;
Environmental Noise Modelling (SoundPLAN, INM, TNIP);
WHS Acoustics;
Architectural Acoustics;
Air Quality measurement, modelling (TAPM, CALPUFF) and assessment;
Atmospheric dust fall monitoring;
Ground vibration and air blast overpressure measurement and prediction;
Vibration condition monitoring;
Project Management.

RECENT PROJECTS

Central Coast Grammar School (Erina, NSW) – Performing Arts Centre acoustic design – *CBM.*

Planetshakers (Melbourne, Vic) – Function Centre acoustic design – *CBM.*

Myer Hobart reconstruction (Hobart, Tas) – Historic building ground vibration monitoring during piling activity – *Hutchinson Builders*

Tarkarri
Engineering
Air Quality • Acoustics • Environment • Vibration

Tarkarri Engineering
Air Quality • Acoustics • Environment • Vibration

Evans Head Airpark (Evans Head, NSW) – INM modelling of aircraft movements – *Evans Head Airpark*

Aluminium Smelter (Bell Bay, Tas) – Environmental noise survey and modelling – *Pacific Aluminium.*

Diesel reciprocating engine and diesel fired turbine emergency power generation (multiple sites, Tas) – Environmental noise and air quality modelling and assessment – *Hydro Tasmania*

Gas-fired reciprocating engine co-generator air quality modelling and environmental noise modelling (Perth, WA and Canberra, ACT) – *University of Western Australia* and *Australian National University*

Gas turbine power station (Bell Bay, Tas) – Environmental noise survey and modelling – *AETV Power.*

Coal mine (Stradford, NSW) – Real time noise model – *Gloucester Coal*

Limestone mine (Railton, Tas) – Development of air blast overpressure prediction calculator – *Cement Australia*

Dilston Bypass (Tamar Valley, Tas) – Historic building ground vibration monitoring during road construction – *Shaw Contracting*

Sewage treatment plant odour emissions modelling (Brighton, Tas) – *Brighton Council*.

Sewage treatment plant CALPUFF odour emissions modelling (Lower Molonglo Water Quality Control Centre, ACT) – *CEE.*

Sewage treatment plant CALPUFF odour emissions modelling (Blackmans Bay, Tas) – *CEE.*

Odour control unit performance testing (Ulverstone, Tas) – *Netco Pumps and Equipment*.

MOUNT WELLINGTON CABLEWAY COMPANY
*Pty Limited*

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20th September, 2019

Wes Ford
Director
Environment Protection Authority
Level 6, 134 Macquarie Street
Hobart TAS 7000

Dear Wes,

**INFORMATION REQUEST, APPLICATION NO. PLN-19-345**

I write in response to your letter dated 16th August 2019. On behalf of the Mount Wellington Cableway Co. I appreciate your time recently on the 20th August allowing us to present the project overview and our findings in regard to your questions.

To follow up the presentation, the answers to your original and additional questions are as follows:

1. **Excavation**
   a. **Quantity**
   The Bulk Volumes (Total Net m3) for the proposal are as follows:
   - Car Park Area Net: -1000m3
     - (2400 cut less 1400 fill across all holes)
   - Base Terminal Net: -400m3
     - (cut only)
   - Summit Terminal Net: -2057m3
     - (2907 cut less 850 fill across all holes)

   b. **Method of excavation**
   i. A standard rock breaker methodology is expected to be deployed, according to our geotechnical assessment and primary construction contractor. Blasting is unlikely to be required.

   c. **Timeframe and hours for excavation / night works**
   i. Standard business/trade hours for excavation is expected under normal contracting arrangements that comply with relevant existing bylaws.

2. **Noise**
   a. **Details of proposed equipment**
   i. Tramway motor (800kw rated, 1250kw peak) measures 85db inside motor room.

**b. Comparison to Grimmelwald**
   i. (Grimmelwald operates 2 similar motors, measures sub 40-50db directly outside).
   ii. Substation & Telsa Powerpack Lithium Battery Array (noise n/a).
   iii. No diesel generators.
   iv. EMPCA (noise) Part 2.7 requires noise from fixed equipment to be no more than 45db measured outside the nearest residential property (236m away) between 7am and 10pm, and no more than 40db when operated between 10pm and 7am.
   v. Expert analysis calculates sufficient compliance at all hours with a maximum impact of 29.5db.

**c. Night-time activities**
   i. Vehicle ingress/egress from carpark/public road proposed 10am – 6pm with dining guests departure time dependent on operational license.

**d. Night-time operating hours**
   i. Waste transfer proposed between 5pm and 6pm.
   ii. Goods loading proposed between 8am and 9am.

**3. Effluent**

**a. Spillage**
   i. Currently trucked from summit 2-3 times per week.

**b. Proposed Handling:**
   i. 100kl basement holding tank provides up to 7-10 days storage of standard operation.
   ii. Daily carry tank (empty) sits on gravel hardstand beneath southern platform bay when not in use.
   iii. Night crew to latch & secure carry tank to hooks on underside of cabin at 5pm.
   iv. Night crew to connect short hose, open valve and operate pump to transfer effluent from holding tank to carry tank.
   v. End of hose capped when not in use.
   vi. Night crew board cabin and descend from summit.
   vii. Upon arrival at base station, crew connect & secure short hose to sewer, open valve and operate pump to empty carry tank.
   viii. Carry tank returned to summit resting position on gravel hardstand and unlatched from cabin underside.

**c. Contingency for unforeseen circumstances**
   i. When cableway unable to operate over an extended period of time (+4 hours – 7 days) the visitor count

mwCC

at the summit is expected to be substantially lower than standard operation.

ii. Annual maintenance of cableway is 7-10 days.

4. **Odour**

**a.** Odour is unlikely to cause a nuisance due to the best-practice procedural handling technique outlined above.

5. **EPBC indication**

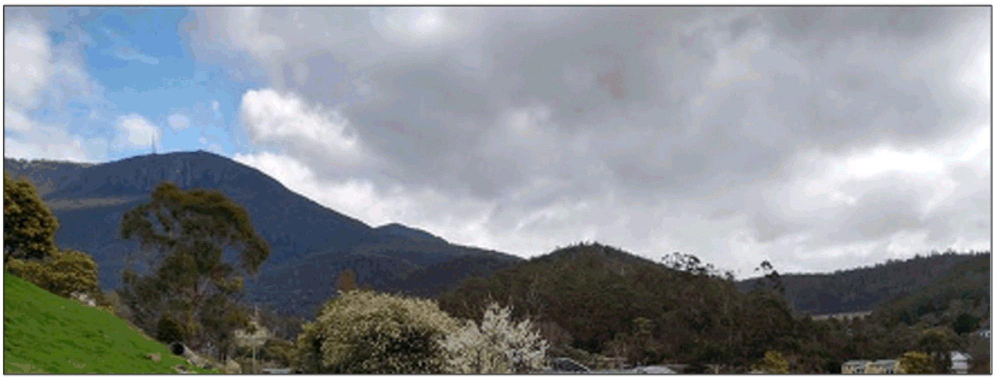
**a.** Whilst we have been in discussion with the Commonwealth to assist their consideration of whether they need to evaluate if the impact of our proposal could be considered significant or otherwise, we are yet to lodge an EPBC referral and we are unlikely to do so until such time as the Development Application is approved. We therefore have no indication we can advise you further at this stage.

I trust these answers provide the Environment Protection Authority the necessary confidence to determine whether the proposal we have put forward for development approval requires your evaluation.

Adrian Bold

Project Director, Mount Wellington Cableway Company Pty. Limited.

GEO-ENVIRONMENTAL SOLUTIONS



**PRELIMINARY SITE INVESTIGATION**
**30 MCROBIES ROAD, SOUTH HOBART, TASMANIA**

**PROPOSED MOUNT WELLINGTON CABLE CAR ACCESS ROAD**

**NOVEMBER 2019**

**For Mount Wellington Cableway Company Pty Limited**

*Geo-Environmental Solutions P/L 29 Kirksway Place, Battery Point, 7004. Ph 6223 1839 E: Office@geosolutions.net.au*

## DOCUMENT CONTROL

| Title | Version | Date | Author | Reviewed By |
|---|---|---|---|---|
| *Preliminary Site Investigation: 100 Pinnacle Road, Wellington Park, Tasmania* | Version 1 | 14 September 2019 | Sarah Joyce | JP Cumming |
| *Preliminary Site Investigation: 30 McRobies Road, Tasmania. Proposed Cable Car Assess Road.* | Version 2 | 18 November 2019 | Sarah Joyce | JP Cumming |
| | | | | |

## EXECUTIVE SUMMARY

This report presents the findings of a Preliminary Site Investigation (PSI) undertaken by Geo-Environmental Solutions Pty. Ltd. (GES) at 100 Pinnacle Road, Wellington Park, Tasmania, as a proposed access road and Base Station Terminal - hereby referred to as 'The Site'. The investigation is in relation to the proposed Mount Wellington Cableway Development which includes an access road to the Base Terminal, designed by Gandy & Roberts. This Preliminary Site Investigation (PSI) was commissioned by the Mount Wellington Cableway Company Pty Ltd. This PSI has been prepared by a suitably qualified and experience practitioner in accordance with procedures and practices detailed in National Environmental Protection Measure [Assessment of Site Contamination] (NEPM ASC; 2013). The objective of this PSI is to identify the presence or absence of potential contamination across the development area.

The following information was gathered during the desktop investigation:

- The site is currently zoned *Environmental Management* and *Utilities* under the *Hobart Interim Planning Scheme of 2015*.
- The geology of the site is *Late Carboniferous to Triassic sedimentary sequences*. The site is surrounded by further Triassic Sediments from the Upper Parmeener Supergroup of the Knocklofty Formation
- The City of Hobart City Council hold records that state that the site may be a *potentially contaminated site* due to the proximity to McRobies Gully Waste Management Centre.
- Historical Aerial photographs confirmed that the site has hosted bush land of dry eucalypt forest and has not hosted any industrial or commercial activities since 1946.
- No specific potential up-gradient contamination sources have been identified.
- Contaminants Of Potential Concern (COPC) at the site relate to; windblown fine plastics and dust particles from the waste management centre across the site, the presence of fill and leachate from the waste management centre at the point where the proposed road entrance to McRobies Road (TPH/TRH; Mono Aromatic hydrocarbons: (BTEXN); PAH; Heavy Metals); and firefighting foams (PFAS). The likelihood of any of these COPCs effecting the site is low and the risk to human and ecological receptors is also low.

GES concludes and recommends the following:

- The desktop investigation has identified a lack of historical contaminating activities that would impact the access road excavations and construction. The likelihood of contaminants of potential concern impacting human health or ecological receptors is unlikely.
- As a precautionary measure, we recommend soil testing along to the first 150 m along the proposed access road footprint from McRobies Road to approximately 35m ASL, prior to construction. This is the most likely location for contamination to have accumulated. The investigation should satisfy the Interim Planning Schemes Excavation Code (E2.6.2 P1).

**Table of Contents**

## Figures



## Tables

### Plates

## ABREVIATIONS

| | |
|---|---|
| AEC | Areas of Environmental Concern |
| AHD | Australian Height Datum |
| ALS | Analytical Laboratory Services |
| ANZECC | Australia and New Zealand Environment and Conservation Council |
| BGS | Below Ground Surface |
| BH | Borehole |
| BTEXN | Benzene Toluene Ethylbenzene Xylene Naphthalene |
| COA | Certificate of Analysis |
| COC | Chain of Custody |
| COPC | Contaminant of Potential Concern |
| CRC CARE | Corporative Research Centre for Contamination Assessment and Remediation of the Environment |
| CSM | Conceptual Site Model |
| DPIPWE | Department of Primary Industries, Parks, Water and Environment |
| DQO | Data Quality Objectives |
| EOH | End Of Hole |
| EIL | Ecological Investigation Levels |
| ESL | Ecological Screening Levels |
| EPA | Environmental Protection Authority |
| ESA | Environmental Site Assessment |
| GDA94 | Geocentric Datum of Australia 1994 |
| GES | Geo-Environmental Solutions Pty. Ltd. |
| HIL | Health Investigation Levels |
| HSL | Health Screening Levels |
| IL | Investigation Levels |
| LOR | Limits of Reporting |
| MDL | Mean Detection Limit |
| NATA | National Association of Testing Authorities |
| NEPM ASC | National Environmental Protection (Assessment of Site Contamination) Measure |
| NHMRC | National Health and Medical Research Council |
| NL | Non Limiting |
| NRMMC | Natural Resource Management Ministerial Council |
| PAH | Polynuclear Aromatic Hydrocarbons |
| PCP | Physico-Chemical Parameters |
| PHC | Petroleum Hydrocarbons |
| PID | Photo-Ionisation Detector |
| PPA | Preferential (PVI) Pathways Assessment |
| PVI | Petroleum Vapour Intrusion |
| PFAS | Per-and Polyfluoroalkyl substances |
| PFHxS | perfluorohexane sulfonate |
| PFOA | Perfluorooctanoic acid |
| PFOS | Perfluorooctane sulfonate |
| TPH | Total Petroleum Hydrocarbons |
| TRH | Total Recoverable Hydrocarbons |
| USCS | Unified Soil Classification System |

# 1 INTRODUCTION

## 1.1 General

This report presents the findings of a Preliminary Site Investigation (PSI) undertaken by Geo-Environmental Solutions Pty. Ltd. (GES) at 30 McRobies Gully, Tasmania, as a proposed access road to a Base Terminal at 100 Pinnacle Road Wellington Park, Tasmania - hereby referred to as 'The Site'. The investigation is in relation to the proposed Mount Wellington Cableway Development which includes an access road to the Base Terminal, designed by Gandy & Roberts. The site location is presented in Figure 1, the aerial photograph is presented in Figure 2 and the proposed access road is presented in **Figure** 3. GES was commissioned by Mount Wellington Cableway Company Pty Limited to conduct the site assessment.

This PSI has been prepared by a suitably qualified and experience practitioner in accordance with procedures and practices detailed in National Environmental Protection Measure [Assessment of Site Contamination] (NEPM ASC; 2013) guidelines and key regulations and policies identified in the References section of this document. Personnel engaged in preparing this PSI are listed in Appendix 1 along with their relevant qualifications and years of experience.

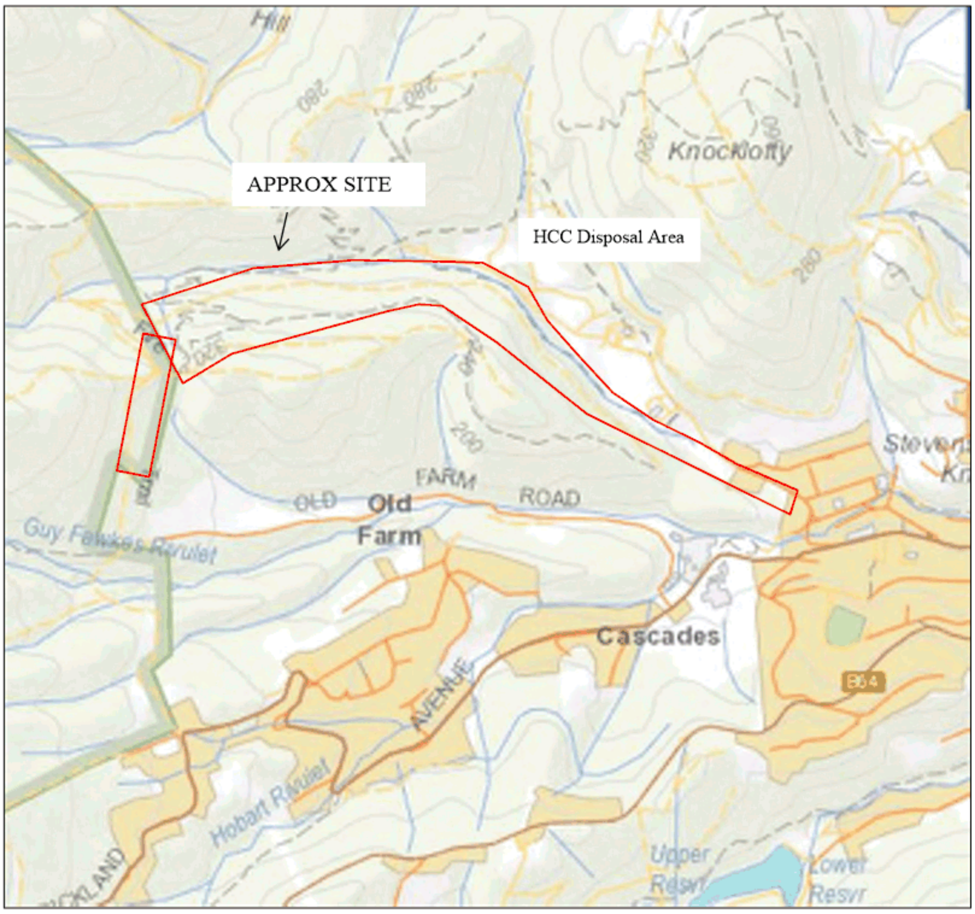



**Figure 1 Site Location (Image C/O the LIST)**

## 1.2 Site Layout

An aerial image of the existing site layout is presented in Figure 2.

**Figure 2 Existing Site Layout (Image C/O The LSIT)**

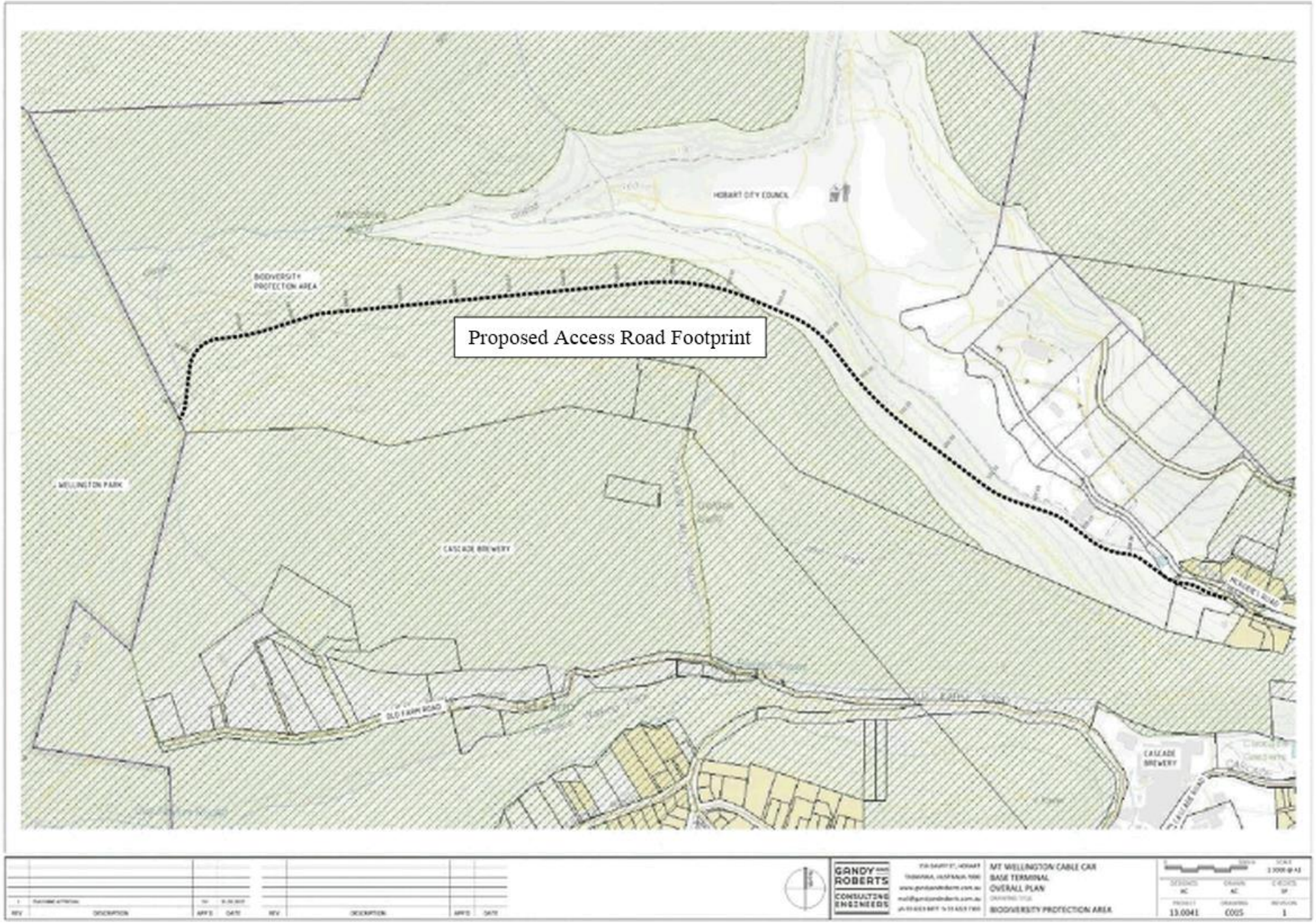



**Figure 3 Cableway Footprint of Access Road (Image C/O Gandy & Roberts)**

## 1.3 Objectives

The objective of the PSI was to address the Interim Planning Scheme (2015); E2.6.2 performance criteria for excavation as the proposed road construction works would include excavations adjected to a potentially contaminating activity; HCC Disposal Area.

## 1.4 Scope of Works

The scope of work for this PSI was to:

- Conduct a desktop and a site walkover investigation to determine the likelihood of potentially contaminating activities.
- Conduct a risk assessment, known as a Conceptual Site Model identifying specific onsite human health or environmental risk which may source from potentially contaminating activities; and
- Report findings in a Preliminary Site Investigation report.

# 2 PLANNING

## 2.1 Overview

The development application is for the proposed construction of an access road to a Base Terminal at 100 Pinnacle Road Wellington Park. As the proposed access route is adjacent a potentially contaminated site where potentially contaminating activities may have taken place, the client is required to address the Potentially Contaminated Land Code of the Interim Planning Scheme 2015 under section 54 of the Land Use Planning and Approvals Act 1993.

## 2.2 Site Zoning

The site is zoned Environmental Management and Utilities under the Hobart City Councils Interim Planning Scheme of 2015, see Figure 4. The land use surrounding the site a mixture of, Utilities, General Residential, Environmental Management and Open Space.

## 2.3 Existing Site Layout

The site is currently bush land with access fire trails.

## 2.4 Proposed Site Development Works

The proposed footprint of the new road will follow a similar path to the existing fire trail.

## 2.5 Assessment Criteria - Excavation Works E2.6.2 P1

The Potentially Contaminated Land Code states 'to ensure that works involving excavation of potentially contaminated land does not adversely impact on human health or the environment'.

As there is proposed excavation works proposed for the accesses road, there are no acceptable solutions to proposed works, E2.6.2 P1 performance criteria are to be addressed. The objective of the performance criteria is to identify that the excavation works must not adversely impact on health and the environment, having regard to:

(a) an environmental site assessment that demonstrates there is no evidence the land is contaminated; or

(b) a plan to manage contamination and associated risk to human health and the environment that includes:

   i. an environmental site assessment;
   ii. any specific remediation and protection measures required to be implemented before excavation commences; and
   iii. a statement that the excavation does not adversely impact on human health or the environment.

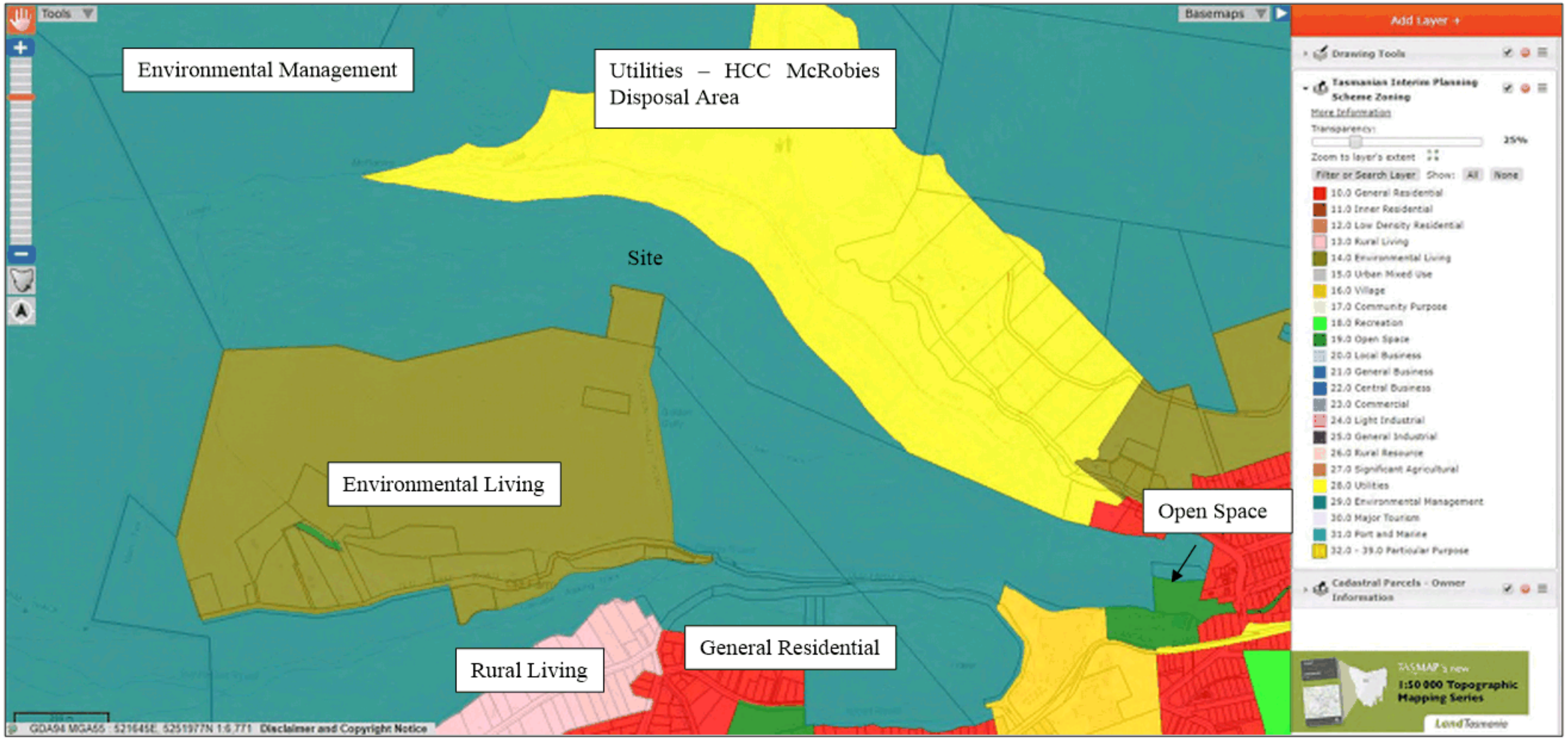



**Figure 4 State-wide Interim Planning Scheme Zones (2015)**

# 3 SITE SETTING

## 3.1 Site Identification

Site details are presented in Table 1.

**Table 1 Site Details**

| |
|---|
| **SITE LOCATION:**<br>100 Pinnacle Road, Wellington Park, Tasmania |
| **INVESTIGATION AREA**<br>30 McRobies Road, South Hobart & 100 Pinnacle Road, Wellington Park, Tasmania |
| **SITE ELEVATION & GRADIENT**<br>Approximately 90 to 300 m AHD |
| **SITE SURFACING**<br>The site is bush with fire trails, walking and bike tracks. |
| **TITLE REFERENCES**<br>The title references: CT 126957/1; PID 3273346 |
| **SITE OWNER**<br>Hobart City Council |
| **PREVIOUS LANDUSE**<br>Unknown |
| **SITE LAND USE**<br>*Recreation Use/ HCC Disposal Area* |
| **SITE and SURROUNDING LAND ZONING**<br>*Tasmanian Interim Planning Scheme 2015 – Footprint – Environmental Management and Utilities*<br>*Surrounding - General Residential, Environmental living and rural living.* |
| **PROPOSED LAND USE**<br>Access Road to a Base Terminal for the proposed Mount Wellington Cableway Development |

## 3.2 MRT Geology Mapping

The 1:25,000 scale geology map of the Greater Hobart area, see Figure 5; indicates the site is underlain by *Late Carboniferous to Triassic sedimentary sequences*. The site is surrounded by further Triassic Sediments from the Upper Parmeener Supergroup of the Knocklofty Formation.

## 3.3 Dangerous Goods Records (WorkSafe Tasmania)

As proven in the historical aerial photographs, the investigation area has not been used for contaminating or industrial activities for over 70 years and therefore it was not deemed necessary to conduct a WorkSafe Tasmania search for Dangerous Goods Records.

## 3.4 Site Topography, Drainage & Hydrogeology

The site topography ranges from 90 to 320m ASL. The groundwater from the site is expected to follow the surface topography and drain North and North Easterly towards McRobies Gully tributary (Nomenclature Register Number 45W), this unnamed tributary is marked as 'drain' on some maps, see Figure 6.

## 3.5 Groundwater

<u>Potential Up-Gradient Contamination Sources</u>

No upgradient contamination sources identified.

<u>Downgradient Ecosystem Receptors</u>

The tributary in McRobies Gully flows to join Hobart Rivulet approximately 1.0km downstream. Hobart Rivulet flows through South Hobart and Hobart to discharge into the Derwent river approximately 5.0km downstream.

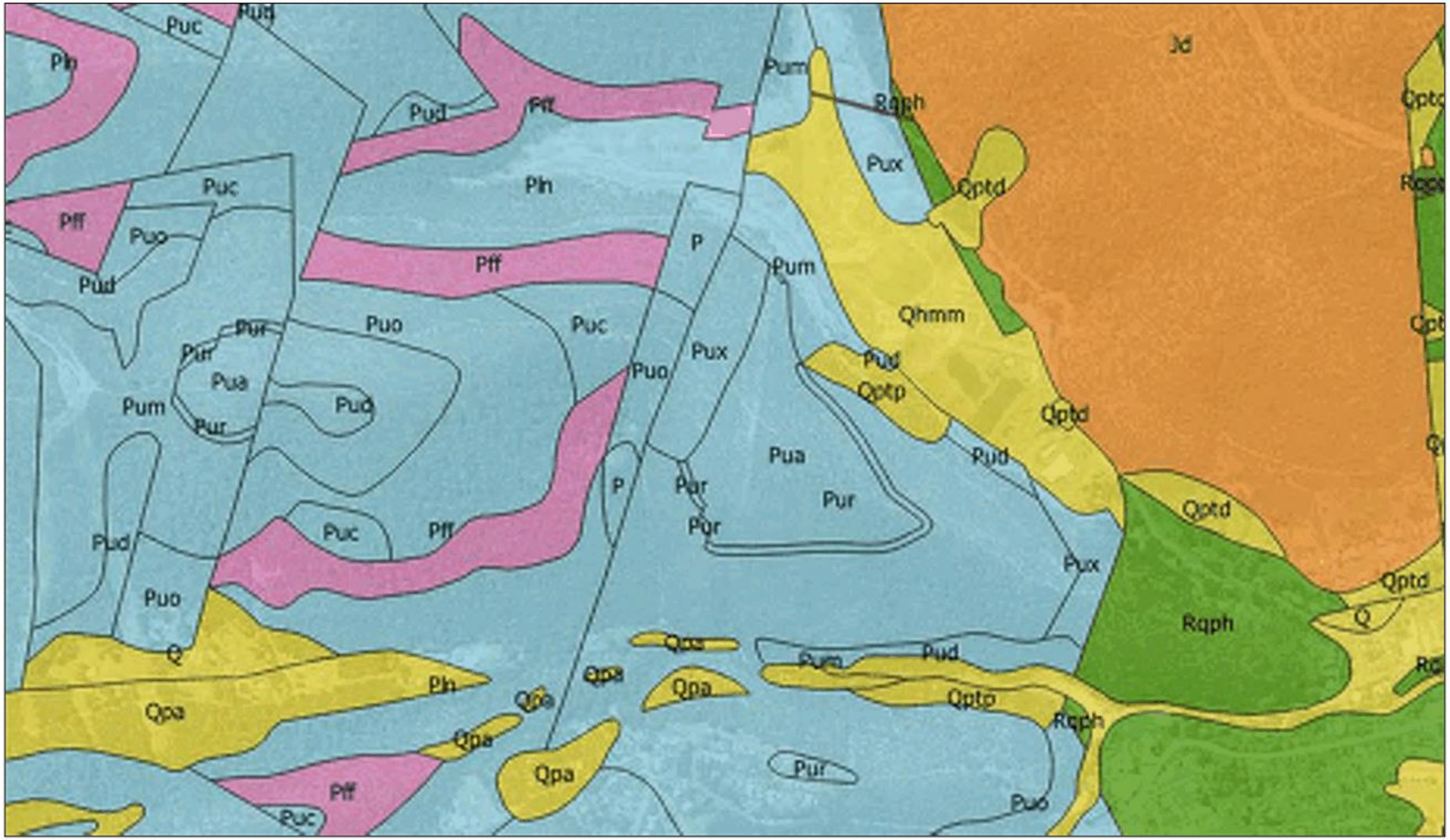



**Figure 5 Mineral Resources Tasmania 1:25.000 Scale Mapping.**

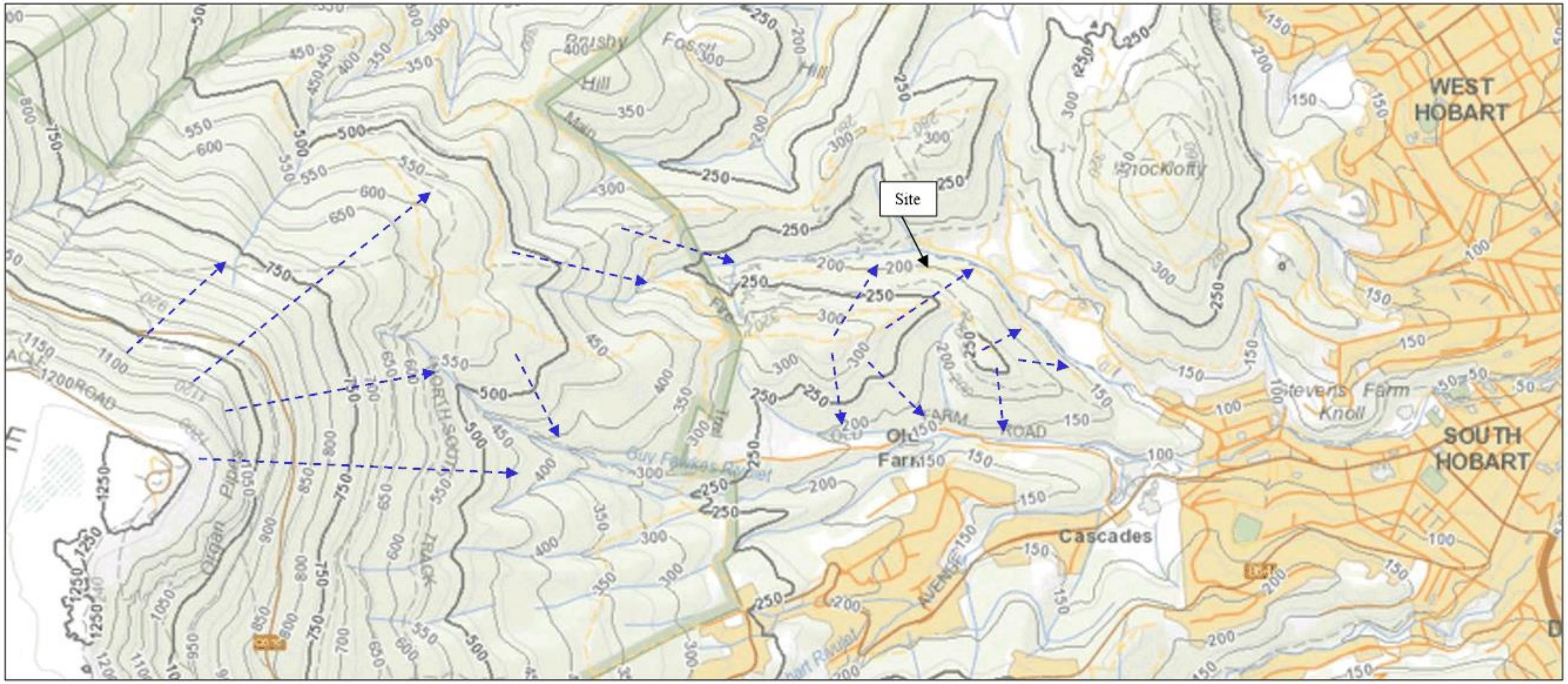



**Figure 6 Contour Elevations and Inferred Surface and Groundwater Flow Direction**

### 3.6 Registered Water Bores

The nearest registered water bores are approximately 700m to the North, and 1.7km to the South East. Neither of these water bores are within the catchment of the site. Due to the fact that all water in the South Hobart area is reticulated and the closest registered groundwater bores (<2km radius) are in different catchments to the site; groundwater bores have not been considered further as potential human or environmental receptors.

### 3.7 Vegetation

The vegetation is predominantly dry eucalypt forest and woodland (TasVEG3.0), and some threatened flora points are present in the area.

### 3.8 Acid sulfate soils

According to the Land Information Service Tasmania (LIST) database, there are no inland patches of acid sulfate soils (ASS) near proposed access road to the base terminal; therefore, acid sulfate soils are not likely to be present at the site.

## 4 HISTORICAL DOCUMENT REVIEW

### 4.1 Council Environmental Records

The Hobart City Council (HCC) hold records that states that the site may be a *potentially contaminated site*, given that the McRobies Gully Waste Management Centre Landfill operates on the title at 30 McRobies Road.

There is an Environmental Protection Notice (EPN) 715/1 McRobies Gully Landfill for the site which is presented in Appendix 4, this shows an image of Waste Fill Area, for which the proposed road to the Base Terminal does not appear to intersect.

## 5 PREVIOUS INVESTIGATIONS

GES is not aware of any site investigations at the site.

### 5.1 Historical Aerial Photography Interpretation

The 2019, 2015, 2005, 2003, 1997, 1989, 1980, 1969, 1957 and 1946 historical aerial photographs were viewed as part of this ESA. Table 2 presents the individual aerial photograph references. Appendix 3

In summary there has been little change to the site over time. The expansion of the McRobies Gully Tip is visible between 1969, 1980 and 1989 aerial photographs, and the fire damage of the 1967 fires is visible in 1969 aerial photograph, however the area of the proposed road and base terminal have remained relatively undisturbed with the exception of some fire trails and bike trails.

**Table 2 Historical Aerial Photograph Reference**

| Photo | Reference |
|---|---|
| 2019 | • Plate 12 Aerial Photograph of the site (c/o Google Earth) 12 April 2019 |
| 2015 | • Plate 13 Aerial Photograph of the site (c/o Google Earth) 17 April 2015 |
| 2005 | • Plate 14 Aerial Photograph of the site (c/o Google Earth) 6 November 2005 |
| 2003 | • Plate 15 Aerial Photograph of the site (c/o Google Earth) 14 October 2003 |
| 1997 | • Plate 16 Historical Aerial Photograph of the site (c/o DPIPWE) 1997 entire Photograph to Plate 18 Historical Aerial Photograph of the site (c/o DPIPWE) 1997 – close up McRobies Road |
| 1989 | • Plate 19 Historical Aerial Photograph of the site (c/o DPIPWE) 1989 entire Photograph to Plate 21 Historical Aerial Photograph of the site (c/o DPIPWE) 1989 Close up McRobies Road |
| 1980 | • Plate 22 Historical Aerial Photograph of the site (c/o DPIPWE) 1980 Entire Photograph to Plate 24 Historical Aerial Photograph of the site (c/o DPIPWE) 1980 Tip entrance |
| 1969 | • Plate 27 Historical Aerial Photograph of the site (c/o DPIPWE) 1969 Tip entrance to Plate 28 Historical Aerial Photograph of the site (c/o DPIPWE) 1969 Tip entrance – extra close up |
| 1957 | • Plate 29 Historical Aerial Photograph of the site (c/o DPIPWE) 1957 Entire Photograph to Plate 32 Historical Aerial Photograph of the site (c/o DPIPWE) 1957 Tip entrance close up |
| 1946 | • Plate 33 Historical Aerial Photograph of the site (c/o DPIPWE) 1946 Entire Photograph to Plate 35 Historical Aerial Photograph of the site (c/o DPIPWE) 1946 Tip entrance |

## 6 SITE WALKOVER

A site visit was conducted on the 5th September 2019, by S. Joyce of GES. Images of current site conditions are presented in Plate 1 to Plate 11. Additional photographs are presented in Appendix 4 (Investigation Area) and Appendix 5 (outside the investigation area).

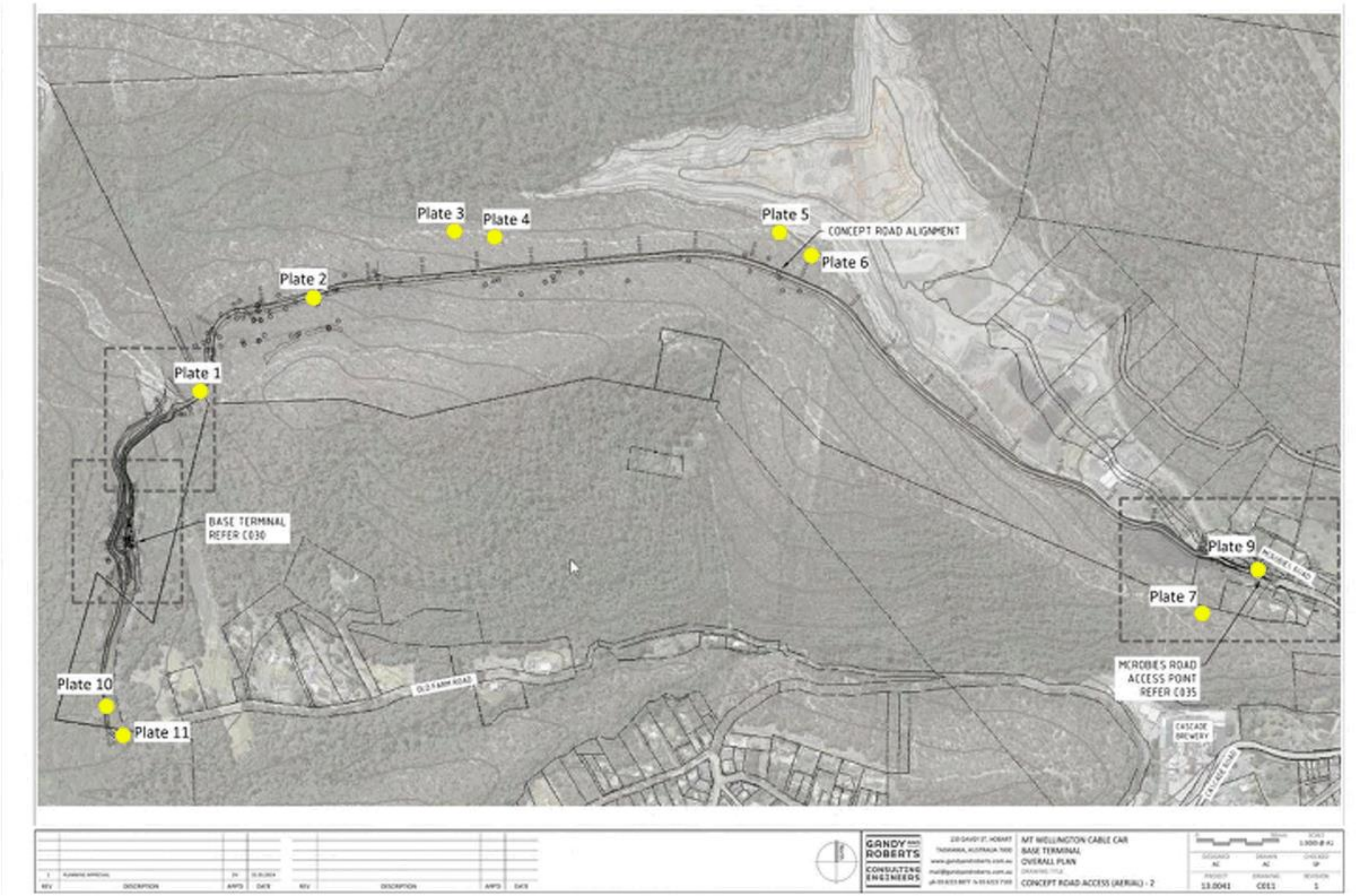



**Figure 7 Location where site Photographs were taken**

## 6.1 Surface Coverings and Signs of Contamination

The site is a large area of bush situated above the HCC Disposal Area; known to most as the 'McRobies Gully Tip'. Except for two main fire trails, bike tracks and the occasional bush fire that has spread across the site, it is relatively undisturbed. Given the difficulty of access, and the lack of visible evidence of surface staining or site contamination there does not appear to be any industrial activity that may have caused contaminated to be released in the investigation area above HCC Disposal Area.

**Plate 1 Current Site conditions, on the western edge of the site.**

**Plate 2 Current Site conditions, typical example of the bike track in the area.**

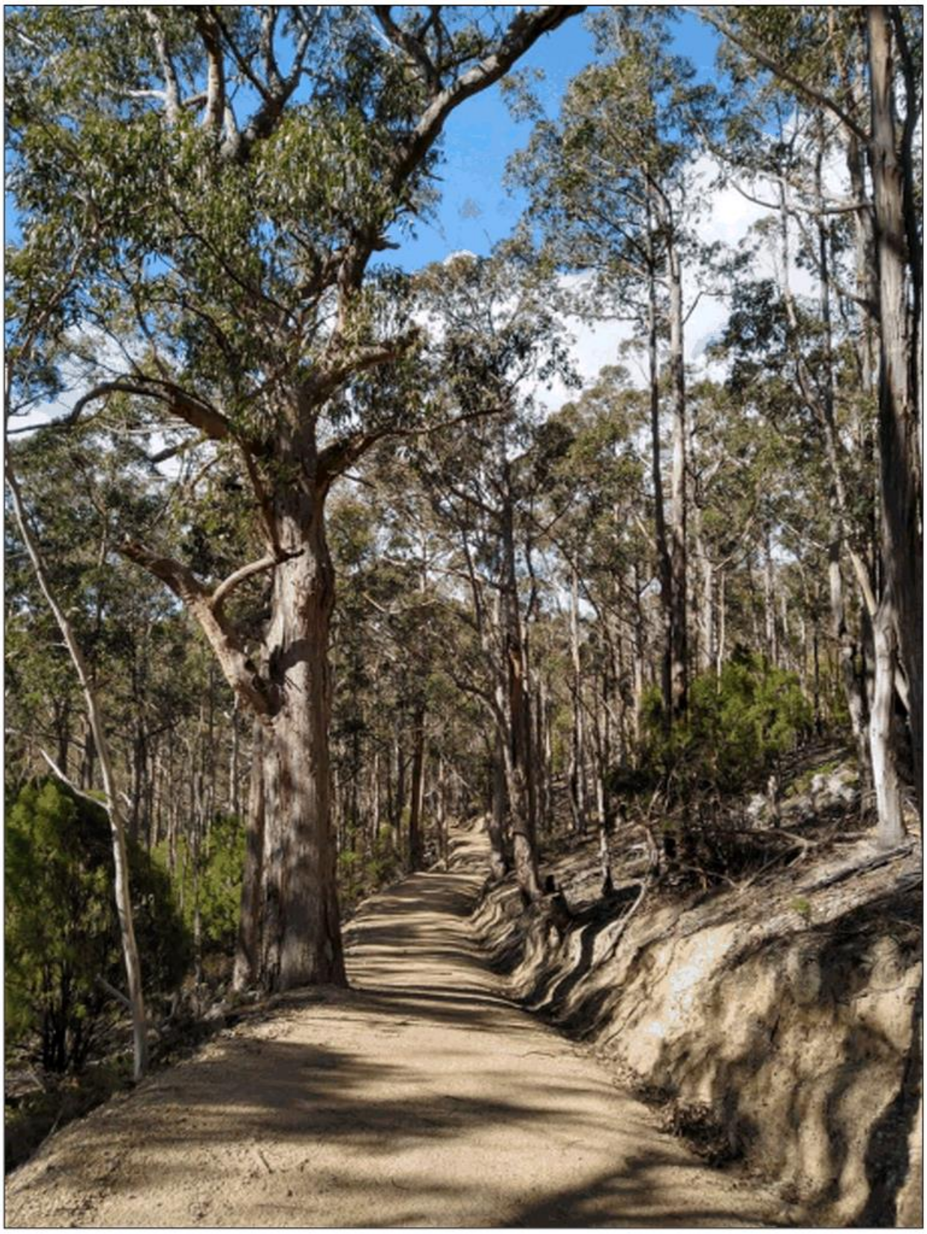


**Plate 3 Current Site conditions, view east along the lower fire trail**

**Plate 4 Current Site conditions, Permian sediments on the lower fire trail.**

**Plate 5 Current Site conditions, HCC Disposal Area, from the lower fire trail**

**Plate 6 Current Site conditions, view south east on the lower fire trail on the boundary to HCC Disposal Area**

**Plate 7 Current Site conditions, Regeneration area – linear rock work, possible garden bed above the new roundabout.**

**Plate 8 Current Site conditions, junction of McRobies Road and Degraves Street**

**Plate 9 Current Site conditions, new roundabout at the entrance to HCC Disposal Area**

**Plate 10 Current conditions, outside investigation area -footprint of proposed visitor centre**

**Plate 11 Current conditions, outside investigation area -footprint of proposed visitor centre**

## 6.2 Potential Contamination Issues

### *6.2.1 Areas of Potential Concern*

The following areas of potential concern have been identified onsite:

- The tip – HCC Disposal Area at 30 McRobies Gully Road – windblown contaminants – such as plastics and localised contamination in the drainage line area only at the start of the access road to the Base Terminal.
- The entire bush area may have been subject to fire-fighting foams containing per-and polyfluoroalkyl substances (PFAS).

There may be other areas on the site where potentially contaminating activities have occurred. This investigation is contained by the available historical information.

### *6.2.2 Contaminants of Potential Concern*

Potential contaminants of potential concern (COPC) that have been considered include the following:

- Hydrocarbons; Total Petroleum/Recoverable Hydrocarbons (TPH/TRH); Mono Aromatic hydrocarbons: Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene (BTEXN); Polynuclear Aromatic Hydrocarbons (PAHs);
- Heavy metals;
- Per-and polyfluoroalkyl substances (PFAS).

# 7 PRELIMINARY CONCEPTUAL SITE MODEL

## 7.1 Preliminary Conceptual Site Model

The site has hosted a dry eucalypt forest, with no signs of industrial or commercial activity for the period investigated, 70 years. The McRobies Gully Waste Management Centre (Hobart Tip) is on the same title, and presents a small chance of contamination, from windblown fine plastics or other contaminants bound to windblown dust; or by leaching or fill at the lowest point (proposed road entrance) of the proposed road.

Given the evidence of bushfire damage to trees (multiple events, given trees younger than 1967 bushfire are charred) there is a small chance of PFAS being used in firefighting. Table 3 illustrates potential risks may be associated with unconfirmed site contamination. In this instance no soil or groundwater has been tested to confirm or rule out the risks. Potential pathways have been identified in the Preliminary Conceptual Site Model.

## 7.2 Potential Human Receptors

Potential human receptors considered during this investigation include onsite current and future (recreational land users); offsite current and future (residential); constructions workers during any future site redevelopment (commercial land users / trench worker specific) future trench works.

## 7.3 Potential Ecological receptors

The site is situated in dry eucalpt forest and features some threatened flora points (TheLIST). The closest receiving water body is the unnamed tributary/drain to the north and northeast of the site, which enters Hobart Rivulet approximately 1km downslope.

**Table 3 Preliminary Conceptual Site Model**

| Contamination Source | COPC | Pathway | Receptor |
|---|---|---|---|
| Wind blown fine plastics, and other dust sized contaminents from Waste Management Centre. | Heavy metals<br>TRH / TPH<br>BTEXN, PAH | Dermal contact (HSL) /dust inhalation and soil ingestion (HILs) of COPC in surface soils | • Trench workers and construction workers – for road and base terminal construction.<br>• Current and future recreational users.<br>• Surrounding site users – downgradient residential. |
| | Heavy metals<br>TRH / TPH<br>BTEXN, PAH | Migration into soil and groundwater (marine or freshwater environments EILs / ESLs) | • Hobart Rivulet 1km downgradient. |
| Leached contaminants from upslope fill. Effecting the entrance point of the proposed road. | Heavy metals<br>TRH / TPH<br>BTEXN, PAH | Dermal contact (HSL) /dust inhalation and soil ingestion (HILs) of COPC in surface soils | • Trench workers and construction workers – for road and base terminal construction.<br>• Current and future recreational users.<br>• Surrounding site users – downgradient residential. |
| | Heavy metals<br>TRH / TPH<br>BTEXN, PAH | Migration into soil and groundwater (marine or freshwater environments EILs / ESLs) and subsequent soil ingestion/dermal contact or inhalation of COPC | • Hobart Rivulet 1km downgradient. |
| Chemicals derived from fire fighting foam | PFAS | Dermal contact (HSL) /dust inhalation and soil ingestion (HILs) of COPC in surface soils . | • Trench workers and construction workers – for road and base terminal construction.<br>• Current and future recreational users.<br>• Surrounding site users – downgradient residential. |
| | PFAS | Migration into soil and groundwater (marine or freshwater environments EILs / ESLs) | • Hobart Rivulet 1km downgradient. |

Abbreviations

COPC – Contaminants Of Potential Concern; TRH – Total Recoverable Hydrocarbons; TPH – Total Petroleum Hydrocarbons; BTEXN – Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene; PAHs – Polynuclear Aromatic Hydrocarbons; HSL – Health Screeing Levels; HIL – Health Invesitigation Levels; ESL's ecological screening levels; EILs ecological investigation levels

# 8 CONCLUSIONS & RECOMMENDIATIONS

## 8.1 Desktop Assessment

The following information was gathered during the desktop investigation:

- The site is zoned *Environmental Management* and *Utilities* under the *Hobart Interim Planning Scheme of 2015*.
- The geology of the site is *Late Carboniferous to Triassic sedimentary sequences*. The site is surrounded by further Triassic Sediments from the Upper Parmeener Supergroup of the Knocklofty Formation
- The City of Hobart Council hold records that state that the site may be a *potentially contaminated site* due to the McRobies Gully Waste Management Centre being on the same title.
- Historical Aerial photographs confirmed that the site has hosted bush land of dry eucalypt forest and has not hosted any industrial or commercial activities since 1946.
- No specific potential up-gradient contamination sources have been identified.
- Contaminants Of Potential Concern (COPC) at the site relate to; windblown fine plastics and dust particles from the waste management centre across the site, the presence of fill and leachate from the waste management centre at the point where the proposed road entrance to McRobies Road (TPH/TRH; Mono Aromatic hydrocarbons: (BTEXN); PAH; Heavy Metals); and firefighting foams (PFAS). The likelihood of any of these COPCs effecting the site is low and the risk to human and ecological receptors is also low.

## 8.2 Conclusion Summary

GES concludes and recommends the following:

- The desktop investigation has identified a lack of historical contaminating activities that would impact the access road excavations and construction. The likelihood of contaminants of potential concern impacting human health or ecological receptors is unlikely.
- As a precautionary measure, we recommend soil testing along to the first 150 m along the proposed access road footprint from McRobies Road to approximately 35m ASL, prior to construction. This is the most likely location for contamination to have accumulated. See Figure 8 for approximate sampling footprint. The investigation should satisfy the Interim Planning Schemes Excavation Code (E2.6.2 P1).

Yours faithfully,

John Paul Cumming *B.Agr.Sc (Hons) Phd CPSS GAICD*

*Director*

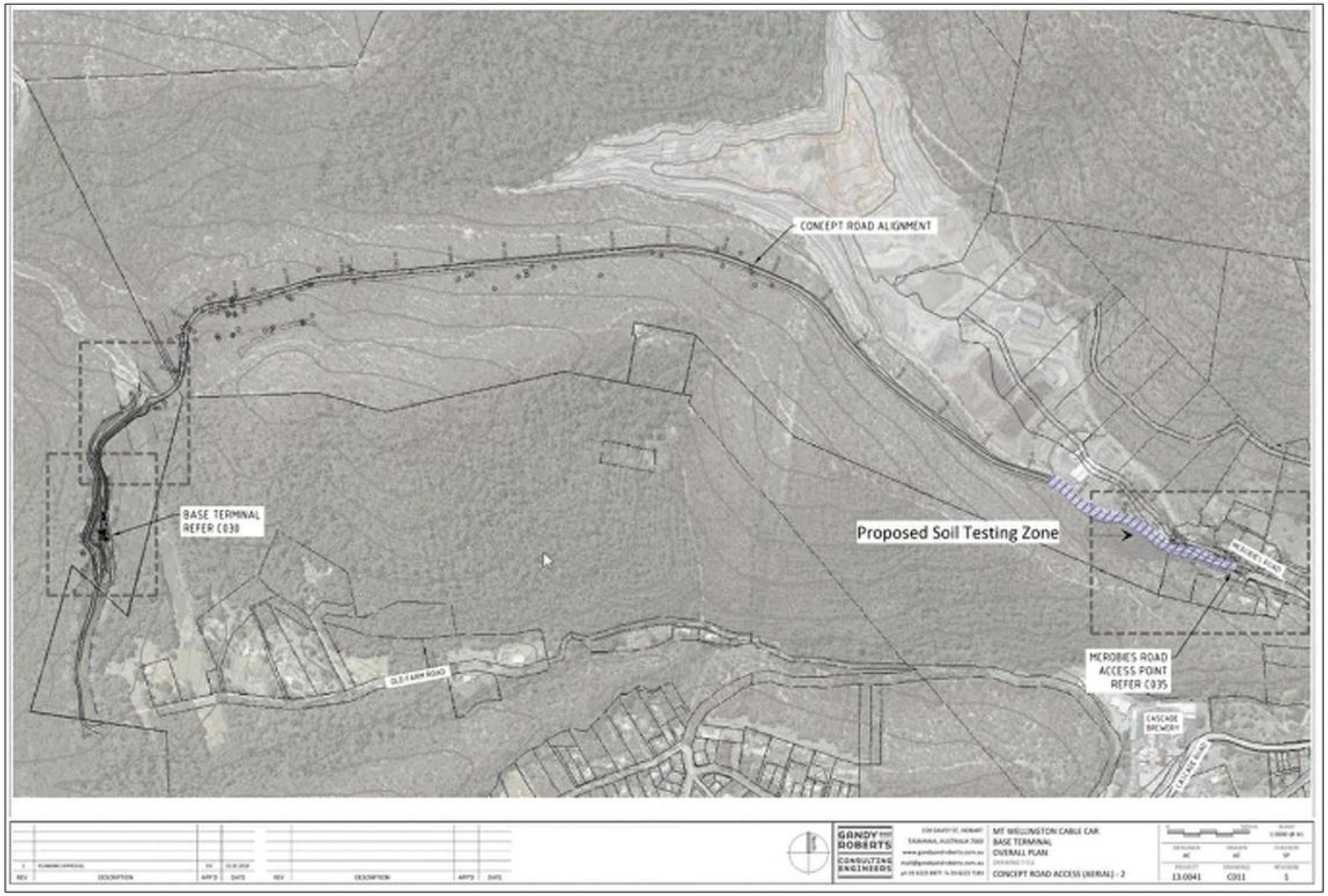



**Figure 8 Proposed soil testing zone**

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NEPC, 1999. Guideline on Data Collection, Sample Design and Reporting Schedule B (2), National Environmental Protection Measure (Assessment of Site Contamination), National Environment Protection Council, 1999. Measures as amended, taking into account amendments up to National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1)

NEPM, 1999.Guideline on Investigation Levels for Soil and Groundwater, Schedule B (1), National Environment Protection (Assessment of Site Contamination) Measure, National Environment Protection Council, 1999. Measures as amended, taking into account amendments up to National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1).

## LIMITATIONS STATEMENT

This *Environmental Site Assessment* Report has been prepared in accordance with the scope of services between Geo-Environmental Solutions Pty. Ltd. (GES) and Mount Wellington Cableway Company Pty Limited ('the Client'). To the best of GES's knowledge, the information presented herein represents the Client's requirements at the time of printing of the Report. However, the passage of time, manifestation of latent conditions or impacts of future events may result in findings differing from that described in this Report. In preparing this Report, GES has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations referenced herein. Except as otherwise stated in this Report, GES has not verified the accuracy or completeness of such data, surveys, analyses, designs, plans and other information.

The scope of this study does not allow for the review of every possible soil and groundwater contaminant over the whole area of the site. The conclusions described within this report are based on these samples, the results of their analysis and an assessment of their contamination status.

This report does not purport to provide legal advice. Readers of the report should engage professional legal practitioners for this purpose as required.

No responsibility is accepted for use of any part of this report in any other context or for any other purpose by third party.

## Appendix 1 GES Staff

Geo-Environmental Solutions (GES) is a specialist geotechnical and environmental consultancy providing advice on all aspects of soils, geology, hydrology, and soil and groundwater contamination across a diverse range of industries.

Geo Environmental Solutions Pty Ltd:

- ACN – 115 004 834
- ABN – 24 115 004 834

**GES STAFF - ENGAGED IN SITE INVESTIGATION WORKS**

*Dr John Paul Cumming B.Agr.Sc (Hons) Phd CPSS GAICD*

- Principle Author and Principle Environmental Consultant
- PhD in Environmental Soil Chemistry from the University of Tasmania in 2007
- 18 years' experience in environmental contamination assessment and site remediation.

*Ms Sarah Joyce BSc (Hons)*

- Senior Environmental Scientist
- Honours in Geography and Environmental Science at the University of Tasmania in 2003;
- Undergraduate Degree Double Major in Geology and Geography & Environmental Science
- 15 years professional work experience and 7 years contaminated site assessment
- Attendance to recent relevant workshops by ALGA – Risk Assessment 101 (May 2018); Vapour Intrusion Workshop (Part A) – Petroleum Hydrocarbons (July 2017)

*Mr Mark Downie B.Agr.Sc*

- Soil Scientist
- 8 Year experience in contamination assessment and reporting of soils and groundwater.

**GES STAFF – CONTAMINATED SITES EXPERIENCE**

*Mr Aaron Plummer (Cert. IV)*

- Soil Technician
- 6 years' experience in hydrocarbon and heavy metal contamination sampling of soils and groundwater.

*Mr Grant McDonald (Adv. cert. hort.)*

- Soil Technician
- 10 years' experience in hydrocarbon and heavy metal contamination sampling of soils and groundwater.

*Mr Kris Taylor Bsc (Hons)*

- Senior Environmental & Engineering Geologist
- Honours in Environmental Geology at the University of Tasmania in 1998
- 20 years' experience in environmental contamination assessments and hydrogeology (including honours in mine site tailing pollution assessment)

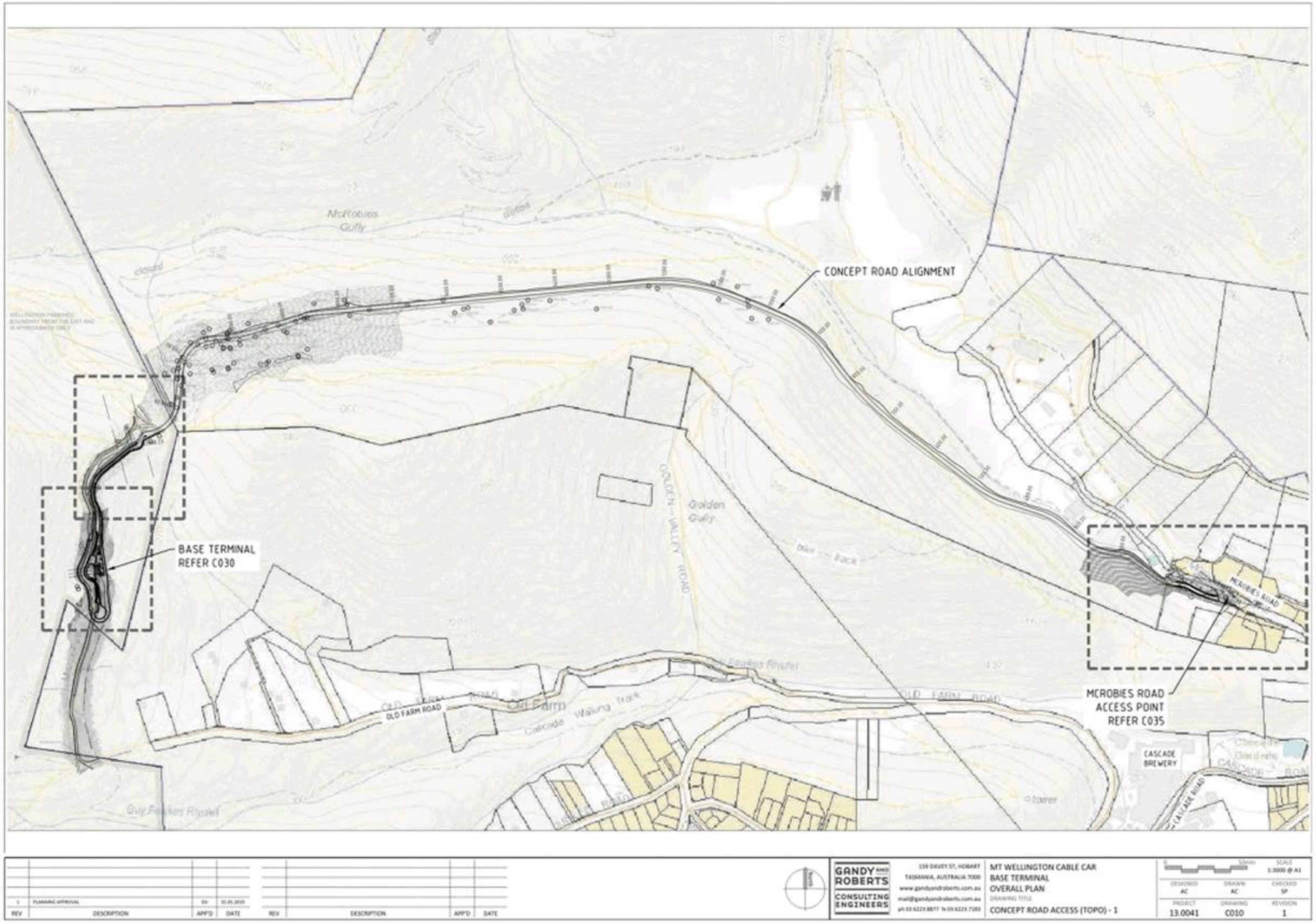
*Mr Sam Rees B.Agr.Sc (Phd)*

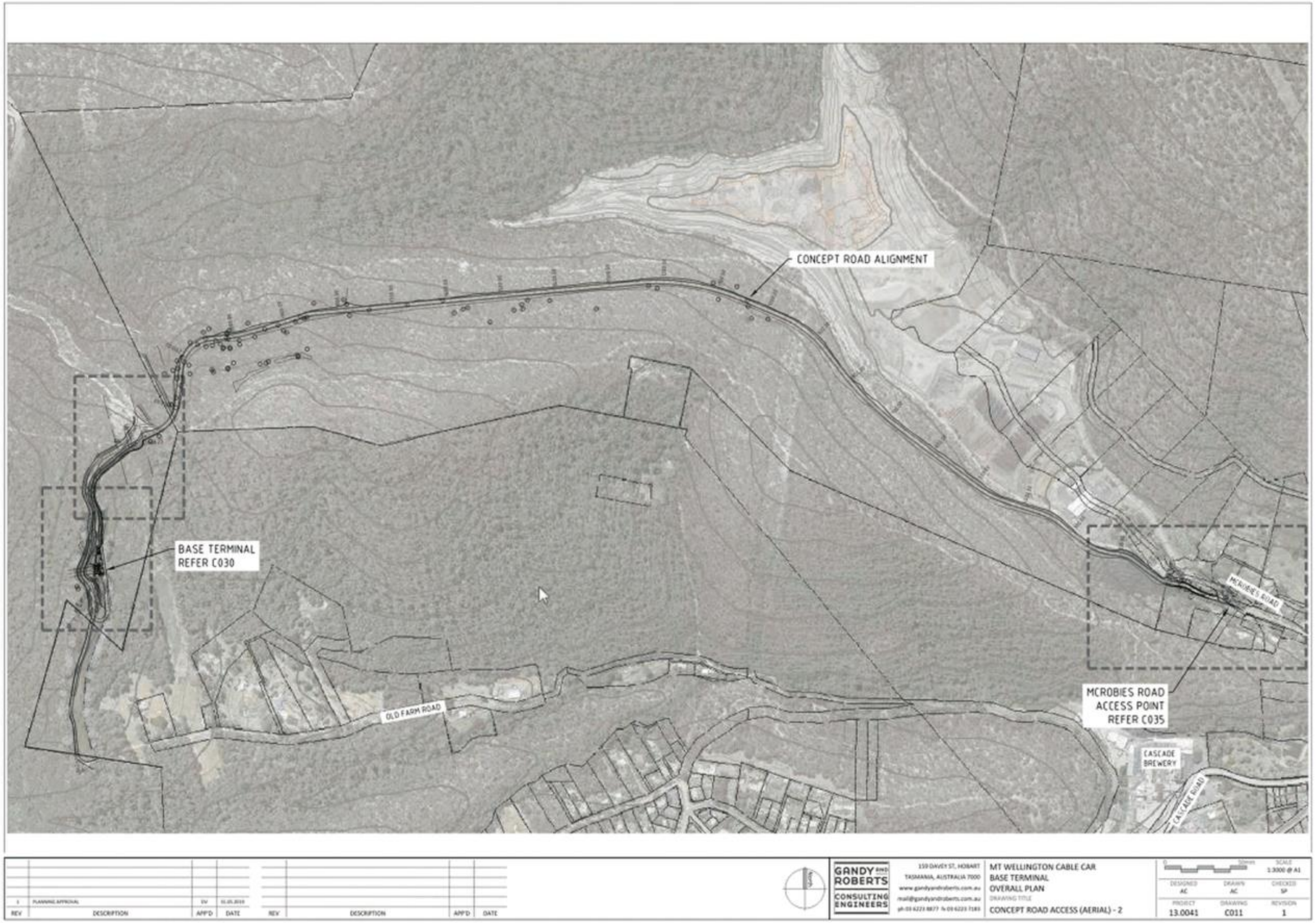
- Soil & Environmental Scientist
- 6 years' experience in hydrocarbon and heavy metal contamination assessment and reporting of soils and groundwater.

*Ms Peri Lucas B.Agr.Sc (Hons)*

- Soil Scientist
- 2 Year experience in contamination assessment and reporting of soils and groundwater.

## Appendix 2 Engineers Design for the Access Road to the Base Terminal

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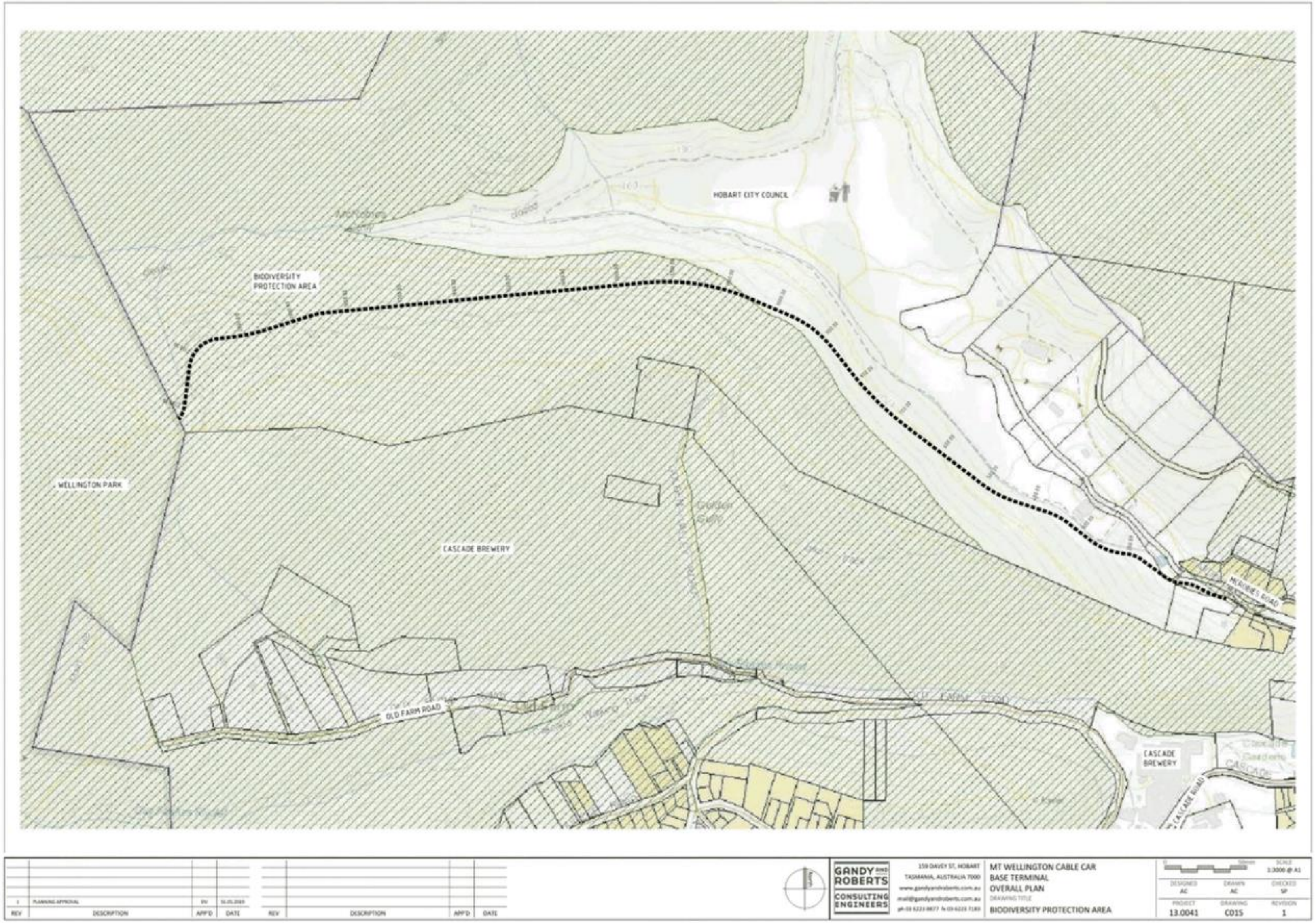
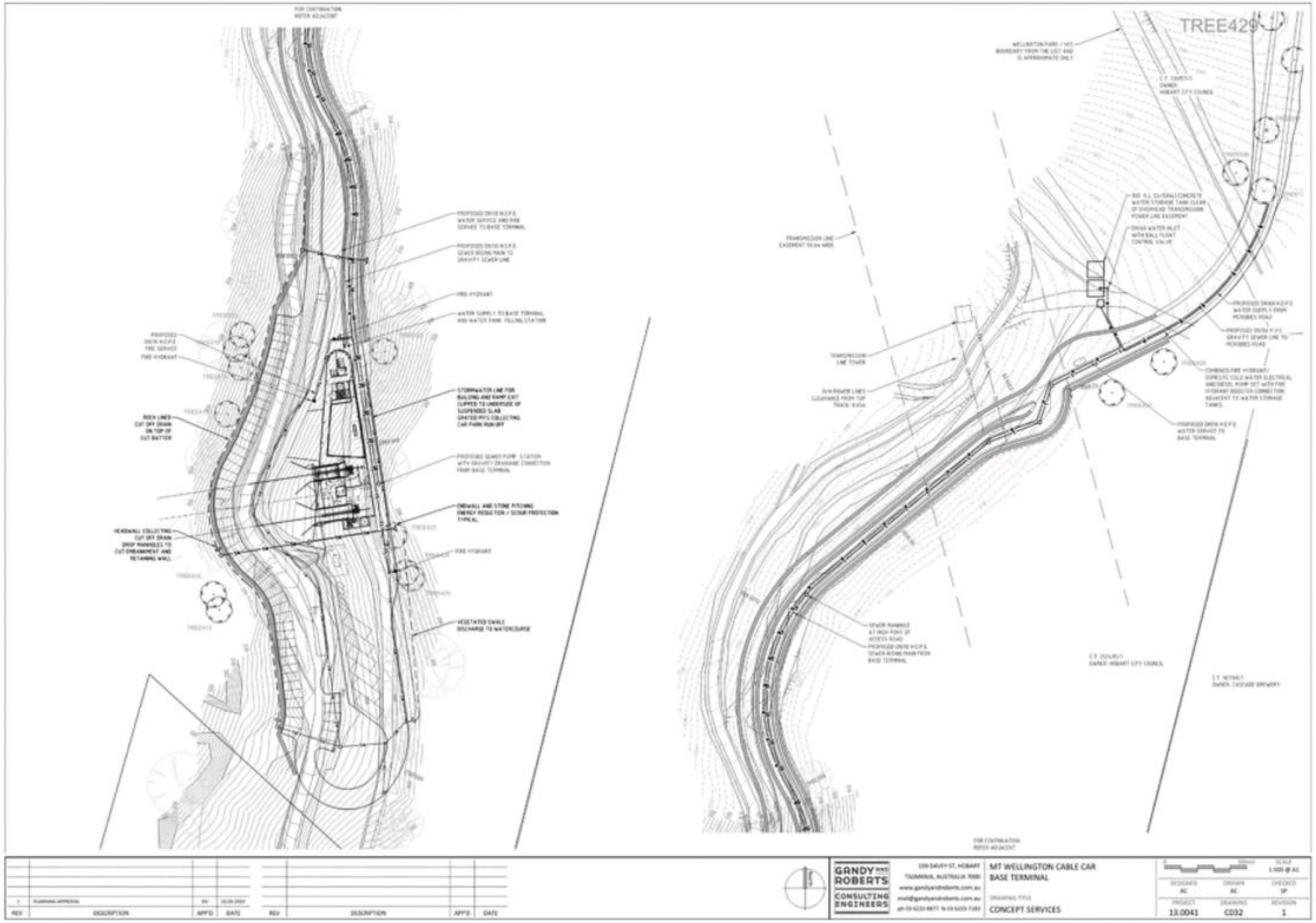
*Preliminary Site Investigation: 30 McRobies Road, South Hobart. Proposed Cable Car Assess Road. November 2019*

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*Preliminary Site Investigation: 30 McRobies Road, South Hobart. Proposed Cable Car Assess Road. November 2019*


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DEGRAVES STREET
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CASCADE ROAD
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## Appendix 3 Aerial Photographs

**Plate 12 Aerial Photograph of the site (c/o Google Earth) 12 April 2019**

**Plate 13 Aerial Photograph of the site (c/o Google Earth) 17 April 2015**

**Plate 14 Aerial Photograph of the site (c/o Google Earth) 6 November 2005**

**Plate 15 Aerial Photograph of the site (c/o Google Earth) 14 October 2003**

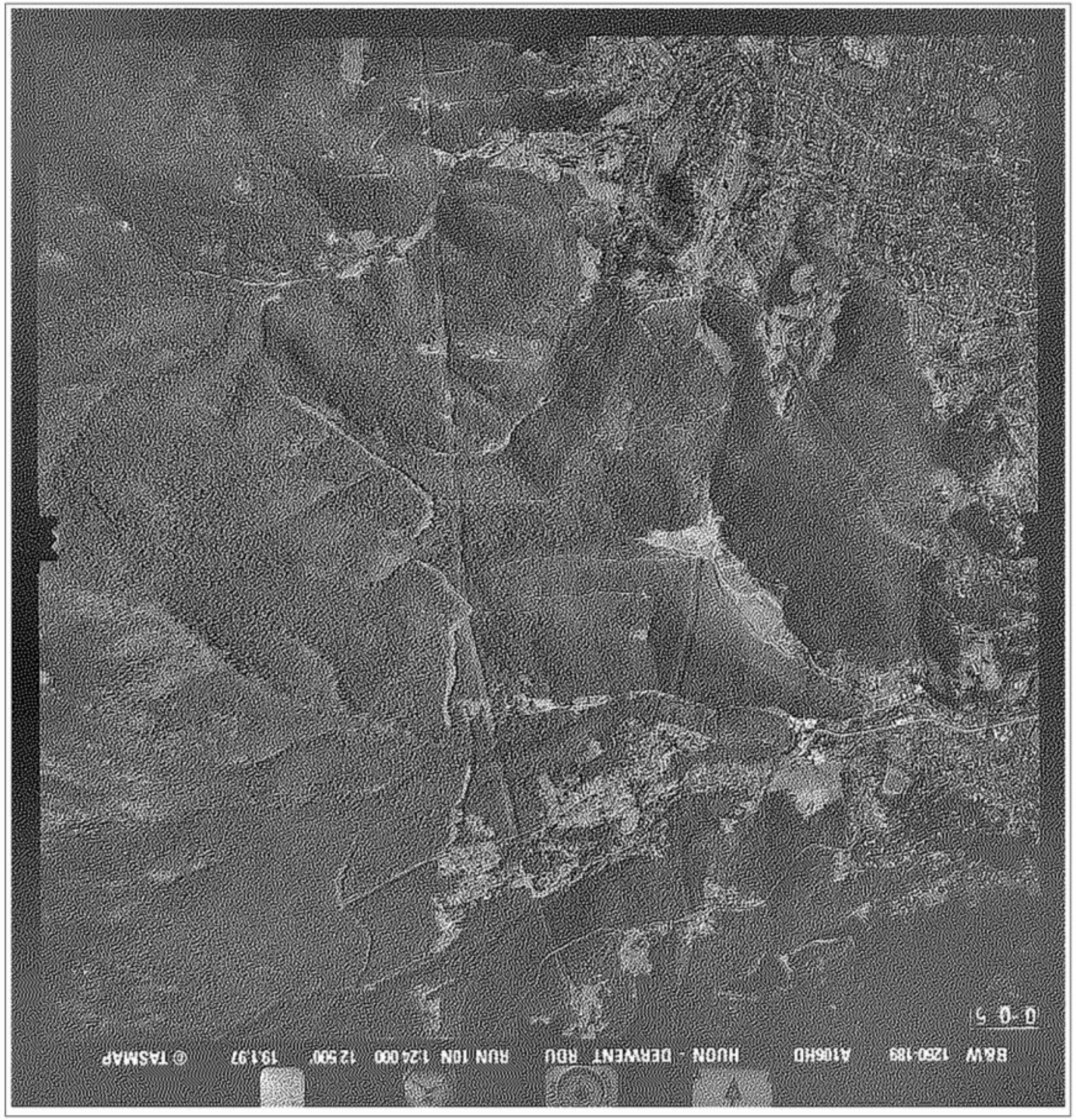

**Plate 16 Historical Aerial Photograph of the site (c/o DPIPWE) 1997 entire Photograph**

**Plate 17 Historical Aerial Photograph of the site (c/o DPIPWE) 1997 Investigation Area**

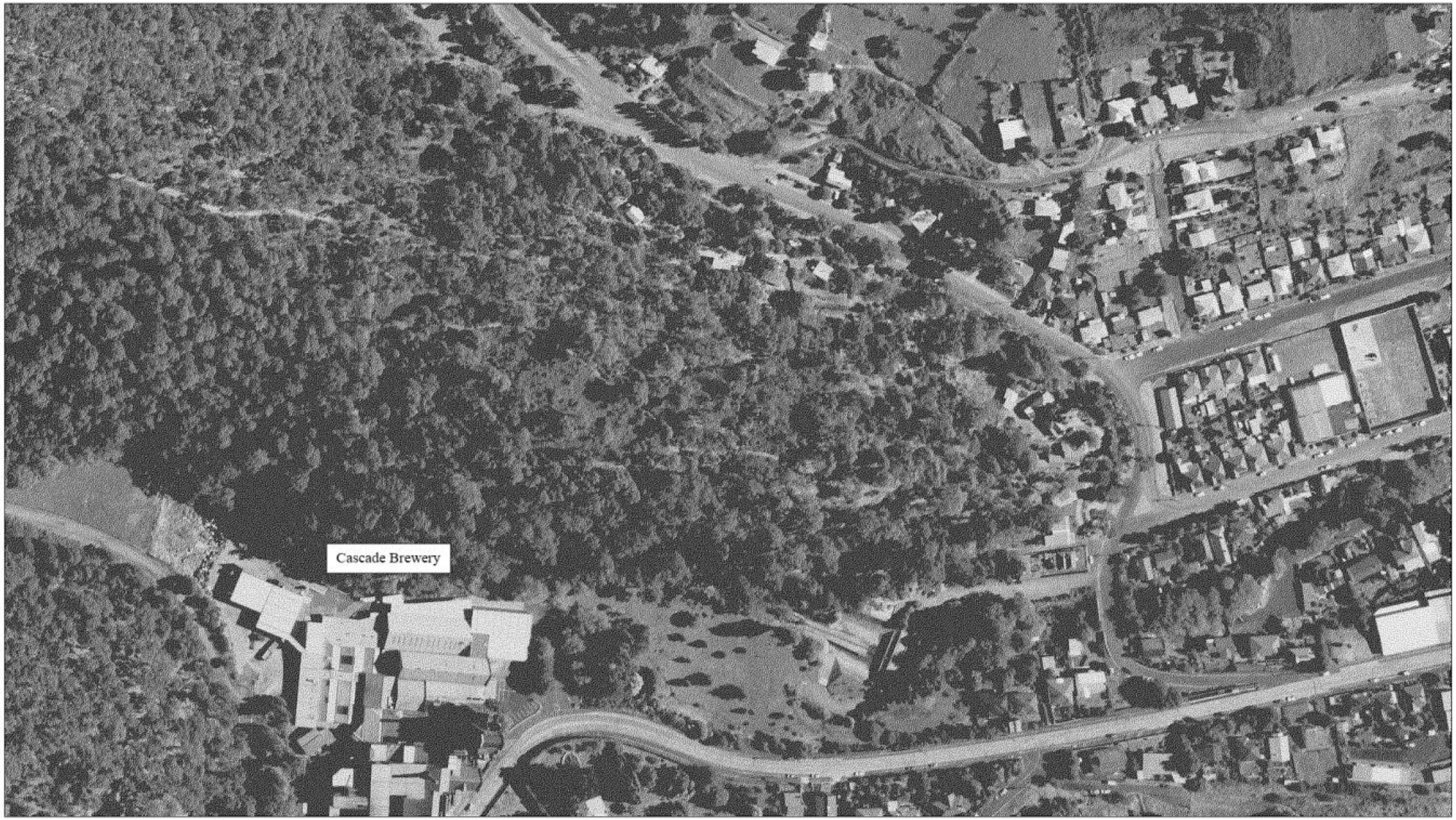


**Plate 18 Historical Aerial Photograph of the site (c/o DPIPWE) 1997 – close up McRobies Road**

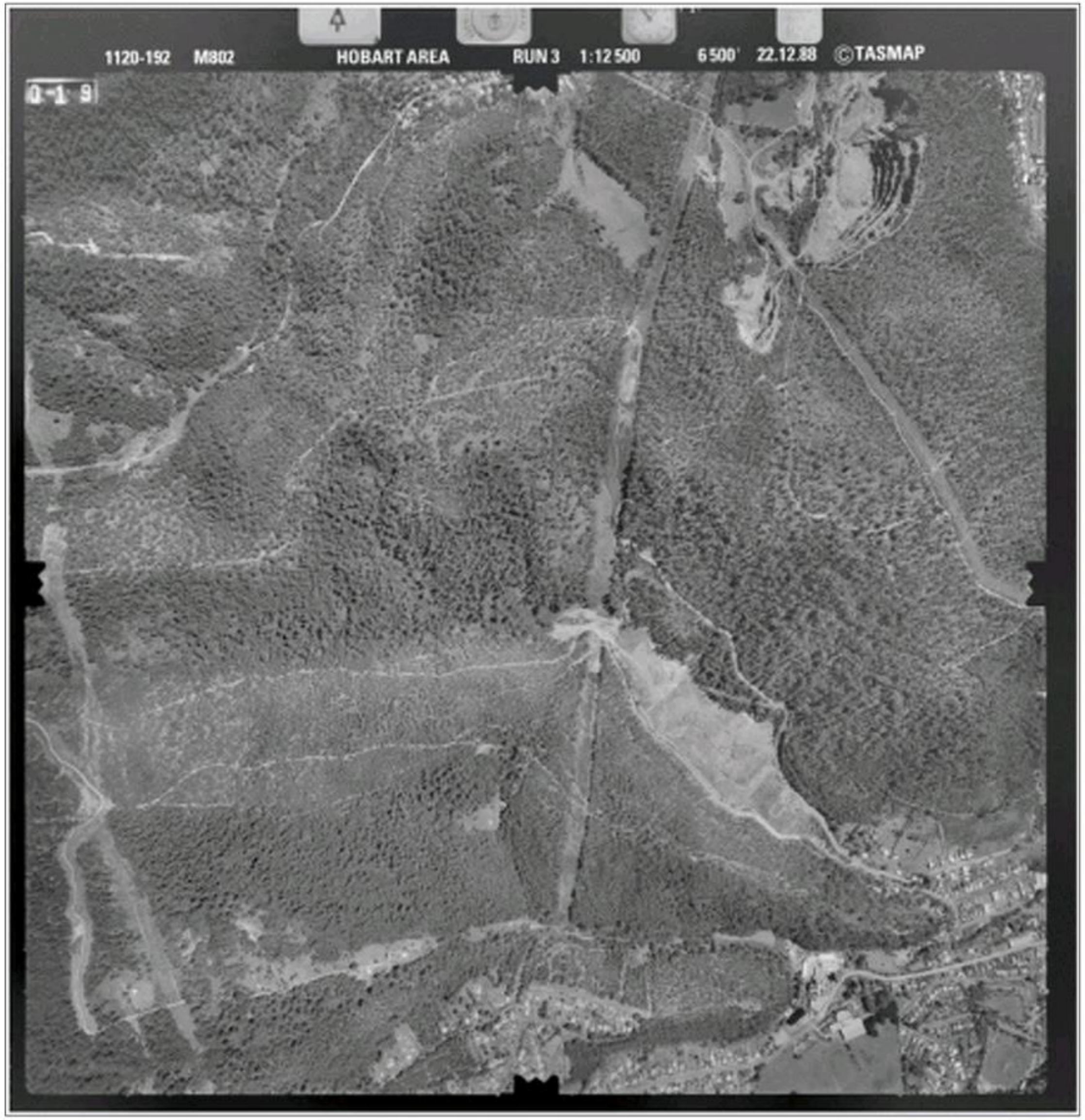


**Plate 19 Historical Aerial Photograph of the site (c/o DPIPWE) 1989 entire Photograph**

**Plate 20 Historical Aerial Photograph of the site (c/o DPIPWE) 1989 Investigation Area**


**Plate 21 Historical Aerial Photograph of the site (c/o DPIPWE) 1989 Close up McRobies Road**

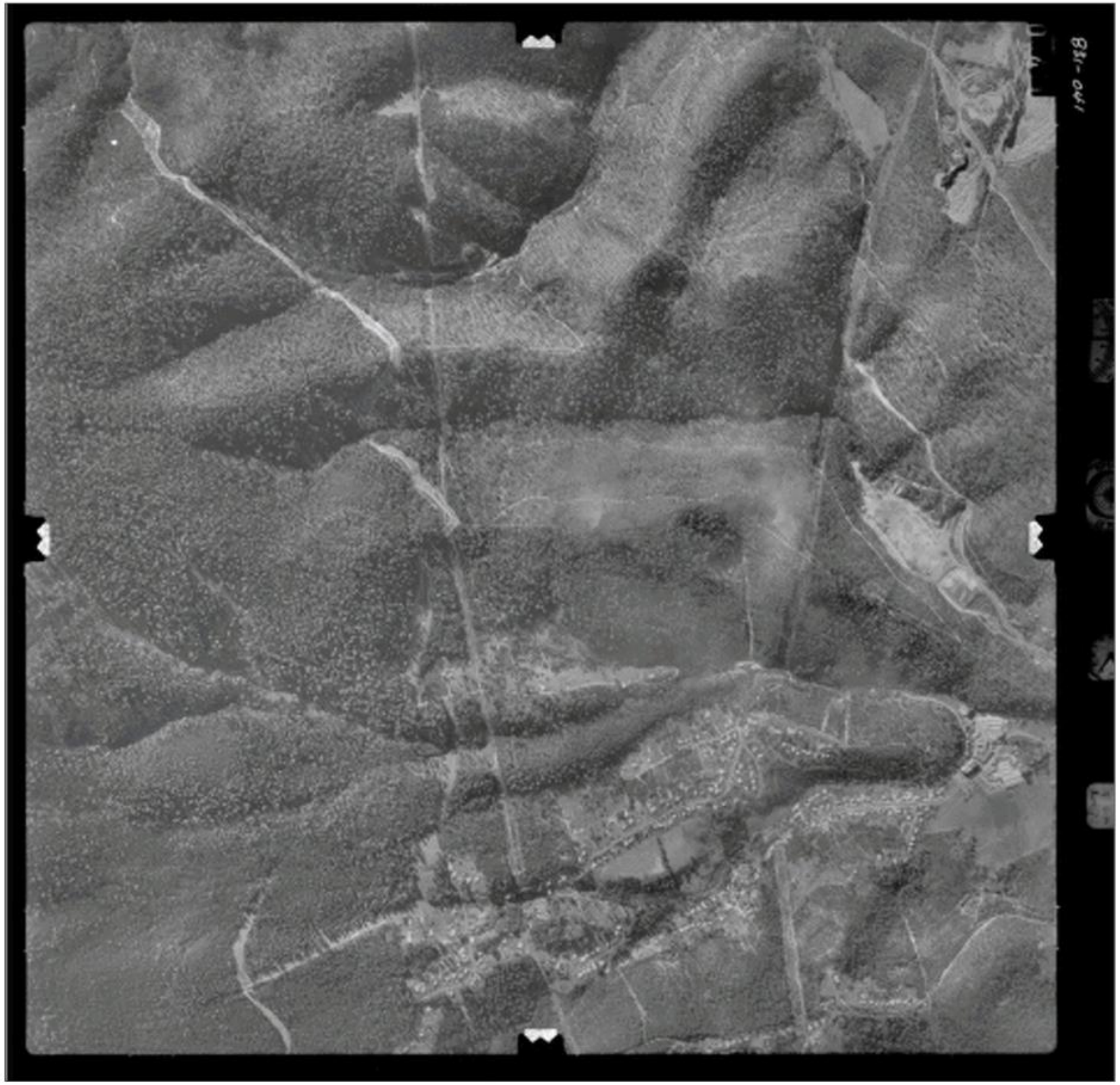


**Plate 22 Historical Aerial Photograph of the site (c/o DPIPWE) 1980 Entire Photograph**

**Plate 23 Historical Aerial Photograph of the site (c/o DPIPWE) 1980 Investigation Area**


**Plate 24 Historical Aerial Photograph of the site (c/o DPIPWE) 1980 Tip entrance**

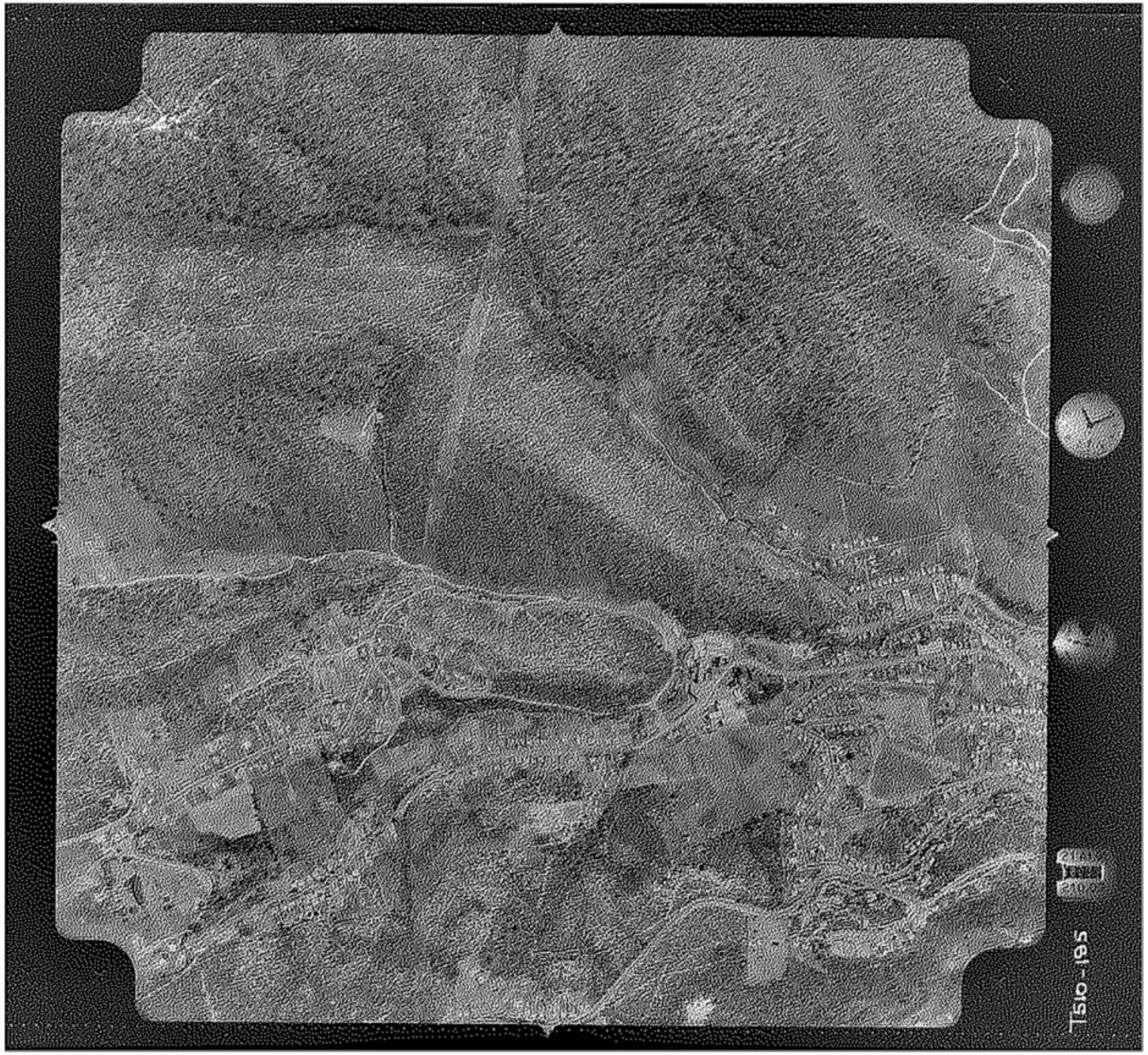


**Plate 25 Historical Aerial Photograph of the site (c/o DPIPWE) 1969 Entire Photograph**

**Plate 26 Historical Aerial Photograph of the site (c/o DPIPWE) 1980 Investigation Area**


**Plate 27 Historical Aerial Photograph of the site (c/o DPIPWE) 1969 Tip entrance**
Post 1967 Bush fires before Tip


**Plate 28 Historical Aerial Photograph of the site (c/o DPIPWE) 1969 Tip entrance – extra close up**


**Plate 29 Historical Aerial Photograph of the site (c/o DPIPWE) 1957 Entire Photograph**

**Plate 30 Historical Aerial Photograph of the site (c/o DPIPWE) 1957 Investigation Area**


**Plate 31 Historical Aerial Photograph of the site (c/o DPIPWE) 1957 Tip entrance**

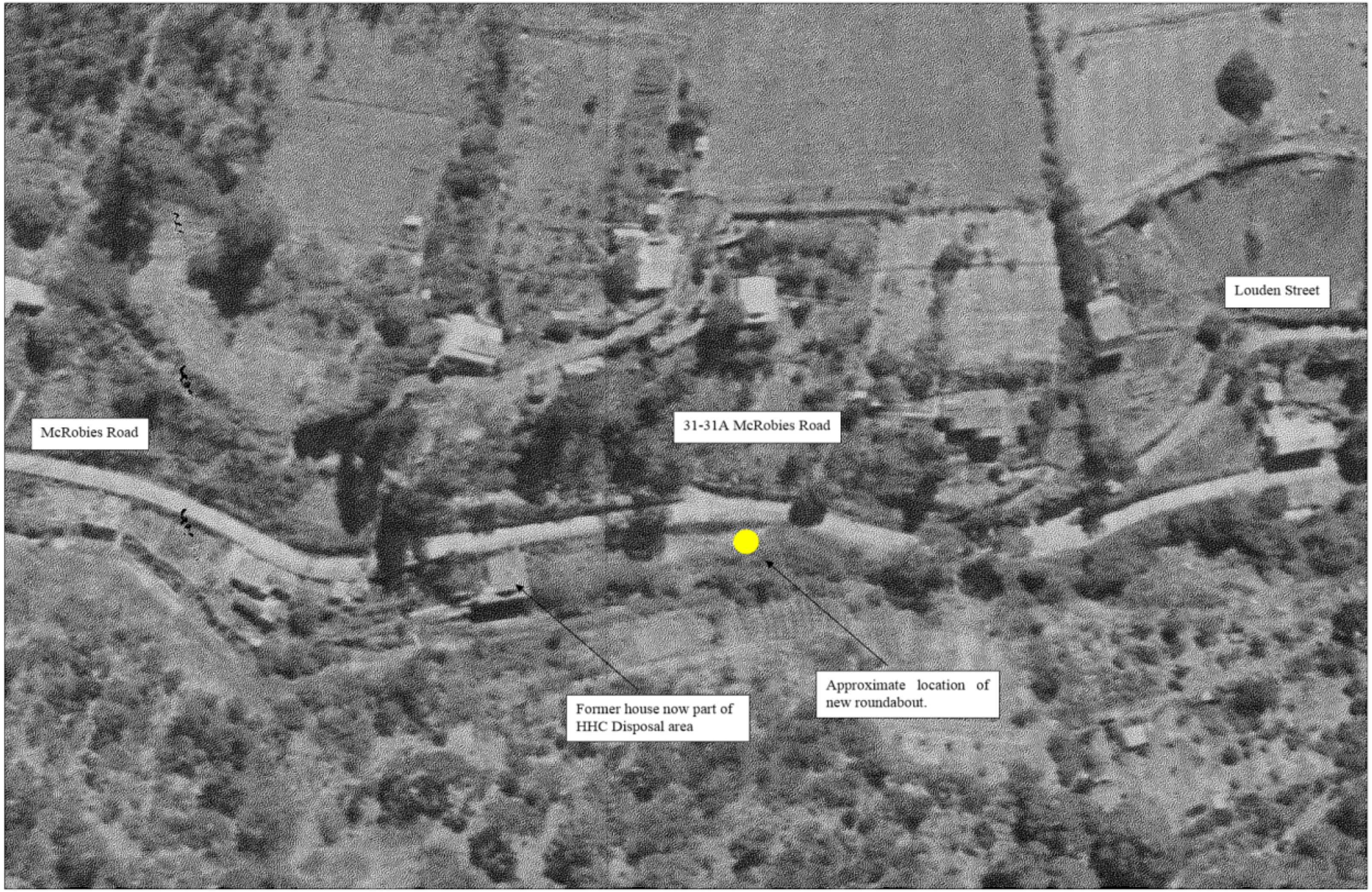


**Plate 32 Historical Aerial Photograph of the site (c/o DPIPWE) 1957 Tip entrance close up**

**Plate 33 Historical Aerial Photograph of the site (c/o DPIPWE) 1946 Entire Photograph**

**Plate 34 Historical Aerial Photograph of the site (c/o DPIPWE) 1946 Investigation Area**


**Plate 35 Historical Aerial Photograph of the site (c/o DPIPWE) 1946 Tip entrance**

## Appendix 4 Environmental Protection Notice McRobies Gully Landfill

Tasmania

DEPARTMENT *of* PRIMARY INDUSTRIES, WATER *and* ENVIRONMENT

ENVIRONMENT DIVISION

Enquiries: Mark Cretney
Phone : (03) 62 33 6374
Fax : (03) 62 33 3800
Email : mark.cretney@dpiwe.tas.gov.au
Our Ref : (031180)tm

CERTIFIED MAIL

- 9 AUG 2004

Mr Brent Armstrong
General Manager
Hobart City Council
GPO Box 503
HOBART TAS 7000

Dear Mr Armstrong

**Environment Protection Notice (EPN) 715/1 McRobies Gully Landfill**

I refer to your Environmental Management Plan prepared by Hobart City Council requesting variation of the permit conditions for the McRobies Gully landfill. Please find attached Environment Protection Notice 715/1 varying several conditions, and imposing new conditions to create a consolidated list of conditions for the site.

This notice takes effect on the date on which it is served upon you. You may appeal to the Appeal Tribunal against this Notice, or against any requirement contained within the Notice, within fourteen days of that date, by writing to:

**The Chairperson**
**Resource Management and Planning Appeal Tribunal**
**GPO Box 2036**
**HOBART TAS 7001**

Please note that the Hobart City Council is legally obliged to comply with the requirements of the EPN.

If you have queries regarding the above, please in the first instance contact Mark Cretney on 6233 6374 or by e-mail to Mark.Cretney@dpiwe.tas.gov.au.

Yours sincerely

Frank Cattell

Frank Cattell
DIRECTOR OF ENVIRONMENTAL MANAGEMENT

Enc.

GENERAL ENQUIRIES (Statewide): *Telephone:* 1300 368 550
*Internet:* http://www.dpiwe.tas.gov.au
HOBART GPO Box 44, Hobart, Tasmania, 7001, Australia DEVONPORT PO Box 303, Devonport, Tasmania, 7310 LAUNCESTON PO Box 46, Kings Meadows, Tasmania, 7249

Tasmania

Department of Primary Industries, Water and Environment

**ENVIRONMENT PROTECTION NOTICE NO. 715/1**

Issued under section 44 of the Environmental Management and Pollution Control Act 1994

Issued to: The General Manager
Hobart City Council
GPO Box 503
HOBART TAS 7001

Activity: Waste Depot
Refuse disposal at McRobies Gully landfill
SOUTH HOBART TAS 7004

I, Frank Cattell, Director of Environmental Management, being satisfied in accordance with Section 44(1)(d) of the *Environmental Management and Pollution Control Act* 1994 (the Act), and in relation to the above mentioned environmentally relevant activity that it is desirable to vary the conditions of your permit, and issue this Environment Protection Notice (EPN) to the above mentioned person as the person responsible for the activity.

**GROUNDS**

The grounds upon which this EPN is issued are that:

It is desirable to vary conditions of permit number 3516 issued by the Director of Environmental Management on 21 December 1995:

(a) Because some conditions must be varied or new conditions imposed to reflect changed management or operational practices as outlined in the *McRobies Gully Refuse Disposal Site Environmental Management Plan August 2002* prepared by Hobart City Council;

(b) To reflect continuous improvement consistent with the objectives of the *Environmental Management and Pollution Control Act;*

(c) To ensure that there are adequate safeguards against environmental harm or nuisance being caused by the activity;

(d) Because the wording of certain conditions must be varied to reflect current or updated terminology and / or clarify the meaning of the condition.

The further grounds upon which this notice is issued are listed in **Schedule 2** of this notice.

Director of Environmental Management: Frank Cattell    Date of Issue: - 9 AUG 2004

## DEFINITIONS

Unless the contrary appears, words and expressions used in this EPN have the meaning given to them in **Schedule 1** of this notice. If there is any inconsistency between a definition in the EMPCA and a definition in the EPN, the EMPCA prevails to the extent of the inconsistency.

## REQUIREMENTS

In accordance with s.44(3) of the EMPCA, the person responsible for the activity is required to comply with conditions contained in **Schedule 3** of this notice. These conditions prevail over the terms of the permit to the extent of any inconsistency.

## INFORMATION

Attention is drawn to **Schedule 4**, which contains important additional information.

## PENALTIES

If a person bound by an environment protection notice contravenes a requirement of the notice that person is guilty of an offence and is liable on summary conviction to a penalty not exceeding $50,000 or in the case of a body corporate $100,000.

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**This notice takes effect on the date on which it is served upon you.**

You may appeal to the Appeal Tribunal against this notice, or against any requirement contained in the notice, within 14 days of that date, by writing to:

**The Chairperson**
**Resource Management and Planning Appeal Tribunal**
**GPO Box 2036**
**Hobart Tas 7001**

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Signed: Frank Cattell
Director of Environmental Management

Date:...............................................

## SCHEDULE 1

### Definitions of Terms

**'Activity (or activities)'** means one or more environmentally relevant activity or activities (as defined in section 3 of the EMPCA) to which this permit relates;

**'Best Practice Environmental Management'** or 'BPEM' has the meaning described in section 4 of EMPCA;

**'Clean fill'** means Soil, rock, concrete, bitumen or similar non-putrescible material that is not contaminated by other waste; and does not contain contaminant levels exceeding limits set by the Director in Bulletin 105, *Classification and Management of Contaminated Soil for Disposal.*

**'Controlled waste'** has the meaning described in the EMPCA and further prescribed in the *Environmental Management and Pollution Control (Waste Management) Regulations, 2000.*

**'EMP'** means the 'Hobart City Council, McRobies Gully Refuse Disposal Site, Environmental Management Plan', prepared by Hobart City Council, and submitted to the Director by the Hobart City Council in August 2002. The Director mat at any time time approve a revised Environmental Management Plan which overrides the previous EMP to the extent of any inconsistency.

**'EMPCA'** means the *Environmental Management and Pollution Control Act*, 1994;

**'Envirocover'** is a brand name for a biodegradable plastic material that can be placed over waste as an alternative to daily cover material;

**'Environmental nuisance'** means the emission of a pollutant that unreasonably interferes with, or is likely to unreasonably interfere with a person's enjoyment of the environment;

**'Environmental harm'** is any adverse effect on the environment (of whatever degree or duration) and includes an environmental nuisance;

**'Leachate'** means any liquid that is either released by or has percolated through waste and contains dissolved or suspended forms of gases, other liquids and solids.

**'LUPAA'** means the *Land Use Planning and Approvals Act*, 1993;

**Permeability** means the degree of permeability of the material. An engineering term for saturated hydraulic conductivity (K-value).

**'Planning authority'** means a Council.

**'Pollutant'** has the meaning given in Section 3 of the EMPCA:

**'Person responsible** means any person who is or was responsible for the environmentally relevant activity (or activities) for which this EPN is issued and includes the officers, employees, agents and assigns of that person, and includes a body corporate;

**'State Policy'** means a Tasmanian Sustainable Development Policy made under Part 2 of the *State Policies and Projects Act* 1993;

**'The Board'** is the Board of Environmental Management and Pollution Control as established under section 12 of the EMPCA. (The Board is located within the Department of Primary Industries, Water and Environment);

**'The Director'** is the Director of Environmental Management holding office under section 18 of the EMPCA and includes a person authorised in writing by the Director of Environmental Management to exercise the relevant power or function on the Director's behalf. (The Director is located within the Department of Primary Industries, Water and Environment);

**'The land'** means the land on which the activity (or activities) to which this EPN relates may be carried out, situated at and known as the McRobies Gully landfill, Hobart, in the State of Tasmania (see the hatched area in Attachment 1). The land, includes:

(a) Buildings and other structures permanently fixed to the land; and

(b) Land covered with water; and

(c) Water covering land; and

(d) Any estate, interest, easement, servitude, privilege or right in or over land

## SCHEDULE 2

*SUMMARY OF GROUNDS FOR ISSUING THIS ENVIRONMENT PROTECTION NOTICE*

The following table provides the grounds for varying the Conditions in Permit reference No L/3516 (waste disposal activity).

| Condition in Schedule 3 of this EPN | Condition in Permit No: L/3516 | Grounds |
|---|---|---|
| Q1 | Nil | **A new condition** to impose a limit on the amount of waste disposed because environmental management infrastructure is designed accordingly. |
| G1 | G4 | **Varied** to clarify the meaning of the condition and to prevent environmental harm by ensuring best practice environmental management is maintained at all stages of development and operation of the waste depot. |
| G2 | Nil | **A new condition** to ensure all persons responsible for the activity have access to and are familiar with the relevant documents associated with activities at the site to promote compliance with the conditions. |
| G3 | Nil | **A new condition** to ensure all practical steps are taken to protect the environment |
| G4 | G2 | **Varied** to clarify the meaning of the condition. |
| G5 | Nil | **A new condition** to ensure the Director is aware of whom is responsible for the activity. |
| G6 | Nil | **A new condition** to specify the minimum content requirements of the Environmental Management Plan review report and to set the date of submission of this report to the Director to ensure the timely submission of environmental information relating to the activity. |
| G7 | Nil | **A new condition** to ensure a proper register of public complaints is maintained by the person responsible as this may give an indication of changing environmental performance as this may give an indication of changing environmental performance over time. |

Director of Environmental Management: Frank Cattell Date of Issue: -9 AUG 2004

| Condition in Schedule 3 of this EPN | Condition in Permit No: L/3516 | Grounds |
|---|---|---|
| C1 (a) | G7 | **Varied** to define the location of the site and that landfilling must be confined within the hatched area of the attached plan (Attachment 1), so that the direct impacts of landfilling are similarly confined. |
| C1 (b) | G7 | **Varied** to define the maximum height of landfilling and the degree of slope to ensure the site does not exceed its approved airspace or become unstable. |
| C1 (c) | Nil | **A new condition** to ensure the stability of the landfill by limiting the height of each lift |
| C1 (d) | Nil | **A new condition** requiring a new site development plan to accurately outline how the site will be developed. |
| C1 (e) | Nil | **A new condition** that establishes survey base stations in the landfill to determine movement and therefore provide an indication of stability of the landfill |
| C2 (a) | G9 | **A new condition** to ensure leachate is retained on site and does not escape with the potential to cause environmental harm |
| C2 (b) | Nil | **A new condition** to ensure the leachate dam does not contain excessive sludge thus reducing its capacity to contain leachate and so prevent accidental release. |
| C2 (c) | Nil | **A new condition** to reduce the level of the water table in the landfill in order to reduce the hydraulic head forcing leachate down through the base of the landfill. |
| C2 (d) | Nil | **A new condition** to reduce the operating level of the leachate dam to ensure sufficient capacity to store leachate during wet weather and so prevent accidental release. |
| C2 (e) | Nil | **A new condition** to improve the performance of the leachate dam by treating the leachate. |
| C2 (f) | Nil | **A new condition** to ensure waste water from the vehicle wash down bay does not cause pollution. |

Director of Environmental Management: Frank Cattell    Date of Issue: - 9 AUG 2004

| Condition in Schedule 3 of this EPN | Condition in Permit No: L/3516 | Grounds |
|---|---|---|
| C2 (g) | Nil | **A new condition** to ensure all possible measures are undertaken to provide for the orderly drainage of leachate under gravity. |
| C2 (h) | Nil | **A new condition** to ensure leachate is not discharged from the land giving rise to pollution |
| C3 (a) | G 10 | **A new condition** to ensure cut off drains are capable of diverting storm water around the site so as this water does not contribute to the volume of leachate. |
| C3 (b) | Nil | **A new condition** to ensure potentially contaminated storm water does not cause pollution |
| C3 (c) | Nil | **A new condition** to ensure stormwater drains are adequately lined. |
| C3 (d) | Nil | **A new condition** to ensure drains are adequately constructed |
| C3 (e) | Nil | **A new condition** to prevent sediment causing pollution |
| C3 (f) | Nil | **A new condition** to ensure the drains are maintained |
| C3 (g) | Nil | **A new condition** to ensure the integrity of the drain which transfers McRobies Rivulet below the landfill footprint is regularly monitored |
| C3 (h) | Nil | **A new condition** to ensure the head wall at the entrance of McRobies rivulet into the landfill is capable of handling a 1 in 75 year storm event. |
| C3 (i) | Nil | **A new condition** to limit the turbidity of stormwater discharging from the landfill |
| C3 (j) | Nil | **A new condition** to ensure the surface water from eastern and northern faces surrounding the site are properly managed. |
| C3 (k) | Nil | **A new condition** to restore vegetation on the western slopes to ease run off intensity. |
| C4 | Nil | **A new condition** to prevent accidental release of leachate and minimise the potential for slope failure of the fill and valley walls, and to allow an understanding of the causes |

Director of Environmental Management: Frank Cattell Date of issue: - 9 AUG 2004

| Condition in Schedule 3 of this EPN | Condition in Permit No: L/3516 | Grounds |
|---|---|---|
| | | of slope failure for improved management conditions. |
| C5 | Nil | **A new condition** to ensure quality control of the project is maintained. |
| C6 | Nil | **A new condition** to ensure independent quality control for all engineering works. |
| V1 | Nil | **A new condition** to establish a regime of annual volumetric surveys to monitor the amount of waste being disposed. |
| SO1 | G8 (a) (b) (e) | **Varied** to clarify the meaning of the condition and to restrict the hours of operation |
| SO2 | G8 (b) (f) (g) | **Varied** to clarify the meaning of the condition and to specify staffing and machinery operating requirements. |
| SO3 | Nil | **A new condition** to require the person responsible to develop an Operations Manual to facilitate the proper functioning of the facility and to ensure compliance with the EPN conditions. |
| SO4 | Nil | **A new condition** to ensure the site has appropriate signage to prevent inappropriate disposal at the site. |
| SO5 | G8 (d) | **Varied** to specify the depth of each landfill lift and covering requirements to ensure the site is operated in accordance with BPEM. |
| SO6 | Nil | **A new condition** to specify final capping requirements to prevent the ingress of water into the landfill once final design height has been reached. |
| SO7 | Nil | **A new condition** to specify new fire control measures to reduce the potential hazard that may arise from a landfill fire. |
| SO8 | Nil | **A new condition** to specify new litter control measures to reduce environmental nuisance arising from the dispersal of litter. |
| SO9 | Nil | **A new condition** to develop a weed management plan to reduce the threat of weeds |

Director of Environmental Management: Frank Cattell        Date of Issue: - 9 AUG 2004

| Condition in Schedule 3 of this EPN | Condition in Permit No: L/3516 | Grounds |
|---|---|---|
| | | encroaching into neighbouring bushland. |
| SO10 | Nil | **A new condition** to specify new disease vector control measures to minimise the risk of the landfill giving rise to infestations of rodents and/or scavenging birds. |
| SO11 | C 1 C2 C3 | **Varied** to specify new recycling measures to assist with resource recovery and the minimisation of the amount of material being landfilled. |
| SO12 | N1 | **A new condition** to control noise emanating from the site. The condition reflects the terminology in the Australian Standard AS1055 and provides consistency in noise measurement with other Level 2 activities. |
| SO13 | Nil | **A new condition** to ensure the composting operation is carried out in accordance with best practice environmental management. |
| LFG 1 | Nil | **Unchanged** (This condition was inserted in permit 3516 by EPN 680/1 on 3 August 2003.) |
| H1, H2 | Nil | **A new condition** to require written approval from the Director for disposal of controlled wastes, other than those listed, to reduce the likelihood of such wastes being disposed of in a manner that causes environmental harm. |
| H3 | Nil | **A new condition** to ensure batteries and waste oil are managed in a sustainable manner, in accordance with Australian Standards. |
| R1, R2, R3, R4 | R1 | **Varied** to require timely notification of cessation of operations to enable appropriate rehabilitation procedures to be carried out, and to require rehabilitation to be carried out in accordance with an approved Site Closure and Rehabilitation Plan that meets BPEM standards |
| M1, M2, M3, M4 | M1 | **Varied** to require the use of modern accreditation practice and currently applicable standards in sample collection and sample analysis procedures, as well as specify monitoring and reporting requirements. |

Director of Environmental Management: Frank Cittell          Date of Issue: - 9 AUG 2004

## SCHEDULE 3 – CONDITIONS

Q1

Maximum Quantities: The maximum amount of waste that can be received by the McRobies Gully landfill, excluding clean fill, is 85,000 tonnes per year.

(Annual permit and inspection fees are derived from this figure)

The permit holder must comply with the following conditions:

### GENERAL CONDITIONS

G1 The land must be developed and used, and the activity on the land must be carried out and monitored, in accordance with the environmental management measures set down in the EMP and in accordance with Best Practice Environmental Management, unless otherwise specified in these conditions or contrary to EMPCA.

G2 A copy of these conditions and any associated documents referred to in these conditions must always be held in a location that is known and accessible to the person responsible for the activity. The person responsible for the activity must take all reasonable steps to ensure that all persons who are responsible for undertaking work on the land, including contractors and sub-contractors, are familiar with these conditions to the extent relevant to their work.

G3 If an incident causing or threatening environmental nuisance, serious environmental harm or material environmental harm from pollution occurs in the course of the activity, then the person responsible for the activity must immediately take all reasonable and practicable action to minimise any adverse environmental effects from the incident.

G4 None of the following changes, if it may cause or increase the emission of a pollutant, or otherwise result in environmental harm, may take place in relation to the activity without a new permit from the relevant planning authority (where the authority determines that a permit is required) or, if no such permit is required, the prior written approval of the Director:

(a) a change to a process used in the course of carrying out the activity; or
(b) the construction, installation, alteration or removal of any structure or equipment used, in the course of carrying out the activity
(c) a change in the nature of the materials used in the course of carrying out the activity.

G5 If the person who is or was responsible for the activity will cease or ceases to be responsible for the activity, then as soon as reasonably practicable, but not later than 30 days after that cessation, that person must:
(a) notify the Director in writing of that fact;
(b) provide the Director with full particulars in writing of any person succeeding him or her as the person responsible; and
(c) notify any such person of the requirements of any relevant permit, environment protection notice or other environmental obligations.

Director of Environmental Management: Frank Cattell Date of Issue: - 9 AUG 2004

G6 (a) The person responsible for the activity must provide an annual review report of the operations of the waste depot to the Director which should include details of the performance of the site and may include, but not be limited to, volume and mass disposed, density achieved, leachate levels, testing, analyte trends, monitoring, general compliance with the EMP, a summary of complaints received and actions taken for the complaints and any other relevant information.

(b) The person responsible for the activity must submit an annual review report to the Director every 12 months, and be submitted within 3 months of the end of the review period. For the period of the review, each report shall include an evaluation of the environmental performance of the site with respect to the environmental controls detailed in the EMP and the conditions of this permit.

(c) The EMP must be critically reviewed by the person responsible for the activity by 12 months from the date of these conditions and at 5 yearly intervals thereafter.

G7 A public complaints register must be maintained and made available for inspection by an authorised officer upon request. The public complaints register must, as a minimum, record the following detail in relation to each complaint received in which it is alleged that environmental harm (including an environmental nuisance) has been caused by the activity:

(a) the time at which the complaint was received
(b) contact details for the complainant
(c) the subject matter of the complaint
(d) any investigations undertaken with regard to the complaint; and
(e) the manner in which the complaint was resolved, including any mitigation measures implemented.

Director of Environmental Management: Frank Aikli Date of Issue: - 9 AUG 2004

## LANDFILL DESIGN AND MAINTENANCE

**C1 Landfilling**

(a) Landfilling must be confined within the hatched area as detailed in Attachment 1.
(b) Final contours of the landfill must not exceed RL 184 and slopes being no steeper than a grade of 1 in 20 (V:H).
(c) A new site development plan providing the filling sequence, along with areas proposed for rehabilitation, including a timeline, must be prepared and submitted to the Director by 31 August 2004.
(d) A set of survey base stations must be established and routinely surveyed to monitor any movement - vertical or horizontal – of the landfill to better ascertain the degree of settlement and to determine whether the fill is moving.

**C2 Leachate Collection System**

(a) All practical measures shall be undertaken to ensure that all leachate in excess of the field capacity of the waste is collected and prevented from escaping from the landfill into groundwater or surface waters.
(b) The leachate dam must be desludged every 3 years at a minimum.
(c) The level of the water table in the landfill must be reduced by pumping down utilising submersible pumps. Where the fill is 30 metres in depth the target water table depth is 15 metres above the base of the landfill, but where the fill is 40 metres in depth the target is 25 metres above the base of the landfill. The leachate extracted must be transferred by pipeline directly to the leachate dam.
(d) The operating level of the leachate dam must be lowered to reduce the potential for groundwater contamination down valley and also provide 600 kilolitres wet weather storage capacity.
(e) At least one mixer / aerator must be installed in the leachate dam to reduce ammonia concentrations along with a reduction in chemical oxygen demand.
(f) Waste water from the vehicle wash down area must be directed to a new sewer pipeline by 30 June 2005.
(g) All practical measures must be undertaken to ensure leachate flows through the fill material and discharges at the toe of the landfill into the leachate dam.
(h) The landfill must be operated so that pollution of water by leachate is prevented.

**C3 Surface Water Management**

(a) Cut-off drains must be constructed at strategic locations on the land and be capable of handling run off generated by a 24 hour, 1 in 20 year storm event.

(b) All stormwater and intercept drains are to be lined with impermeable material to achieve a permeability of $10^{-8}$ m/s to prevent surface water from entering the landfill.

(c) Specifications and design drawings for the perimeter drains must be submitted to DPIWE for approval by the Director, before construction of any new perimeter drain commences.

Director of Environmental Management: Frank Castell     Date of Issue: - 9 AUG 2004

(d) All perimeter and cut off drains must contain appropriate sediment control measures that prevent excessive sediment loads discharging from the drains.

(e) Drains must be regularly cleaned to remove unwanted material such as, vegetation, litter and sediment.

(f) In the event that stormwater becomes contaminated with leachate, all practical measures must be undertaken to stop contaminants from discharging beyond the borders of the land. Contaminated stormwater may be either:

(i) Transferred to the leachate dam, providing the dam has adequate capacity.

(ii) Be irrigated over the landfill cells; or

(iii) Removed to an approved Waste Water Treatment Plant.

(g) The pipe laid along the natural ground level of the site in order to transfer flow from the upper part of McRobies Gully Rivulet under the landfill to the Hobart Rivulet must be inspected at least once every three years.

(h) The headwall where McRobies Gully Rivulet enters the stormwater pipe and the stormwater pipe itself must be designed and constructed to enable flows of up to a 24 hour storm event with a 1:75 year return interval to enter the stormwater pipe and pass under the landfill.

(i) The maximum permissible turbidity for stormwater discharging from the landfill is 50 NTU in dry weather and 100 NTU in wet weather, or that equivalent to the Hobart Rivulet upstream of the discharge.

(j) A review of surface water drainage options for the eastern and northern faces of the landfill must be undertaken by 30 December 2004.

(k) An understorey rehabilitation plan for the western slopes must be developed by 30 June 2005.

**C4 Slope Stability**

(a) The operator must undertake a landfill risk assessment for the landfill and the valley walls in accordance with the *Australian Geomechanics Guideline Volume 35, No. 1: Landslip Risk Management and Guidelines.* This risk assessment should include consideration of the recommendations of the NHT funded project (NLP 13188), *The Effects of Waste Disposal on Groundwater Quality in Tasmania, McRobies Gully Waste Depot, South Hobart: Appendix 1 Seismic Risk McRobies Gully,* by D. E. Leaman, Leaman Geophysics, plus other natural and artificial contributing factors for land stability.

(b) In the event of a significant slope failure, the Director and Mineral Resources Tasmania must receive written notification within 12 hours.

**C5 Quality Assurance**

(a) A suitably qualified engineer with appropriate experience must be present when any significant construction works are undertaken at the landfill. The engineer must supervise works to the leachate collection system and surface water controls. The suitably qualified person shall be directly responsible for:

Director of Environmental Management: Frank Cattell
Date of Issue: - 9 AUG 2004

(i) The supervision of all technical staff involved;

(ii) 'Signing off' of all quality control testing;

(iii) The complete documentation of all relevant activities including engineering construction and quality assurance activities;

**C6** (a) Quality assurance specifications must be prepared for construction and testing of all significant landfill engineering works, including surface water drains, caps and the leachate collection system. In particular:

(i) All quality control testing and certification is to be performed independently of both Council and the construction contractor; and

(ii) A report documenting conformance with the design and these conditions will be prepared on completion of the works and signed off by the engineer referred to in C4, and submitted to the Director for final approval.

(b) Best Practice Environmental Management must be maintained at all stages of construction of the leachate collection system, management of leachate from the waste depot and construction and maintenance of stormwater drains.

Director of Environmental Management: Frank Ostill
Date of Issue:

## SITE OPERATIONS

**V1 Surveys**

(a) Annual volumetric surveys of the landfill, commencing one year from the date of issue of this permit, must be carried out and the results of the survey must be provided to the Director within 14 days of Council's receipt of the results.

(b) Monitoring of the composition of the waste stream entering the landfill must be undertaken.

(c) Within 12 months of the commencement of collection of waste composition data an annual report on waste types received must be submitted to the Director.

(d) Data should be recorded in a manner that is compatible with the Australian Waste Database.

**SO1 Hours of Operation**

(a) The opening hours at the landfill facility will be from 7.30 am to 4.15pm Monday to Friday and 8.00am to 4.30pm on Saturday and 9.00am to 4.30pm on Sunday and public holidays. The site must be closed Christmas day and Good Friday.

(b) Council may allow disposal of refuse on the site outside the normal operating hours for contractors with special needs where a specific prior arrangement has been made.

(c) The hours of operation must be posted on a sign, which must be erected and maintained at the entrance to the site.

(d) Access must be through a security gate that must be locked when the site is unattended.

**SO2 Staffing**

(a) While the site is open for disposal it must be attended by a person or persons whose duties shall include directing of traffic on the site to disposal and recycling areas, and the supervision of the dumping of refuse.

(b) The level and nature of staffing must be adequate for environmentally responsible and safe management of the landfill.

**SO3 Operations Manual**

An updated site operations manual or equivalent system must be developed within 6 months of the date of issuing this permit and made available to all landfill personnel. The manual should provide detailed information relating to waste depot operations and must detail operational procedures required to ensure compliance with these conditions.

**SO4 Signage**

Signs must be erected and maintained in reasonable condition to convey important operational and safety information.

Signage must encompass the following:

(a) Direction and distance to the site (to be installed at major intersections and other appropriate locations en route to the site)
(b) Hours of operation and tipping fees (to be installed at the gate or gatehouse).
(c) Hazards and dangerous areas on the site (eg leachate dams)

Director of Environmental Management: Frank Castelli    Date of Issue: - 9 AUG 2004

(d) Items that can be recycled and the locations within the site where recyclable items should be deposited for collection / processing.
(e) Responsibilities (eg. Vehicle operators must ensure that the remnants of their load or material stuck to the underside of the vehicle or the wheels does not litter public roads).
(f) Contact staff / organisation and relevant telephone numbers to report any fire or other emergency at the site.

**SO5 Waste Cover**

(a) Machinery capable of spreading, compacting and covering the refuse must be kept on site at all times. A person capable of operating the machinery shall be available for an adequate period of time to spread; compact and cover all refuse deposited.

(b) An 'Envirocover' or alternative approved cover material must be used to cover putrescible waste material at the end of each day of operation.

(c) Adequate volumes of suitable cover material to cover the active face must be stockpiled adjacent to the active face at all times.

(d) The active tipping face must not exceed 50m in width, and public access to the tipping face must be minimised.

(e) Each successive landfilling lift must not exceed 2m in vertical height, excluding cover material.

(f) Each 2m lift of compacted waste must be progressively covered with compacted clay or other suitable low permeability material to a minimum depth of 300 mm, with the exception of the final lift. This cover may be temporary and may be removed immediately prior to landfilling on a successive lift.

(g) Council may choose to operate another tipping face for inert materials.

(h) Council must operate a separate tipping face for controlled wastes specified in H1 (b).

**SO6 Waste Capping**

(a) Unless otherwise approved in writing by the Director, on reaching the final lift of compacted waste, the waste must be progressively capped according to the following sequence:

(i) 500 mm deep layer of compacted clay, or suitable low permeability material, with a maximum *in situ* permeability of $1 \times 10^{-9}$ metres/second,

(ii) An appropriately designed drainage layer of at least 100 mm thickness; and

(iii) A final layer of 300 mm of topsoil.

(b) The landfill operator may apply to the Director to undertake alternative capping procedures provided they can demonstrate environmental acceptability.

(c) Capping must commence at the rate of approximately $10{,}000m^2$ per financial year of areas at final height.

Director of Environmental Management: Frank Attell Date of Issue: - 9 AUG 2004

**SO7 Fire Management**

(a) The operator of the landfill must demonstrate sufficient capacity to extinguish any fires that may occur on site.

(b) The lighting of fires at the waste depot is not permitted.

(c) Fires occurring at the waste depot must be extinguished as soon as possible using all practical means available.

(d) Fire control measures at the refuse site must be to the satisfaction of the Tasmanian Fire Service. Correspondence from the TFS indicating the suitability of fire control measures must be submitted to the Director by 31 August 2004.

(e) Hazard reduction (vegetation clearance) is to be undertaken periodically as part of the landfill fire prevention strategy. The frequency of hazard reduction shall be based on advice from officers of the Tasmanian Fire Service and / or Council's Fire Management Officer. Vegetation clearance shall not contribute to slope instability, erosion or sediment generation as this may result in adverse water quality impacts downstream.

**SO8 Litter Management**

(a) Litter control measures must be employed around and close to active landfilling areas.

(b) Litter must be cleared at least weekly, but more frequently when litter is readily apparent, from inactive areas of the waste depot, litter control fences, and roads within a one half-kilometre radius of the waste depot boundary.

(c) Inspections of the areas specified in SO8(b), for the purpose of litter management, must be carried out on a weekly basis. A record of the dates of such inspections and litter clearing must be kept and maintained for a period of at least 2 years.

(d) The landfill operator must develop procedures for managing the acceptance and placement of lightweight, loose wastes to minimise transportation off-site

(e) The operator must implement systems for gross litter collection at the entrances to the stormwater system.

(f) The operator must investigate moving light vehicles away from the tipping face through the construction of a fully enclosed waste transfer station by June 2005.

**SO9 Weed Management**

A management plan must be prepared and implemented to stop the spread of weeds to the bushland area immediately adjacent the landfill site.

**SO10 Disease Vectors**

Council must implement an effective control program to minimise and control disease vectors such as rodents and scavenging birds

The program may include:

(i) The employment of traps
(i) The erection of fences
(ii) Regular baiting by a reputable pest control firm, which must include:

Director of Environmental Management: Frank Cattell. Date of Issue: - 9 AUG 2004

(a) Maintaining a log record of operations which details the type of baits used and their deployment locations
(b) A bait selection and method of deployment that does not allow the non-target native animals to be affected.

**SO11 Recycling and Recovery of Waste Materials**

(a) Specific clean and secure hard stand areas must be set aside at the landfill site for the segregation and collection of green waste, scrap metal and white goods (i.e. refrigerators, washing machines, dishwashers etc).

(b) Green organic waste stockpiles must be kept free from contamination and heavy wood (such as tree trunks, thick branches and stumps) and shall be mulched on a regular basis. The mulch may be used for interim cover, rehabilitation of the waste depot, use in Council parks and gardens or for commercial sale.

(c) Green organic waste stockpiles must not exceed 15,000m$^3$ in size prior to mulching.

(d) All recycling and collection areas must be adequately signposted.

(e) All recycling and collection areas must be kept in a neat and orderly state, with appropriate access.

(f) Salvaging activities may be permitted onsite with Council approval.

(g) A voluntary recycling facility must be maintained at the waste depot for the recovery of:

- Glass
- Aluminium cans
- Steel cans
- Liquidpaperboard cartons
- PET, HDPE plastic bottles
- Cardboard and newsprint
- Lead acid batteries –refer to condition H3
- Used engine oil – refer to condition H3

**SO12 Noise**

(a) Noise emissions from the activity when measured at any domestic premises in other ownership and expressed as the adjusted time average A-weighted sound pressure level must not exceed:

- 45 dB(A) during the specified hours of operation, and
- 40 dB(A) outside these hours.

(b) Where the combined level of noise from the activity and the normal ambient noise exceeds the noise levels stated above, for the appropriate time of day, this condition will not be considered to be breached unless the noise emissions from the activity are audible and exceed the ambient noise levels by at least 5 dB(A). Noise level measurements must be taken in the presence of ambient noise normally existent in the area.

(c) The time interval over which noise levels are to be averaged must be between 10 and 20 minutes.

Director of Environmental Management: Frank Gatti    Date of Issue: - 9 AUG 2001

(b) Measured noise levels are to be adjusted for tonality and impulsiveness in accordance with Australian Standard AS 1055.

(c) All methods of measurement must be in accordance with Australian Standard AS 1055 – 1997 *Acoustics – Description and measurement of environmental noise* and the Tasmanian *Code of Practice for Sound Pressure Level Measurement*.

**SO13 Composting Operation**

(a) A hardstand area of 30,000 square metres, incorporating a sub-grade of clay material, will be graded and drained to reduce seepage into the landfill. Composting operations must be confined to this area.
(b) All run off from the composting pad must be directed to the leachate pond.
(c) Unless otherwise approved by the Director, machinery must not be operated on the site outside the hours given in SO1 (a), with the exception that the composting screen and front end loader may be operated until 5.00pm.
(d) A person or persons, whose duties shall include directing traffic on the site to the green waste stockpile area and composting area must attend the site while the site is open for acceptance of waste.
(e) The mixture of feedstock that is being composted must be managed to ensure that the following parameters are maintained within the windrows during the thermophilic stage of the composting operation:
  (i) Moisture content between 45 – 65%
  (iii) Oxygen content between 12 – 14% for 99% of the time and never less than 5% oxygen content.
  (iv) Carbon : Nitrogen ratio >15
  (v) Temperatures of at least 55°C should be achieved for three consecutive days for the whole composting mass. Temperatures within the windrows must not exceed 65°C.
(f) Moisture content, oxygen content and temperature of windrows must be monitored on weekdays. All monitoring data collected in accordance with this condition, along with protocols involved in conducting monitoring, must be made available to an authorised officer upon request.
(g) Unless otherwise approved by the Director only the following materials may be received, stored and/or used in composting on the land:
  (i) mulched green organic waste
  (ii) Biosolids classified as Class 1 or Class 2 as defined in the *Tasmanian Biosolids Reuse Guidelines, August 1999*, or as updated from time to time.
  (iii) Poultry mortalities
  (iv) Fish waste
  (v) Fish food waste
  (vi) Yeast waste
  (vii) Blackcurrant pulp
  (viii) Leaves from Council street sweeping operations
  (ix) Sawdust
  (x) Scallop shell waste
  (xi) Cardboard

Director of Environmental Management: Frank Cattell    Date of Issue: - 9 AUG 2004

(xii) Taste of Tasmania waste – food waste, compostable plates and cutlery
(xiii) Glucose waste

(h) Where waste, as listed above is received at the composting site and that material is a controlled waste, the quantity, source, transporter, and composition of the waste must be accurately recorded and forwarded to the Director at least annually.
(i) Putrescible material stored or stockpiled on the site must be in a sealed covered area and for no more than 7 days.
(j) The composting operation must be maintained in such a manner that odours do not cause environmental nuisance beyond the boundary of the premises.
(k) Trucks leaving the site and travelling by public roads and carrying loads containing material which may blow or spill out of the vehicle must utilise effective measures to prevent loss of the material by windage or spillage, such as tarpaulins or load dampening.
(l) Airborne dust must be controlled such that dust is not visible crossing the boundary of the land on any more than 3 days in any calendar year.
(m) Machinery capable of spreading, mixing and covering the compost must be kept on site at all times. A person capable of operating the machinery must be available for an adequate period of time to spread, mix and cover all compost on a weekday basis and on any weekend days that putrescible waste is to be delivered to the composting operation.
(n) A composting site operations manual must be submitted to the Director for information by 2 November, 2004. Compost site personnel must be made aware of its contents to the extent necessary to secure compliance with these conditions. The manual must provide detailed information relating to training programs, induction in management of composting operations, etc as detailed in the EMP section 4.1.9.

LFG 1 Landfill gas extraction at the waste depot

(a) The landfill gas extraction and flaring system for McRobies Gully Landfill must be installed as specified in Hobart City Council McRobies Road Tip Compiled Plan no: A – 913 – 146.
(b) The raw landfill gas must be sampled and analysed to ascertain the concentration of the following parameters on at least three occasions during the feasibility study of the proposed power generation facility. The following appropriate components, as a minimum shall be given as a percentage:
Methane;
Carbon dioxide;
Nitrogen;
Oxygen;
Total silicon
Total chlorine
Total fluorine
Total sulphur;
Ammonia; and
Relative humidity
(c) The gases emitted following flaring must be sampled at commissioning and annually on the anniversary of commissioning thereafter and analysed to ascertain

the concentration of the following parameters, unless otherwise agreed by the Director:

Oxides of Nitrogen;
Sulphur dioxide; and
Carbon monoxide or oxygen.

(d) Total stack emissions are to be modelled based on the volume of landfill gas extracted (calculated from flow monitoring data), the degree of combustion achieved, and the composition of the raw landfill gas as determined in accordance with paragraph (b). The results of such modelling shall be provided to the Director annually and within three months of the sampling of the emitted gases.

(e) Landfill gas must not present a source of odour beyond the premises boundary or an explosion or toxicity hazard.

(f) Environmental aspects of the flaring of landfill gas are to be addressed as outlined in Section 3.9 of the *McRobies Gully Refuse Disposal Site: Environmental Management Plan, August 2002* and any reviews of same.

(g) If required by the Planning Authority, a fresh development application is to be made in respect of any proposal to generate electricity by burning landfill gas. In any event, such a proposal is to be referred to the Director as required by condition G4 of this notice.

Director of Environmental Management: Frank Cattell

Date of Issue: - 9 AUG 2004

## HAZARDOUS SUBSTANCES

**Controlled Waste Conditions**

**H1**

(a) Where there is doubt concerning the classification of waste as "controlled waste", clarification must be sought from the Director.

(b) After June 30, 2004 controlled waste must not be accepted for disposal at the waste depot without the prior written approval of the Director, with the exception of the following low level controlled wastes:
- (i) Asbestos waste;
- (ii) Shredded scrap tyre waste;
- (iii) Suitably treated and dried sewage sludge, including grit, silt and screening provided that total and leachable concentration values do not exceed those specified as Class 2 in the *Tasmanian Biosolids Reuse Guidelines*;
- (iv) Sharps in an approved sealed sharps container and,
- (v) Quarantine waste in accordance with the procedures prescribed by Quarantine Tasmania, until alternative treatment technologies are established.
- (vi) Waste listed in SO13 (g)

(c) Low level controlled waste as defined in H1 (b) (with the exception of tyres described under H2) must be disposed of in area at least 100 metres away from tipping face which is accessible by the public, and must be covered within two hours of receipt with a minimum of 300 mm of compacted clay soil to protect public and worker health.

**H2** Tyres must be disposed of in accordance with the following, unless otherwise approved by the Director:

(a) No whole motorcycle, passenger, light truck and whole truck tyres are to be disposed of in the landfill.
(b) No more than 600 tyres may be stored on the land and such storage may only occur as an interim measure while awaiting removal to a site authorised to receive tyres for storage and reprocessing or disposal.
(c) Scrap tyres must be stored on a clean, hard stand area that has all weather access, and is secure.
(d) Tyres, other than motorcycle, passenger, light truck and truck tyres, may only be disposed of at the waste depot where no other approved disposal option exists. Earthmoving vehicle tyres must be individually buried and be filled completely, to remove any voids, with an inert and non-degradable material such as soil or sand.

**H3 Batteries and Waste Oil**

(a) Any used motor vehicle lead acid batteries received at the waste depot must be stored in a facility that conforms to Australian Standard 3780; The Storage and Handling of Corrosive Substances.

(b) Used oil must be received and stored in accordance with the following:

Director of Environmental Management: Frank Cattell    Date of Issue: - 9 AUG 2004

(i) The tank must be of suitable volume (eg. 500 – 1,500 Litres) to store the volumes of used oil that are likely to be received on a regular basis (e.g. 4 weeks storage);

(ii) The tank must be placed in a suitable bunded containment area, constructed of suitable impervious materials, designed to contain not less than 110% of the volume of the storage tank.

(iii) Storage areas must be designed in accordance with relevant Australian Standards (AS-1940) and the requirements of the relevant Dangerous Goods legislation.

(iv) The bunded area must be covered to prevent ingress of rainwater.

(v) The bunded area must contain appropriate valves to allow drainage and recovery of materials in the bund.

(vi) These valves must contain suitable locking mechanisms such that the valves can only be operated by authorised personnel.

(vii) A spill kit and spill response procedures must be developed and retained at the depot.

(c) Any waste oil accumulated in the bunded containment area must be emptied into a used oil storage tank on a regular basis.

(d) Only operators or contractors authorised by the Hobart City Council shall be permitted to empty used oil into the used oil storage tank and handle lead acid batteries for storage purposes.

Director of Environmental Management: Frank Cattek        Date of Issue: - 9 AUG 2004

**Rehabilitation Conditions**

**R1** Progressive rehabilitation must be conducted in accordance with the following:

(a) Waste capping must commence at the rate of approximately 10,000m$^2$ per annum commencing in 2004 and be in accordance with SO6.

(b) Rehabilitation must include planting or seeding with appropriate species endemic to the locality, if the area is not intended to be used for alternative purposes.

**R2** If permanent cessation of disposal operations on the land is planned then the Director must be notified of the planned cessation of operations at least six (6) months prior to the planned date of cessation, or as soon as reasonably practicable after a decision is taken to cease disposal operations in less than six (6) months. A detailed site closure and rehabilitation plan must be prepared and submitted to the Director.

**R3** An audit of the capping thickness of the areas of the site which are at their final height must be undertaken within twelve months of issuing of these conditions.

**R4** No less than two months prior to commencement of site closure and final rehabilitation:

(a) A site closure and final rehabilitation plan for the waste depot must be submitted to the Director for approval, in accordance with the Division's Guide for the rehabilitation of waste depots, and any other written requirement of the Director.

(b) Site closure and final rehabilitation work on the site must not take place without the Director's written approval of the site closure and final rehabilitation plan. Suitable materials may be stockpiled on the site for rehabilitation purposes prior to approval.

(c) Site closure and final rehabilitation must be carried out in accordance with the site closure and final rehabilitation plan approved in writing by the Director and must be substantially commenced within 12 months of cessation of landfilling operations.

Director of Environmental Management: Frank Cattell Date of Issue: - 9 AUG 2004

## Monitoring Conditions

### Sampling Methodology

**M1** All samples required to be obtained by these permit conditions must be subject to the following:

(a) All samples must be tested in a laboratory accredited by the National Association of Testing Authorities (NATA) for the specified test, or a laboratory approved in writing by the Director;

(b) All samples must be collected and analysed in accordance with the following Australian Standards or other standard(s) approved by the Director: Groundwater Sampling Australian Standards/New Zealand Standards 5667.11:1998 and Pump Testing Australian Standards2368-1990.

(c) All records of sampling and analysis (including an estimate of flow of effluent/water at the time of sampling) must be retained for at least 10 years after the date of sampling and made available for public inspection upon request.

(d) All water samples must be taken by a person experienced in the methodology used for taking and transporting water samples.

### Monitoring, Record Keeping and Reporting

**M2** (a) Unless otherwise directed in writing by the Director, monitoring must be carried out at the following points:

(i) Groundwater monitoring will be undertaken four times per year from bores 1996/1, 1996/2 and 1996/3, which are located in the McRobies Gully up valley from the controlled waste area, in the northern gully upstream of the landfill and down valley from the leachate dam.

(ii) The location of any additional bore(s) must be determined in consultation with the Director and Mineral Resources Tasmania.

(iii) Surface water sampling points upstream of the landfill in the original valley watercourse, the stormwater manhole immediately below the leachate pond, the Hobart Rivulet 5 metres above the 1500mm stormwater pipe and 5 metres below the 1500mm stormwater pipe.

(iv) The leachate dam referred to condition C2.

(b) Unless otherwise directed in writing by the Director, monitoring and the frequency of monitoring, must be conducted in accordance with Tables 1 and 2.

(c) The results of all monitoring must be forwarded to the Director within 14 days of completion of analysis. These must be forwarded to the Director in electronic form in an approved format.

(d) A record of all controlled waste disposed of at the waste depot must be kept that includes the:

Director of Environmental Management: Frank Cattell    Date of Issue: - 9 AUG 2004

(i) Quantity of waste;

(ii) Description of the waste;

(iii) The identity of the waste generator where possible and;

(iv) Date of disposal.

M3 Groundwater investigations of any new and existing bores must be carried out as follows:

(i) Any new groundwater monitoring bore(s) must have an approved installation and development record as outlined in condition M4. Pump testing must also be carried out.

(ii) Any new groundwater monitoring bore(s) must be monitored quarterly for one year. Monitoring must be for chemical analytes outlined in Table 2. After this period of initial monitoring, and dependent upon results, the frequency of monitoring may be reviewed.

(iii) Groundwater monitoring results and interpretation must be included in the annual review prepared in accordance with G6 (a).

(iv) The monitoring of the groundwater bores must be carried out as defined in M1.

**Groundwater Bores**

M4 (a) All groundwater bores must have an installation and development record that includes, at least, the following:

(i) Description of materials used for construction;

(ii) Initial field water parameters (conductivity, TDS, pH and temperature);

(iii) Details of slot screens installed, and to what depth;

(iv) Depth of gravel packing;

(v) Depth of bentonite cap;

(vi) Details of bore development during pumping (removal of drilling contamination);

(vii) Aquifer levels; and

(viii) A detailed geological log.

(b) Sampling of all bores must be recorded on a pre-drafted recording sheet which includes, at least, the following:

(i) Standing water level;

(ii) Bore volume (purging should be 3 times the bore volume);

(iii) Time for purging;

(iv) Sampling time and number; and

Director of Environmental Management: Frank Cattell Date of Issue: - 9 AUG 2004

(v) Field water parameters (such as conductivity, TDS, pH and water temperature).

(c) Bore and piezometer placement must be carried out in consultation with and under supervision of a professional person with suitable expertise in hydrogeology.

Director of Environmental Management: Frank Cattell

Date of Issue: - 9 AUG 2004

## Table 1 SURFACE WATER AND LEACHATE MONITORING

| | MONITORING PARAMETERS | MONITORING FREQUENCY |
|---|---|---|
| Group 1 | pH | Quarterly |
| | Conductivity | Quarterly |
| | Total Dissolved Solids | Quarterly |
| | Redox potential (Eh) | Quarterly |
| | Total Suspended Solids | Quarterly |
| | Turbidity | Quarterly |
| | Alkalinity (as CaCO3) | Quarterly |
| | Total Nitrogen | Quarterly |
| | Ammonia | Quarterly |
| | Nitrate | Quarterly |
| | Nitrite | Quarterly |
| | Total phosphorus | Quarterly |
| | Orthophosphate | Quarterly |
| | Dissolved Organic Carbon | Quarterly |
| | Chemical Oxygen Demand | Quarterly |
| | E. coli | Quarterly |
| | Total CN (as CN) | Quarterly |
| Group 2 | Total Iron (Fe) | Quarterly |
| | Aluminium (Al) | Quarterly |
| | Copper (Cu) | Quarterly |
| | Zinc (Zn) | Quarterly |
| | Chromium (Cr) | Quarterly |
| | Manganese (Mn) | Quarterly |
| | Nickel (Ni) | Quarterly |
| | Lead (Pb) | Quarterly |
| | Cadmium (Cd) | Quarterly |
| Group 3 | Chloride | Quarterly |
| | Sulphate | Quarterly |
| | Sodium (Na) | Quarterly |
| | Potassium (K) | Quarterly |
| | Magnesium (Mg) | Quarterly |
| Group 4 | Arsenic (As) | Yearly |
| | Mercury (Hg) | Yearly |
| | Selenium (Se) | |
| | Total Petroleum Hydrocarbons (TPH) and Benzene Toluene Ethyl-Benzene, and Xylene (BTEX) | Yearly |
| | polynuclear aromatic hydrocarbons | Yearly |
| | organophosphate pesticides | Yearly |
| | organochlorine pesticides | Yearly |
| | polychlorinated biphenyls | Yearly |

Director of Environmental Management: Frank Attell

Date of Issue: - 9 AUG 2004

## Table 2 GROUNDWATER MONITORING

| | MONITORING PARAMETERS | MONITORING FREQUENCY |
|---|---|---|
| | bore depth | Quarterly |
| | ground water depth | Quarterly |
| | static hydraulic head | Quarterly |
| Group 1 | pH | Quarterly |
| | Conductivity | Quarterly |
| | Total Dissolved Solids | Quarterly |
| | Redox potential (Eh) | Quarterly |
| | Total Nitrogen | Quarterly |
| | Ammonia | Quarterly |
| | Nitrate | Quarterly |
| | Nitrite | Quarterly |
| | Total phosphorus | Quarterly |
| | Orthophosphate | Quarterly |
| | Dissolved Organic Carbon | Quarterly |
| | Chemical Oxygen Demand | Quarterly |
| | Total CN (as CN) | Quarterly |
| Group 2 | Total Iron (Fe) | Quarterly |
| | Copper (Cu) | Quarterly |
| | Zinc (Zn) | Quarterly |
| | Chromium (Cr) | Quarterly |
| | Manganese (Mn) | Quarterly |
| | Nickel (Ni) | Quarterly |
| | Lead (Pb) | Quarterly |
| | Cadmium (Cd) | Quarterly |
| Group 3 | Chloride | Quarterly |
| | Sulphate | Quarterly |
| | Sodium (Na) | Quarterly |
| | Potassium (K) | Quarterly |
| | Magnesium (Mg) | Quarterly |
| Group 4 | Arsenic (As) | Yearly |
| | Mercury (Hg) | Yearly |
| | Selenium (Se) | |
| | Total Petroleum Hydrocarbons (TPH) and Benzene Toluene Ethyl-Benzene, and Xylene (BTEX) | Yearly |
| | polynuclear aromatic hydrocarbons | Yearly |
| | organophosphate pesticides | Yearly |
| | organochlorine pesticides | Yearly |
| | polychlorinated biphenyls | Yearly |

Director of Environmental Management: Frank Cattell

Date of Issue: - 9 AUG 2004

## SCHEDULE 4

### Additional Information

**1 General requirements**

The activity must be conducted in accordance with the requirements of the *Environmental Management and Pollution Control Act 1994* and Regulations thereunder, and in accordance with the principles of Best Practice Environmental Management. The requirements of this permit must not be construed as an exemption from any of those requirements or principles.

**2. Notification of incidents under s.32 of EMPCA**

(1) A person responsible for an activity that is not a level 2 activity or a level 3 activity must notify the relevant council, as soon as reasonably practicable but not later than 24 hours, after becoming aware of the release of a pollutant occurring as the result of any incident in relation to that activity, including an emergency, accident or malfunction, if this release causes or may cause an environmental nuisance.

(2) A person responsible for an activity that is a level 2 activity or a level 3 activity must notify the Director, as soon as reasonably practicable but not later than 24 hours, after becoming aware of the release of a pollutant occurring as a result of any incident in relation to that activity, including an emergency, accident or malfunction, if this release causes or may cause an environmental nuisance.

(3) A person responsible for an environmentally relevant activity must notify the Director, as soon as reasonably practicable but not later than 24 hours, after becoming aware of the release of a pollutant occurring as a result of any incident in relation to that activity, including an emergency, accident or malfunction, if this release causes or may cause serious or material environmental harm.

*The Director can be notified by telephoning 1800 005 171 (a 24-hour emergency telephone number).*

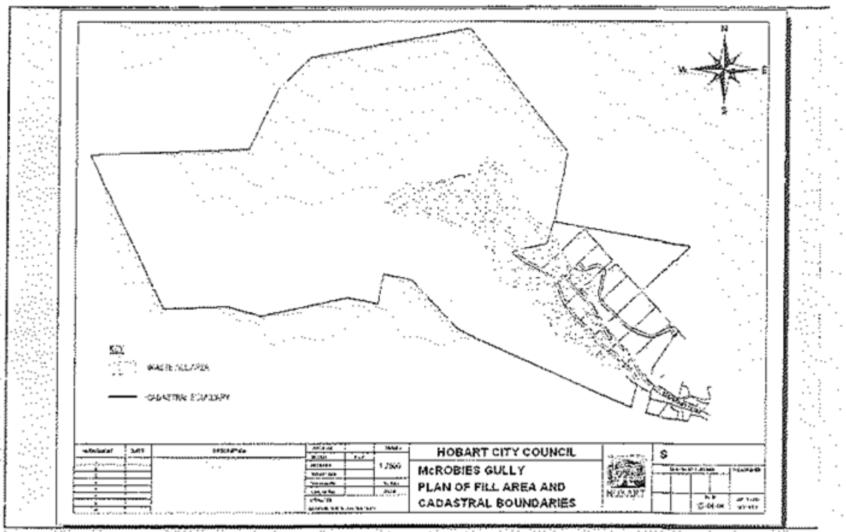
(4) Any notification referred to in subsection (1), (2) or (3) must include details of the incident, its nature, the circumstances in which it occurred and any action that has been taken to deal with it.

*This notification can be faxed to the Director on 62 333 800, or delivered by hand.*

(5) Any notification given by a person in compliance with this section is not admissible in evidence against the person in proceedings for an offence or for the imposition of a penalty (other than proceedings in respect of the making of a false or misleading statement).

Director of Environmental Management: Frank Cattell Date of Issue: - 9 AUG 2016

Attachment 1




Director of Environmental Management: Frank Cattell

Date of Issue: - 9 AUG 2004

## Appendix 5 Site Photographs – Investigation Area

### Plates

**Plate 36 View East from the Western Boundary of Investigation Area**

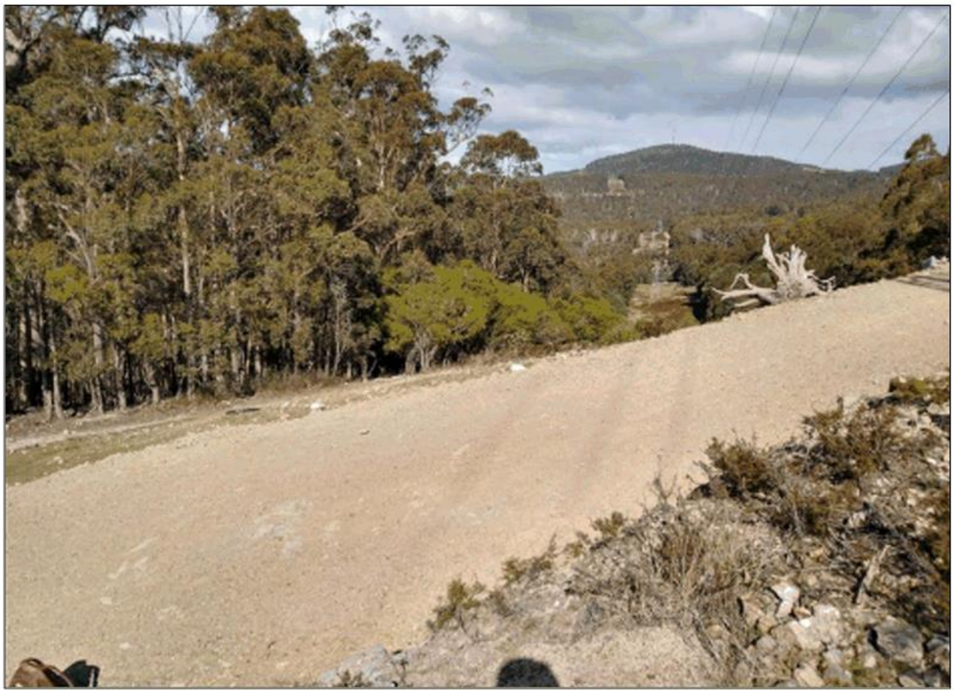


**Plate 37 View South from the Western Boundary of Investigation Area**

**Plate 38 View northwest near the Western Boundary of Investigation Area**

**Plate 39 View west from the Western Boundary of Investigation Area**

**Plate 40 Example of the existing bike path on upper slopes**

**Plate 41 View towards the east, existing bike path on upper slopes**

**Plate 42 View towards the north, existing bike path on upper slopes**

**Plate 43 View towards the east, existing bike path on upper slopes**

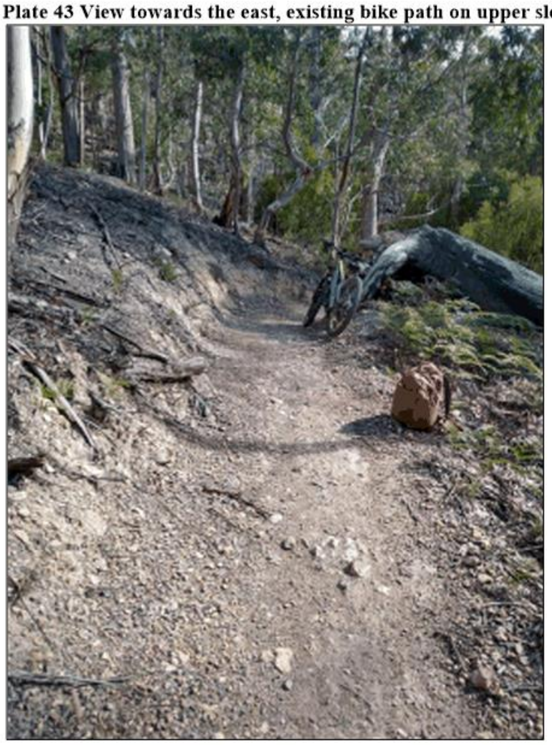


**Plate 44 View towards the west, existing bike path on upper slopes**

**Plate 45 View towards the east, existing bike path on upper slopes**


**Plate 46 View of the junction of the lower fire trail and lower bike track.**

**Plate 47 View south (upslope) from the lower fire trail**


**Plate 48 Aerial showing bike track location**

**Plate 49 Soil profile of Permian sediments half way down the lower fire trail**

**Plate 50 Weathered Soil profile of Permian sediments half way down the lower fire trail**

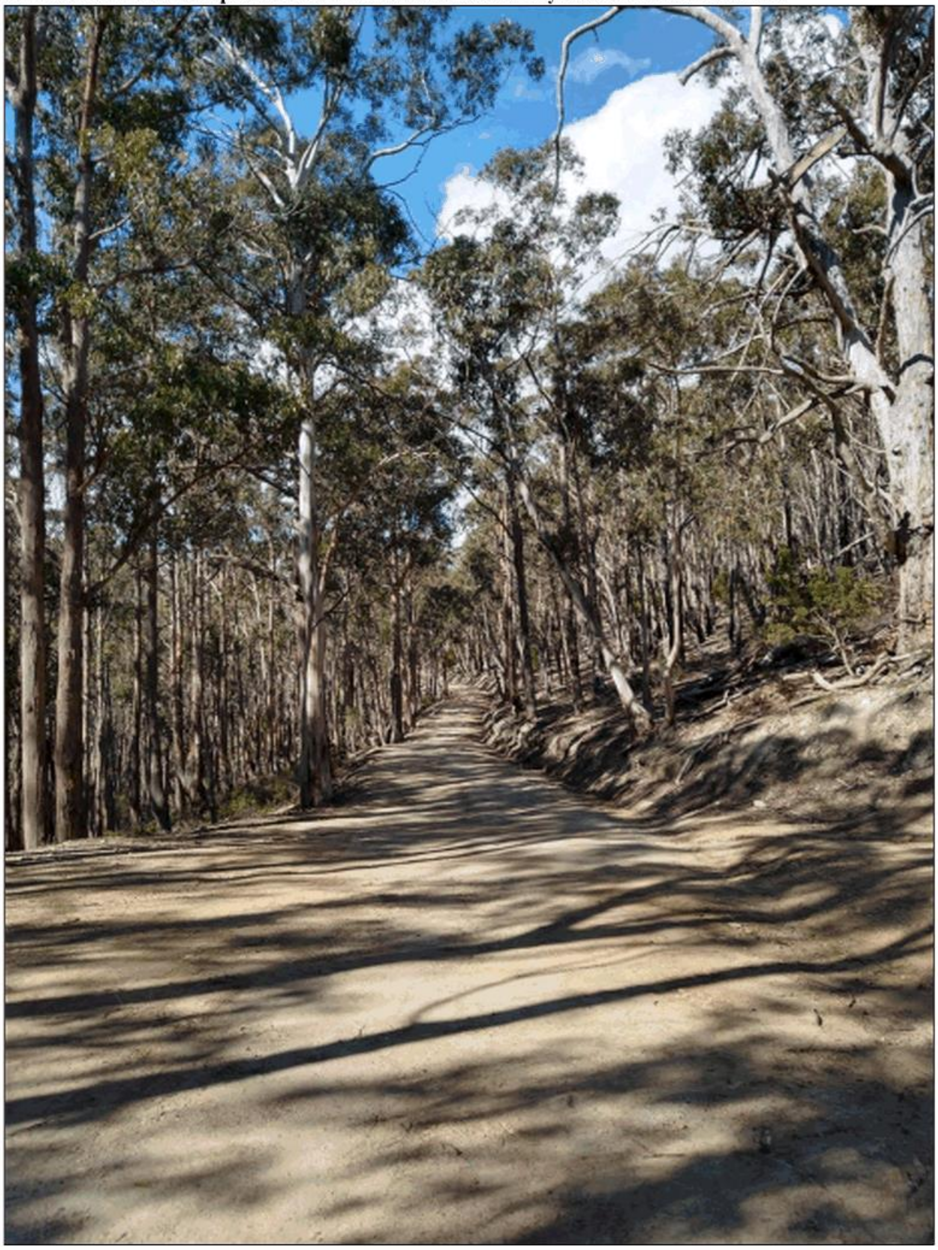


**Plate 51 View east along the lower fire trail**

**Plate 52 Groundwater monitoring bore above the HCC Disposal Area**

**Plate 53 McRobies Gully above the tip site.**

**Plate 54 Groundwater monitoring bore above the HCC Disposal Area**

**Plate 55 Groundwater monitoring bore above the HCC Disposal Area**

**Plate 56 View west up the lower fire trail**

**Plate 57 Weathered soil profile**

**Plate 58 Example of the vegetation on the lower fire trail**

**Plate 59 Example of the bedrock on the lower fire trail**

**Plate 60 View north from the lower fire trail**

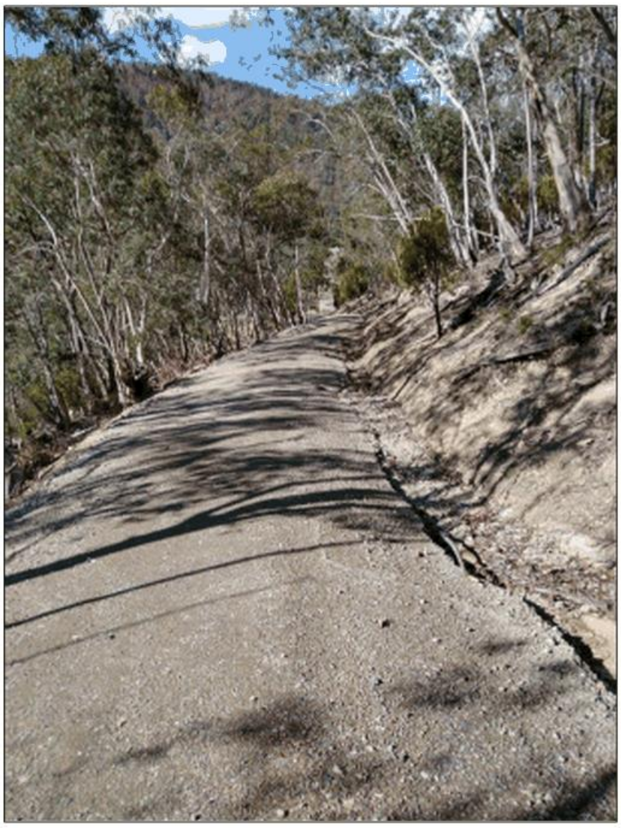


**Plate 61 View east from the lower fire trail**

**Plate 62 View east of HCC Disposal Area from the lower fire trail**

**Plate 63 View north of HCC Disposal Area from the lower fire trail**

**Plate 64 example of fine plastics windblown from the HCC Disposal Area**

**Plate 65 example of limited amount of fine plastics windblown from the HCC Disposal Area**

**Plate 66 Soil profile on the lower fire trail adjacent to HCC Disposal Area**

**Plate 67 View south east on the lower fire trail on the boundary to HCC Disposal Area**

**Plate 68 View north west on the lower fire trail on the boundary to HCC Disposal Area**

**Plate 69 Soil profile on the lower fire trail adjacent to HCC Disposal Area – close up**

**Plate 70 Soil profile on the lower fire trail adjacent to HCC Disposal Area**

**Plate 71 View northwest on the lower fire trail on the boundary to HCC Disposal Area, above the new roundabout**

**Plate 72 View north west at the junction above the roundabout**

**Plate 73 Junction of HCC Disposal Area fence, lower fire trail and bike track**

**Plate 74 Permian bedrock at lower track junction**

**Plate 75 View up old fire trail**

**Plate 76 Regeneration area – linear rock work, possible garden bed**


**Plate 77 Tas Museum boxes near the linear rock formation**

**Plate 78 Old door or gate hinge**

**Plate 79 linear rocks**

**Plate 80 linear Rocks**

**Plate 81 View East to south at junction of McRobies Road and Degraves Street**

**Plate 82 New Roundabout at the entrance of the HCC Disposal Area**

## Appendix 6 Photographs Outside the Investigation Area

### Plates

**Plate 83 View of McRobies HCC Disposal Area from Wellesley Park**

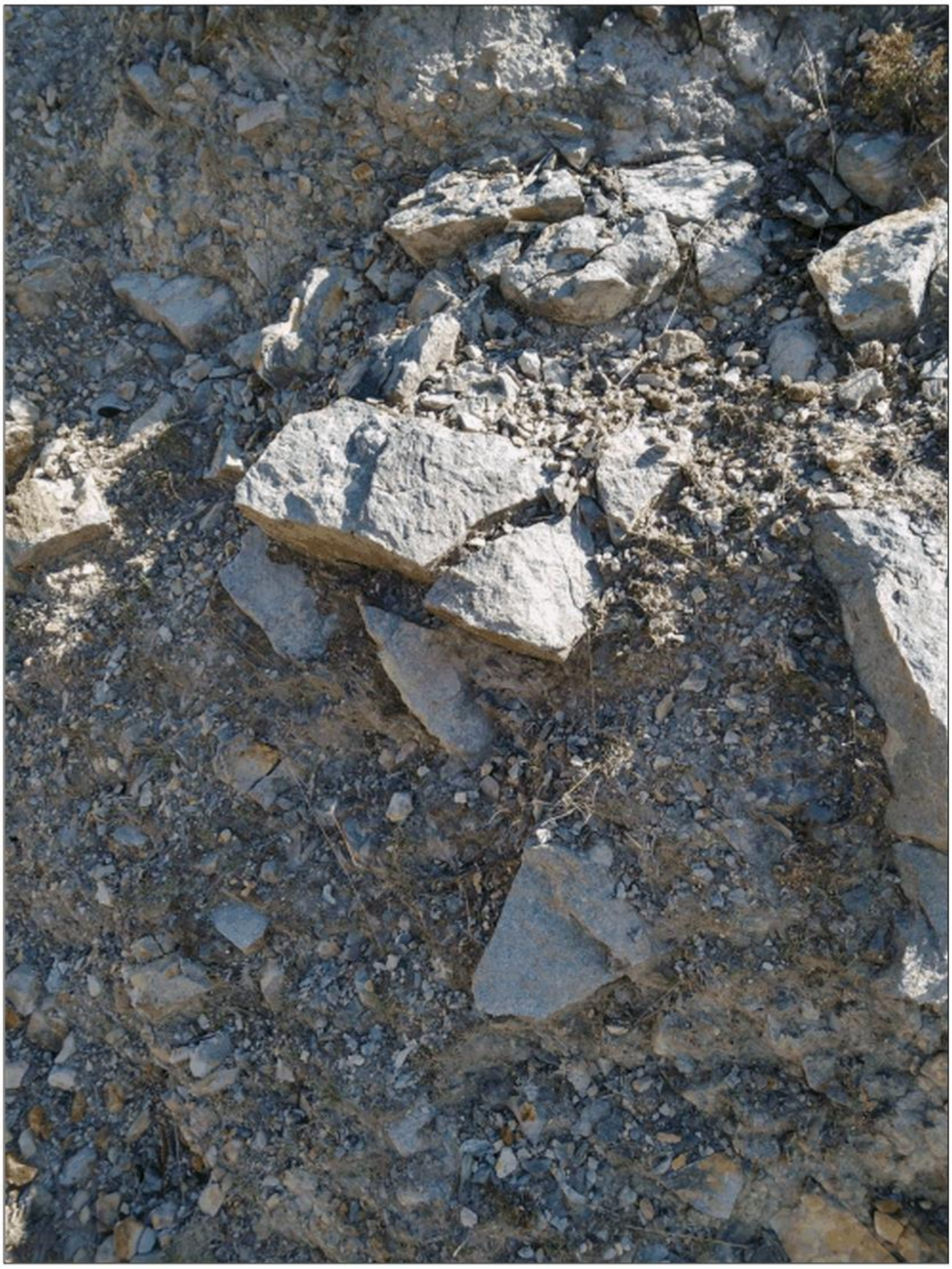
**Plate 84 View north from 71 Marlyn Road, South Hobart**
The proposed path of the MWCC is on the other side of the ridge with the communication tower on.

**Plate 85 Soil Profile on Strickland Avenue, near 198 Strickland Avenue, South Hobart**


**Plate 86 Main Fire Trail from Strickland Avenue, South Hobart**

**Plate 87 Out cropping sandstone on main fire trail**

*Preliminary Site Investigation: 100 Pinnacle Road, Wellington Park. September 2019*

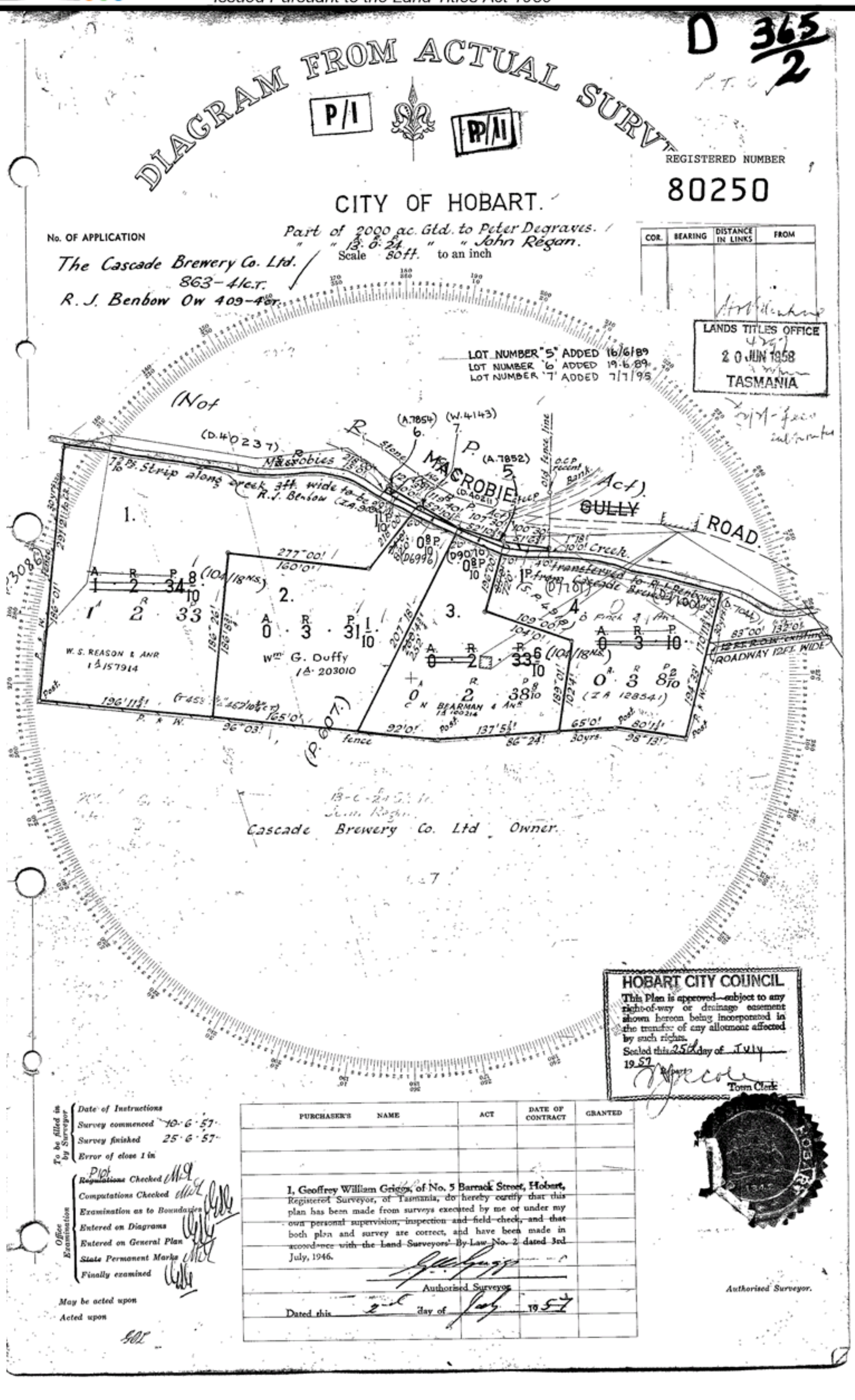


# FOLIO PLAN

DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government



# FOLIO PLAN

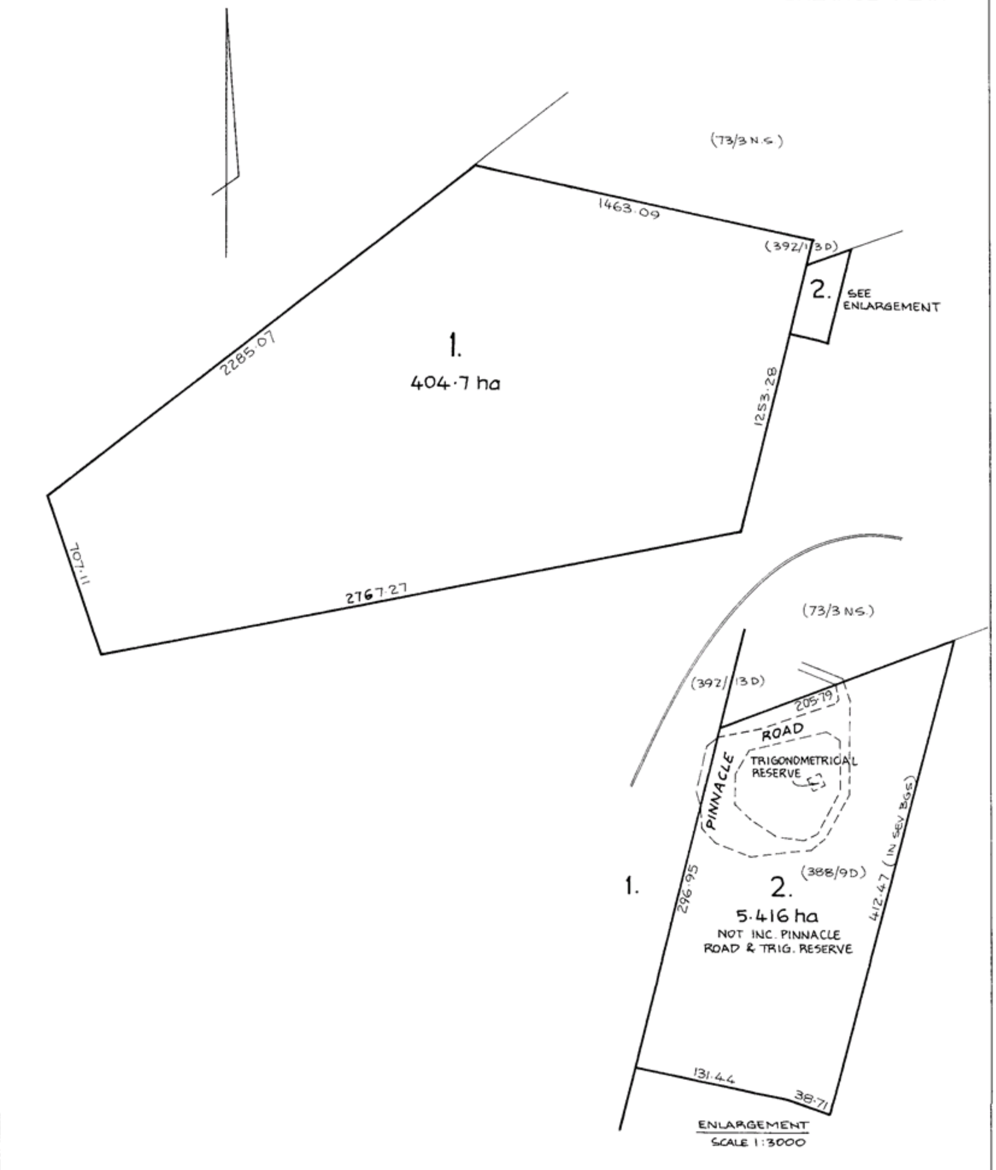
DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

| OWNER<br>FOLIO REFERENCE LOT1 - F.R. 252496-1<br>LOT2 - F.R. 246783-1<br>GRANTEE | PLAN OF TITLE<br>LOCATION<br>CITY OF HOBART<br>FIRST SURVEY PLAN No. 8/18 BUCK,<br>COMPILED BY<br>SCALE 1: 15000 LENGTHS IN METRES | REGISTERED NUMBER<br>P121202<br>APPROVED 10 OCT 1995<br>Recorder of Titles |
|---|---|---|
| MAPSHEET MUNICIPAL CODE No. 114 | LAST UPI No 2100002 2100003 | LAST PLAN No. 8/18 BUCK |
| ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN | | |

BALANCE PLAN




A-143

# FOLIO PLAN

DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

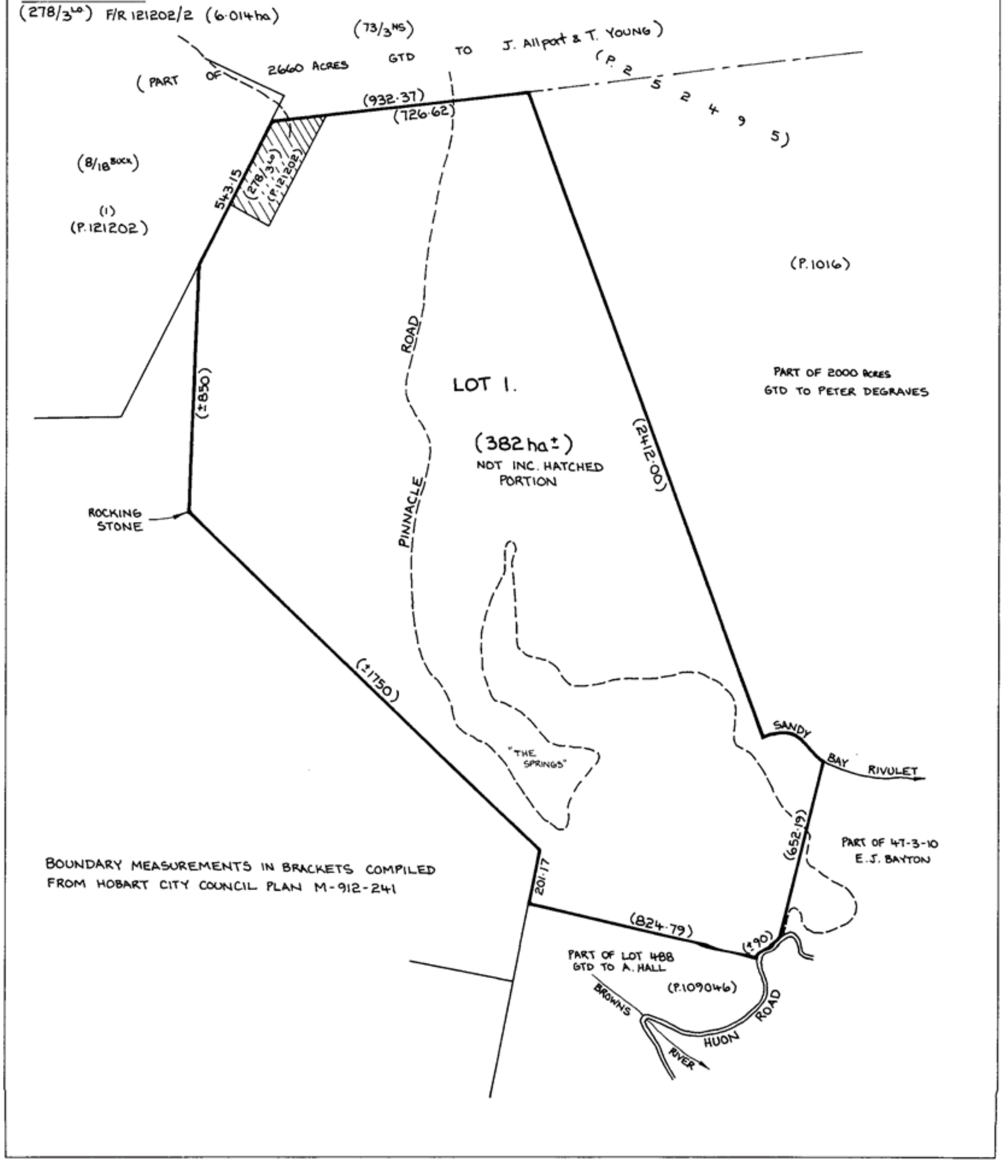
Tasmanian Government

## CONVERSION PLAN

| | | |
|---|---|---|
| FILE NUMBER A.16835<br>GRANTEE<br>PART OF MOUNTAIN PARK VESTED IN THE HOBART CITY COUNCIL 21 GEO. V. No 64 | LOCATION CITY OF HOBART & BUCKINGHAM - KINGBOROUGH<br>CONVERTED FROM SCHEDULE 7, OF THE HOBART CORPORATION ACT 1947.<br>NOT TO SCALE LENGTHS IN METRES | REGISTERED NUMBER **P126375**<br>APPROVED 12 NOV 1996<br>Recorder of Titles |
| MAPSHEET MUNICIPAL (5224) CODE No. 114, 117 (5024) | LAST UPI No. 2100001 2302808 | ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN — DRAWN P. PAGE |

**SKETCH BY WAY OF ILLUSTRATION ONLY**

"EXCEPTED LANDS"
(278/3^Lo) F/R 121202/2 (6·014ha)



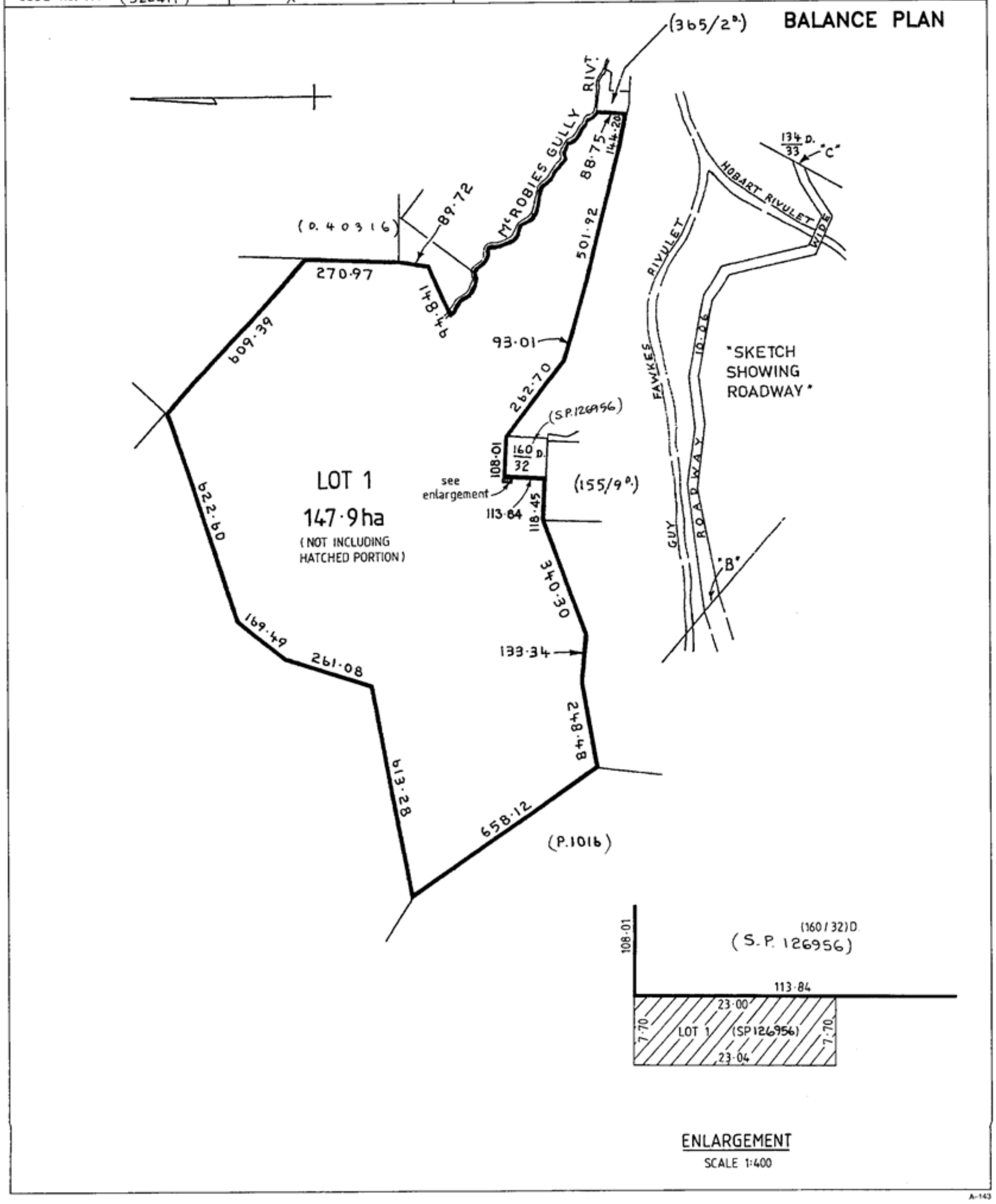
# FOLIO PLAN

DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

| | | |
|---|---|---|
| OWNER HOBART CITY COUNCIL<br>FOLIO REFERENCE 114735/1<br>GRANTEE PART OF 2660 ACRES GRANTED TO THOMAS YOUNG WALLPORT & ~~ANOR.~~ AND PART OF 2000 ACRES GRANTED TO PETER DEGRAVES. | PLAN OF TITLE<br>LOCATION<br>CITY OF HOBART<br>FIRST SURVEY PLAN No. P. 3086<br>COMPILED BY P S FLEMING<br>SCALE 1:10000 LENGTHS IN METRES | REGISTERED NUMBER<br>P126957<br>APPROVED 6 MAR 1997<br>Recorder of Titles |
| MAPSHEET MUNICIPAL CODE No. 114 (522411)<br>LAST 21 UPI No. 11458 | LAST PLAN No. P. 114735 | ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN |

## BALANCE PLAN



the list

# FOLIO PLAN

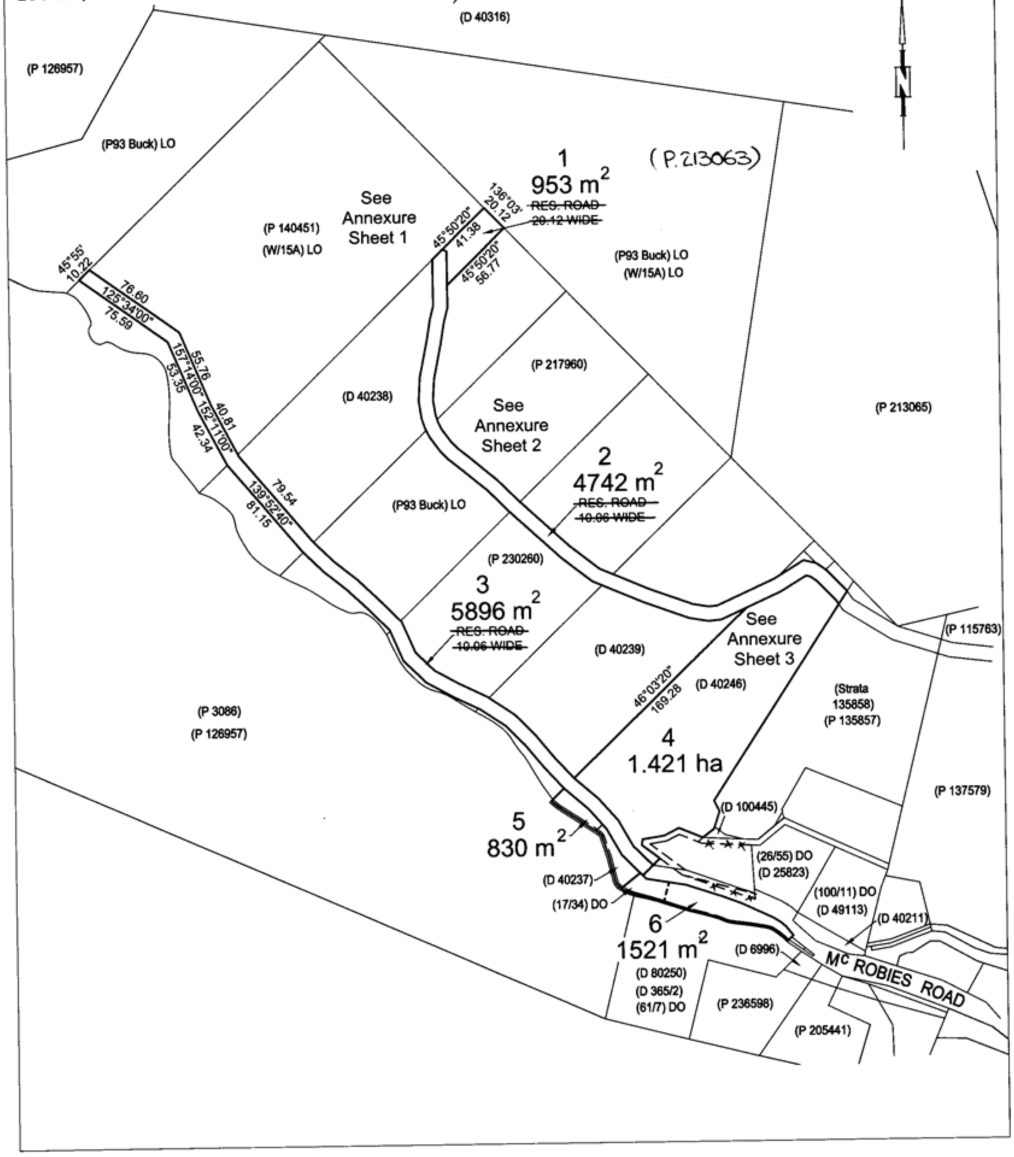
DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

| | | |
|---|---|---|
| OWNER The Crown, Hobart City Council,<br>FOLIO REFERENCE SEC 27A (M435821) C.T. 40246/1, C.T. 40237/1, C.T. 40237/2<br>GRANTEE Part of Lot 21, 4A-2R-15Ps. Gtd. to Daniel Ferguson & Part of | PLAN OF SURVEY<br>BY SURVEYOR M.A. ANDERSON OF HOBART CITY COUNCIL<br>LOCATION CITY OF HOBART<br>SCALE 1: 2500 LENGTHS IN METRES | Registered Number<br>P166085<br>APPROVED 15 OCT 2013<br>~~EFFECTIVE FROM~~<br>Alice Kawa<br>Recorder of Titles |
| MAPSHEET MUNICIPAL CODE No. 114 (5225-51) | LAST UPI No. GAR63 GJS85, GJS86 / LAST PLAN No. D.40246, D.40237 | ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN |

GRANTEE (CONT.)
Lot 20, 5A-2R-0Ps. Gtd. to Malcolm Brown, & Whole of Lot 1 (953m²), Lot 2 (4742m²), Lot 3 (5896m²) The Crown (P.166085)



the list

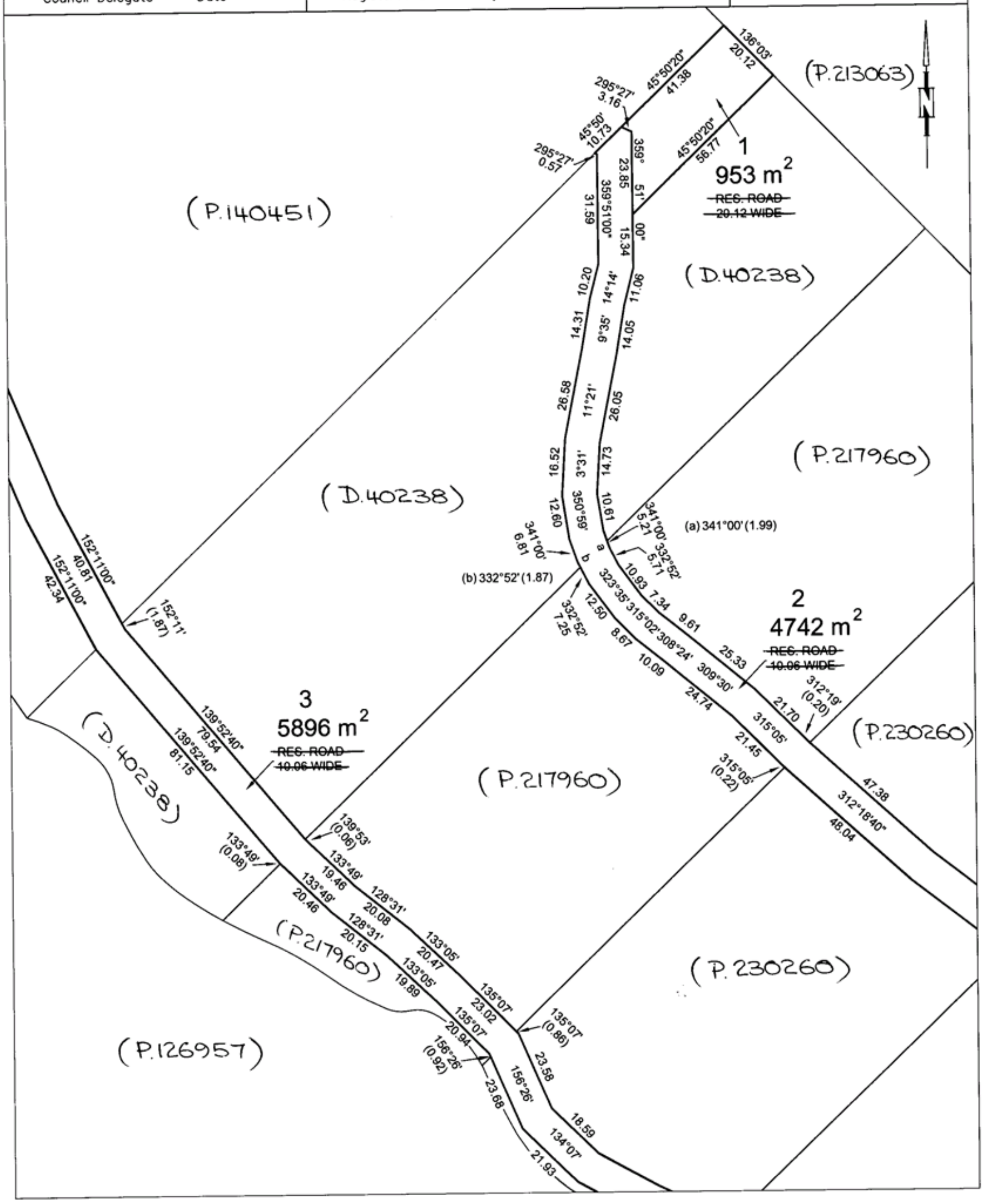
# FOLIO PLAN

DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

| | | |
|---|---|---|
| **PLAN OF SURVEY**<br>ANNEXURE SHEET<br>SHEET 1 OF 3 SHEETS | OWNER: THE CROWN, HOBART CITY COUNCIL<br>FOLIO REFERENCE<br>SCALE 1:1000 LENGTHS IN METRES | Registered Number<br>**P166085** |
| SIGNED FOR IDENTIFICATION PURPOSES<br>..................... Council Delegate ........ Date | THIS ANNEXURE SHEET FORMS PART OF THE ATTACHED INDEX PLAN. THE SURVEYOR'S CERIFICATE EXTENDS TO THE DETAILS ON THIS SHEET.<br>M. A. Anderson Registered Land Surveyor 02/10/13 Date | APPROVED ~~EFFECTIVE FROM~~ 15 OCT 2013<br>Alice Kirwin<br>Recorder of Titles |



the list...

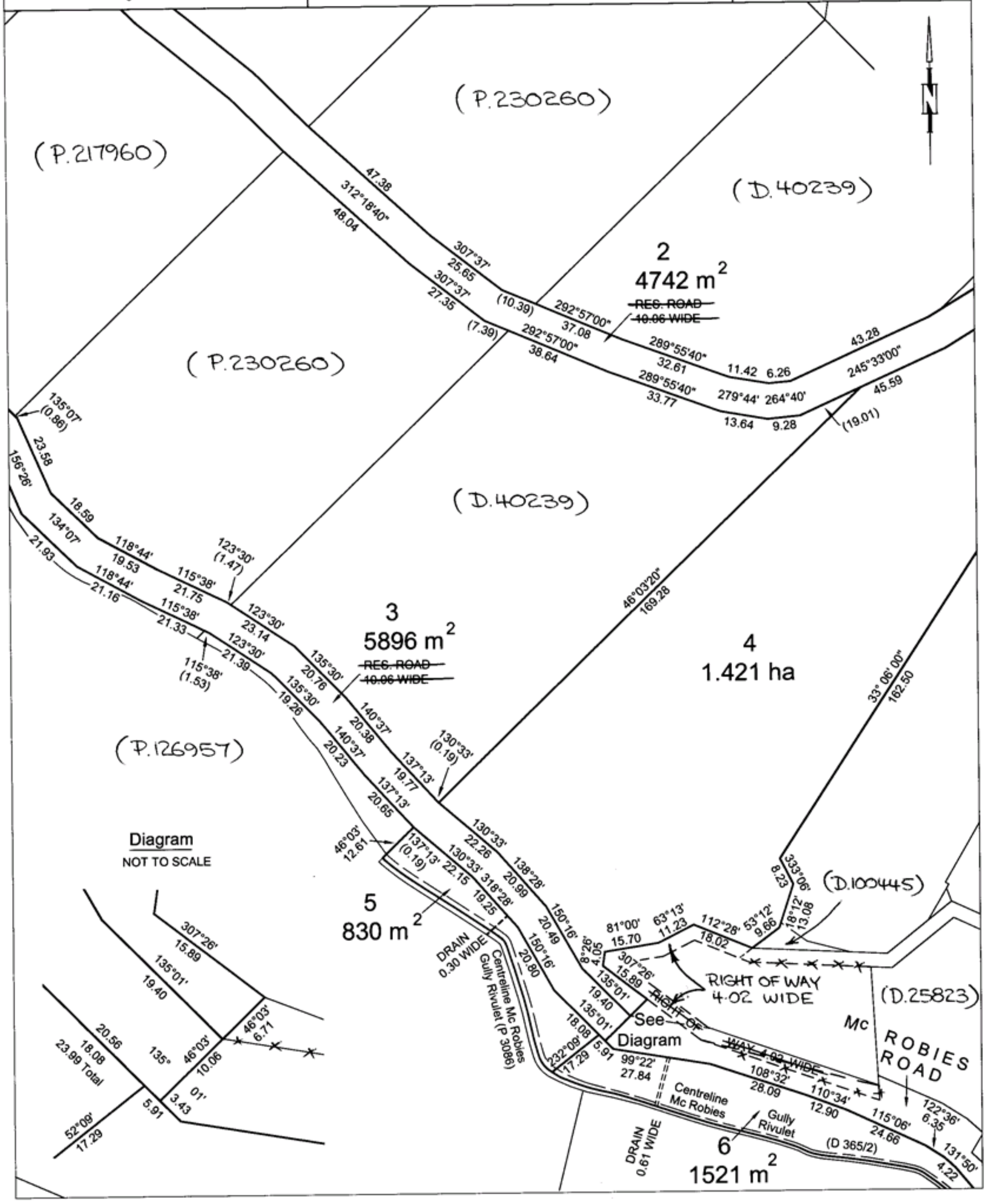
# FOLIO PLAN

DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

| | | |
|---|---|---|
| PLAN OF SURVEY<br>ANNEXURE SHEET<br>SHEET 2 OF 3 SHEETS | OWNER: THE CROWN, HOBART CITY COUNCIL<br>FOLIO REFERENCE: C.T. 40246/1, C.T. 40237/1, C.T. 40237/2<br>SCALE 1:1000 LENGTHS IN METRES | Registered Number<br>P 166085 |
| SIGNED FOR IDENTIFICATION PURPOSES<br>............ Council Delegate ............ Date | THIS ANNEXURE SHEET FORMS PART OF THE ATTACHED INDEX PLAN. THE SURVEYOR'S CERIFICATE EXTENDS TO THE DETAILS ON THIS SHEET.<br>M. A. Anderson 02/10/13<br>Registered Land Surveyor Date | APPROVED ~~EFFECTIVE FROM~~ 15 OCT 2013<br>Alice Kuch<br>Recorder of Titles |



the list

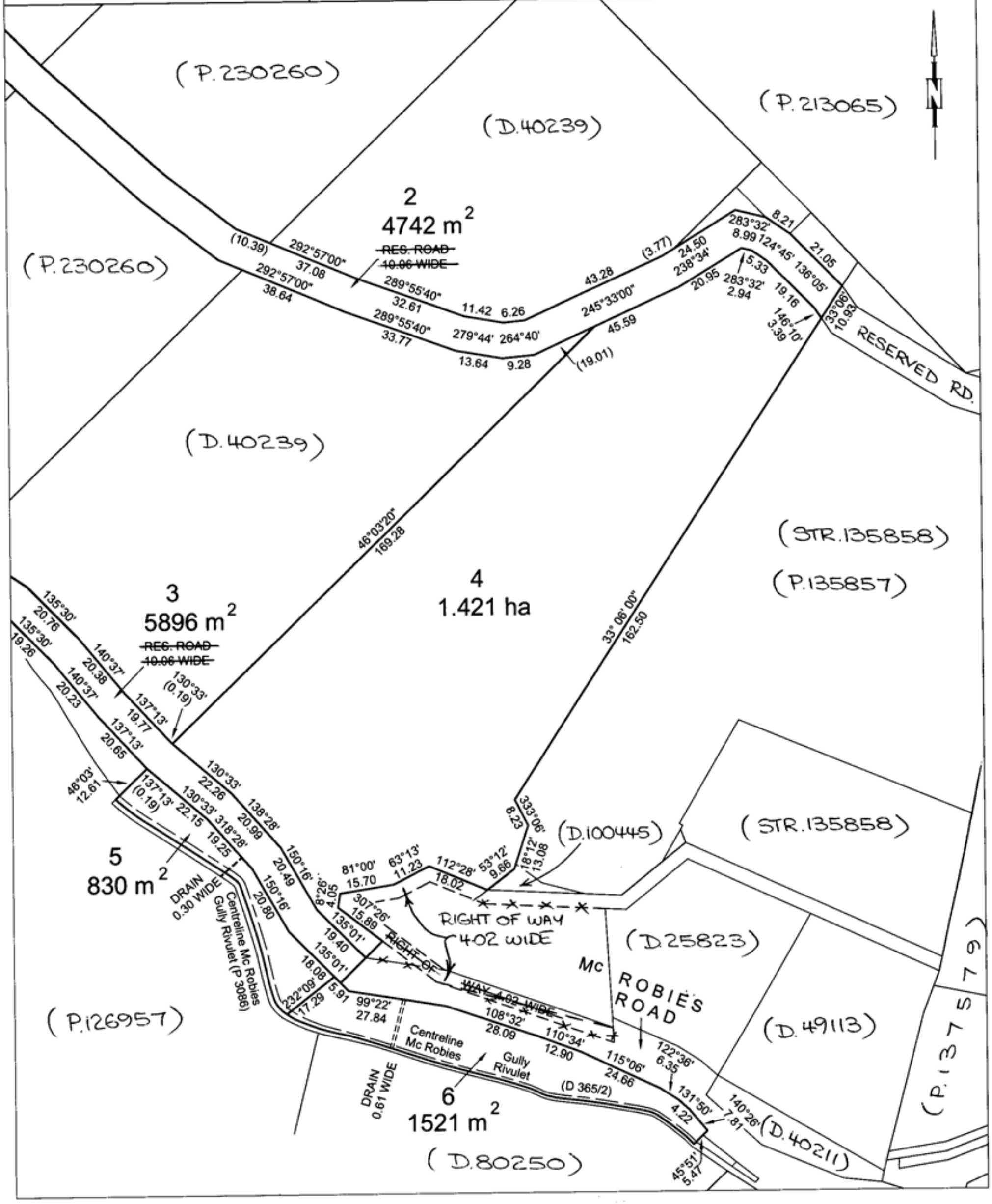
# FOLIO PLAN

DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

| | | |
|---|---|---|
| PLAN OF SURVEY<br>ANNEXURE SHEET<br>SHEET 3 OF 3 SHEETS | OWNER: THE CROWN, HOBART CITY COUNCIL<br>FOLIO REFERENCE: C.T. 40246/1, 40237/1, C.T. 40237/2<br>SCALE 1:1000 LENGTHS IN METRES | Registered Number<br>P166085 |
| SIGNED FOR IDENTIFICATION PURPOSES<br>Council Delegate Date | THIS ANNEXURE SHEET FORMS PART OF THE ATTACHED INDEX PLAN. THE SURVEYOR'S CERIFICATE EXTENDS TO THE DETAILS ON THIS SHEET.<br>M. A. Anderson 02/10/13<br>Registered Land Surveyor Date | APPROVED 15 OCT 2013<br>~~EFFECTIVE FROM~~<br>Alice Keen<br>Recorder of Titles |



the list

# FOLIO PLAN

DEPUTY RECORDER OF TITLES

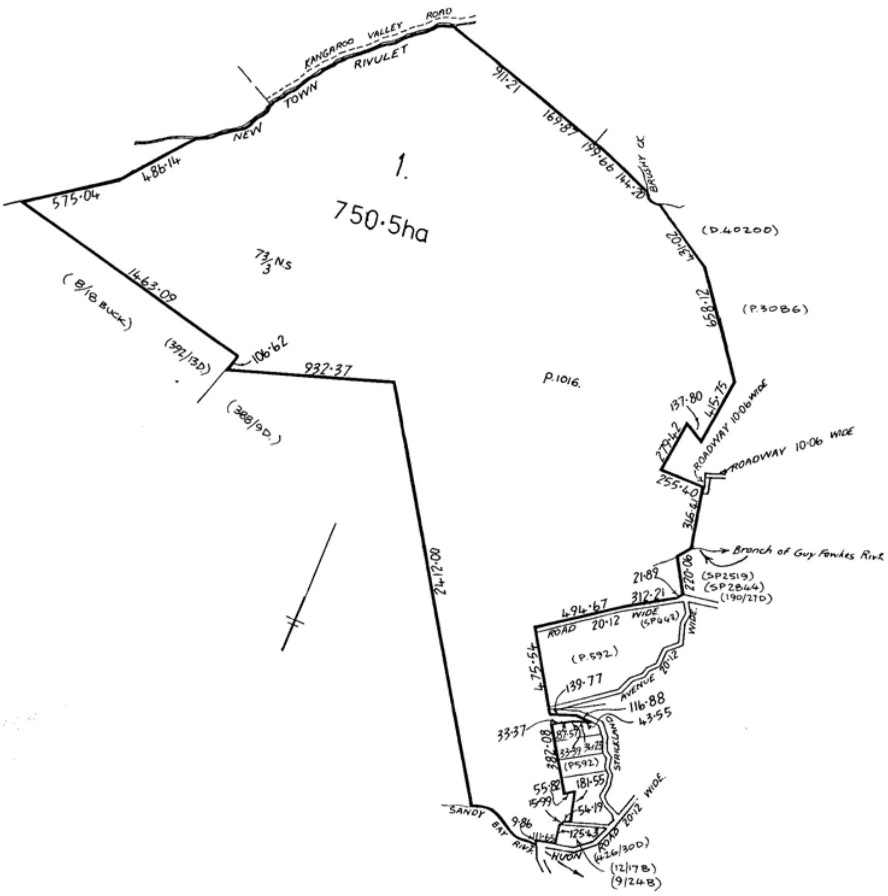
*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

| | | |
|---|---|---|
| OWNER<br>FOLIO REFERENCE F.R. 252495-1<br>GRANTEE | PLAN OF TITLE<br>LOCATION<br>CITY OF HOBART<br>FIRST SURVEY PLAN No. 73/3NS. P.1016<br>COMPILED BY<br>SCALE 1: 20000 LENGTHS IN METRES | REGISTERED NUMBER<br>P252495<br>APPROVED 10 OCT 1995<br>Recorder of Titles |

| | | | |
|---|---|---|---|
| MAPSHEET MUNICIPAL CODE No. 114 | LAST UPI No 2107166 | LAST PLAN No. 73/3NS P.1016 | ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN |

BALANCE PLAN






Department of Primary Industries, Parks, Water and Environment **www.thelist.tas.gov.au**

# RESULT OF SEARCH

DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

SEARCH OF TORRENS TITLE

| VOLUME | FOLIO |
|---|---|
| 80250 | 1 |
| EDITION | DATE OF ISSUE |
| 2 | 01-Jul-2015 |

SEARCH DATE : 11-Jun-2019
SEARCH TIME : 02.07 PM

## DESCRIPTION OF LAND

City of HOBART
Lot 1 on Diagram 80250 (formerly being 365-2D)
Derivation : Part of 2000 Acres Gtd. to P. Degraves and Part of 13A-0R-24Ps. Gtd. to J. Regan
Prior CT 2840/25

## SCHEDULE 1

A480535 TRANSFER to HOBART CITY COUNCIL

## SCHEDULE 2

Reservations and conditions in the Crown Grant if any

## UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

# RESULT OF SEARCH

DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

SEARCH OF TORRENS TITLE

| VOLUME | FOLIO |
|---|---|
| 121202 | 2 |
| EDITION | DATE OF ISSUE |
| 4 | 20-Feb-1996 |

SEARCH DATE : 11-Jun-2019
SEARCH TIME : 02.14 PM

## DESCRIPTION OF LAND

City of HOBART
Lot 2 on Plan 121202
Derivation : Whole of Lot 32916 Gtd to The Lord Mayor & Citizens of the City of Hobart
Prior CT 2527/26

## SCHEDULE 1

HOBART CITY COUNCIL

## SCHEDULE 2

Reservations and conditions in the Crown Grant if any

A112080 LEASE to The Commonwealth of Australia of 2A 1Rd 6. 1/10 Ps on D.388/9 Together with a Right of Carriageway for a leasehold estate for the term of 99 years from 25-Nov-1958
Leasehold Title(s) issued: 96563/1

A117604 LEASE to Tasmanian Television Limited of portion of the land in C/Ts 160/149 & 372/145 (D.392/13) for a leasehold estate for the term of 99 years from 11-Nov-1959. Together with a Right of Carriageway.
Produced 20-Nov-1959 at 3.50 pm

B720037 CAVEAT by Michael Dixon, (Wellington Park Act 1993)
Registered 07-Jan-1994 at noon

## UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

# RESULT OF SEARCH

DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

SEARCH OF TORRENS TITLE

| VOLUME | FOLIO |
|---|---|
| 126375 | 1 |
| EDITION | DATE OF ISSUE |
| 1 | 26-Nov-1996 |

SEARCH DATE : 11-Jun-2019
SEARCH TIME : 02.13 PM

## DESCRIPTION OF LAND

City of HOBART
Parish of KINGBOROUGH, Land District of BUCKINGHAM
Lot 1 on Plan 126375
Being the land described in Part VII of Schedule 7 of the Hobart Corporation Act 1947
Excepting thereout Folio of the Register Volume 121202 Folio 2
Derivation : Part of Mountain Park vested in the Hobart City Council 21 Geo. V No.64
Derived from A16835

## SCHEDULE 1

HOBART CITY COUNCIL

## SCHEDULE 2

Reservations and conditions in the Crown Grant if any

## UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

# RESULT OF SEARCH

DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

SEARCH OF TORRENS TITLE

| VOLUME | FOLIO |
|---|---|
| 126957 | 1 |
| EDITION | DATE OF ISSUE |
| 2 | 24-Jun-2015 |

SEARCH DATE : 11-Jun-2019
SEARCH TIME : 02.11 PM

## DESCRIPTION OF LAND

City of HOBART
Lot 1 on Plan 126957
Derivation : Part of 2660 Acres Gtd to J Allport & Anor and
Part of 2000 Acres Gtd to P Degraves
Prior CT 114735/1

## SCHEDULE 1

A454296 HOBART CITY COUNCIL

## SCHEDULE 2

Reservations and conditions in the Crown Grant if any
BENEFITING EASEMENT a right of carriageway over the roadway 10.
06 wide marked B.C. on Plan No. 126957
A454297 INSTRUMENT creating covenants

## UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

the list...

# RESULT OF SEARCH

DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

SEARCH OF TORRENS TITLE

| VOLUME | FOLIO |
|---|---|
| 166085 | 6 |
| EDITION | DATE OF ISSUE |
| 1 | 25-Nov-2013 |

SEARCH DATE : 11-Jun-2019
SEARCH TIME : 02.05 PM

## DESCRIPTION OF LAND

City of HOBART
Lot 6 on Plan 166085
Derivation : Part of Lot 21, 4A-2R-15Ps. Gtd. to Daniel Ferguson and Part of Lot 20, 5A-2R-0Ps. Gtd. to Malcolm Brown
Prior CT 40237/2

## SCHEDULE 1

HOBART CITY COUNCIL

## SCHEDULE 2

Reservations and conditions in the Crown Grant if any
31/9171 CONVEYANCE - Burdening Easement: Drainage Right over the strip of land marked "Drain 0.61 metres wide" on Plan 166085

## UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

# RESULT OF SEARCH

DEPUTY RECORDER OF TITLES

*Issued Pursuant to the Land Titles Act 1980*

Tasmanian Government

SEARCH OF TORRENS TITLE

| VOLUME | FOLIO |
|---|---|
| 252495 | 1 |
| EDITION | DATE OF ISSUE |
| 1 | 11-Sep-1995 |

SEARCH DATE : 11-Jun-2019
SEARCH TIME : 02.12 PM

## DESCRIPTION OF LAND

City of HOBART
Lot 1 on Plan 252495
Derivation : Parts of 2,660 Acres Gtd to J Allport & Anor and Part of 2,000 Acres Gtd to P Degraves
Prior CT 3152/32

## SCHEDULE 1

76381 HOBART CITY COUNCIL

## SCHEDULE 2

Reservations and conditions in the Crown Grant if any

A117604 LEASE to Tasmanian Television Limited of a leasehold estate for the term of 99 years from 11-Nov-1959. Produced 20-Nov-1959 at 3.50 pm

B720037 CAVEAT by Michael Dixon, (Wellington Park Act 1993) Registered 07-Jan-1994 at noon

D10584 CAVEAT by Tasmanian Water and Sewerage Corporation (Southern Region) Pty Limited (affecting that portion of land described as Lot 1 and measuring 1574m2 as detailed on the plan annexed thereto) Registered 06-May-2011 at noon

## UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

21 September 2020

TasNetworks
Delivering your power

Tasmanian Networks Pty Ltd
ABN 24 167 357 299
PO Box 606
Moonah TAS 7009

Adrian Bold
Mount Wellington Cableway Company P/L
Level 3, 85 Macquarie Street
Hobart TAS 7000

Email – arb@mtwellingtoncablecar.com

Dear Mr Bold

**Mount Wellington Cable Car – Base Terminal – Road Access**

Thank you for your email dated 3 September 2020 and the subsequent information you provided regarding the proposed location of the Base Terminal and associated access roads.

The information you provided illustrates the Base Terminal and surrounding parking areas to be clear of any TasNetworks encumbrances. However, the access road leading to the Terminal crosses beneath two overhead transmission lines that are each benefitted by wayleave easements.

Both easements are benefited by the Hobart Interim Planning Scheme's (HIPS) Code and associated Overlay; the Electricity Transmission Infrastructure Protection Code (ETIPC).

Therefore, in accordance with E8.5.1 and E8.7.1 of HIPS, TasNetworks advises that it has no objection to the proposed road works in these locations subject to the following requirements being met:

- All works associated with road construction must be a minimum of 10 metres (horizontal) clearance from any part of a transmission line tower.
- Overhead clearance required between roads and lowest overhead conductors are to be:
  - A minimum of 6.7 metres under TL432 (the transmission line closest to the Base Terminal) when at maximum operating temperature; and
  - A minimum of 5.50 metres under all other powerlines.
- All works undertaken beneath the transmission lines must be carried out in accordance with the Power System Safety Rules (PSSR).

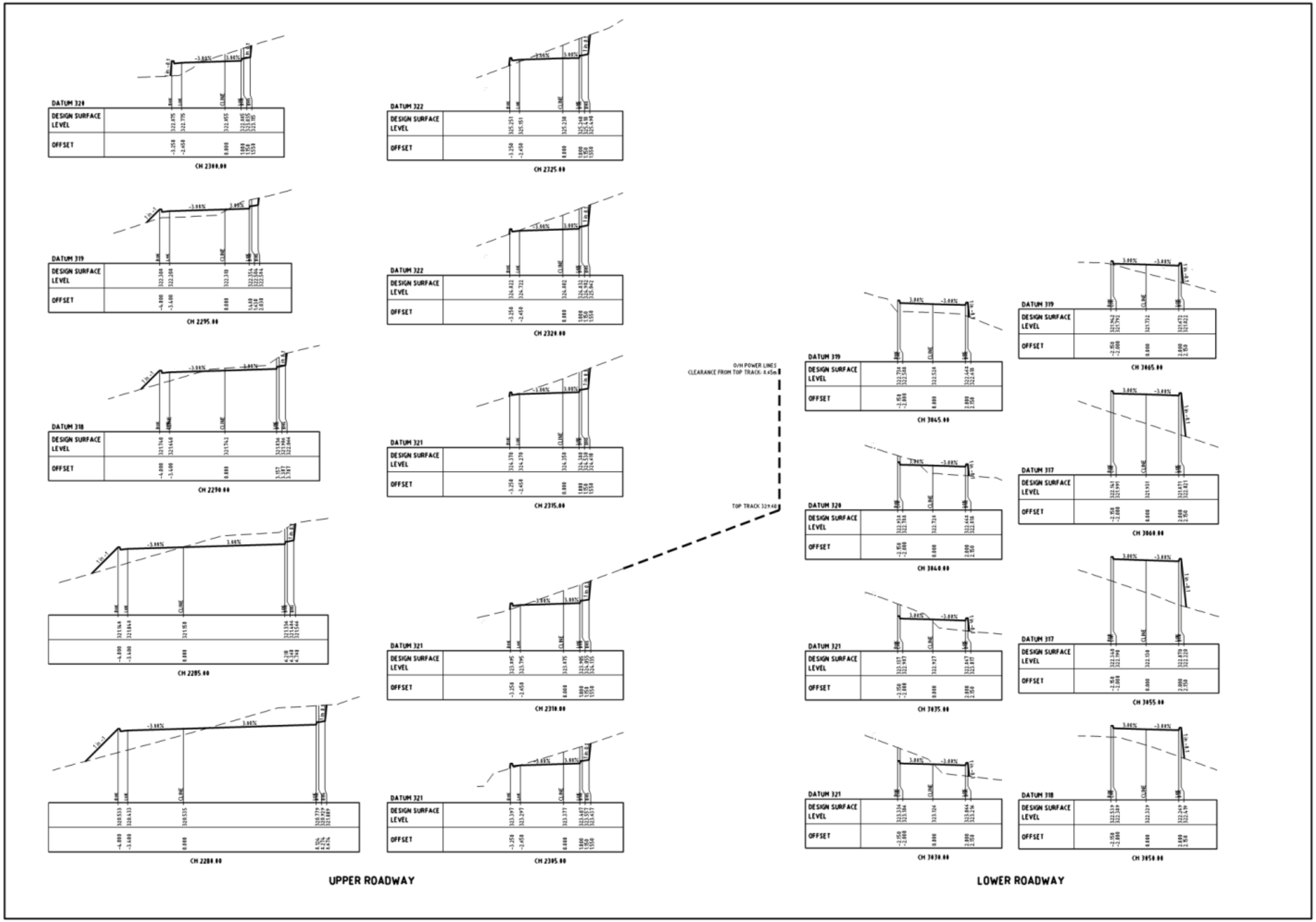
If you have any queries or require any further information, please contact me by telephone on 6271 6710 or by email at mark.bresnehan@tasnetworks.com.au.

Yours sincerely

Mark Bresnehan
Project Development Officer

Attachments (extracts from MWCC drawings provided to TasNetworks:
- Site Plan – Dwg No. 1780_DA00 Rev 02
- Upper Roadway & Lower Roadway – Road Sections


DEVELOPMENT APPLICATION
1780_DA00
SITE PLAN & DRAWING SCHEDULE
Mt. Wellington Cable Car
mwcc
JAWS ARCHITECTS
EXISTING ELECTRICITY TRANSMISSION CORRIDOR EASEMENT
PROPOSED CABLEWAY ALIGNMENT


DATUM 320
DESIGN SURFACE LEVEL
OFFSET
CH 2300.00
DATUM 319
CH 2295.00
DATUM 318
CH 2290.00
CH 2285.00
CH 2280.00
DATUM 322
CH 2325.00
DATUM 322
CH 2320.00
DATUM 321
CH 2315.00
DATUM 321
CH 2310.00
DATUM 321
CH 2305.00
O/H POWER LINES
CLEARANCE FROM TOP TRACK: 4.45m
TOP TRACK 329.60
DATUM 319
CH 3045.00
DATUM 320
CH 3040.00
DATUM 321
CH 3035.00
DATUM 321
CH 3030.00
DATUM 319
CH 3065.00
DATUM 317
CH 3060.00
DATUM 317
CH 3055.00
DATUM 318
CH 3050.00
UPPER ROADWAY
LOWER ROADWAY