Tasmanian Heritage Council
GPO Box 618 Hobart Tasmania 7000
Tel: 1300 850 332
enquiries@heritage.tas.gov.au
www.heritage.tas.gov.au

PLANNING REF: PLN-22-790
THC WORKS REF: 8058
REGISTERED PLACE NO: 12028
APPLICANT: University of Tasmania
DATE: 25 January 2023

NOTICE OF HERITAGE DECISION

(*Historic Cultural Heritage Act 1995*)

Registered Place: Crisp & Gunn offices and workshop, and Forestry Tasmania dome, 79-83 Melville Street, 83 Melville Street and 80 Brisbane Street**,** Hobart.
Proposed Works: New pedestrian bridge and landscaping work.

Under section 39(6)(b) of the *Historic Cultural Heritage Act 1995*, the Heritage Council gives notice that it consents to the discretionary permit being granted in accordance with the documentation submitted with Development Application PLN-22-790, advertised on 22/12/2022, subject to the following conditions:

1. **The historic brick parapet wall, which forms part of Tasmanian Heritage Register Place #12028, must be protected during the works. A detailed description of the proposed protective measures must be submitted to Heritage Tasmania and must be to the satisfaction of the Works Manager, prior to the commencement of works.**

Reason for condition
To ensure the heritage elements of the place are protected during the development works.

2. **(i) A communication protocol must be developed and implemented to ensure that all persons working on the site understand and appreciate the heritage values of the site and the obligations arising from the Tasmanian Heritage Register listing and this approval.**
(ii) For all persons involved in excavation work or ground disturbance the protocol must include a briefing about the reporting requirements related to the discovery of any unanticipated archaeological remains, such as cesspits and building footings.
(iii) Evidence that this communication protocol has been developed and that procedures are in place for its communication to all persons working on the site must be submitted to Heritage Tasmania and must be to the satisfaction of the Works Manager, prior to the commencement of works.

Reason for condition
To ensure that all persons working on the site are aware of the heritage values of the site and their responsibilities, and to ensure that heritage fabric is protected and conserved during the works.

3. **Works must cease immediately where unanticipated archaeological deposits are encountered. An archaeologist must be engaged to assess, record, and make recommendations for the management of the deposits in consultation with Heritage Tasmania's Works Manager.**

Reason for condition
To ensure that sub-surface heritage information is considered and appropriately managed.

Advice
This advice is a reiteration of the advice provided with the Heritage Council's Replacement Notice of Heritage Decision dated 18/07/2022. It is recommended that the University of Tasmania engages with the neighbours of the adjacent historic buildings on Melville Street and Murray Street, to ensure any concerns these neighbours may have about potential impacts to their properties are appropriately addressed.

Please note that no permanent signage is to be erected or installed on the site without the approval of the Tasmanian Heritage Council. Proposals for new signs will require additional approval.

Should you require clarification of any matters contained in this notice, please contact Deirdre Macdonald on 0419 589 283 or on 1300 850 332.

Ian Boersma
Works Manager – Heritage Tasmania
Under delegation of the Tasmanian Heritage Council

Planning: #269594

Property

83 MELVILLE STREET HOBART TAS 7000

People

Applicant *	University of Tasmania C/- All Urban Planning Pty Ltd 19 Mawhera Avenue SANDY BAY TAS 7005 0400109582 frazer@allurbanplanning.com.au
Owner *	University of Tasmania C/- Justin Hanlon, Senior Project Manager, Capital Projects Delivery Private Bag 35 HOBART TAS 7001 0428606304 justin.hanlon@utas.edu.au
Entered By	FRAZER ERIC READ 0400 109 582 frazer@allurbanplanning.com.au

Use

Educational facility

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. *

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)? *

tertiary education

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

proposed pedestrian bridge

Estimated cost of development *

1000000.00

Existing floor area (m2)

Proposed floor area (m2)

Site area (m2)

Carparking on Site

Total parking spaces

Existing parking spaces

N/A

☒ 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? ◉ Yes

Documents

Required Documents

Title (Folio text and Plan and Schedule of Easements) *	Certificate of title.pdf
Plans (proposed, existing) *	Appendix A - Architectural.pdf

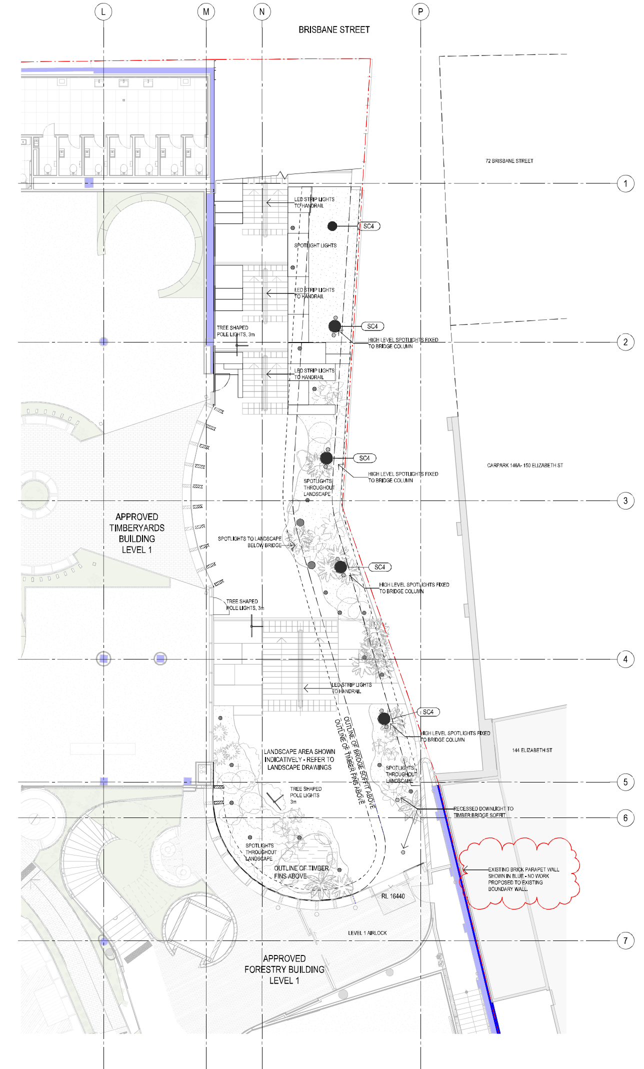
Supporting Documents

Landscape Plan	Appendix B - Landscape.pdf
Planning Report	Planning Report - Pedestrian walkway for Forestry Building Redevelopment.pdf
Heritage Report	Appendix E - Heritage Report.pdf
Architectural report	UTas DA Report_Bridge rev C.pdf
civil engineering plans	Appendix C - Civil.pdf
Structural Drawings	Appendix D - Structural.pdf
environmental site assessment	Appendix F - Site Contamination Report.pdf

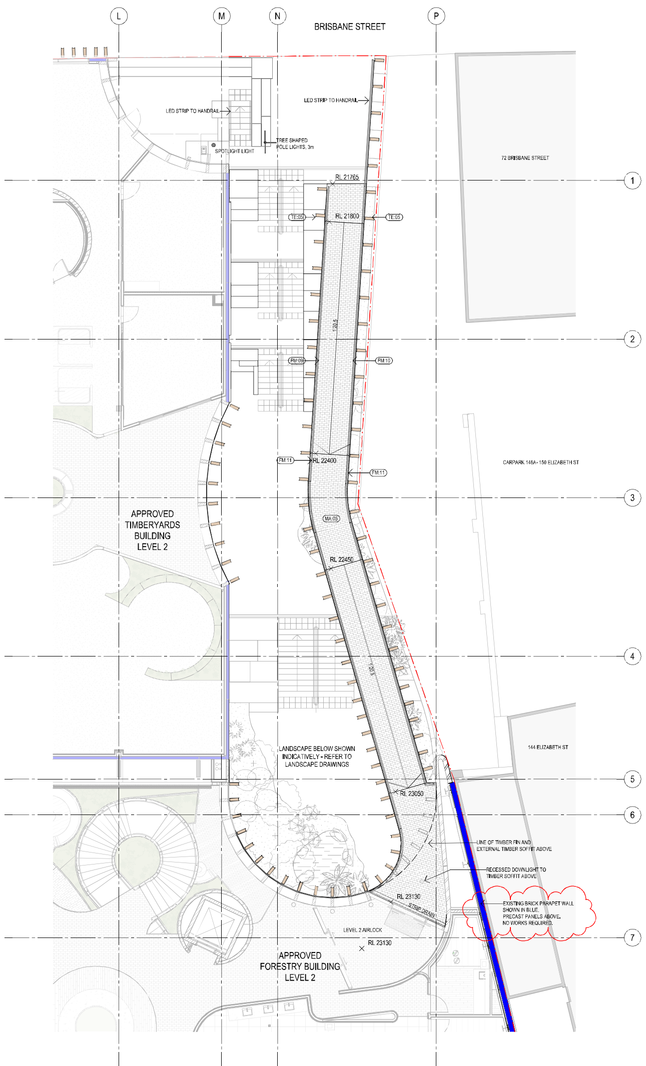
A

Appendix A:

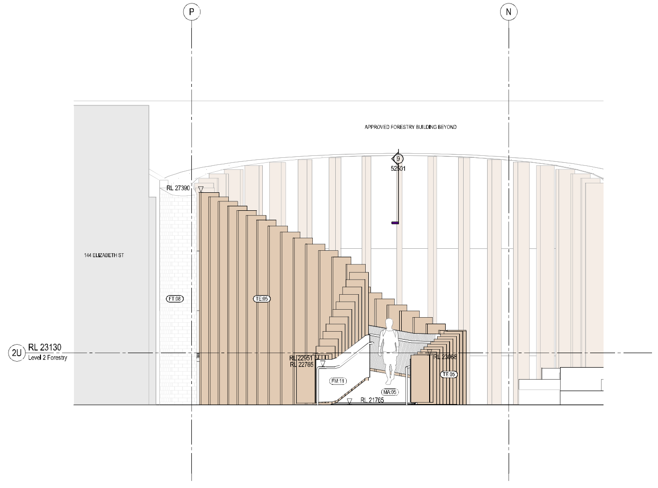
Architectural Drawings



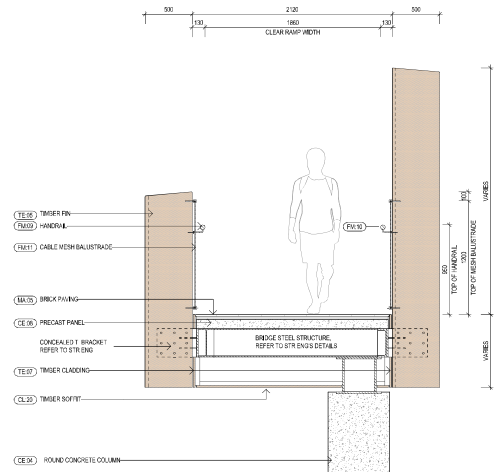
1 Bridge General Arrangment Plan - Level 1
SCALE 1 : 100



2 Bridge General Arrangment Plan - Level 2
SCALE 1 : 100



3 Bridge Brisbane Street Elevation
SCALE 1 : 50



4 Typical Bridge Section
SCALE 1 : 20

PERSPECTIVE 1 - AERIAL VIEW OF BRIDGE CONNECTING FORESTRY BUILDING

PERSPECTIVE 2 - LEVEL ONE ENTRY TO FORESTRY BUILDING

PERSPECTIVE 3 - OVERALL AERIAL VIEW OF BRIDGE

Recent revision history

#	Status	Description	Date
A	For Information	Bridge DA Issue	02.09.22
B	For Information	LOCATION OF EXISTING BRICK PARAPET WALL CLARIFIED AS PER COUNCIL REQUEST	16.12.22

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

BRIDGE LEGEND

CE:08	PRECAST CONCRETE PANEL SANDBLASTED FINISH
CL:20	EXTERNAL GLULAM SOFFIT
FM:09	STAINLESS STEEL HANDRAIL
FM:10	STAINLESS STEEL HANDRAIL WITH LED
FM:11	STAINLESS STEEL MESH BALUSTRADE
MA:05	BRICK TILE
TE:05	GLULAM TIMBER BLADE
TE:07	GLULAM TIMBER CLADDING
FT:08	EXTERNAL MASONRY WALL
SC4	CIRCULAR CONCRETE COLUMN OFF FORM FINISH

Existing
Title Boundary

ABBREVIATIONS:

(E)	Existing
FFL	Finished Floor Level
SSL	Structural Setout level
(N)	New
RL	Relative Level to AHD
TBC	To Be Confirmed
TME	To Match Existing
WF	Floor Waste Gully
DP	Downpipe

Refer to AR Schedules for details of all coded items

Project
Southern Futures: Forestry / Timber Yards

Address
80 Brisbane Street / 79-83 Melville Street, Hobart

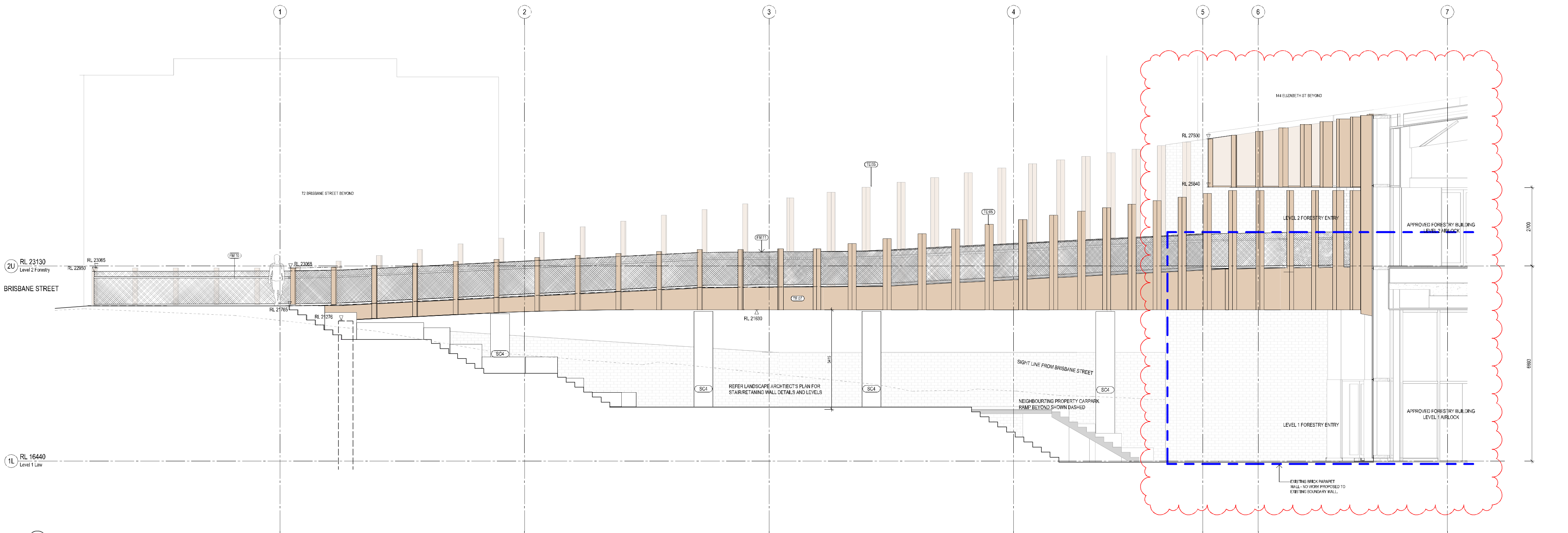
Client
University of Tasmania

Issuer
WOODS BAGOT

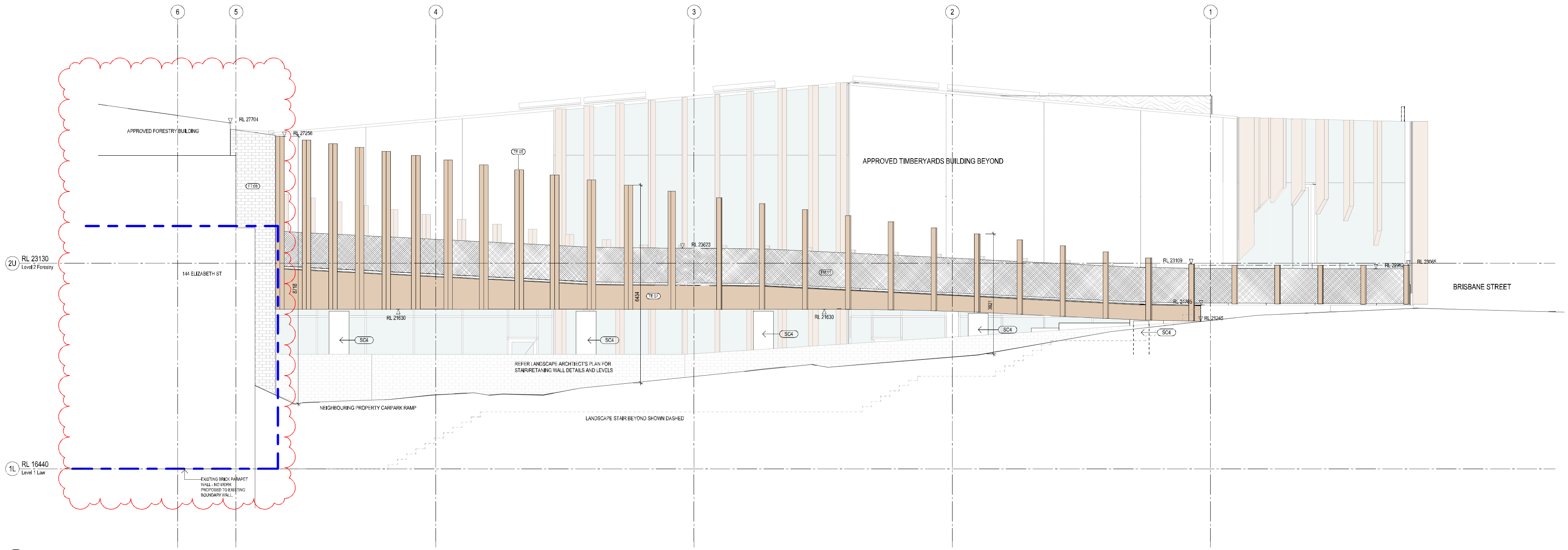
Project number 130807
Size check 25mm
Checked AF | Approved SB | Sheet size A0 | Scale As indicated

Sheet title
Brisbane Street Pedestrian Bridge DA Sheet 01

Sheet number AR-44030
Revision B
Status FOR INFORMATION



1 East Elevation
SCALE 1 : 50



2 West Elevation
SCALE 1 : 50

Recent revision history

#	Status	Description	Date
A	For Information	Bridge DA Issue	02.09.22
B	For Information	LOCATION OF EXISTING BRICK PARAPET WALL CLARIFIED AS PER COUNCIL REQUEST	16.12.22

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Refer to AR Schedules for details of all coded items

Project
Southern Futures: Forestry / Timber Yards

Address
80 Brisbane Street / 79-83 Melville Street, Hobart

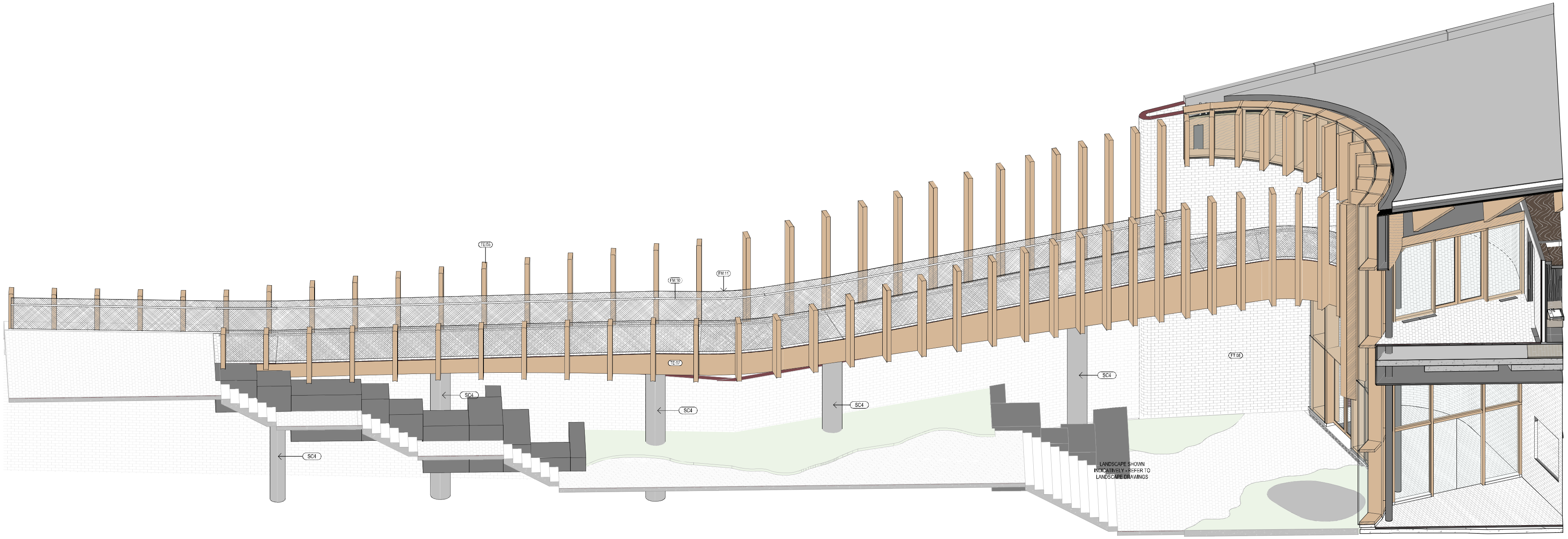
Client
University of Tasmania

Issuer
WOODS BAGOT

Project number: 130807
Size check: 25mm
Checked: AF
Approved: SB
Sheet size: A0
Scale: 1 : 50

Sheet title
Brisbane Street Pedestrian Bridge DA Sheet 02

Sheet number: AR-44031
Revision: B
Status: FOR INFORMATION



BRIDGE AXONOMETRIC VIEW

PERSPECTIVE 4 - ON BRIDGE VIEW

PERSPECTIVE 5 - ON TERRACE VIEW

Recent revision history

#	Status	Description	Date
A	For Information	Bridge DA Issue	02.09.22

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

BRIDGE LEGEND

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Title Boundary

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Refer to AR Schedules for details of all coded items

Project
Southern Futures: Forestry / Timber Yards

Address
80 Brisbane Street / 79-83 Melville Street, Hobart

Client
University of Tasmania

Issuer
WOODS BAGOT

Project number: 130807
Size check: 25mm
Checked: AF | Approved: SB | Sheet size: A0 | Scale: 1 : 50

Sheet title
Brisbane Street Pedestrian Bridge DA Sheet 03

Sheet number: AR-44032
Revision: A
Status: FOR INFOMATION

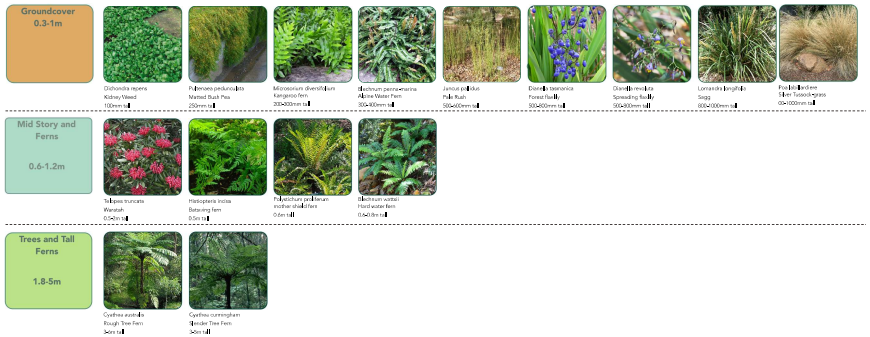
B

Appendix B:

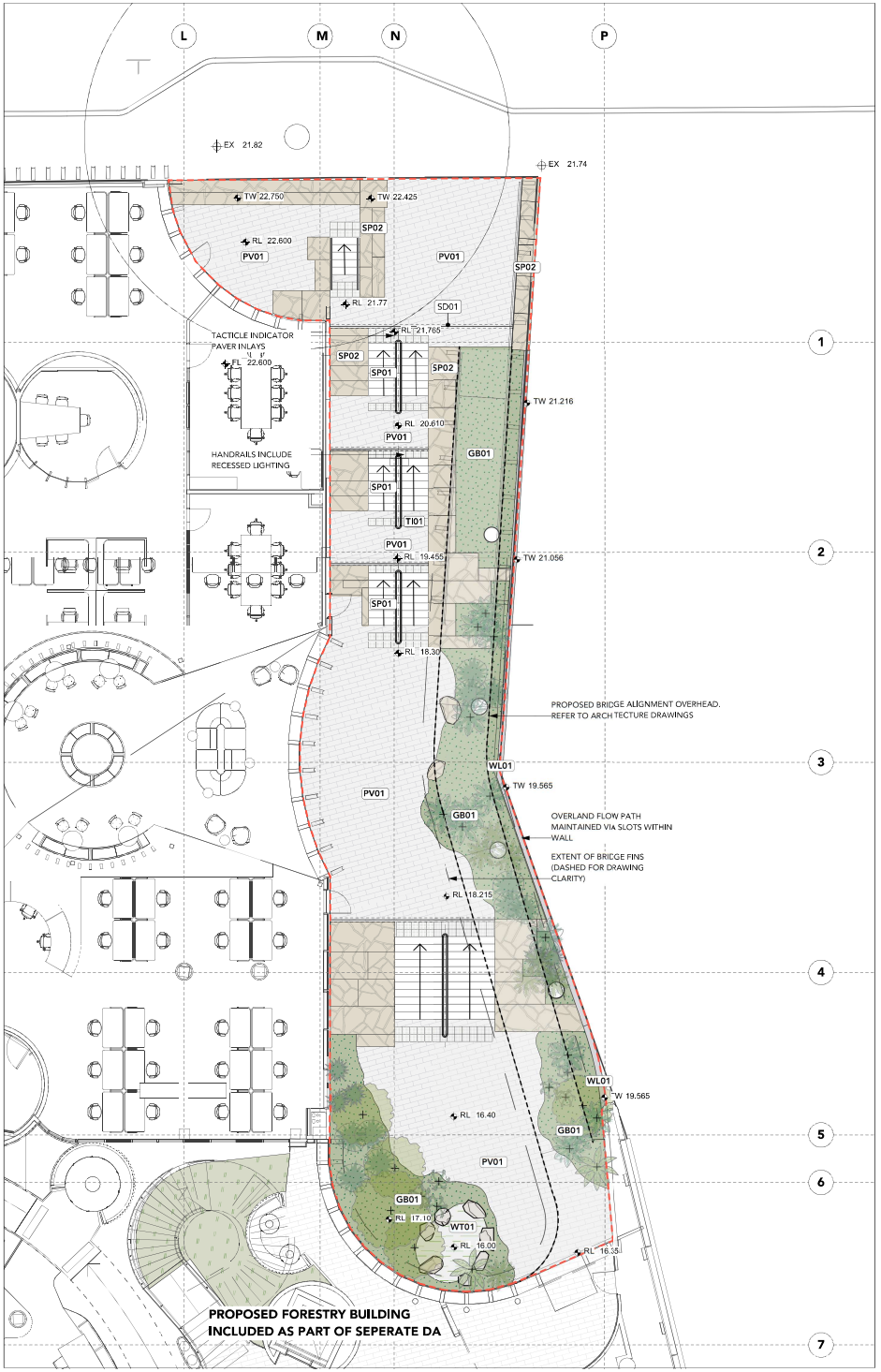
Landscape Plan

UTAS FORESTRY AND TIMBER YARDS - BRISBANE STREET BRIDGE DA

PLANT SELECTION



1 Pedestrian Bridge Location Plan
Scale: N.T.S



2 Landscape General Arrangement Plan
Scale: 1:100

LEGEND

GENERAL
- SITE BOUNDARY

SOFTWORKS
- PROPOSED TREE AND TALL FERN PLANTING 1.8-5M HIGH
- PROPOSED MID STORY AND FERNS 0.6-1.2M HIGH
- GB01 — PROPOSED GROUND COVER PLANTING 0.3-0.6M HIGH
- WT01 — PROPOSED EPHEMERAL "FOREST POOL"

HARDSCAPE, STAIRS & WALLING
- PV01 — BRICK PAVERS
- SP01 — BRICK PAVED STAIRS
- TI01 — TACTICLE INDICATORS
- HR01 — HANDRAILS INCLUDING RECESSED LIGHTING
- SD01 — BRICK INSET SLOT DRAIN
- SP02 — SANDSTONE BLOCK TERRACES
- WL01 — BRICK WALL

REALM studios

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Ground floor, 79-81 Coppin Street
Richmond, Vic 3121
T: +61 3 9118 7366

Sydney
Level 4, 68 Wentworth Avenue
Surry Hills 2010
T: +61 2 9087 4903

Perth
Level 2, Commonwealth Bank Building
242 Murray Street, WA 6000
T: +61 8 9321 3599

Hobart
89 Macquarie Street
Hobart, TAS 7000
T: +61 3 6705 7081

NOT FOR CONSTRUCTION

CLIENT
UNIVERSITY OF TASMANIA
79 MELVILLE STREET, HOBART TAS 7000

PROJECT
FORESTRY
83 MELVILLE STREET, HOBART TAS 7000
LANDSCAPE WORKS

DRAWING
UTAS FORESTRY AND TIMBER YARDS - BRISBANE STREET BRIDGE DA

DRAWN	CHECKED	SCALE @ A1
BR	AH	N/A

STATUS
DEVELOPMENT APPLICATION

DRAWING NO.	REVISION
20343-DA-L300	A

B

Appendix B:

Landscape Plan

AllUrbanPlanning PTY LTD

University of Tasmania
Redevelopment of 79-83 Melville Street and 80 Brisbane Street
Planning Report for Pedestrian Bridge

Date 24 November 2022

19 Mawhera Ave, Sandy Bay Tasmania 7005 Call 0400 109 582
Email frazer@allurbanplanning.com.au allurbanplanning.com.au

Table of contents

1. Introduction

All Urban Planning Pty Ltd has been engaged by the University of Tasmania to provide a planning assessment of the proposed alterations to the approved but not yet commenced redevelopment of the former Forestry and Freedom buildings for educational use under planning permit PLN-21-869. The proposed alterations are for the addition of a new pedestrian bridge from the Brisbane Street frontage of the site to level 2 of the central atrium space.

The following assessment has been prepared to accompany a new application for a planning permit for these alterations that addresses the relevant provisions of the *Hobart Interim Planning Scheme 2015* (planning scheme).

1.1Site

The site is shown in Figure 1 below and has a combined area of 7873m^2. The site is strata titled and includes the former Forestry building as Lot 2 (CT 149231/2) and the current Freedom building on the Brisbane Street frontage known as Lot 1 (CT 149231/1).

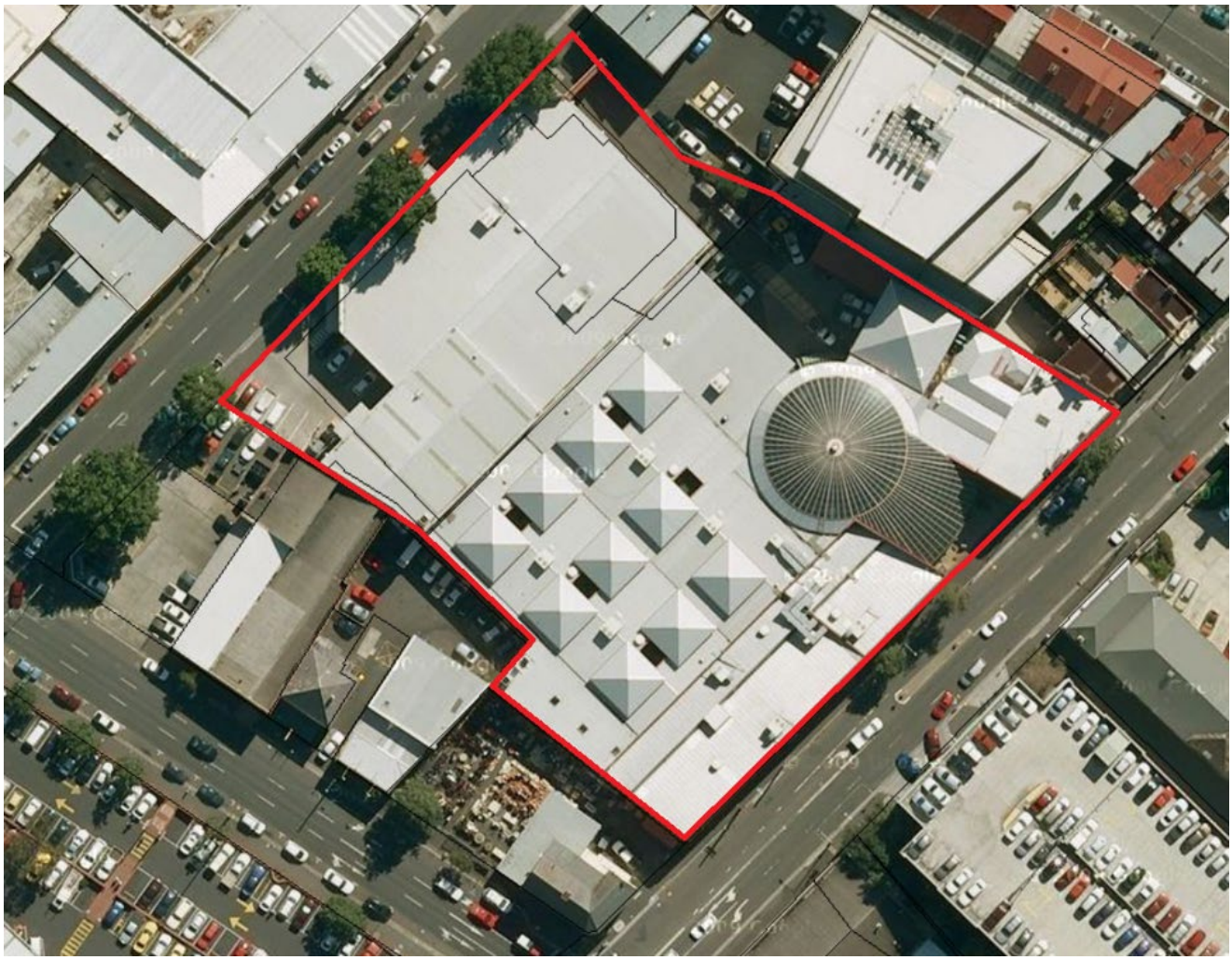


Figure 1 – the site (source: theList)

The proposed alterations do not involve any works outside the site including within the Brisbane Street road reservation.

2. Proposal

The proposal is for alterations to the approved redevelopment of the site for educational use under PLN-21-869. The alterations are detailed in the accompanying plans prepared by Woods Bagot and are for a pedestrian bridge linking the Brisbane Street footpath level to Level 2 of the approved building.

The purpose of the proposal is to ensure the University is providing equal access for people of all abilities and maintaining their intent to be a highly connected, porous campus that welcomes students, staff and the community into their facilities.

The bridge is to be constructed with mass timber fins and patterned brick paving consistent with the materials of the approved building. Metal mesh stretched between the fins is intended to be lightweight and visually permeable. The concrete columns supporting the bridge are consistent with the existing and new concrete columns throughout the building.

The landscape concept for the overall project is for the landscaping to act as a link through the building into the atrium.

The landscaping to the terrace adjacent to the bridge is conceptually consistent with the landscape proposal approved as part of condition PLN s4 of the planning permit, with some adjustments to suit the bridge structure, for safety and to enable passive surveillance. The landscape design, concept lighting and plant selections are further detailed in the accompanying landscape plan by Realm.

3. The Planning Scheme

Under Clause 8.10.1 of the planning scheme the planning authority must, in addition to the matters required by ss51(2) of the Act, take into consideration:

(a) all applicable standards and requirements in this planning scheme; and

(b) any representations received pursuant to and in conformity with ss57(5) of the Act,

but in the case of the exercise of discretion, only insofar as each such matter is relevant to the particular discretion being exercised.

Relevantly, a standard is applicable if the site is within the relevant zone and the standard deals with a matter that could affect or be affected by the proposed development; cl.7.5.2.

A standard is defined to mean the objective for a particular planning issue and the means for satisfying that objective through either an acceptable solution or corresponding performance criterion.

Compliance with a standard is achieved by complying with either the acceptable solution or corresponding performance criterion; cl.7.5.3.

The objective of the standard may be considered to help determine whether the proposed use or development complies with the performance criterion of that standard; cl.7.5.4. The acceptable solution is not relevant to the assessment of the corresponding performance criteria.

3.1 Central Business Zone

The site is zoned Central Business.

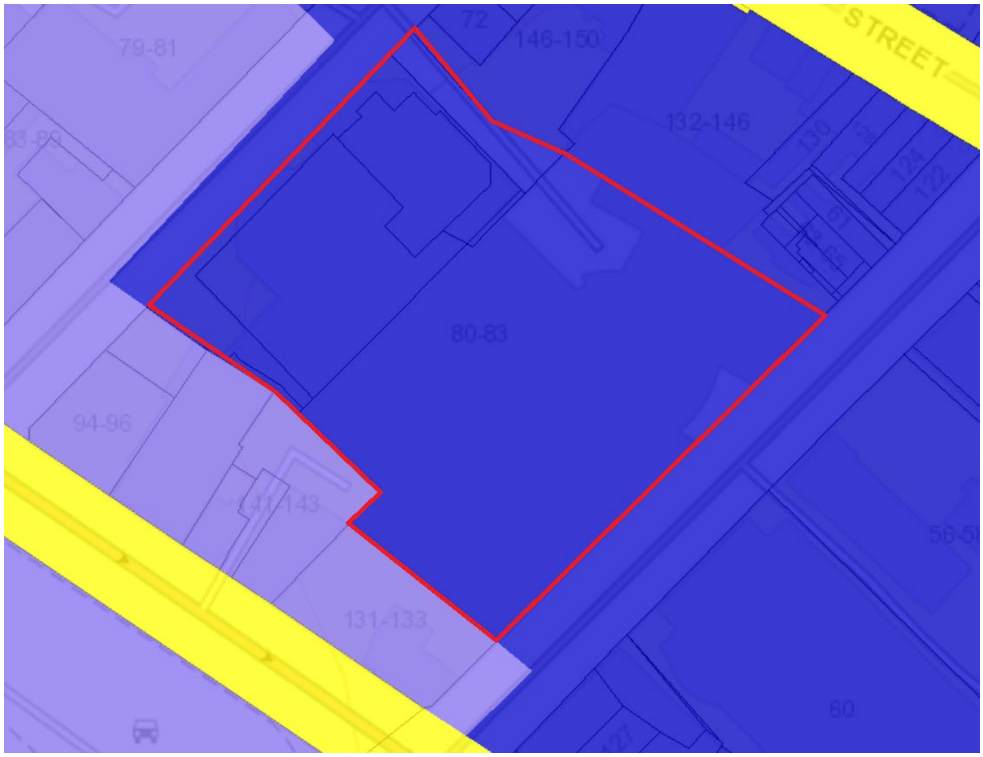


Figure 2 - Zoning plan (Source: iplan)

The Zone Purpose Statements under Clause 22.1.1 are as follows:

22.1.1.1 *To provide for business, civic and cultural, community, food, hotel, professional, retail and tourist functions within a major centre serving the region or sub-region.*

22.1.1.2 *To maintain and strengthen Hobart's Central Business District and immediate surrounds including, the waterfront, as the primary activity centre for Tasmania, the Southern Region and the Greater Hobart metropolitan area with a comprehensive range of and highest order of retail, commercial, administrative, community, cultural, employment areas and nodes, and entertainment activities provided.*

22.1.1.3 *To provide a safe, comfortable and pleasant environment for workers, residents and visitors through the provision of high quality urban spaces and urban design.*

22.1.1.4 *To facilitate high density residential development and visitor accommodation within the activity centre above ground floor level and surrounding the core commercial activity centre.*

22.1.1.5 *To ensure development is accessible by public transport, walking and cycling.*

22.1.1.6 *To encourage intense activity at pedestrian levels with shop windows offering interest and activity to pedestrians.*

22.1.1.7 *To encourage a network of arcades and through-site links characterised by bright shop windows, displays and activities and maintain and enhance Elizabeth Street Mall and links to it as the major pedestrian hub of the CBD.*

22.1.1.8 *To respect the unique character of the Hobart CBD and maintain the streetscape and townscape contribution of places of historic cultural heritage significance.*

22.1.1.9 *To provide a safe, comfortable and enjoyable environment for workers, residents and visitors through the provision of high quality spaces and urban design.*

These zone Purpose Statements are no relevant to this proposal that does not alter the Permitted, educational use. However, in any case the proposal can be seen to further the above Purposes for improved accessibility, pedestrian interest and connectivity.

3.2 Use Table

The proposal does not alter the use of the approved building.

Tertiary education falls within the *Educational and occasional care* Use Class. Educational and occasional care is a Permitted Use under the Use Table 22.2 for a site such as this that is outside the Active Frontage Overlay shown in Figure 22.1 of the planning scheme (Figure 3 below).

The approved administration offices are also Permitted in the zone whether they are treated as ancillary to the educational use or separately classed as a *Business and professional services* use.

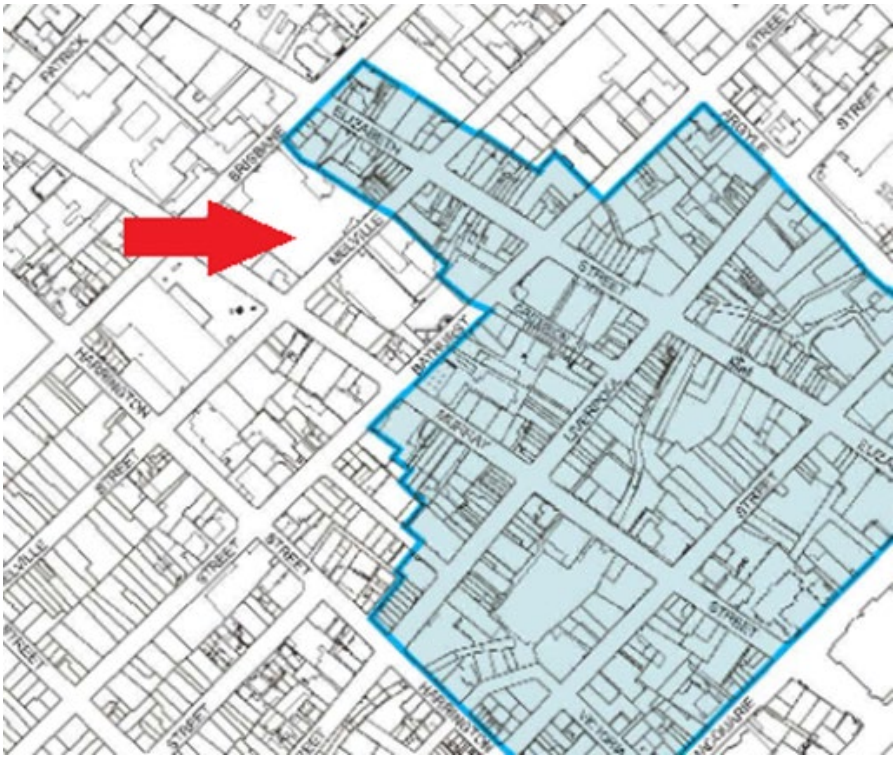


Figure 3 –The site is located outside the Active Frontage Area (Figure 22.1 of the planning scheme)

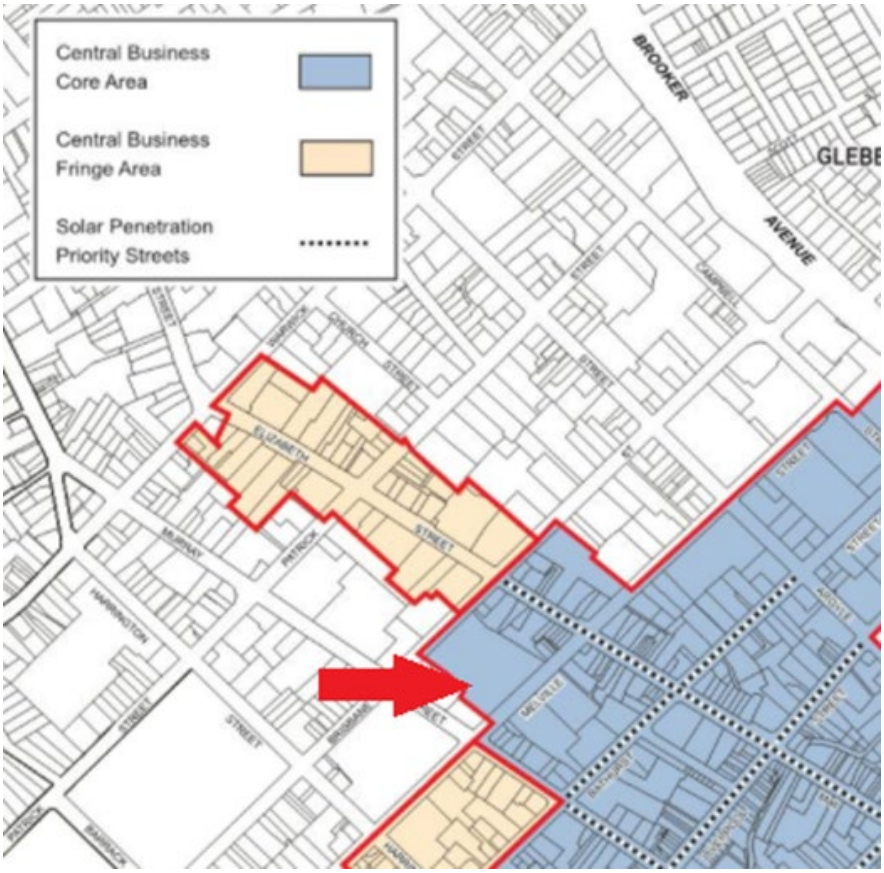


Figure 4 –The site is located outside the Pedestrian Priority Area (Figure 22.2 of the planning scheme)

3.3 Use Standards

Hours of Operation (22.3.1)

Use Standard	***Assessment***
A1 Hours of operation of a use within 50 m of a residential zone must be within: (a) 6.00 am to 10.00 pm Mondays to Saturdays inclusive; (b) 7.00 am to 9.00 pm Sundays and Public Holidays. except for office and administrative tasks.	The site is not within 50m of a Residential Zone. This Standard therefore does not apply.

Noise (22.3.2)

Use Standard	***Assessment***
A1 *Noise emissions measured at the boundary of a residential zone must not exceed the following:* *(a) 55dB(A) (LAeq) between the hours of 7.00 am to 7.00 pm;* *(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;* *(c) 65dB(A) (LAmax) at any time.* *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.* *Noise levels are to be averaged over a 15 minute time interval.*	Complies. The proposal will not involve significant noise emissions that would exceed these limits at the boundary of a residential zone. In this case the closest area of residential zoning is approximately 190m west on the upper side of Harrington Street.

External Lighting (22.3.3)

Use Standard	***Assessment***
A1 *External lighting within 50 m of a residential zone must comply with all of the following:* *(a) be turned off between 11:00 pm and 6:00 am, except for security lighting;* *(b) security lighting must be baffled to ensure they do not cause emission of light outside the zone.*	The site is not within 50m of a Residential Zone. This Standard does not apply.

Commercial Vehicle Movements (22.3.4)

Use Standard	***Assessment***
A1 *Commercial vehicle movements, (including loading and unloading and garbage removal) to or from a*	The site is not within 50m of a Residential Zone. This Standard does not apply.

site within 50 m of a residential zone must be within the hours of: *(a) 6.00 am to 10.00 pm Mondays to Saturdays inclusive;* *(b) 7.00 am to 9.00 pm Sundays and Public Holidays.*	

The proposal does not involve a take Away Food Premises, Hotel Industry, Manufacturing, Processing Use or an Adult Entertainment Venue. The Uses Standards under 22.3.5 and 22.3.8 therefore do not apply.

3.4 Development Standards for Buildings and Works

The Development Standards for the Central Business Zone apply differently depending on whether a site is within the Core or Fringe Area, on a Solar Penetration Priority Street or within the Active Frontage Overlay.

In this case the site is:

- located within the Central Business Core Area (Figure 3);
- not located on a Solar Penetration Priority Street (Figure 3); and
- located outside the Active Frontage Overlay (Figure 4).

Having regard to these overlays the following Development Standards apply to height and setback on the land.

22.4.1 Building Height

Objective

That building height:

(a) contributes positively to the streetscape and townscape;

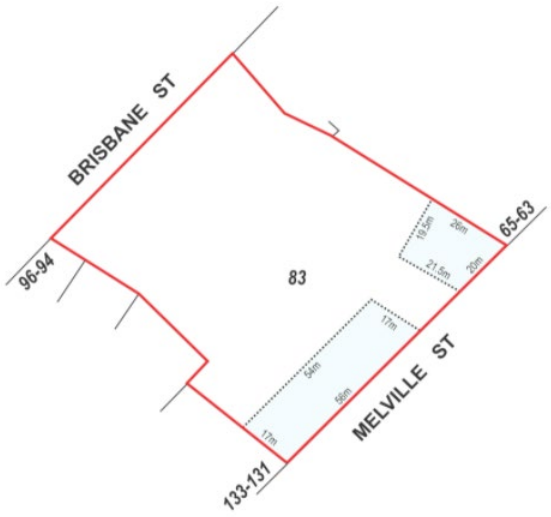
(b) does not unreasonably impact on historic heritage character;

(c) does not unreasonably impact on important views within the urban amphitheatre;

(d) does not unreasonably impact on residential amenity of land in a residential zone; and

(e) provides significant community benefits if outside the Amenity Building Envelope.

Acceptable Solutions	***Performance Criteria***
A1 *Building height within the Central Business Core Area in Figure 22.2 must be no more than:* *(a) 15m if on, or within 15m of, a south-west or south-east facing frontage;* *(b) 20m if on, or within 15m of, a north-west or north-east facing frontage;* *(c) 30m if set back more than 15m from a frontage;*	The proposal complies with A1 as follows: a) the proposal does not exceed 15m in height within 15m of the south east facing Melville Street frontage of the site. b) The proposal does not exceed 20m in height within 15m of the north west facing Brisbane Street frontage.

unless an extension to an existing building that: *(i) is necessary solely to provide access, toilets, or other facilities for people with disabilities;* *(ii) is necessary to provide facilities required by other legislation or regulation.*	c) The proposal is well below the 30m maximum height for other areas of the site that are setback more then 15m from either frontage.
A4 *Building height of development on the same title as a place listed in the Historic Heritage Code, where the specific extent of the heritage place is specified in Table E13.1, and directly behind that place must:* *(a) not exceed 2 storeys or 7.5m higher (whichever is the lesser) than the building height of any heritage building within the place, and be set back between 5m and 10m from the place (refer figures 22.4 i and 22.4 ii); and* *(b) not exceed 4 storeys or 15m higher (whichever is the lesser) than the building height of any heritage building within the place, and be set back more than 10m from the place (refer figures 22.4 i and 22.4 ii);* *or* *(c) comply with the building height in clauses 22.4.1 A1 and A2;* *whichever is the lesser.*	The specific extent of the heritage place is defined as the shaded blue areas in Figure E13.1.11 of the planning scheme as shown below. These represent the two redbrick heritage buildings on the Melville Street frontage. The proposed pedestrian bridge is located outside of these specific extents. The proposal complies with A4 in that it will not exceed 2 storeys or 7.5m (whichever is lesser) within 10m of the heritage place or 4 storeys or 15m higher than the heritage buildings. 
A5 *Building height of development within 15m of a frontage and not separated from a place listed in the Historic Heritage Code by another building, full lot (excluding right of ways and lots less than 5m width) or road (refer figure 22.5 i), must:* *(a) not exceed 1 storey or 4m (whichever is the lesser) higher than the facade building height*	The proposal complies with A5.

of a heritage building on the same street frontage (refer figure 22.5 ii); and *(b) not exceed the facade building height of the higher heritage building on the same street frontage if the development is between two heritage places (refer figure 22.5 ii);* *or* *(c) comply with the building height in Clauses 22.4.1 A1 and A2;* *whichever is the lesser.*	

22.4.2 Setback

Objective:

To ensure that building setback contributes positively to the streetscape and does not result in unreasonable impact on residential amenity of land in a residential zone.

Acceptable Solutions	***Performance Criteria***
A1 *Building setback from frontage must be parallel to the frontage and must be no more than:* *0 m*	The approved building aligns the Brisbane Street frontage and complies with A1.

Design (22.4.3)

Objective

To ensure that building design contributes positively to the streetscape, the amenity and safety of the public and adjoining land in a residential zone.

Development Standard	***Assessment***
A1 *Building design must comply with all of the following:* *(a) provide the main pedestrian entrance to the building so that it is clearly visible from the road or publicly accessible areas on the site;* *(b) for new building or alterations to an existing façade provide windows and door openings at ground floor level in the front façade no less than 40% of the surface area of the ground floor level façade;*	The proposal complies with A1 as follows: a) the main pedestrian entrances to the building will continue to be provided to Melville and Brisbane Streets. The proposal will also enhance visibility to the proposed Level 2 atrium entry at the end of the bridge. b) the proposed new bridge will not alter the approved street facing, building facade to Brisbane Street and will continue to satisfy criterion b);

(c) for new building or alterations to an existing facade ensure any single expanse of blank wall in the ground level front façade and facades facing other public spaces is not greater than 30% of the length of the facade; *(d) screen mechanical plant and miscellaneous equipment such as heat pumps, air conditioning units, switchboards, hot water units or similar from view from the street and other public spaces;* *(e) incorporate roof-top service infrastructure, including service plants and lift structures, within the design of the roof;* *(f) not include security shutters over windows or doors with a frontage to a street or public place.*	c) the proposal will not alter the approved Brisbane Street façade that is articulated and avoids the creation of blank walls on the ground floor frontage; d) the proposal does not involve new mechanical plant and complies with criterion d); e) the proposal does not involve new roof top infrastructure and complies with criterion e); f) the proposal does not include security shutters.
A2 *Walls of a building facing a residential zone must be coloured using colours with a light reflectance value not greater than 40 percent.*	The proposal complies with A2 in that the external colours and finishes of timber, brick and steel mesh will have a light reflectance value not greater than 40 percent and do not face a residential zone.
A3 *The facade of buildings constructed within 15m of a frontage and not separated from a place listed in the Historic Heritage Code by another building, full lot (excluding right of ways and lots less than 5m width) or road (refer figure 22.5 i), must:* *(a) include building articulation to avoid a flat facade appearance through evident horizontal and vertical lines achieved by setbacks, fenestration alignment, design elements, or the outward expression of floor levels; and* *(b) have any proposed awnings the same height from street level as any awnings of the adjacent heritage building.*	A3 is not considered relevant in that the proposal does not involve a new façade constructed within 15m of the frontage.
A4 *For new buildings or alterations to existing façades within the Active Frontage Overlay (Figure 22.1) provide windows with clear glazing and door openings at ground floor level in the front façade and façades facing other public space boundaries no less than 80% of the surface area;*	The site is not within the Active Frontage Overlay area. This Standard does not apply.

A5 *For new buildings or alterations to existing façades within the Active Frontage Overlay (Figure 22.1) awnings must be provided over public footpaths.*	The site is not within the Active Frontage Overlay area. This Standard does not apply.

Passive Surveillance (22.4.4)

Objective:

To ensure that building design provides for the safety of the public.

Development Standard	***Assessment***
A1 *Building design must comply with all of the following:* *(a) provide the main pedestrian entrance to the building so that it is clearly visible from the road or publicly accessible areas on the site;* *(b) for new buildings or alterations to an existing facade provide windows and door openings at ground floor level in the front façade which amount to no less than 40 % of the surface area of the ground floor level facade;* *(c) for new buildings or alterations to an existing facade provide windows and door openings at ground floor level in the façade of any wall which faces a public space or a car park which amount to no less than 30 % of the surface area of the ground floor level facade;* *(d) avoid creating entrapment spaces around the building site, such as concealed alcoves near public spaces;* *(e) provide external lighting to illuminate car parking areas and pathways;* *(f) provide well-lit public access at the ground floor level from any external car park.*	The proposal satisfies A1 in that: a) the main pedestrian entrances to the site will be clearly visible from the street; b) complies c) complies d) the proposal avoids the creation of concealed spaces and the courtyard space, bridge and landscaping has been designed to avoid the creation of entrapment spaces; e) the courtyard and pedestrian bridge will be safely lit to accepted standards. f) this criterion is not relevant in that it does not involve a new carpark.

Landscaping (22.4.5)

Clause 22.4.5 confirms that landscaping is not regulated in this zone in this planning scheme. It is not considered necessary in the Hobart context.

Notwithstanding the above, the proposal includes a concept for integrated landscaping enhancements.

Outdoor Storage Areas (22.4.6)

Objective:

To ensure that outdoor storage areas for non-residential use do not detract from the appearance of the site or the locality.

Development Standard	***Assessment***
A1 *Outdoor storage areas for non-residential uses must comply with all of the following:* *(a) be located behind the building line;* *(b) all goods and materials stored must be screened from public view;* *(c) not encroach upon car parking areas, driveways or landscaped areas.*	Not applicable. The proposal does not include any outdoor storage areas.

Fencing (22.4.7)

No fences are proposed and this Standard therefore does not apply.

Pedestrian Links (22.4.8)

The proposed pedestrian bridge will enhance the approved pedestrian link of the redevelopment proposal with improved level access between Brisbane and Melville Streets via the glazed dome of the former Forestry building. The proposal complies with this standard.

4. Planning Scheme Codes

The site is not within any specific mapped planning scheme overlays. The proposal is considered in relation to the relevant codes below.

4.1 Potentially Contaminated land Code

The accompanying environmental site assessment addresses the requirements of this code.

4.2 Stormwater Management Code

The application is supported by an updated engineering assessment by JMG of the stormwater requirements of the site to address this code.

4.3 Historic Heritage Code

The requirements of this Code are assessed in the accompanying Heritage Impact Assessment prepared by Praxis.

4.4 Inundation Prone Areas Code

An updated flood assessment accompanies the application and confirms at the proposal does not conflict with the requirements of this code.

4.5 Signage

No signage is proposed as part of this application.

5. Conclusion

The proposal is for alterations to the approved redevelopment of the former Forestry and Freedom buildings to include a new pedestrian bridge from Brisbane Street to the central atrium space and Melville Street.

The proposal complies with the relevant use and development standards for the Central Business Zone. It is also supported by environmental, heritage and civil engineering assessments that demonstrate that the relevant planning scheme codes are met.

The proposal demonstrates a high degree of compliance with the relevant planning scheme provisions and is recommended for approval following public advertisement pursuant to Section 57 of the Act.

Frazer Read

Principal

24 November 2022

W–B
WOODS BAGOT

22.11.2022

REVISION C

University of Tasmania
Forestry / Timber Yards
Pedestrian Bridge Planning Report

Issue Register

Issue Date	Revision	Issued For	Comments	Issued To:
26.08.22	A	Review	Draft Issue - for review	UTas
05.09.22	B	Review	Final draft - for review	UTas
22.11.22	C	Lodgement	Submission to Council	City of Hobart (via AUP)

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Woods Bagot acknowledges Australia's Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land on which we live and work and pay our respects to their Elders past, present and emerging. We believe each and every project is an opportunity to engage and respond to Indigenous Australians' cultural connections to country. By respecting and celebrating the value and significance of both the heritage and contemporary culture of Indigenous Australians, our built environment is enriched and anchored into its location, its story, and varied experience.

Contents

01

Introduction

01.01 Introduction

01.01 Introduction

Overview

This report has been prepared by Woods Bagot on behalf of The University of Tasmania (UTAS).

It provides the rationale for the design, architecture and urban response to public realm and landscape to support the planning application for the pedestrian bridge at 80 Brisbane street. This forms part of the approved development at 79 - 83 Melville St / 80 Brisbane Street, Hobart, title reference 149231 (lots 1 & 2). The site is zoned 22.0 Central Business under the Hobart Interim Planning Scheme 2015.

The development at 79-83 Melville Street / 80 Brisbane Street was approved in July 2022 (application number PLN-21-869. This planning application should be read in conjunction with the approval and endorsed documents relating to PLN-21-869.

The report includes commentary, images, plans and diagrams to illustrate the basis for the proposed scheme.

The report demonstrates the design as it responds to UTAS' aspiration to ensure the Forestry and Timber Yards building's provide equal access into the campus from both Melville Street and Brisbane Street.

The broad themes explored in the report include:

- Site conditions and context
- Design rationale
- Architectural planning
- Facade strategy, palette and materials

Relationship to Approved DA

This new application is for a pedestrian bridge linking the Brisbane Street footpath level to Level 2 of the proposed Forestry building. This ensures the University is providing equal access for people of all abilities and maintaining their intent to be a highly connected, porous campus that welcomes students, staff and the community into their facilities.

Given the significant elevation change between Melville Street and Brisbane Street, this bridge is necessary to ensure a direct accessible path into the campus from Brisbane Street.

Contributors and Consultation

This Development Application is underpinned by a collaborative process that has involved input across all disciplines. This process has resulted in a design that has been rigorously tested and developed to meet the client brief and create a contextual response that builds upon the design of the wider development on this site. The entire project team is listed below.

Prior to submission of the original DA, a rigourous consultation process took place with City of Hobart, the Tasmanian Heritage Council, TasWater, TasNetworks and the Tasmanian Fire Service, as well as engagement with Robert Morris-Nunn, the original architect of the Dome. The consultation process continued post-submission, throughout the design phases of the project.

Consultation specific to the pedestrian bridge has also taken place as required - namely with TasWater and the Tasmanian Fire Service. A lengthy process of stakeholder engagement within the university has also taken place.

Project Team

The design team consists of:

Architect:	Woods Bagot
Landscape Architect:	Realm
Town Planning:	All Urban Planning
Heritage:	Praxis Environment
Services, ESD & Facades:	Arup
Fire Engineering:	Arup
Civil & Structure Engineering:	JMG
Traffic Engineering:	GHD
Access Consultant:	Equality Building
Building Code Certification:	Lee Tyers & Associates
Quantity Surveyor:	Exsto Management / Slattery

02

Site and Context

02.01 Forestry & Timber Yards Site

02.01 Forestry & Timber Yards Site

The Forestry / Timber Yards project forms part of the Southern Futures Program, which will deliver on the long-term plan to move the University's campus from Sandy Bay to the Hobart CBD, in turn activating the University's properties across the city.

The project site is situated on a hill, with a level change of approximately five metres between the street frontages of Melville Street and Brisbane Street. Equal access for all building occupants and visitors is a significant part of the success of the building and the wider campus, and the addition of the bridge is a key way to achieve this for this project.

Key Concepts

The key concepts for development of the University's city campus, as outlined in their urban design framework and the Forestry / Timber Yards project brief, are:

- A university of and for the City, not just in the City
- A university for the Southern Region
- A campus that is easy to access, close to employment, and close to partners
- A university where we do distinctive things for Tasmania and from Tasmania
- A university that gives expression to Hobart's unique qualities of place
- A university that enriches the civic, social, cultural and economic life of the city.

Urban Design Principles

The Southern Campus Urban Design Framework clearly articualtes the following four guiding principles:

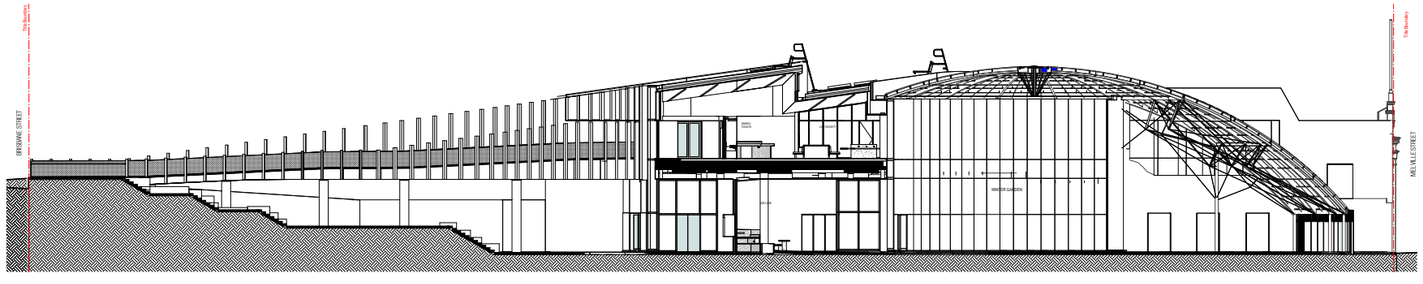
The Place Principle: Enhance the distinctive natural and human qualities of nipaluna/Hobart

The Sustainability Principle: Bring nature into the city as an integral part of a sustainable campus

The Accessibility Principle: Create a highly accessible campus that enhances connections across the city and from the Southern Region

The Community Principle: Create an inviting heart to a connected series of University and city communities

Site plan showing key connection from Melville Street to Brisbane Street



Section through campus showing elevation change from Melville Street (right) to Brisbane Street (left)

03

Design Response

03.01 Project Vision & Concept

The vision for the pedestrian bridge is for it to be an extension of the building, adopting the materiality of the original bridge located within the Forestry atrium and the design language of the new facade and paving treatment.

The three key design ideas informing the bridge are:

Materiality / Conceptual re-use

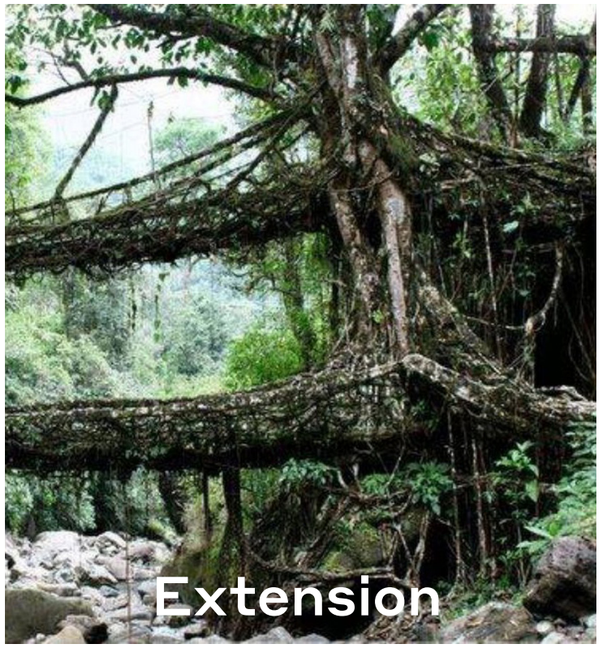
A material connection to the original site is created through the use of mass timber and brick pavers, which link to the previous uses of the site as well as the materiality of the existing bridge within the atrium.

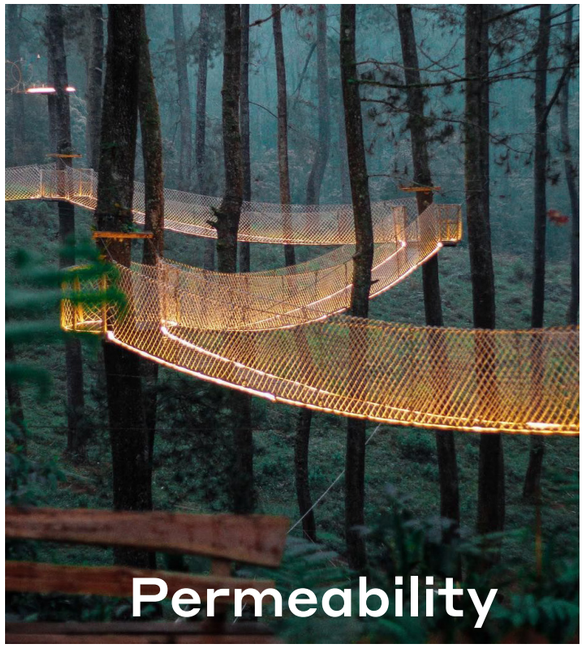
Extension of the building

The bridge is designed to read as part of the building facade rather than as a separate element. The facade treatment to the overall building is intended as a uniform element to link existing and new facades and create visual consistency. In a civic gesture, the bridge acts as a link between the public realm and the building itself

Visual and solar permeability

The use of mesh to form a skin to the balustrade balances a lightweight, delicate aesthetic that encourages permeation while connecting to the found condition of the original bridge.





03.02 Design Response

Design Response

The design principles informing our approach to the pedestrian bridge are underpinned by the overarching principles of the wider campus:

The Place Principle: This is articulated through integration of architecture and landscape, as well as the adaptive reuse of materials and consistency of design language.

The Sustainability Principle: The ambitious carbon reduction target set by the university ties into this principle and informs the material choices of the bridge, as does the idea behind extensive planting through out the site connecting the exterior and interiors and anchoring the buildings to site.

The Accessibility Principle: The landscaped path through the Forestry building creates a new through-block pedestrian link between Melville and Brisbane Streets. The pedestrian bridge is an extension of this link ensuring a porous and activated campus.

The Community Principle: The campus is of and for the city of Hobart. Clear navigation into a welcoming environment is a critical part of the success of the campus. The bridge links the student-accessible areas of the building to Brisbane Street in an accessible way.

+

MERGING TWO CONDITIONS

03.03 Built Fabric / Materiality

Our intent fpr the main building is to create a unified, consistent experience across Forestry and Timber Yards. Our approach to the external materiality of the building, which extends to the bridge, centres around two key concepts:

- Working with found conditions

- Consistency of materials

The circular geometry of the courtyard the bridge sits within is an echo of the existing geometry of the dome. The form of the bridge is conceptually a peeling off of this circular, vertically fenstrated facade to create a direct link with the public realm.

The built fabric of the bridge is also an extension of the building. The paving treatment throughout the public areas of the building is patterned brick, locally sourced and carbon neutral. The horizontal surface of the bridge is an extension of this groundplane. The bridge balustrade structure is mass timber fins, consistent with the unifying facade treatment. The metal mesh strectched between the fins is intended to be lightweight and visually permeable. Timber is the key new material used externally, and the bridge celebrates this.

The concrete columns supporting the bridge are consistent with the existing and new concrete columns throughout the building.

Brisbane Street entry showing new glazing and mass timber fins

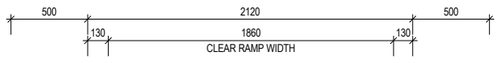
Stainless steel mesh - built example showing detailing

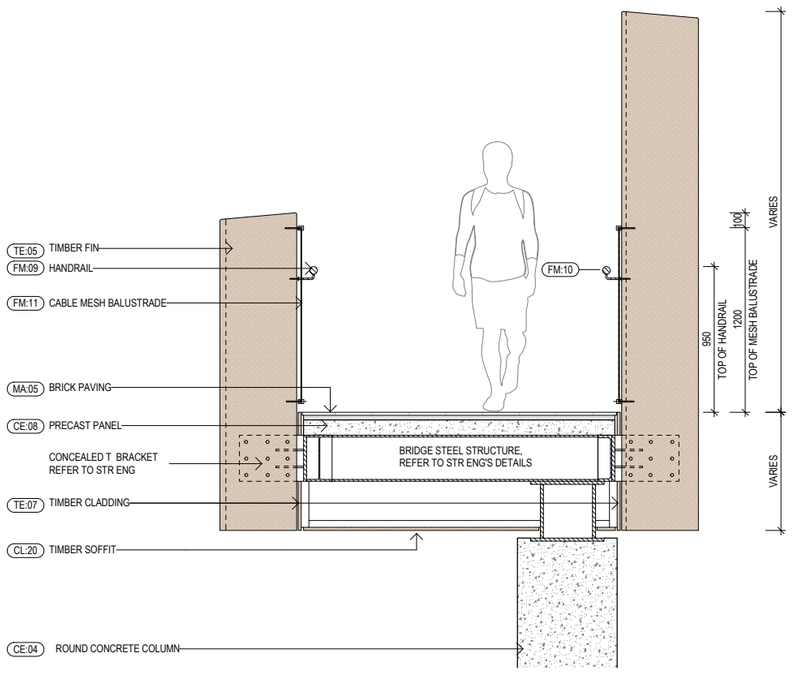
03.03 Built Fabric / Materiality

The landscape concept for the overall project is for the landscaping to act as a link through the building into the atrium.

The landscaping to the terrace adjacent to the bridge is conceptually consistent with the landscape proposal approved as part of the overall building DA, with some adjustments to suit the bridge structure, for safety and to enable passive surveillance. The landscape design and plant selections are further detailed in the accompanying landscape plan by Realm.

Diagrammatic elevation showing consistent facade treatment unifying the building and bridge





Typical section showing materiality and proportion

03.04 Sightlines & Safety

Clause 22.4.4 of the relevant planning scheme addresses passive surveillance. Our specific response to these performance requirements is described in detail in the accompanying planning report.

The wider strategy for safety and security within the Forestry / Timber Yards building is as follows:

- The building is to be open for 'extended hours' to staff and students - final open hours will vary depending on the university calendar

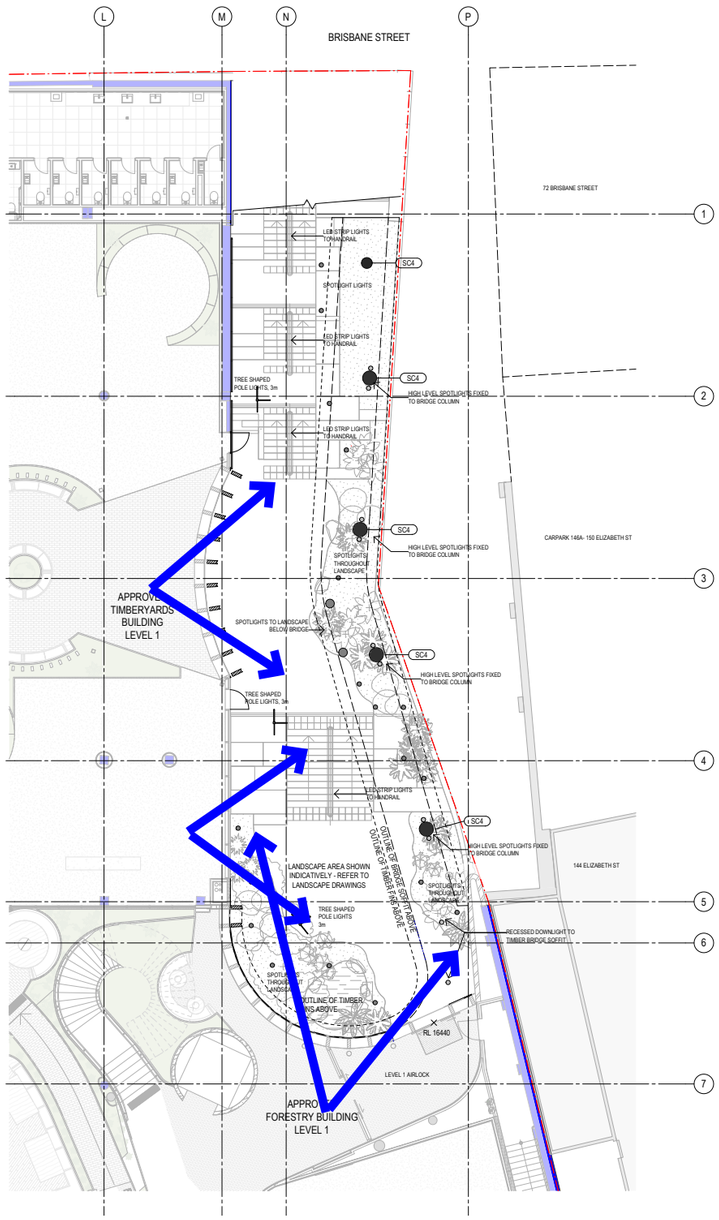
- The external landscaped areas, wintergarden and learning landscape across levels one and two will be accessible to the public during these 'extended hours'

- Outside of these hours, the building will be accessible to staff and students via proximity card

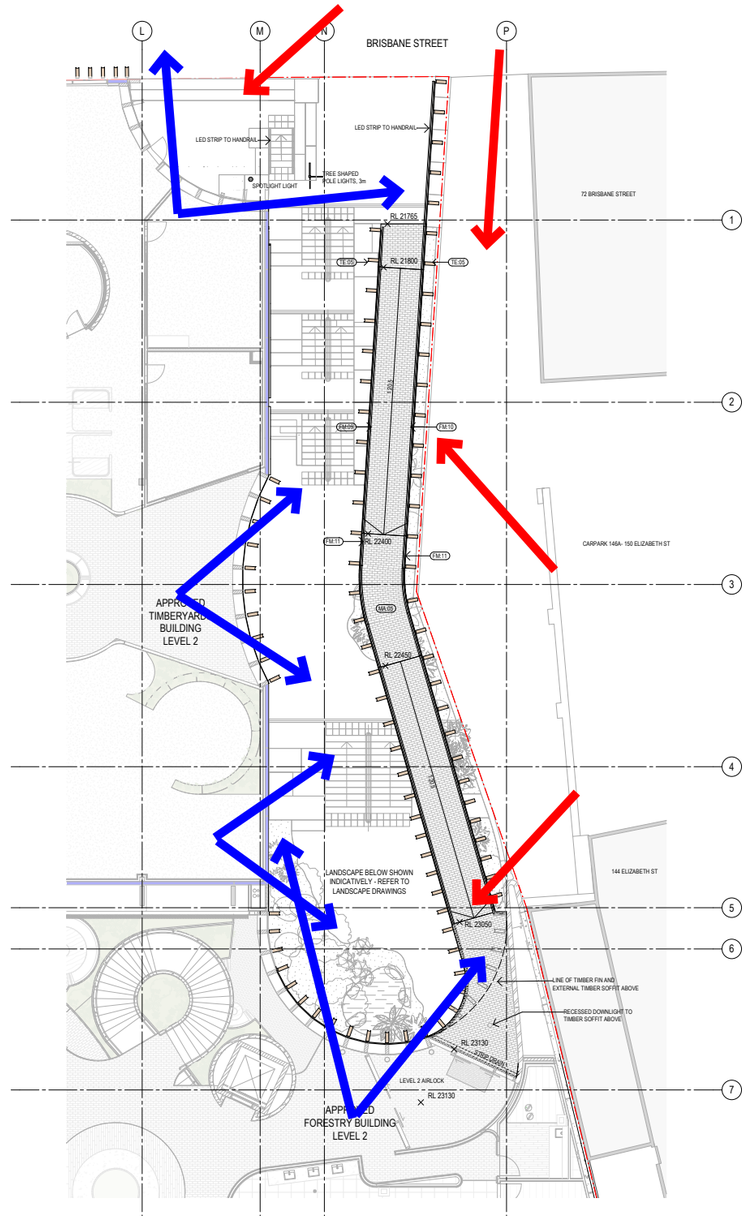
- There is a security control centre within the building, which will be staffed 24 hours a day.

Passive surveillance and visibility have been considered during the design process for the wider project, and particularly in the context of the pedestrian bridge.

Diagrams on this page show sightlines from the building to the bridge and landscaped terrace (in blue), and sightlights from the street and the neighbouring building to the east (in red). Sightlines along the landscaped terrace itself are demonstrated in the visualisations in section 4 of this report.



Level 1 Floor Plan



Level 2 Floor Plan

04

Visualisation

04.01 Renders

04.01 Renders

Aerial view of the pedestrian bridge

Building facade unwrapping to create the structure of the pedestrian bridge

View from Forestry

Lower entry into Forestry through landscaped connection from Brisbane Street

View from the pedestrian bridge

E

Appendix E:

Heritage Report

On behalf of the University of Tasmania
May 2021

HISTORIC HERITAGE MANAGEMENT STRATEGY

79-83 Melville Street, HOBART, TASMANIA

praxisenvironment
heritage | planning | archaeology
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north hobart
tasmania 7002
0418 303184
info@prax.com.au

This document was written by Brad Williams (BA.Hons Archaeology, MA Cultural Heritage Management, G.Dip Environmental Planning) Director – Praxis Environment, with historical research part of Section 3 authored by Alan Townsend, Consultant Historian.

Unless otherwise stated, all photographs were taken by Brad Williams, 2021

Unless otherwise stated, the north point (or approximate) of maps and plans is to the top of the page – project north is designated as the Elizabeth Street frontage.

Cadastral information depicted in this document must not be relied upon without verification by a Surveyor. Rectified aerial imagery has not been used; therefore, the actual location as depicted in aerial images may differ to that of actual survey. Floor and roof plans are not necessarily to scale and indicative only. Unless expressly stated, measurements are only indicative.

Praxis Environment (ABN 93 918 955 735) is a division of Praxis Synergy Pty. Ltd. (ACN 623 700 818).
PO Box 338 NORTH HOBART TAS 7000
PO Box 5228 SOUTH MELBOURNE 3205

CONTENTS

1. INTRODUCTION

1.1. RATIONALE, PROJECT BRIEF AND SCOPE

This document has been commissioned by the University of Tasmania, via Morrison Breytenbach Architects (Hobart) and Woods Bagot Architects (Melbourne) in order to comprehensively and strategically manage any historic heritage values of the subject site at 79-83 Melville Street, Hobart (the *site*) in an any future development of that site. Praxis Environment were commissioned to undertake this project, further to the brief of providing a staged process of heritage guidance, that of the provision of preliminary heritage advice to assist in any broad feasibility studies and concepts of future development, followed by a more detailed and specific project to further guide the design of a more detailed development scheme followed by a heritage impact assessment of that scheme. Specifically, the brief for this project was:

1. **A detailed review and confirmation of heritage requirements** - Undertake a review of all statutory historic heritage and archaeological requirements associated with the proposed development (e.g. site and surrounds) and provide a detailed framework of those requirements as early as possible in the planning process. Also, undertake a review of all non-statutory policy/guidelines which may provide a framework for understanding the heritage issues, significance and requirements relevant to the subject site and surrounds (including a review of the client-provided heritage assessment).

2. **An overview site history -** which is the essential basis for (3) and (4) below.

3. **Statement of Historical Archaeological Potential** for the place which would involve a review of historic documents and secondary source material with the aim of gaining a detailed understanding of the development of the site and therefore gaining a detailed understanding of the site formation processes acting upon that site. This would also include a regional, thematic and temporal analysis of any identified/likely archaeological remains in order to gain a thorough understanding of the significance of such as well as a detailed title history search. This (and other archaeological approaches) would be in accordance with the relevant industry standards, namely the Tasmanian Heritage Council's Practice Note 2 (Managing Historical Archaeological Significance in the Works Application Process) which is considered to be the industry benchmark for sites of historical archaeological potential. The results of this exercise would be used to guide the design process with the aim of minimising/avoiding impact upon significant archaeological remains, or to provide a substantive understanding of the site sufficient to guide the management and mitigation strategies in points (5b) and (5c) below if impact is not feasibly avoidable.

4. **A Conservation Brief for the listed portion of the site (i.e. refined by the results of (1)).** An assessment of the form and fabric of the listed portion of the site as a means of determining, potentially limiting and ranking the significance of the various portions of the building(s). This would also include a review of the significance, setting and context of the heritage building(s) within the wider townscape attributes of the vicinity, which seeks to set policy for appropriate (re)development of the site consistent with ICOMOS Australia Burra Charter process and the applicable statutory heritage requirements. This policy should be used to guide the development design to respond to any significant heritage values of adjacent places/areas.

Note that part-way through the project, the brief was extended to include the portion of the strata-titles place known as the 'Freedom' building facing Brisbane Street.

1.2. DEFINITION OF PLACE

The *subject site* is comprised of 79-83 Melville Street, Hobart, Tasmania, which includes the following broad site features as considered here:

- The former Crisp and Gunn warehouse/store (a 2-3 storey c1923 building facing Melville Street).
- The former Crisp and Gunn office (a 2 storey c1923 building facing Melville Street).
- The 'Forestry Dome' – a large glass dome between the two above buildings, built in 1997.
- The 'Freedom' building, a late 1990s showroom with a near full-footprint basement carpark, facing Brisbane Street.
- The 1997 Forestry offices, carpark etc. between the two building complexes (i.e. central portion of the site)

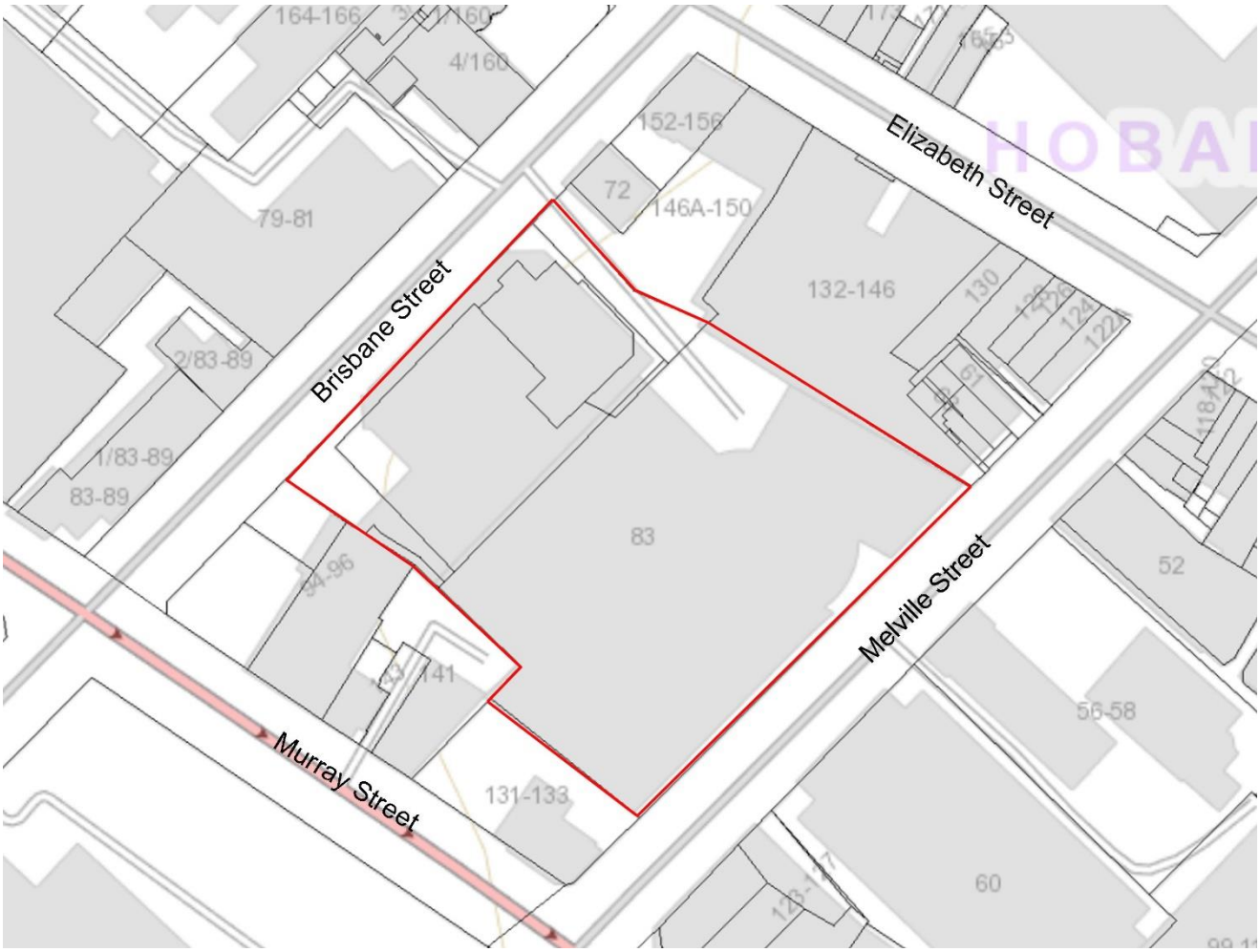


Figure 1.1 – The cadastral parcels comprising the subject site (depicted in red) and surrounds (www.thelist.tas.gov.au).

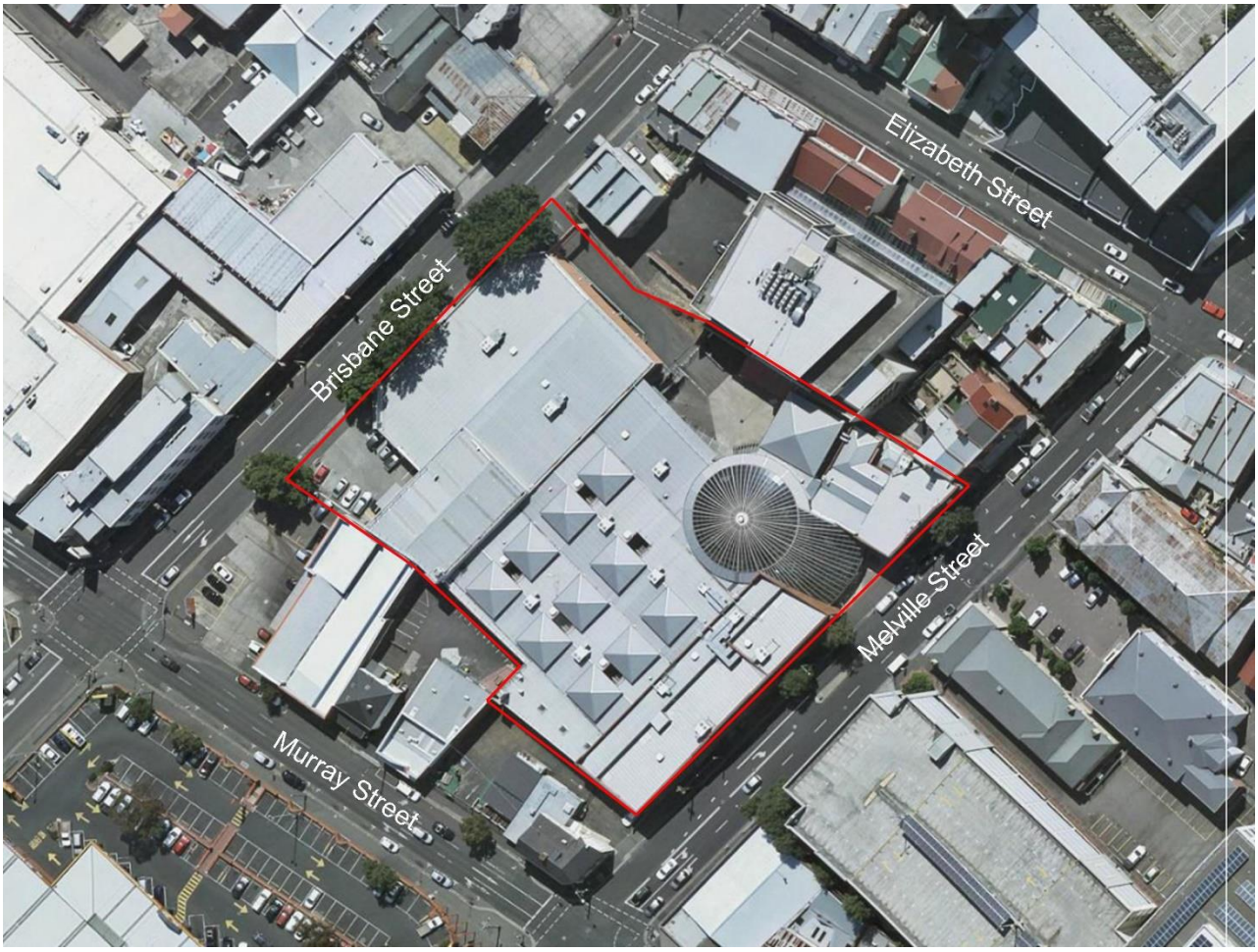


Figure 1.2 – A recent aerial image of the site and immediate surrounds– the subject site outlined in red. www.thelist.tas.gov.au

1.3. METHODOLOGY

This assessment has been undertaken in accordance with the ICOMOS Australia ***Burra Charter,*** which is considered to be the Australian heritage industry's benchmark for assessing, understanding and managing heritage values. Figure 1.3 depicts this process:

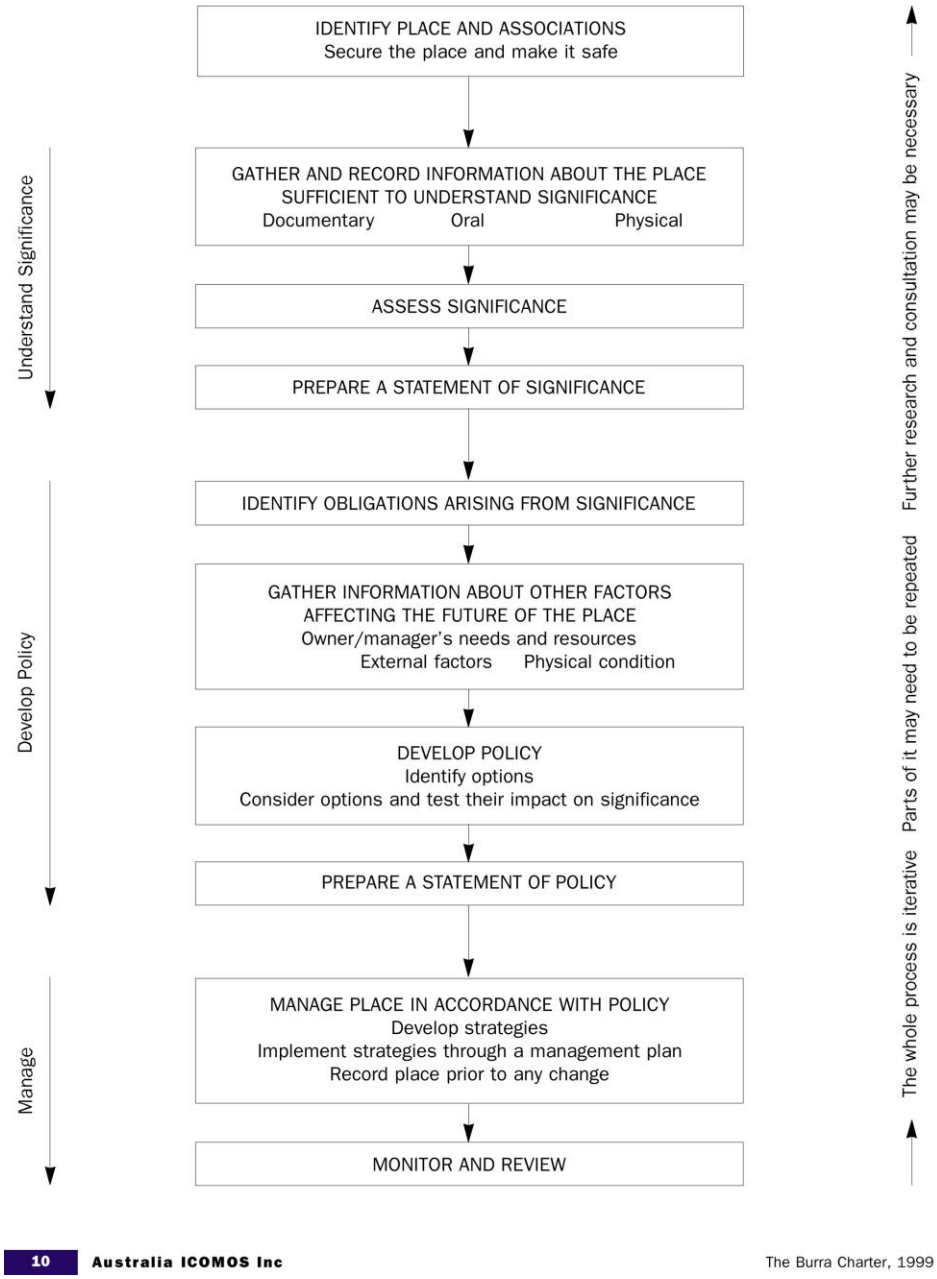


Figure 1.4 – The Burra Charter Process. ICOMOS Australia.

The statutory provisions and consequent responsibilities as outlined in Section 1.2 have also been considered in formulating this document.

This document takes the principles of conservation planning, as outlined in J.S. Kerr's *The Conservation Plan*[1], in order to develop the policies upon which the conservation of the place (and assessment of development impact) is based. This document has also been developed with regard to the standard content of conservation management plans as detailed by the New South Wales Heritage Office's *A Suggested Table of Contents for a Conservation Management Plan*[2], as well as the New South Wales Heritage Office guidelines for the preparation of brief conservation management strategies.[3]

It is intended that this document be used by the design team in any forthcoming development of the place and this sets the benchmark of understanding the significance of the place against which a heritage impact assessment for any proposed development can be undertaken. Figure 1.5 depicts this process:

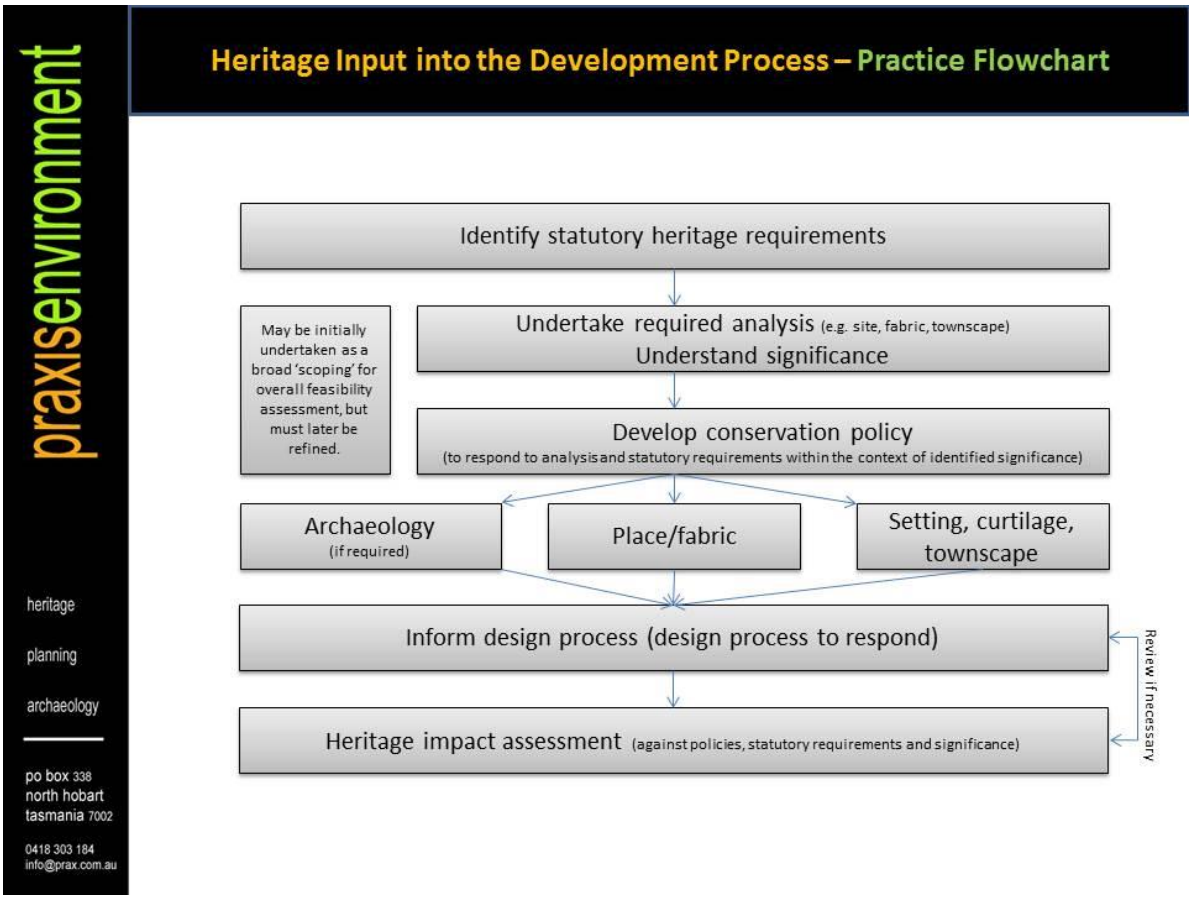


Figure 1.5 – Practice flowchart for the application of this conservation planning document.

Note that this document does not include any heritage impact assessment, as per the brief above.

[1] KERR, J. (2000): *The Conservation Plan.* National Trust of NSW, Sydney.
[2] http://www.heritage.nsw.gov.au/docs/cmp_contents2.pdf
[3] http://www.heritage.nsw.gov.au/docs/CMS_part1investigation.pdf

1.4. PROJECT TEAM AND ACKNOWLEDGEMENTS

This document as written by Brad Williams, heritage consultant and historical archaeologist, Praxis Environment – a division of Praxis Synergy Pty. Ltd. (Hobart and Melbourne). Historical research assistance was provided by Alan Townsend, sub-consultant historian. The author would like to acknowledge the following for their assistance in this project:

- James Morrison and Yvette Breytenbach – Morrison Breytenbach Architects
- William Thiessen, Fernanda Eusebio and Alistair Flynn – Woods Bagot Architects
- Justin Hanlon – University of Tasmania
- Sarah Waight, Hobart City Council

-

2. STATUTORY HERITAGE REQUIREMENTS

The following heritage listings and overarching legislative provisions are relevant to the management of the historic cultural heritage values of the place:

2.1. HOBART INTERIM PLANNING SCHEME 2015 (HIPS15)

HERITAGE PLACE

83 Melville Street is listed as a *Heritage Place* on Table E13 of the scheme (as defined in Figure E.13.1.11 'Specific Extent 83 Melville Street', which basically includes only the footprint of the two former Crisp and Gunn (1923) buildings:

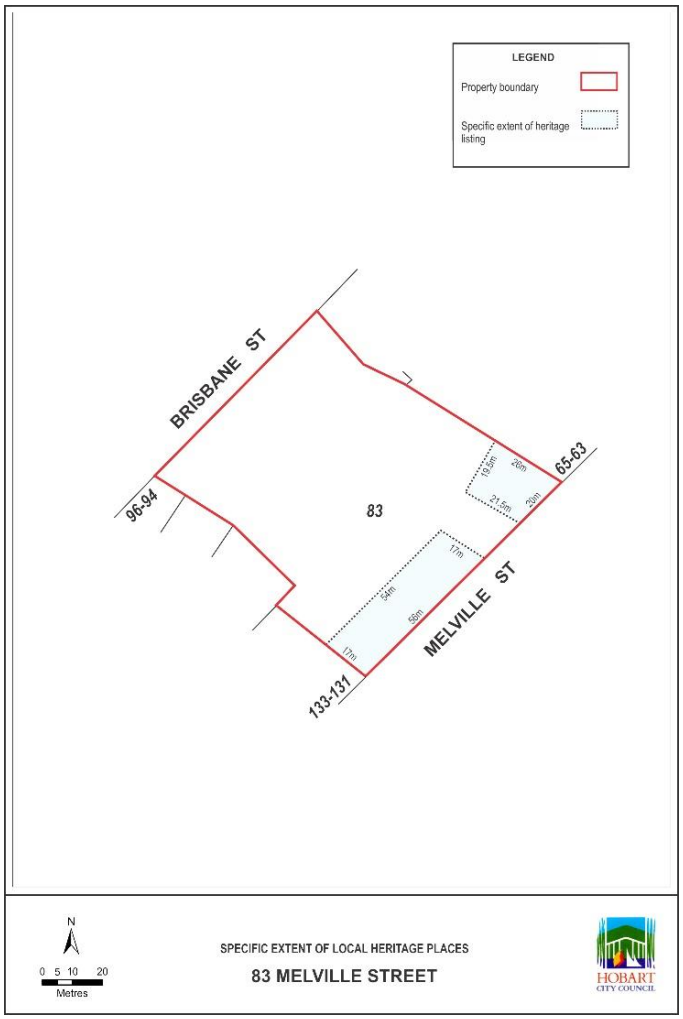


Figure 2.1 – Area affected by Table E.13 of the HIPS15 (Fig. E.13.1.11)

Any demolition, development or subdivision of the place must be in accordance with the provisions of Part E13.7 of the Scheme (Development Standards for Heritage Places):

	Acceptable Solution	**Performance Criteria**
E.13.7.1 - Demolition	*A1. No Acceptable Solution.*	*Demolition must not result in the loss of significant fabric, form, items, outbuildings or landscape elements that contribute to the historic cultural heritage significance of the place unless all of the following are satisfied;* *(a) there are, environmental, social, economic or safety reasons of greater value to the community than the historic cultural heritage values of the place;* *(b) there are no prudent and feasible alternatives;* *(c) important structural or façade elements that can feasibly be retained and reused in a new structure, are to be retained;* *(d) significant fabric is documented before demolition.*
E.13.7.2 – Building and Works other than Demolition	*A1. No Acceptable Solution.*	*P1. Development must not result in any of the following:* *(a) loss of historic cultural heritage significance to the place through incompatible design, including in height, scale, bulk, form, fenestration, siting, materials, colours and finishes;* *(b) substantial diminution of the historic cultural heritage significance of the place through loss of significant streetscape elements including plants, trees, fences, walls, paths, outbuildings and other items that contribute to the significance of the place.*
	A2. No Acceptable Solution.	*P2. Development must be designed to be subservient and complementary to the place through characteristics including:* *(a) scale and bulk, materials, built form and fenestration;* *(b) setback from frontage;* *(c) siting with respect to buildings, structures and listed elements;* *(d) using less dominant materials and colours.*
	A3. No Acceptable Solution.	*P3. Materials, built form and fenestration must respond to the dominant heritage characteristics of the place, but any new fabric should be readily identifiable as such.*
	A4. No Acceptable Solution.	*P4. Extensions to existing buildings must not detract from the historic cultural heritage significance of the place.*

	A5. New front fences and gates must accord with original design, based on photographic, archaeological or other historical evidence.	*P5. New front fences and gates must be sympathetic in design, (including height, form, scale and materials), to the style, period and characteristics of the building to which they belong.*
	A6. Areas of landscaping between a dwelling and the street must be retained.	*P6. The removal of areas of landscaping between a dwelling and the street must not result in the loss of elements of landscaping that contribute to the historic cultural significance of the place.*
E.13.7.3 - Subdivision	*A3. No Acceptable Solution.*	*P1. A proposed plan of subdivision must show that historic cultural heritage significance is adequately protected by complying with all of the following:* *(a) ensuring that sufficient curtilage and contributory heritage items (such as outbuildings or significant plantings) are retained as part of any title containing heritage values;* *(b) ensuring a sympathetic pattern of subdivision;* *(c) providing a lot size, pattern and configuration with building areas or other development controls that will prevent unsympathetic development on lots adjoining any titles containing heritage values, if required.*

PLACE OF ARCHAEOLOGICAL POTENTIAL

The site is included in Table E.13.4 (Places of Archaeological Potential), as defined by Figure E.13.4.1 of the scheme, therefore Clause E.13.10.1 of the scheme applies to the entire site. This means that any development on the subject site will need to be informed by a *statement of historical archaeological potential* (SoHAP) which will consider the site history, past development, the research potential of such (along a range of regional, thematic and temporal lines), and the disturbance history and propose an *archaeological zoning plan* for the site.

Any future development will require an *archaeological impact assessment* to be undertaken as informed by the SoHAP. If impact is likely, this will require consideration of design amendments to avoid or minimise that impact (particularly on very significant remains) – unless there are no prudent or feasible alternatives to that impact. If impact is likely and unavoidable, then an *archaeological method statement* will be required.

	Acceptable Solution	Performance Criteria
E.13.10.1 – Building and Works other than Demolition	*A1. Building and works do not involve excavation or ground disturbance.*	*P1. Buildings, works and demolition must not unnecessarily impact on archaeological resources at places of archaeological potential, having regard to:* *a) the nature of the archaeological evidence, either known or predicted;* *b) measures proposed to investigate the archaeological evidence to confirm predictive statements of potential;* *c) strategies to avoid, minimise and/or control impacts arising from building, works and demolition;* *d) where it is demonstrated there is no prudent and feasible alternative to impacts arising from building, works and demolition, measures proposed to realise both the research potential in the archaeological evidence and a meaningful public benefit from any archaeological investigation;* *(a) measures proposed to preserve significant archaeological evidence 'in situ'.*
E.13.10.2 – Subdivision	*A1. Subdivision provides for building restriction envelopes on titles over land defined as the Place of Archaeological Potential in Table E13.4.*	*P1. Subdivision must not impact on archaeological resources at Places of Archaeological Potential through demonstrating either of the following:* *(a) that no archaeological evidence exists on the land;* *(b) that there is no significant impact upon archaeological potential.*

HERITAGE PRECINCT

The subject site is not within any Heritage Precinct as defined by Table E13.2 and depicted on Map E13.3 of the Scheme, therefore the provisions of Clause E13.8 do not apply.

SUBMISSION REQUIREMENTS

Further to Clause E13.5.1 of the Scheme, the Planning Authority **may** require the following to accompany any application for use or development of a Heritage Place:

(a) a conservation plan;

(b) photographs, drawings or photomontages necessary to demonstrate the impact of the proposed development on the heritage values of the place;

(c) a statement of significance;

(d) a heritage impact statement;

(e) a statement of compliance;

(f) a statement of archaeological potential;

(g) an archaeological impact assessment;

(h) an archaeological method statement;

2.2. HISTORIC CULTURAL HERITAGE ACT 1995

83 Melville Street (the former Crisp and Gunn buildings) is listed on the Tasmanian Heritage Register (ID#2507); therefore, the place is subject to the provisions of the *Historic Cultural Heritage Act 1995* (HCHA).

At the outset of this project, only a basic datasheet for the place existed, and no Central Plan Registry registered plan existed to explicitly define the registered area, therefore the listing deferred to the cited title (C/T 149231/2).

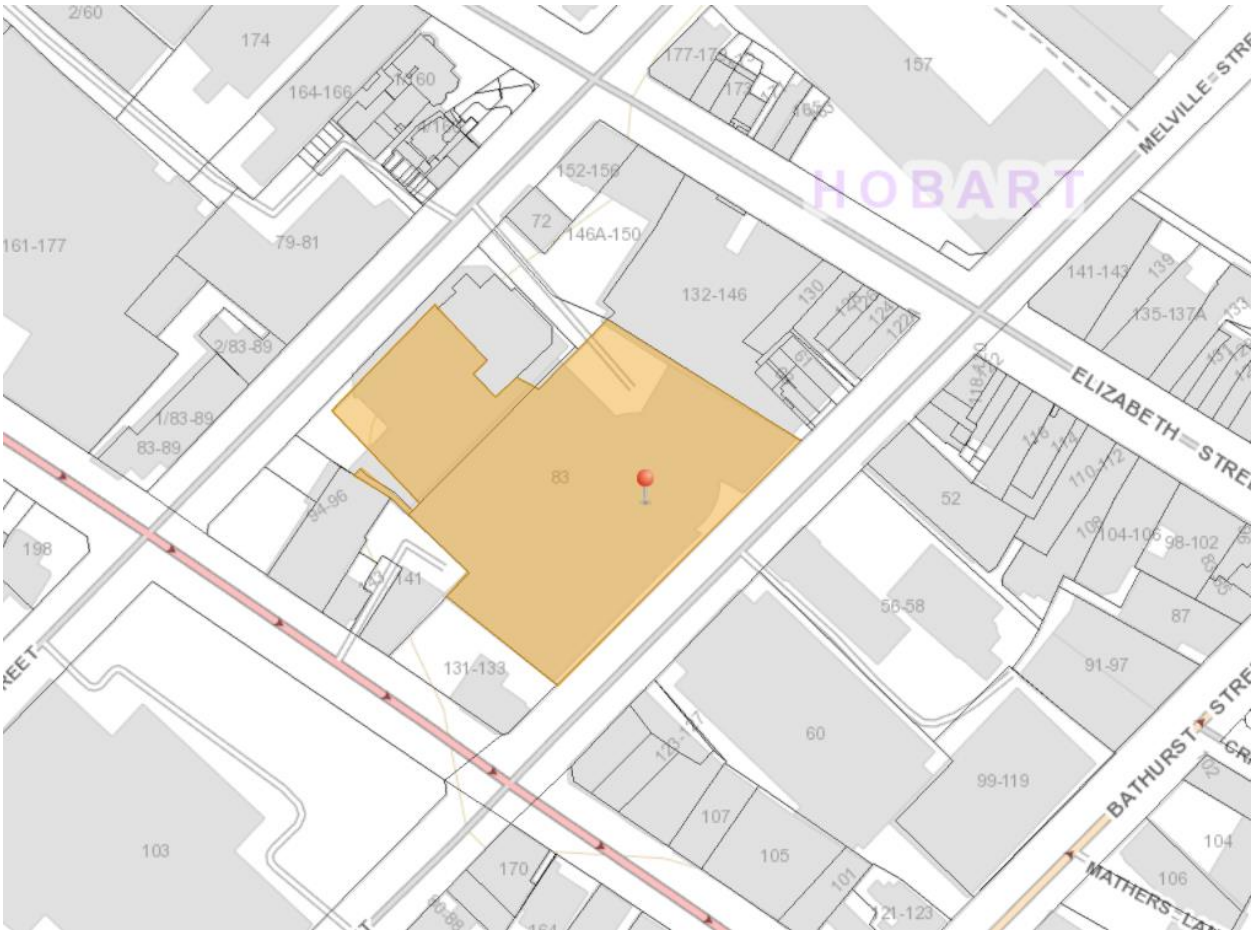


Figure 2.2 – Area affected by the Tasmanian Heritage Register entry at the time of project inception (i.e. C/T 149231/2).

That area the area includes the buildings on the Melville Street frontage (i.e. the two brick former Crisp and Gunn buildings – the stated intent of the listing) however the land affected also includes the 1997 Forestry dome and associated buildings, as well as the basement carpark of the Freedom building (not the building itself though, which has a separate C/T reference as part of a strata title).

In mid-2021, the Tasmanian Heritage Council provided a replacement entry for the place, which added C/T's 149231/1 and 149231/0 to the registered area (i.e. the entire subject site here). That datasheet (provided here as Appendix A) also explicitly adds reference to the Forestry Dome and a sandstone wall on the Brisbane Street frontage of the site.

Part 6 of the HCHA (Heritage Works) sets the process by which approvals for works may be gained from the Tasmanian Heritage Council (THC):

> ***35. Heritage works require heritage approval***
>
> ***(1)*** *A person must not carry out any heritage works unless those heritage works have heritage approval.*

(2) *For the purposes of subsection (1), heritage works are taken to have heritage approval if, and only if –*

(a) *in a case where a certificate of exemption has been issued, the heritage works are carried out in accordance with –*

(i) *that certificate of exemption; and*

(ii) *if a discretionary permit or other permit is required for the heritage works under the Planning Act, that discretionary permit or other permit; or*

(b) *in a case where a certificate of exemption has not been issued, the heritage works are carried out in accordance with a discretionary permit.*

(3) *It is a defence in proceedings for an offence under subsection (1) if the defendant establishes that –*

(a) *the heritage works were carried out in response to an emergency; and*

(b) *the heritage works were, both as to nature and extent, reasonably necessary for the purposes of responding to the emergency; and*

(c) *in the circumstances, it was not practicable to seek a certificate of exemption; and*

(d) *the defendant, before, while or as soon as practicable after carrying out the heritage works, notified the Heritage Council, in writing, of the emergency and the details of the heritage works.*

Sections 36-41 set the process for the lodgement and assessment of applications for a heritage works permit, via a Discretionary Development Application under the Land Use Planning and Approvals Act 1993. Section 42 describes the process whereby certain works may be exempt from the requirement of s.35:

42. Certificates of exemption for heritage works

(1) *A person may apply to the Heritage Council for a certificate of exemption for heritage works.*

(2) *The exemption certificate application –*

(a) *is to be in a form provided or approved by the Heritage Council; and*

(b) *is to be supported by such information as the Heritage Council requires, either at the time of lodgment or subsequently.*

(3) *The Heritage Council may –*

(a) *approve the exemption certificate application; or*

(b) *refuse the exemption certificate application.*

(4) *Without limiting its discretion, the Heritage Council must approve the exemption certificate application if it is reasonably satisfied that the heritage works –*

(a) *are identified in the works guidelines as works that will have no impact or only negligible impact on the historic cultural heritage significance of the relevant registered place or heritage area; and*

(b) *are capable of being carried out in accordance with the works guidelines.*

Whilst the HCHA provides no specific detail as to how particular proposals are considered, nor does it provide any indicative thresholds of what may be considered to have *no or negligible* heritage impact, the THC/Tasmanian Government publication *Works Guidelines for Historic Heritage Places* (November 2015)[4] provides further detail on the application process, guiding principles and the basis for decisions made by the THC. In addition, the THC has a series of practice notes and technical guides, available via www.heritage.tas.gov.au which provide useful guiding principles for how the THC are expected to assess and determine applications for heritage works.

2.3. ENVIRONMENT PROTECTION & BIODIVERSITY CONSERVATION ACT 1999

The place is not included on the National or Commonwealth Heritage Lists, therefore the historic cultural heritage provisions of the Environment Protection and Biodiversity Conservation Act 1999 are not applicable.

2.4. ABORIGINAL HERITAGE ACT 1975 (AMENDED 2017)

An assessment of any possible Aboriginal heritage values is not part of the brief for this report; nonetheless the provisions of the *Aboriginal Heritage Act 1975* are applicable to the place. A search of the Tasmanian Aboriginal Heritage sites register (Job # 21898847) did not identify any registered Aboriginal relics nor apparent risk of impacting Aboriginal relics (search valid until 28/12/21). The Tasmanian Government *Unanticipated Discovery Plan*

[4] http://heritage.tas.gov.au/Documents/Works_Guidelines_FINAL_Nov2015.pdf

– *Procedure for the management of unanticipated discoveries of Aboriginal relics in Tasmania* must be adhered to in the event that any Aboriginal heritage items are discovered during the course of any works.

2.5. PREVIOUS CONSERVATION PLANNING DOCUMENTS

Although not having any statutory standing, there are two relevant previous conservation planning documents relating to the former Crisp and Gunn buildings:

- A Statement of Cultural Significance of Crisp and Gunn Buildings, Melville Street, Hobart. Michael Court and Kerry Edwards, Historical Interpretation Consultants. (1990).
- 79 Melville Street, Fabric Assessment & Retention of Significance Study. Robert Vincent and Mike Grant, April 1995.

Both of these documents relate to the office building as part of the wider complex. The latter document appears to be intended to guide the redevelopment of the building post-Tasmanian Fire Service divestment and appears to have strongly guided the 1997 Forestry redevelopment of the site.

The Court and Edwards document provided some conservation policy for the buildings, noting that this was before they had any form of statutory heritage protection. Those policies have been considered here in the formulation of conservation policies in Section 8.

The Vincent and Grant document goes into a great deal more detail and was informed by the Court and Edwards document (which was included in the later report as Appendix 2). That document provided a thorough photographic survey of the building, a detailed fabric analysis and statement of significance. The report ranks the significance of the various forms, fabric and spaces of the building. The recommendations arising form that report and relative significance of the various elements have been used here in the formulation of conservation policies in Section 8 and the heritage impact assessment.

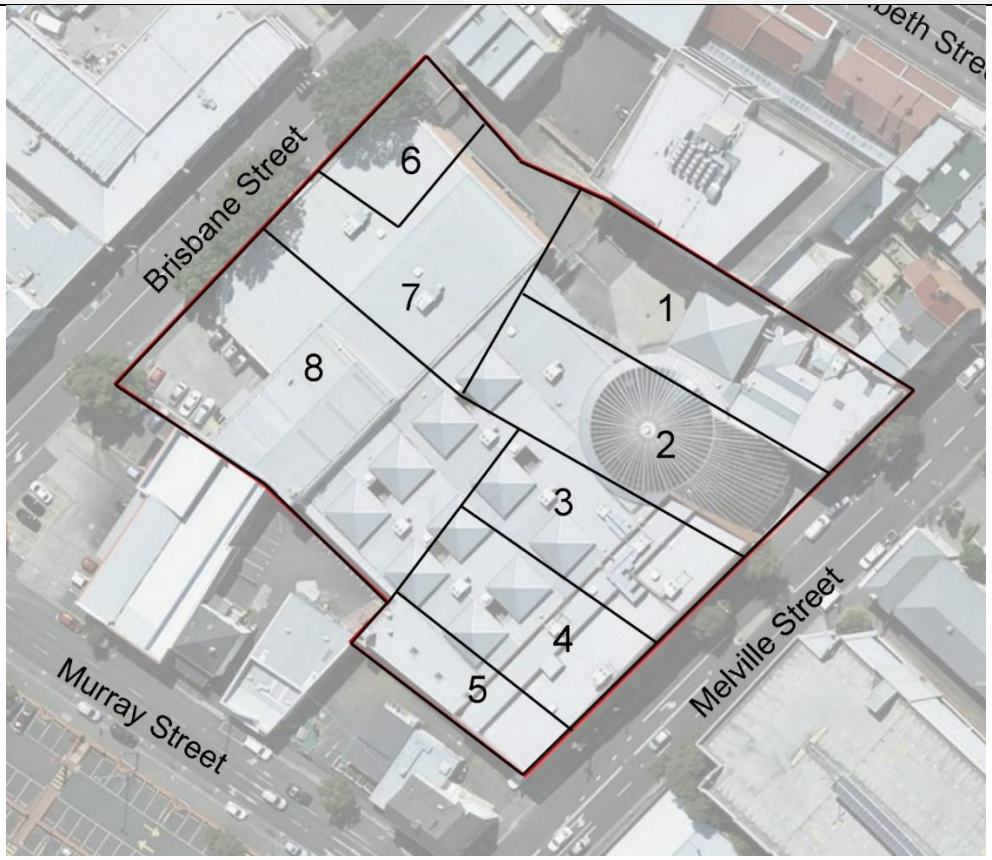
3. DOCUMENTARY EVIDENCE – HISTORICAL BACKGROUND

As outlined in the methodology in Section 1.3, the key to assessing historic heritage significance is to gain an understanding of the history of the place, the context of it within its surrounds, associated thematic contexts, and other intangible values (e.g. community value, value associated with people, events etc.). To enable this assessment, this research will focus on the physical development of the subject area, in order to provide the most detailed possible account of the structures erected on this site, their purposes, and their fate since European settlement in 1804.

3.1. PRE THE 1886 CRISP AND GUNN OCCUPATION

The subject site is comprised of eight early grants – for the sake of the early history of the site (at least) the narrative will follow each of those grants, as their dates of development, later subdivision and functional uses all vary. Following the 1886 Crisp and Gunn acquisition, these were progressively adhered – as the narrative further below will follow. Figure 3.1 provides this arrangement:

Figure 3.1 – Configuration of early land grants comprising the subject site, showing the early tenure of parcels comprising the subject site (largely based on Sprent's c1845 survey.



1	1 rood, 7 perches	Orignally granted to Joseph Bowden, recorded as being owned by Thomas Priest prior to 1833.
2	1 rood, 6.5 perches	Originally granted to Thomas Hoskission, gained by debtors judgment by William Lindsay in 1833.
3	25 2/10 perches	Originally located to John Swan, formally granted to Andrew Bent in 1828.
4	31 perches	In 1838 Joseph Barker addigend the land to his daughter Elizabeth Ibbotson, and granted to Henry Wilks as trustee for Ibbotson in 1840.
5	15 perches	Claimed by William Morgan prior to 1857, not formally granted until 1924 to Crisp and Gunn.
6	17 perches	Granted to Joseph Molloy pre-1845.
7	27 & 6/10 Perches	Claimed by William Willet and Bryant Webb pre-1845. Not formally granted until 1919 when granted to Emma and Frederick Crisp.
8	1 rood, 37 perches	Originally granted to Lewis Riley in 1867 apparantly after an earlier claim by Joseph Bowden that was cancelled in 1846.

Figure 3.2 - C1832 survey of Hobart – Hobart H5

This survey shows four substantial timber buildings fronting Melville Street, as well as a larger masonry building with timber additions fronting the western frontage of Brisbane Street. The interior of the site appears undeveloped, however this survey is known to only show major buildings. The accuracy of this survey is dubious in terms of precise boundaries and buildings, however, is generally accurate in depicting the general presence of buildings. The grey shading depicts timber buildings, and the pink shading depicts masonry buildings.

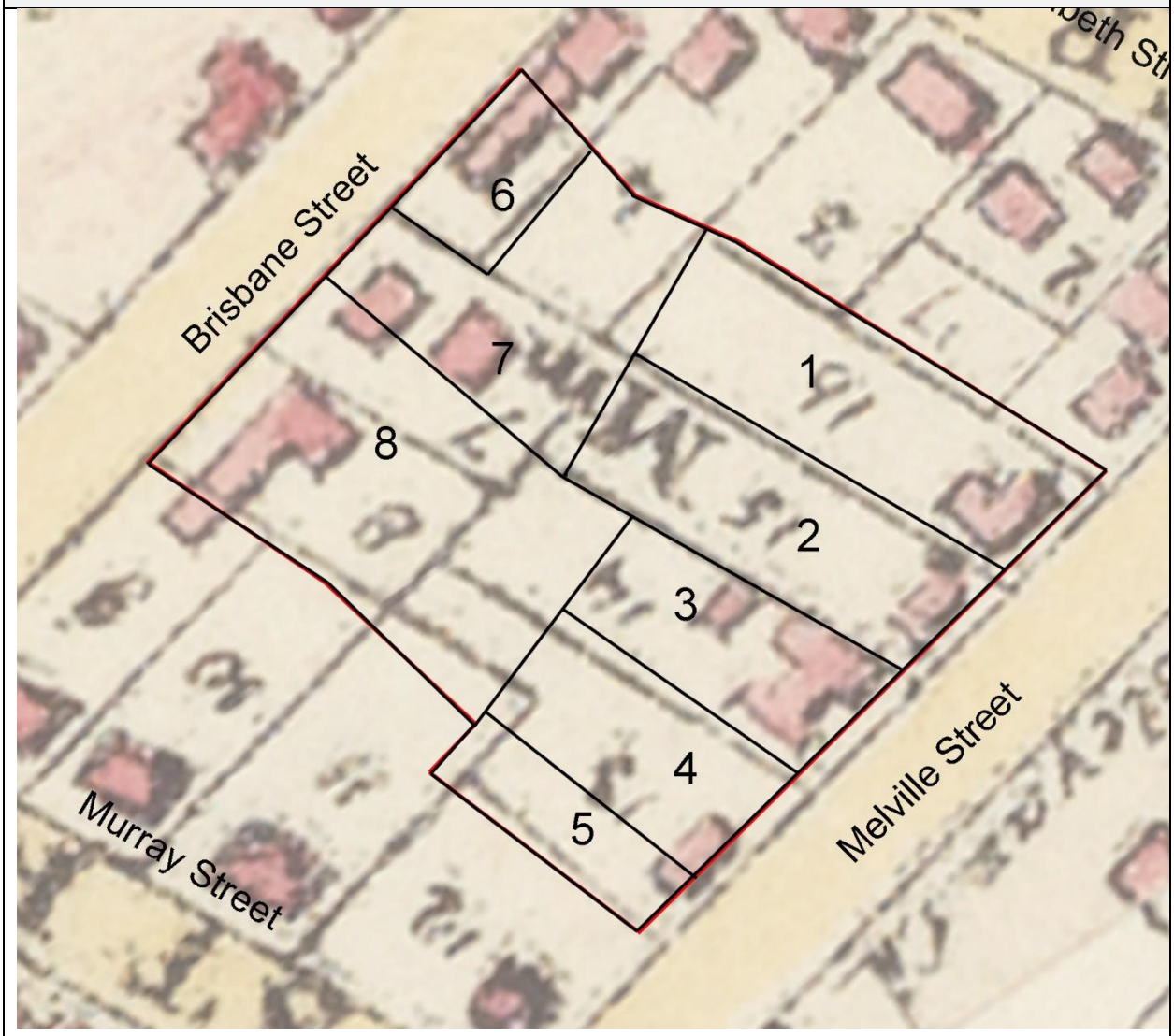
1.	The earliest record found for this 1 rood 7 perch allotment (shown as 33 and 14 perches on Sprent) records Thomas Priest in 1833 as living on this allotment[5], which had originally been part of a location to Joseph Bowden[6]. The c1832 survey of Hobart shows a timber building on this lot close to Melville Street.

[5] *The Colonist & Van Diemen's Land Commerce and Agricultural Advertiser*, 8 March 1833 p1
[6] *Cornwall Chronicle* 10 March 1875 p.4

2.	This allotment was originally granted to Thomas Hoskisson (date unknown). By August 1833, Hoskisson was indebted to William Lindsay for 200 pounds. The debt fell into arrears and in June 1839 Lindsay gained a judgement against Hoskisson from the Supreme Court. Eventually, Hoskisson conveyed the allotment to Lindsay in August 1843 in satisfaction of the debt[7]. The c1832 survey depicts a large timber building fronting Melville Street on this allotment.
3.	This allotment was originally located to John Swan, date unknown.[8] The first recorded transaction on this allotment occurs in May 1828, at which point Andrew Bent conveyed the property to Richard Bent for 70 pounds. The memorial for this transaction states that the property included "the weatherboarded house and other erections now thereupon standing"[9], which is consistent with the c1832 depiction. The boundaries described appear to correspond to the block shown on Sprent including the smaller division labelled "claimed by S.A. Shirley".
4.	The first recorded transaction on this land occurs in February 1838, when Joseph Barker, a farmer from New Norfolk, assigned the land to his daughter, Elizabeth Ibbotson[10]. The c1832 survey shows a timber building on the site fronting Melville Street.
5.	The site is shown as undeveloped on this survey.
6.	
7.	
8.	Ownership of this part of the site at this time is unclear, however a large masonry building is depicted, which appears to be larger than domestic scale, with two timber outbuildings nearby. The precise purpose of this building is not known although it is known that the site was later (at least) owned by Joseph Bowden who was the proprietor of the Lamb Inn in Brisbane Street. Sprent's survey of Hobart does not show Bowden as owning any other land in Brisbane Street, therefore this building *may* represent the Lamb Inn.

[7] DPIPWE The LIST Mem 2/6453
[8] *The Mercury* 24 August 1876 p.4
[9] DPIPWE The LIST Mem 1/657
[10] DPIPWE The LIST Mem 2/1939

Figure 3.3 – Frankland's 1839 survey of Hobart. Libraries Tasmania.



As pe the c1832 survey, this survey has a degree of inaccuracy insofar as boundaries and precise building locations, however it is known to reasonably accurately depict the general presence of buildings on a particular site.

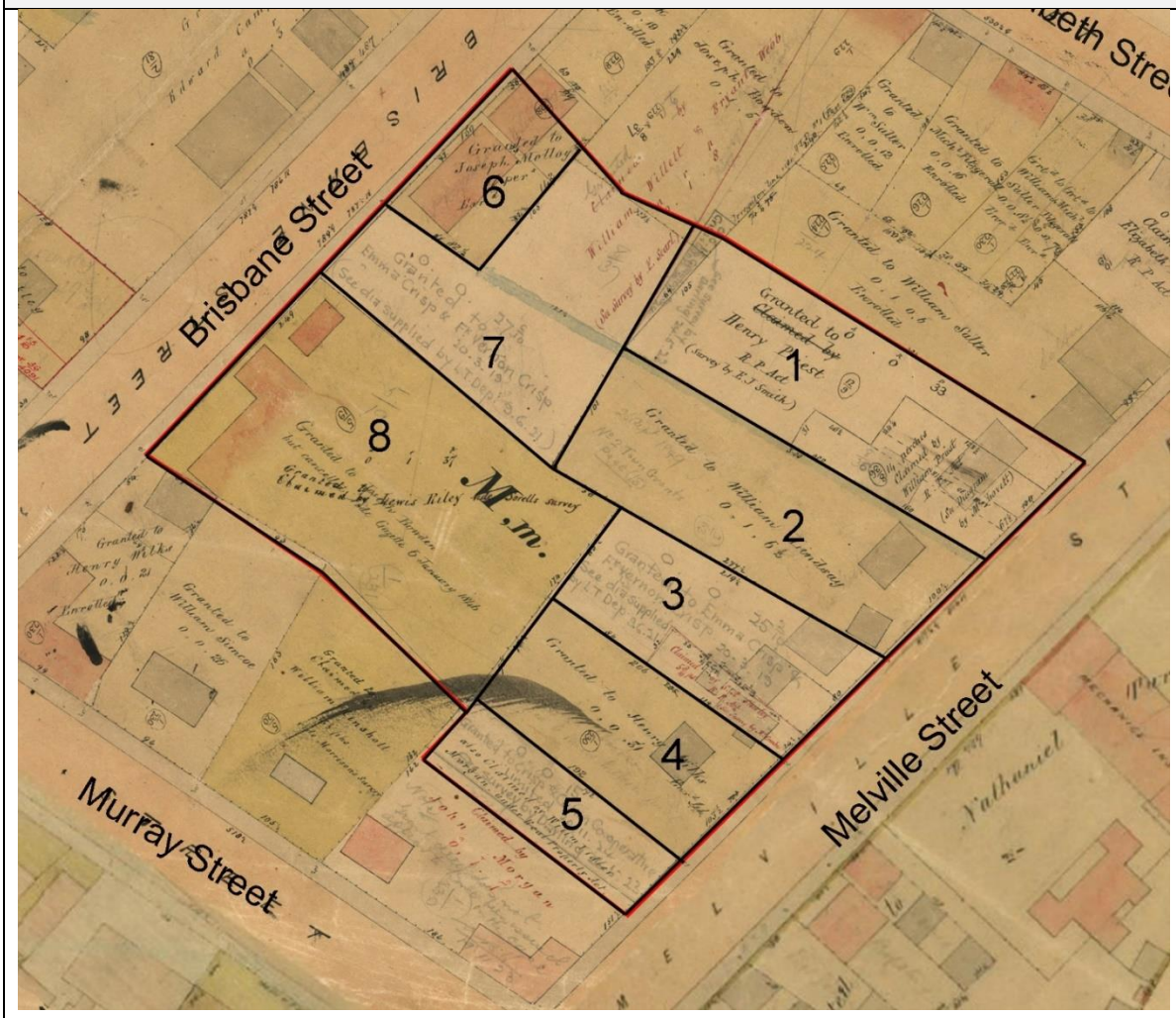
1.	As per the c1832 survey, it appears that a substantial building was present on the Melville Street frontage of this lot.
2.	As per the c1832 survey, it appears that a substantial building was present on the Melville Street frontage of this lot.
3.	In 1835, Richard Bent subdivided the allotment. The larger portion was sold to Thomas Fisher for 500 pounds[11]; this is the 25 2/10 perch allotment shown on Sprent, together with "the Brick Messuage thereon built with the kitchen detached", for 150 pounds[12]. This allotment remained in the hands of Fisher and his

[11] DPIPWE The LIST Mem 1/4461
[12] DPIPWE The LIST Mem 1/4460

	heirs until June 1897, when William Fisher sold it to Frederick Henry Crisp for 400 pounds[13]. Frankland's 1839 survey shows a larger complex of buildings on this site than the c1832 survey. See below for the divergent history of the smaller portion of the subdivision, sold to a Sarah Ann Shirley.
4.	The 1839 survey shows what is likely to be the same building as per the c1832 survey.
5.	This site is shown as undeveloped on this survey.
6.	A pair of houses had been developed on the Molloy lot by this time – likely only one (and a part of another) of these was within the subject site.
7.	A dwelling and rear outbuilding had been developed by this time. The ownership at the time is unclear.
8.	The earlier buildings are depicted on this survey, again the ownership and function is unclear but it is possibly that this Joseph Bowden's Lamb Inn.

[13] DPIPWE The LIST Mem 9/7771

Figure 3.4 – Sprent's c1843 survey of Hobart.



The c1843 Sprent survey of Hobart is known to have a very high degree of accuracy in terms of building locations, boundaries and materials (i.e. grey = timber, pink = masonry). This survey has been relied upon here for the designation of the early allotments comprising the subject site – note however Sprent only recorded portions of buildings that were visible from the public domain, therefore may not represent a comprehensive dossier of all buildings on ay particular site, and in the case of area 8 only depicts the front (i.e. publicly visible) portion of that building.

1.	The large timber building fronting Melville Street is seen on this survey, with a subdivision of the lot having occurred which passed through the building. Priest died in Hobart in December 1874[14] leaving the property to Henry and William Priest. This structure is bisected by later additions to Sprent showing a shared roadway passing through the location of the wooden structure. In March 1875, William Priest applied for and was granted 14 perches of Thomas' allotment.[15]

[14] TAHO RGD 35/1/8 No 2372
[15] *Cornwall Chronicle* 10 March 1875 p.4

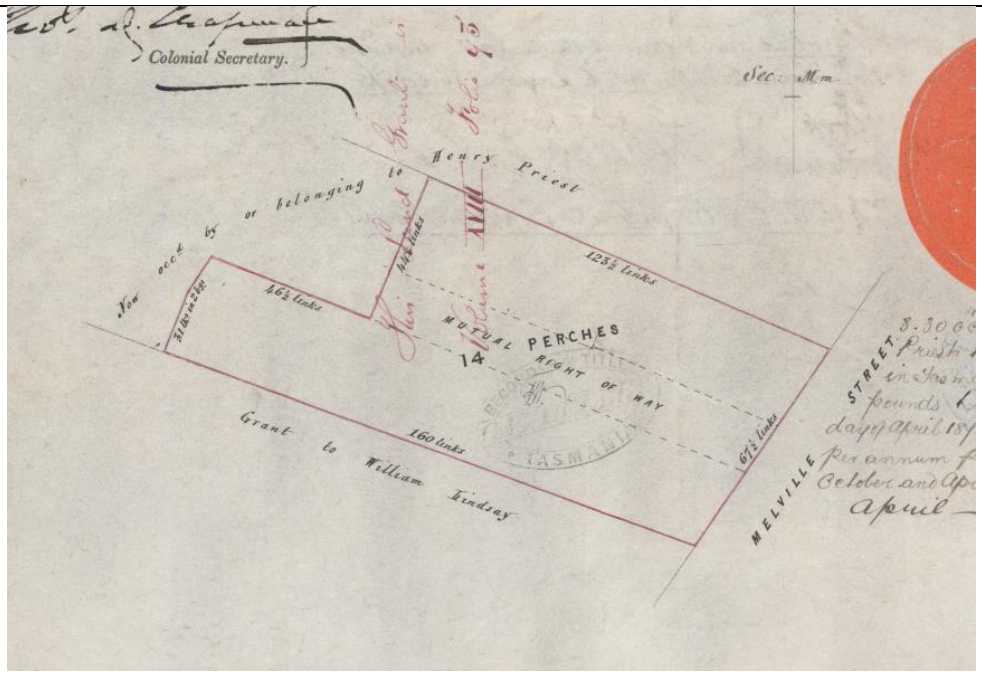


Figure 3.4a - Detail from Purchase Grant 25/121 showing William Priests' 14 perches

In October 1875, Priest sold the 14 perches to William Bezett, a licensed victualler, for 300 pounds[16]; in April 1885 Bezett sold to George Salier and George James[17]. In September 1885, Salier and James further subdivided the 14 perch block by dividing it in two:

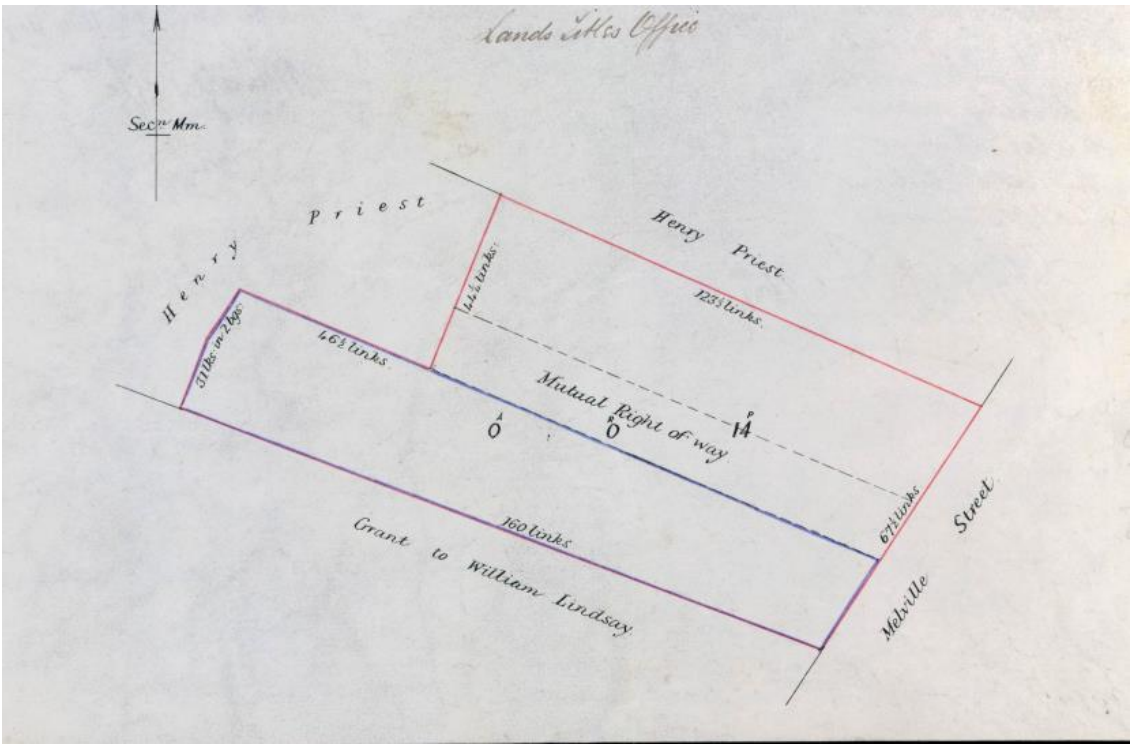


Figure 3.4b - Detail from DPIPWE CT47/8

[16] DPIPWE The LIST PG25/121 Purchase Grant
[17] DPIPWE The LIST CT18/93

The Murray Street side, measured at 7 perches (see blue outline above) was sold to William Langford, a licensed victualler, for 100 pounds[18]. In December 1894, Langford sold this 7 perch block to Frederick Henry Crisp for 135 pounds[19]. By 1914, this had been absorbed into the 32.9 perch Crisp block[20] which eventually enlarged to include the entire subject area.

The remaining portion of William Priests' 14 perch allotment (outlined in red above) sold to George Grey in May 1886 for 425 pounds[21]. The survey diagram from this sale (see below) depicts "old brick houses" at the front of this allotment[22]. Grey sold to Joshua Simmons in June 1891 for 400 pounds[23]. The allotment was purchased by Frederick Henry Crisp in May 1903[24].

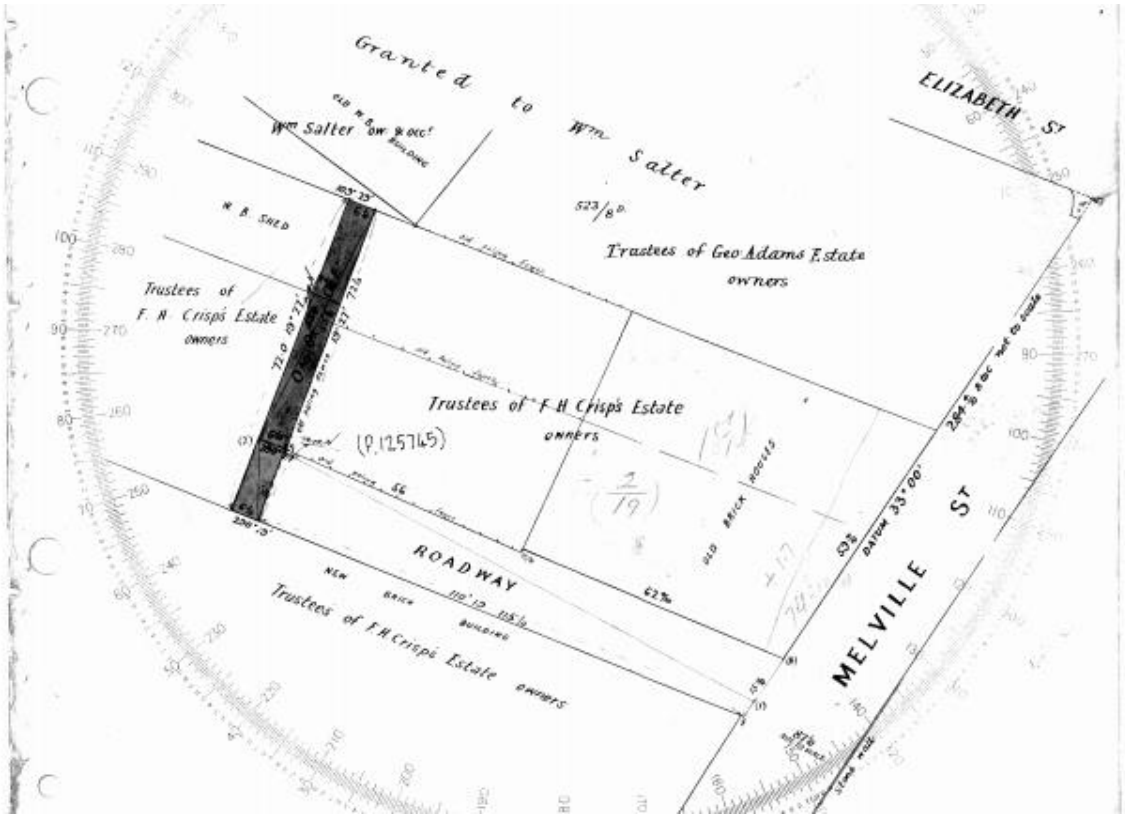


Figure 3.4c - Detail from DPIPWE Survey Diagram Hobart 13/13 (90323): The 8 perch portion of William Priest's grant

The remaining 33 perch portion of Thomas Priest's original allotment was granted to Henry Priest in August 1893[25] (see below). In April 1900, Henry Priest sold this allotment to Frederick Henry Crisp for 575 pounds[26].

[18] DPIPWE The LIST CT47/8
[19] DPIPWE The LIST CT49/72
[20] DPIPWE The LIST CT218/118
[21] DPIPWE The LIST CT47/8
[22] DPIPWE Survey Diagram Hobart 13/13
[23] DPIPWE The LIST CT54/96
[24] DPIPWE The LIST CT110/23
[25] DPIPWE The LIST PG67/74
[26] DPIPWE The LIST CT115/106

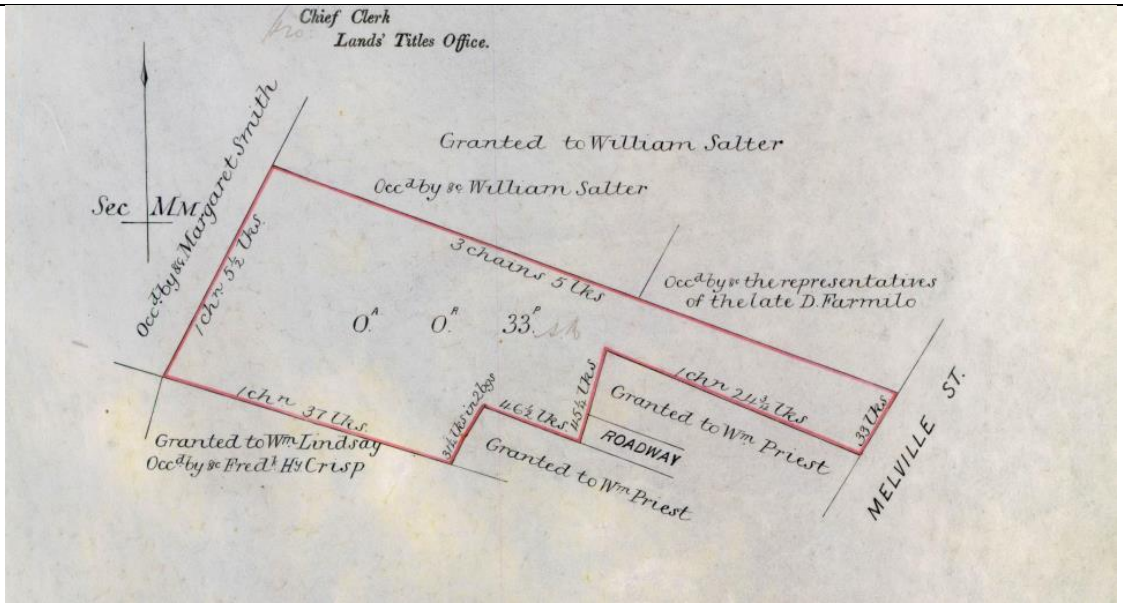


Figure 3.4d - Detail from DPIPWE CT115/106 showing Henry Priest's 33 perch grant

2.	A notation on Sprent records that the allotment was granted to William Lindsay in September 1849. Sprent records two timber structures fronting Melville Street. This research has not been able to trace the title history beyond this point, other than that by the early 20th century it was part of the F.H.Crisp block.
3.	As per the discussion on the 1839 survey, Sprent's c1845 survey shows a complex of timber buildings on this site, and the site having been subdivided into two lots. That survey shows a (much later) notation of a small lot (5.8 perches) having been acquired by a Sarah Ann Shirley. The pre-1832 dwelling appears to be the house and detached kitchen shown on the 1876 survey (see below). In March 1843, Jones conveyed the allotment to his son Richard Jones the younger in the form of a trust[27]. In April 1861, Jones Jr sold the property to William Morton for 60 pounds[28]. In March 1870, Morton conveyed the property to Robert Howard as a trustee for his 'spinster daughter' Sarah Ann Morton[29]. In April 1873, Sarah married Henry Shirley[30], and in August 1876 Sarah Ann Shirley applied to have her title to the allotment recognised by way of a grant from the Crown[31].

[27] DPIPWE The LIST Mem 2/6046
[28] DPIPWE The LIST Mem 4/9844
[29] DPIPWE The LIST Mem 5/6864
[30] TAHO RGD37/1/32 no 357
[31] *The Mercury* 24 August 1876 p.4

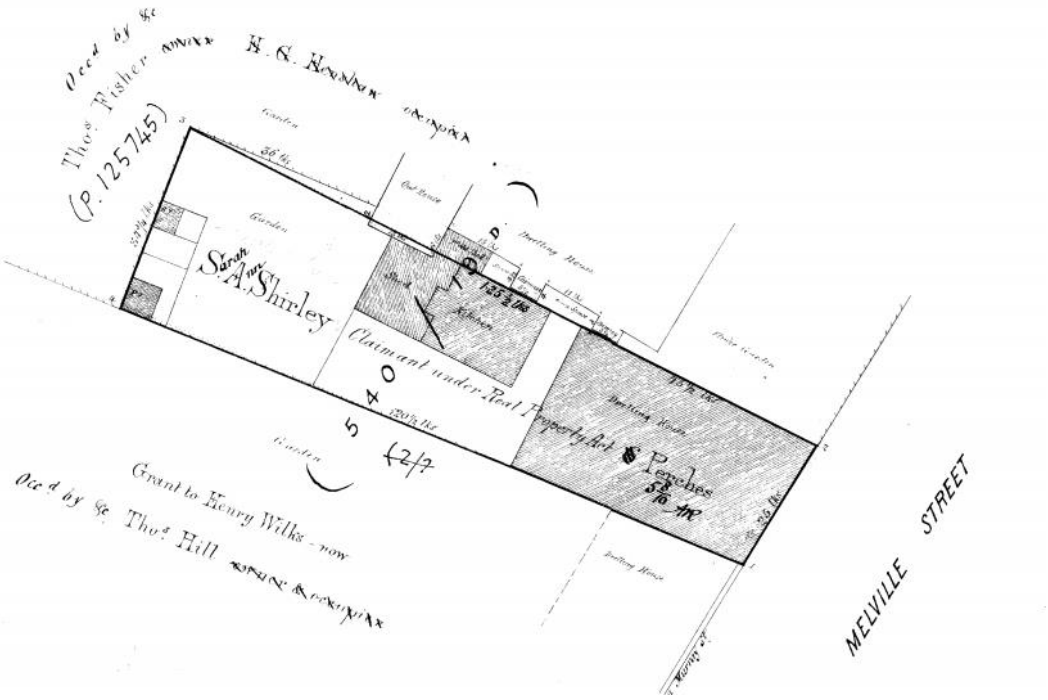


Figure 3.4e - Detail from Survey Diagram Hobart 2/21 showing the dwelling, detached kitchen and offices and privies.

Sarah Ann Shirley was granted this land in September 1876 and retained it until November 1892, at which point she sold it to William George Ibbotson for 400 pounds[32]. In 1922, Crisp and Gunn Co-Operative Ltd became the owners through the will of William George Ibbotson[33]. In January 1925, this allotment was subsumed by the larger Crisp & Gunn Co-Operative Ltd title.[34]

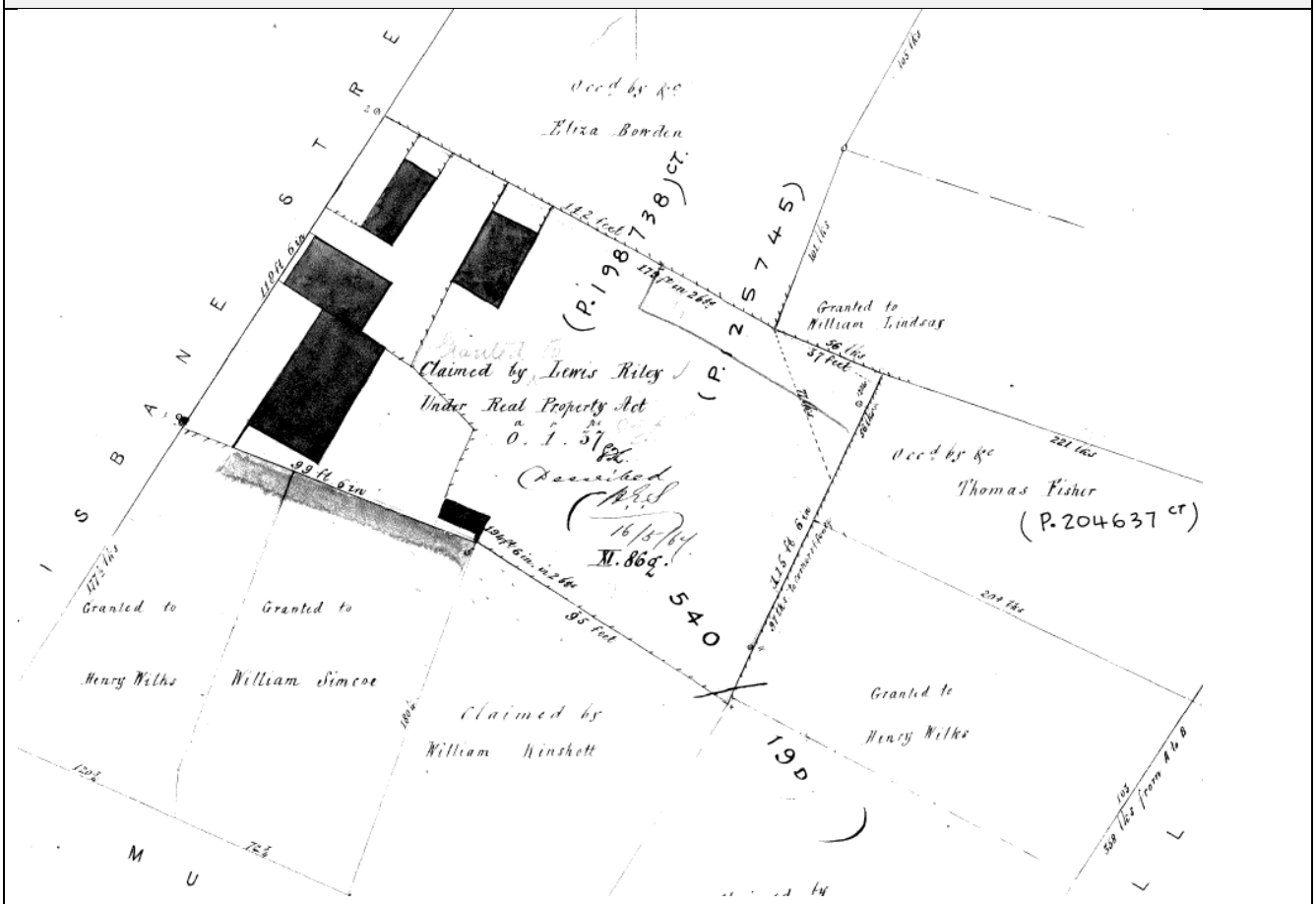
4.	The Sprent survey shows a single timber building on the site as well as a small timber outbuilding forward of the main building. The property was used in a series of mortgages until it was eventually conveyed to Elizabeth's son William George Ibbotson in July 1883. By this time, the property included a blacksmith's shop and a house[35] (possibly those buildings depicted on Sprent?). By 1922, the property was still in William George Ibbotson's hands, and at this point he mortgaged it to James Isherwood[36]. This research was unable to trace the title history further, other than to state that it had become subsumed into the amalgamated Crisp & Gunn Co-Operative block by 1923[37].
5	In 1923, Crisp & Gunn applied for 15 perches fronting Melville Street. The Lands Titles Office queried the Surveyor General as to "whether any portion of the land has been granted" and were advised that it did seem

[32] DPIPWE The LIST PG28/160 Purchase Grant
[33] DPIPWE The LIST CT85/177
[34] DPIPWE The LIST CT326/126
[35] DPIPWE The LIST Mem 7/1384
[36] DPIPWE The LIST Mem 15/8213
[37] DPIPWE The LIST CT 326/126

	to be part of a larger claim for grant by John Morgan in July 1857[38]. A notation on Sprent records that it was also claimed by William L Morgan under the Real Property Act. Crisp & Gunn Co-operative Limited were granted the 15 perches in November 1924[39].
6	The earlier Molloy houses are shown in greater detail and accuracy on this survey, one and a part of another being within the subject site.
7	Although the earlier (1839) survey shows two buildings on this lot – the Sprent survey shows it as vacant. Ownership at the time is unclear.
8	This survey shows the earlier large masonry building, with an adjacent building earlier depicted as timber now being depicted as masonry. The annotations state that the site was granted to Joseph Bowden, but that grant being cancelled in 1846 in favour of Lewis Riley, who did not receive a formal grant until 1867. The detail of these early transactions requires further research beyond the scope of the current investigations. It is possible that this is the Lamb Inn of which Bowden was the proprietor through the 1830s.

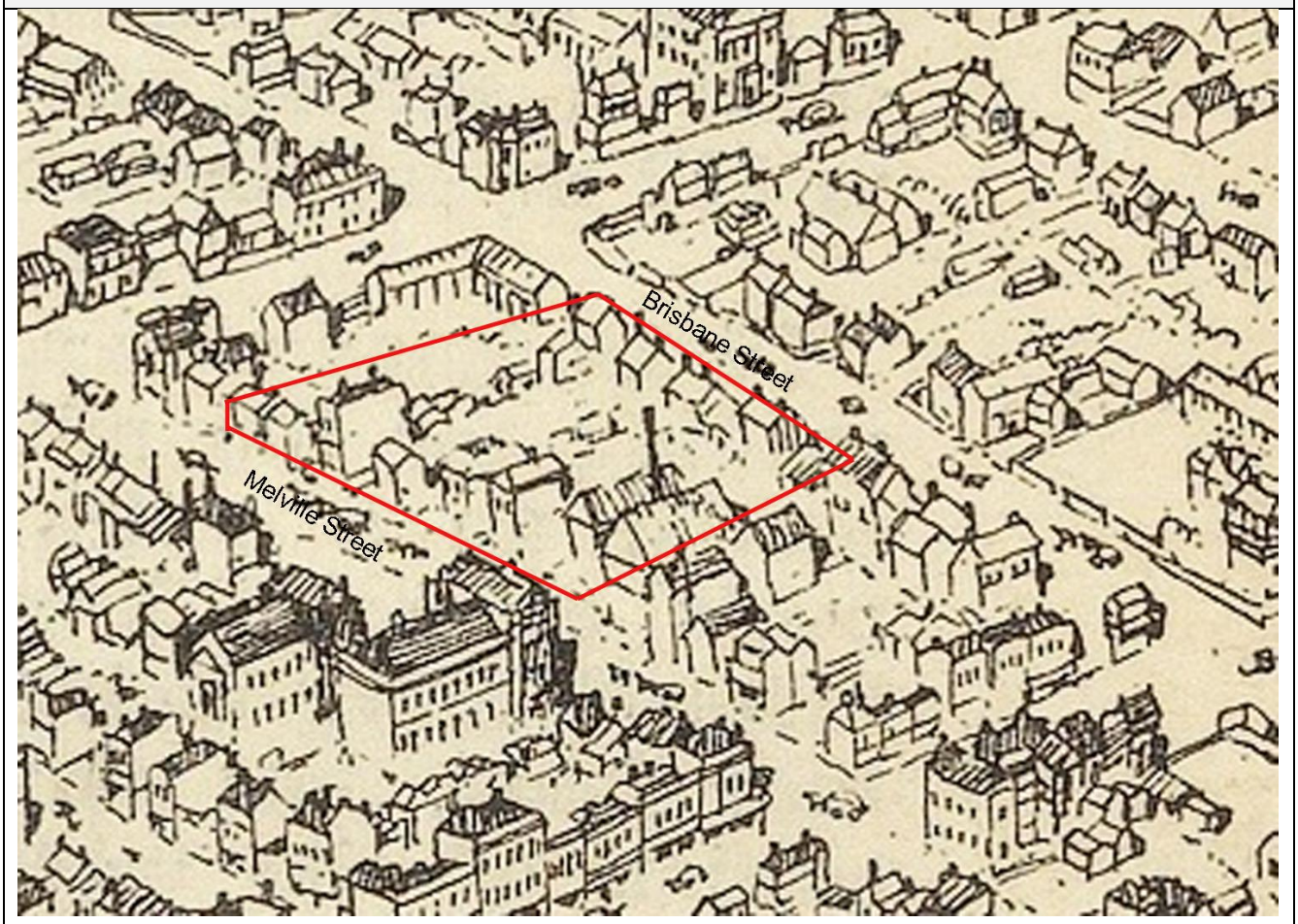
[38] DPIPWE The LIST Survey Notes 67825 (re Hobart 25/5)
[39] DPIPWE The LIST PG 165/97 Purchase Grant

Figure 3.5 – Layout of the Riley (formerly Bowden) lot (Area 8) in 1867 DPIPWE The LIST PG11/86.



This survey plan shows the pre-1832 larger building fronting Brisbane Street of unknown function, as well as an adjacent building shown on that early map also. Another rear building shown on the 1832 map has been removed by this time and another rear building added to the north. This again shows the internal portion of the site as vacant.

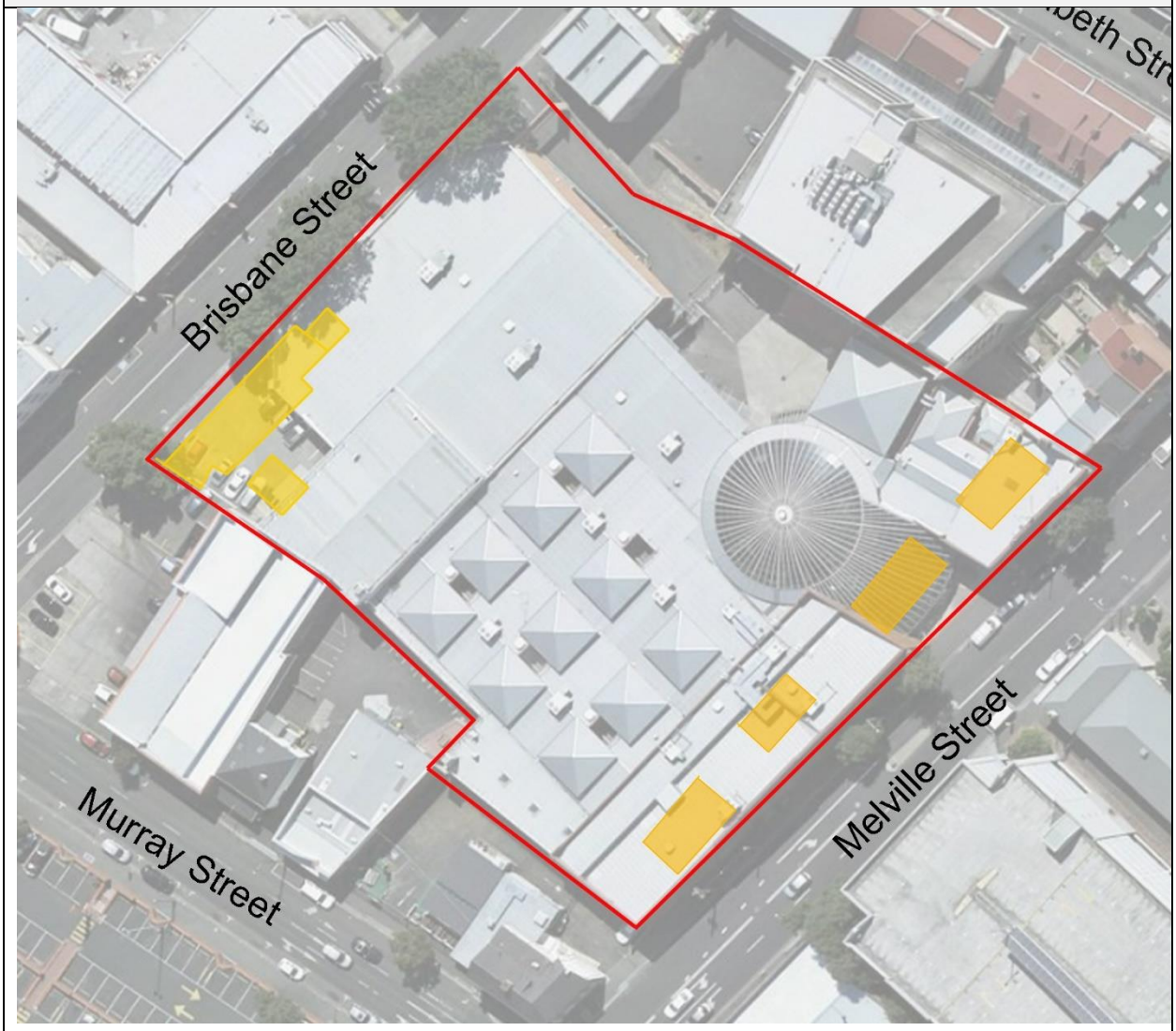
Figure 3.6– Birds Eye View of Hobart, The Town and Country Journal, 17/11/1894:26-27.



This image depicts the site following the first Crisp acquisitions, with buildings fronting Brisbane and Melville Streets and a generally open area in the central part of the site – note however the chimney depicting the change to industrialisation of the site. Whilst the 'artistic licence' of this image makes it difficult to ascertain individual buildings on each earlier allotment, it suggests that by this time some of the presumably ephemeral timber buildings fronting Melville Street had been removed in favour of larger commercial buildings.

The following figures depict the pre-Crisp acquisition historical evolution of the site based on the (most reliable depictions) from the historical overview above:

Figure 3.7 – Locations of pre-1832 buildings, based on the 1832 survey over a recent aerial photograph.



The orange areas represent the presence of buildings on the c1832 survey of Hobart. This survey is known to not be highly accurate in terms of the precise size and location of building but is generally accurate in the depiction of the presence of buildings – therefore is likely to reliably depict the presence of a building on each lot at that time. That survey also did not necessarily pick up all minor site features (e.g. sheds, privies etc.). What this does show however is that development was likely concentrated on the Melville and Brisbane Street frontages.

Figure 3.8 – Locations of pre-c1843 buildings, based on the Sprent survey over a recent aerial photograph.

The yellow areas depict the location of building footprints as per the c1843 Sprent survey, which is known to be a very accurate, yet possibly incomplete depiction of the development of the site by that time. Again, this indicates that development was concentrated on the Melville and Brisbane Street frontages. The above has been supplemented by the 1867 Riley survey in the north-western corner of the subject site (purple).

There are no known depictions of the site layout in the later c19th – see below for some distant panoramic images which give some indication of the post 1886 Crisp development, and the later 1908 depiction being the next known depiction of site layout.

The following Figure provides an overview of nineteenth century function of the various parts of the site that will lead the later discussion on archaeological potential (note that twentieth century development has been omitted here, as this is not considered to have any archaeological significance, however will be discussed below in terms of possible disturbance of earlier archaeological remains).

Figure 3.9 – Functional overview of pre-1900 development.

Colour	Historial activity
Red	Small-scale residential development from as early as pre-1832.
Blue	Probable commercial development, most likely a hotel, from as early as pre-1832.
Remainder of site	Backyard spaces, with development likely limited to minor/ancillary structures, paths, drains, garden beds etc.

3.2. 3826POST-1886 CRISP AND GUNN OWNERSHIP & EXPANSION OF THE SITE

Samuel Crisp arrived in Van Diemen's Land the 1830s from Suffolk, England and established a timber business in Campbell Street around 1850. His son George served his apprenticeship in the business and later set up a timber business in the Old Market Place – taking over his father's business c1853. By 1865 he was trading with his brother, Alfred Crisp at 3 Campbell Street. Both George and Alfred each served terms as Mayor of Hobart. Alfred's sons, Ernest and Samuel eventually assumed the business, with Ernest later buying his brother out. George's son, Frederick established a sawmill and offices in Melville Street in 1886 (part of the subject site) and successfully imported timber from America, the Baltic and New Zealand. In 1902, cousins Ernest and Frederick merged, trading as F and E Crisp from the Melville Street premises. Around 1900, the cousins built elaborate Victorian Italianate style premises fronting Melville Street (likely in area 3 as described here) and had a timber yard extending rearward to Brisbane Street (on area 7 as described here).

Figure 3.10 - The original Crisp and Gunn building, c1900. The 'Shirley' residence can be seen to the far left of this image. Libraries Tasmania AUTAS001139594071.

Figure 3.11 - Crisp and Gunn offices and showroom, c1910. State Library of Victoria, H27134.

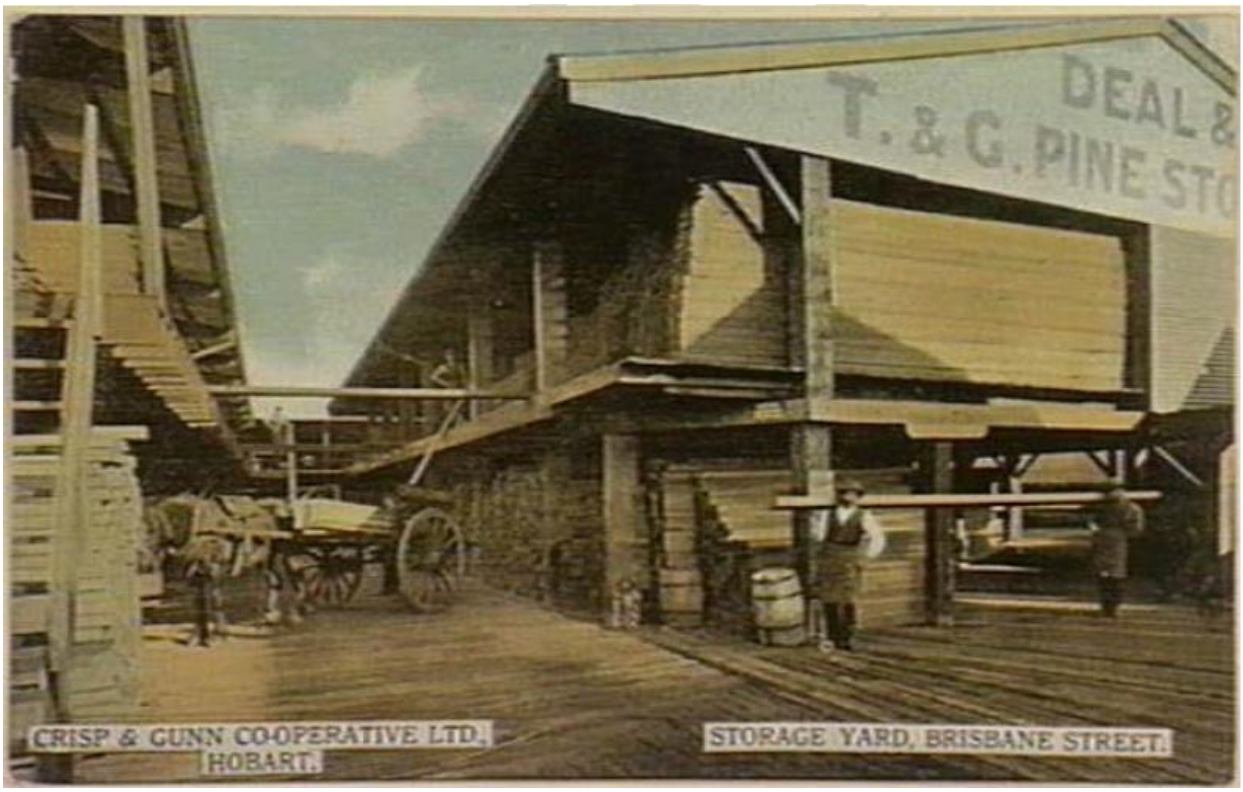


Figure 3.12 - The Crisp and Gunn timber yard, Brisbane Street, c1910. State Library of Victoria a11526.

Figure 3.13 - Crisp's Timber Yard Brisbane Street frontage from the north-west c1900 (within area 7 as discussed here. Tasmanian Archive and Heritage Office NS1013/1/522.

Figure 3.14 – The c1900 Crisp-occupied parts of the subject site. Note that Crisp's ownership was wider, however it seems that his earlier occupation phase retained many of the residential buildings and small backyards, whilst the timber yard operations filled excess backyard spaces.

In 1908, the Crisp cousins went into partnership with the southern interests of J & T Gunn and formed the Crisp and Gunn Cooperative Ltd, continuing their operation from their Melville Street offices and Brisbane Street timber yard.

Figure 3.15 - Metropolitan Drainage Board survey 1907. Libraries Tasmania SD_ILS:553788.

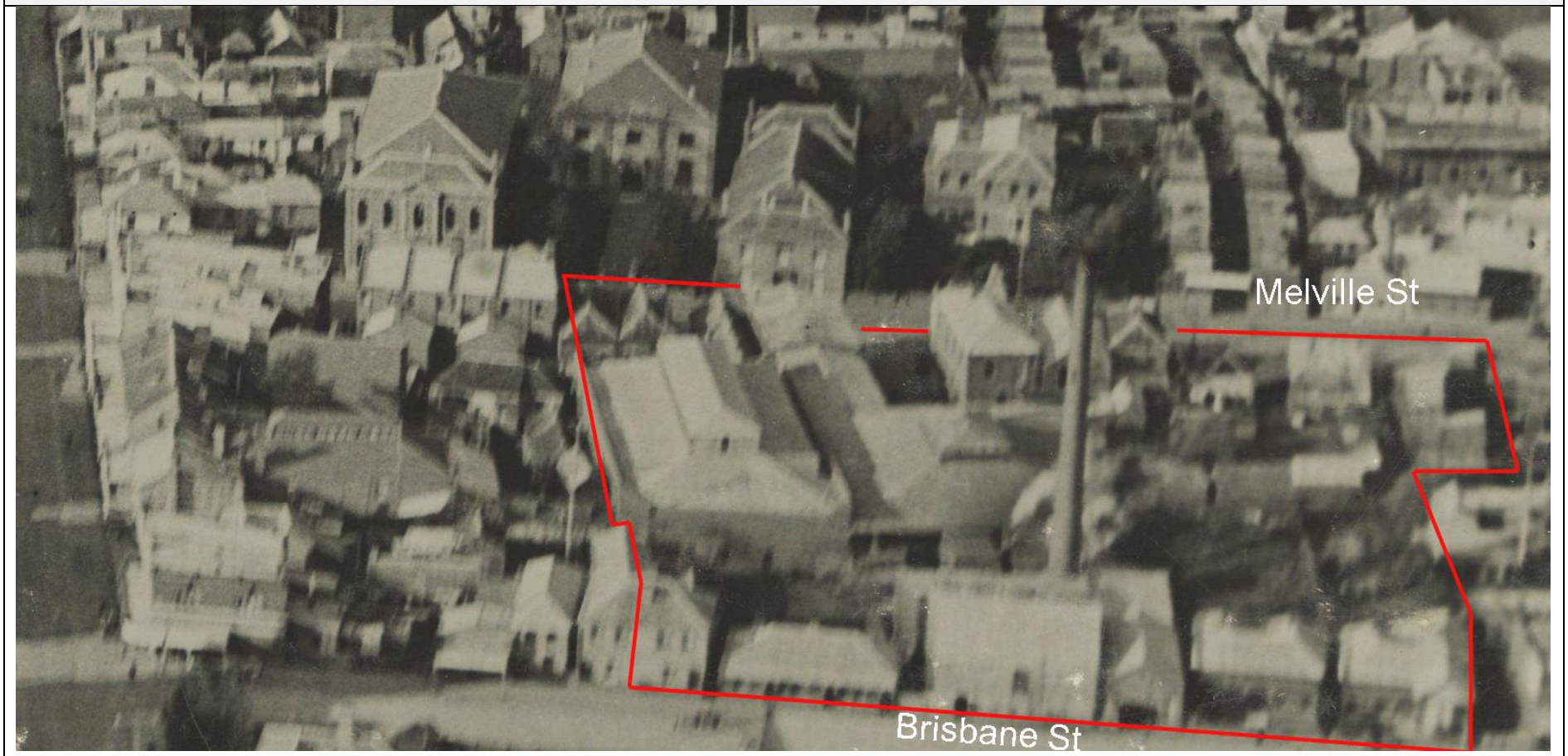
The Metropolitan Drainage Board plan is probably the most accurate and detailed depiction of the circa-1900 layout of the site.

1	The narrow lot on the Murray Street side of this area had been acquired by Crisp in 1894, but appears not to have been developed. The Melville Street frontage closer to Elizabeth Street of this area had been bought by Crisp in 1903, however appears to have still retained the 'old brick houses' (i.e. then 61 and 63 Melville Street) as described on that transfer until after 1907 – these are likely to have been post-1845 construction relacing the earlier timber building in that area). The rear portion accessed by the right-of-way to Melville Street had been developed as three cottages, probably after the 1893 sale to Henry Priest and sold to Crisp in 1900. Overall, the 1907 survey depicts this area still as residential, owned by Crisp, but not yet incorporated into the timber yard operations.
2	Owned by Crisp at the time, the was the main Melville Street entrance to the timber yards.

3	Owned by Crisp at the time, this was the site of the elaborate Victorian Italianate office building and adjacent showroom. One earlier (1830s/40s) residence remained standing to the immediate west.
4	Residential, owned by the Ibbottson family.
5	Residential, owned by Morgan at the time.
6	Crisp owned these buildings at the time, which presumably remained as tenanted residences, but with almost all of their backyard space occupied by timber yard operations.
7	Owned by Crisp by this time, this was the primary Brisbane Street frontage of the timber yard site.
8	Lewis Riley died in 1906 and his estate was devised to Edward Mulhearin, who sold the property to a Mr. Lilley who undertook a complex series of subdivisions. Of relevance to the current considerations is that by 1908 the earlier large masonry building (and others) had been cleared and two houses had been built facing Brisbane Street. The interior of the lot appears relatively undeveloped. Crisp and Gunn eventually acquired all of these titles between 1919 and 1957. Note that the westernmost house survived on a remnant lot until purchased by Crisp and Gunn in 1957 as the last domestic building in the entire subject site.

A 1921 oblique aerial photograph of Hobart shows the peak of the earliest form of the Crisp and Gunn site, with the Victorian Italianate offices facing Melville Street, two large workshops in the central part of the site and the timberyard sales office fronting Brisbane Street. At that time, the current subject site included at least 10 residential properties which were not owned /occupied by Crisp and Gunn at the time. By that time, substantial buildings had been erected within the central portion of the site.

Figure 3.16 – 1921 excerpt of a panorama of Hobart. Tasmanian Archive and Heritage Office NS5748-1-78



On the 13th May 1922, a fire tore through the Crisp and Gunn timber yard and joinery works causing £25,000 damage. The following report from *The Daily Telegraph* (15/5/1922:4) gives an account of the total destruction:

> *BIG BLAZE IN HOBART: CRISP & GUNN'S TUBER YARDS WOKS, OFFICES, ETC., DESTROYED) DAMAGES ESTIMATED AT £25,000*
>
> *HOBART, Sunday. — It is but comparatively a short time back since Risby's timber yards at the bottom of Elizabeth-street was devastated by fire, and it has now to be reported that an outbreak on a similarly large scale occurred just before midnight on Saturday, when Crisp and Gunn's timber yard, joinery, works, show-rooms and offices were completely destroyed.*
>
> *For years, there has been considerable talk as to the danger of having timber yards so close to the city business establishments, and this was exemplified on Saturday night. Crisp and Gunn's promises were practically in the heart of the city, located in the centre of a block surrounded by Elizabeth, Murray, Brisbane and Melville Streets. The premises in Elizabeth Street in the vicinity of Crisp and Gunn's consist of about ten new business places and three or four shops that have been there for a very long time, In the Melville and Murray Streets block they are mainly cottages. Opposite where the fire occurred are situated the Temperance Hall, Methodist Church, and Mechanics' Institute. The fire broke out so suddenly that it was a foregone conclusion that the whole of the timber premises would be destroyed. The only question that had to be solved was would the brigade be able to save the surrounding properties and for a long time a satisfactory answer was not forthcoming. At the outset the night was calm, and it was this fact that really saved the situation so far as contiguous premises were concerned. The flames rose to a great height and sparks travelled a considerable distance, even with the wind as light as it was. The reflection lit up the heavens for miles around and this had the effect of drawing a huge crowd to witness the conflagration, and each street of the block had its large coterie of onlookers. The fire was assailed from every side by a large number of hoses pouring copious supplies of water onto the adjoining properties, but it is a matter for regret that so many of the hoses were in such a state of disrepair that leakages were of common occurrence. Looking down on the outbreak from Brisbane-street, the seat of fire from this aspect being some 10 or 15ft below the roadway, it presented a miniature Dante's Inferno. Right to Melville Street, with a width of around 200ft, was a veritable block of fire throwing off heat, and considerably hampering efforts of firemen. At one o'clock a little wind arose, and in con confluence sparks and burning paper were carried onto the roofs of the Mechanics' Institute and Wesleyan Church, and water was promptly played on to the shingles and prevented a spread of the outbreak in that direction. This performance had to be repeated at intervals. The changing of hoses from one side of the road to the other had the effect of completely dousing a large number of spectators, and this provided a humorous side to otherwise a very serious matter.*

A pathetic site to the picture was the removal of furniture from the houses in the immediate danger zone and keeping guard thereof by women. Murray, Brisbane and Elizabeth-street accommodating all kinds of furniture, some of which had suffered materially in handling.

By 1.30 a.m. although the fire was still raging heavily, yet it could be seen that it was quickly burning itself out to such a degree that the work of members of the fire brigade was made a degree lighter, because it was apparent that with no increase in the strength of the wind and the surrounding places as yet untouched would be saved. And this proved to be the case. Gradually the flames got less and less, while more water could be directed at the fire until it was reduced to a smouldering heap. The firemen maintained their efforts throughout the night, and when the scene of outbreak was visited this morning, water was still being played on the smoking debris. The daylight revealed, the havoc that had been made during the few horns the fire had raged. The whole of the interior of the block had been gutted. The offices and stables were left with but brick walls and chimney standing, and that was all. that remained of Crisp and Gunn's hive of industry of a few short hours previously. The fire is believed to have occurred near the boiler, right in the centre of the yards. It is somewhat significant that three months ago a lad was found lighting some shavings near a pine stack, when some boards were charred, and he was dealt with at the Juvenile Court.

Several householders; reported that looters had taken away some goods that had been placed in the streets, while Mr Nat Edwards states that his shop was deliberately broken into and articles of clothing taken.

Mr E.T. Crisp, one of the principals of the firm, said he. estimated the damage at about £25,000, although he was unable to make an absolutely accurate estimate. The plant and stock were well insured. Mr Crisp said there were about 150 men employed in the different yards and mill, and the majority worked at the premises which had been destroyed. The men included carpenters, joiners, mill hands, machinists, engine drivers and yardmen. There were 13 horses in the stables, and they were all saved. Carts and harness were also safely removed. The plant, which included planing, sandpapering, and other timber-dressing machines, was one of the most up to date in the Commonwealth and considerable delay must ensue before it can be replaced; Mr Crisp added that the origin of the fire was a complete mystery. When he left the premises at 12.45 p.m. on Saturday everything was all right. He was asleep when the fire broke out. Superintendent Trousselot said the alarm was given 11:51; and when the brigade arrived immediately after, the whole premises were well alight.

TIMBER STACK MENACE AGAIN EMPHASISED

CRISP AND GUNN'S BIG YARDS AND FACTORY GUTTED

SEETHING MASS OF FLAME ILLUMINATES THE CITY

FIRE BRIGADE'S HEROIC EFFORTS TO PREVENT GREAT DISASTER

Figure 3.17 – Headline from *The World,* 15/5/1922:5.

Newspaper articles in the following month discussed the disaster in terms of the ability of the city's fire brigade to deal with such occurrences, as well as the suitability of such businesses in the central city. The 1922 Crisp and Gunn fire followed the disastrous Risby Bros. fire in Elizabeth Street 15 months before, and the Chesterman's fire in Campbell Street nine months before. Noting also that the earlier Crisp's timber yard in Macquarie Street had been destroyed by fire in 1890. Crisp and Gunn however had a quick recovery, with plans submitted to the City Council in July of that year for new premises. *The World,* 11/7/1922:6 reported:

> *CRISP AND GUNN: Plans for New Building Approved by City Council*
>
> *Messrs Crisp and Gunn Co-operative limited submitted tentative plans to last nights meeting of the City Council, for their proposed new buildings in Melville Street. The plans show brick parapet walls on all boundary lines; and all buildings with the exception of the mill proper, which are of brick. Each block is separated from another with solid brick walls and fire, proof doors, where openings occur. Alderman Valentine moved the adoption of the report and said the layout was one which would give satisfaction. Alderman Shield seconded; and said the plans complied with the Act. Alderman Lord said the Superintendent of the Fire Brigade was well satisfied with the plans. Alderman Williams said he thought that before any attempt was made to re-build the premises that were destroyed, they should have had the report of the committee which recently took evidence regarding fire risks to the city. He was rather surprised that the report had not been furnished. Alderman Rogers was of opinion that they should delay approving of the plans if possible. There was a big diversity of opinion regarding the matter, which was one they should not hurriedly agree to. Alderman Wignall: The plans comply with the Act, and we have no power to hold them up. Alderman Martin: If the Superintendent of the Fire Brigade was satisfied with the plans there was no reason why the scheme should be retarded. He could not see why the Council should attempt to hold up the work. Alderman Valentine said he regretted that the committee had not been able to furnish its, report, but nevertheless it was not for the aldermen to anticipate what that document would contain. The recommendation was adopted.*

The plans for the new buildings were by Architect George Stanley Crisp (1883-1933) who was the son of Alfred Crisp of Crisp Bros. Crisp was a prominent Hobart architect of the 1920s, designing notable buildings including:

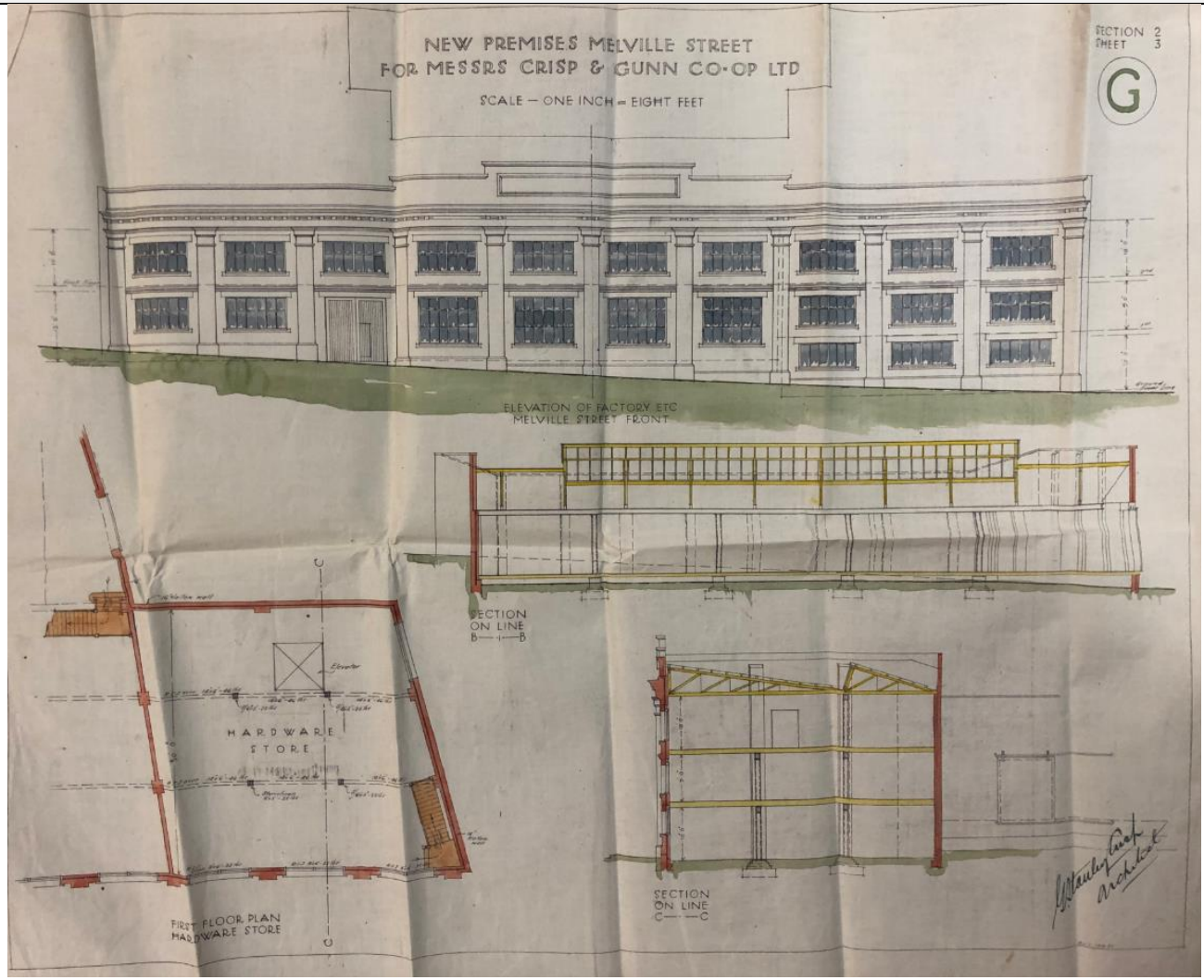
- Waimea and Graystanes houses, Sandy Bay.
- The Odeon (formerly His Majesty's and Strand) Theatre, Liverpool Street Hobart.
- The Palace Theatre, 28-32 Elizabeth Street Hobart (demolished)
- Commercial Bank, 75 Wilson Street Burnie.
- Commercial Bank Moonah.
- Fifth floor extension, Kodak Building, 45 Elizabeth Street Hobart.
- Heathorns Garage, Bathurst Street Hobart (largely destroyed by fire 2010).
- Additions to Brownell's Department Store, Liverpool Street Hobart (destroyed by fire 2007).

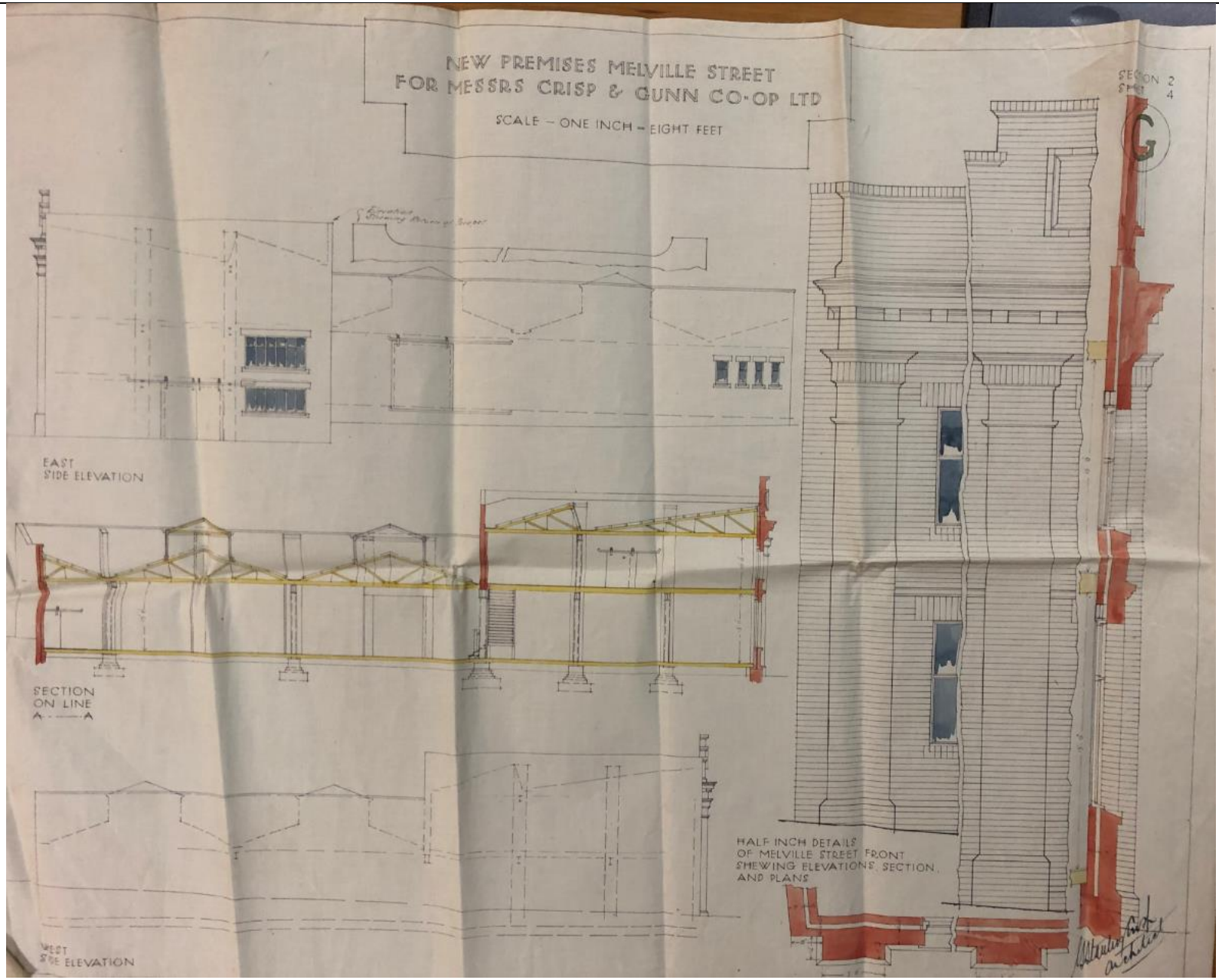
Crisp was the President of the Tasmanian Chapter of the Architect's Institute during 1917, 1918, 1926, 1927 and the year of his death in 1933. Noting his death at age 50 (the result of being hit by a vehicle), Crisp did not have a particularly long architectural career. His nephew Albert Lauriston Crisp worked for him and is perhaps better represented amongst Tasmanian commercial and public architecture, continuing the Crisp family's name in architecture, particularly in the Art-Deco realm, designing buildings such as the Hobart Masonic Temple, Sandy Bay Savings Bank, Motors Garage Launceston, the Paragon Theatre Queenstown and Millbrook Rise at New Norfolk. The Crisp family are therefore prominent not just in building materials in late c19th and early c20th Tasmania, but in architecture through the first half of the c20th also.

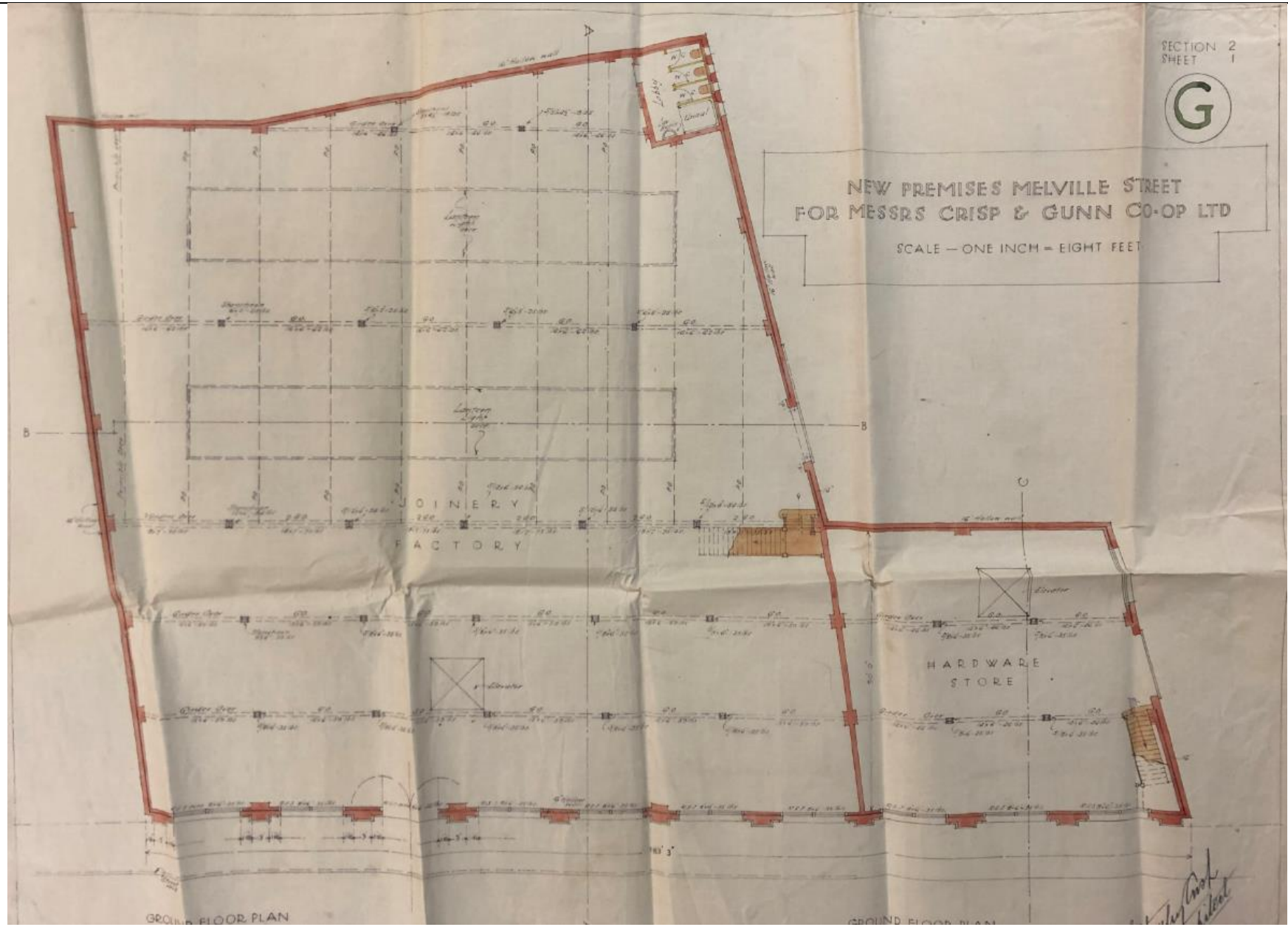
Whilst the former Commercial Bank in Burnie is perhaps the best example of Federation Free-Classical architecture by George Stanley Crisp, the Crisp and Gunn buildings are a more restrained and slightly later example of his commercial work and one of the better-known Hobart examples of his commercial work. The interior of the offices in particular attest to his quality of work and the use of the roof lanterns were perhaps an innovative feature adopted by Crisp.

The buildings were constructed by William Cooper and Sons of Molle Street, Hobart.

Figure 3.18 – 1919 plans for the 1923 Crisp and Gunn workshops and store. Tasmanian Archive and Heritage Office AE417/1/48




NEW PREMISES MELVILLE STREET
FOR MESSRS CRISP & GUNN CO-OP LTD
SCALE – ONE INCH – EIGHT FEET
EAST
SIDE ELEVATION
SECTION
ON LINE
A – – A
HALF INCH DETAILS
OF MELVILLE STREET FRONT
SHEWING ELEVATIONS, SECTION,
AND PLANS


SECTION 2
SHEET 1
G
NEW PREMISES MELVILLE STREET
FOR MESSRS CRISP & GUNN CO-OP LTD
SCALE — ONE INCH = EIGHT FEET
JOINERY
FACTORY
HARDWARE
STORE
GROUND FLOOR PLAN

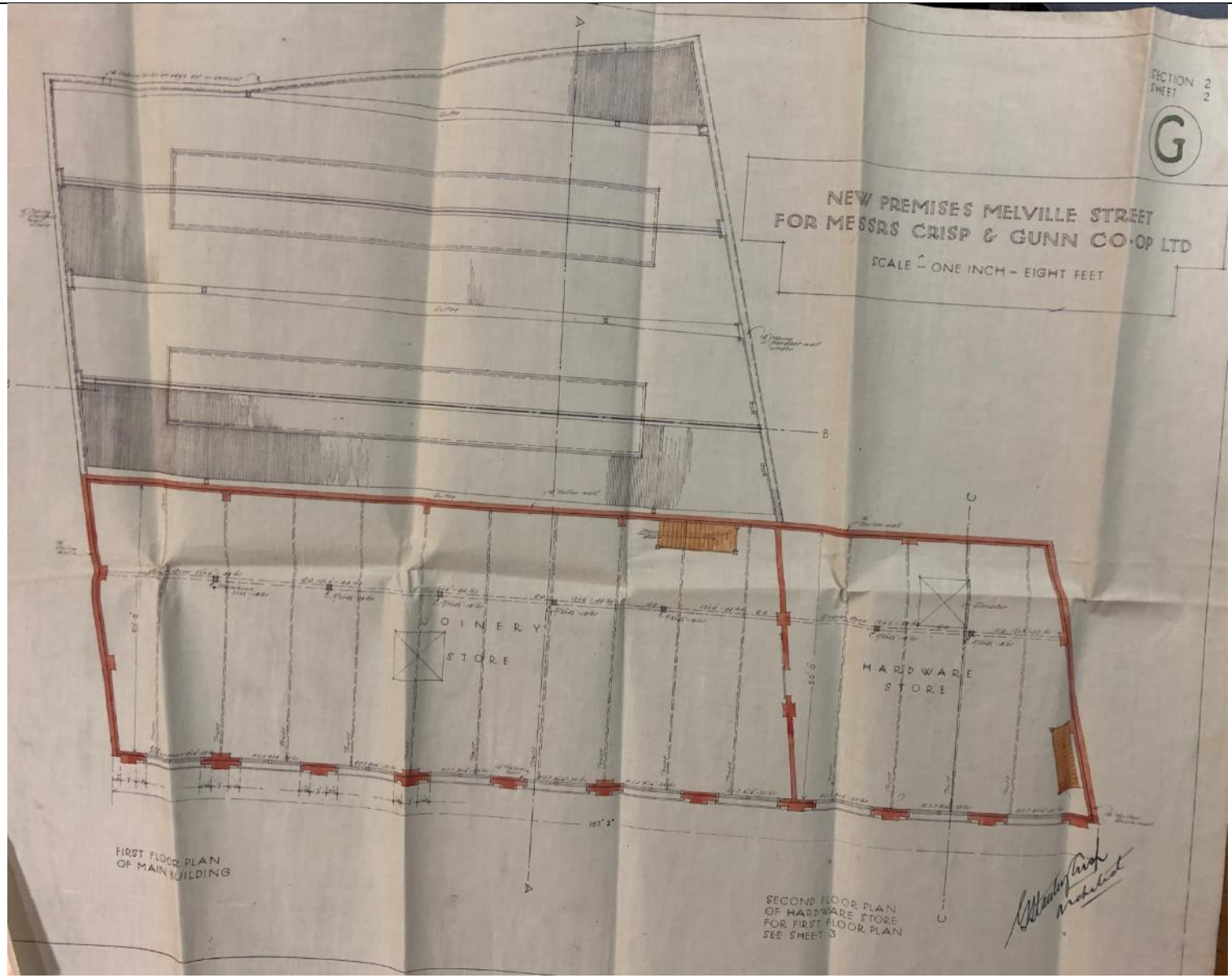
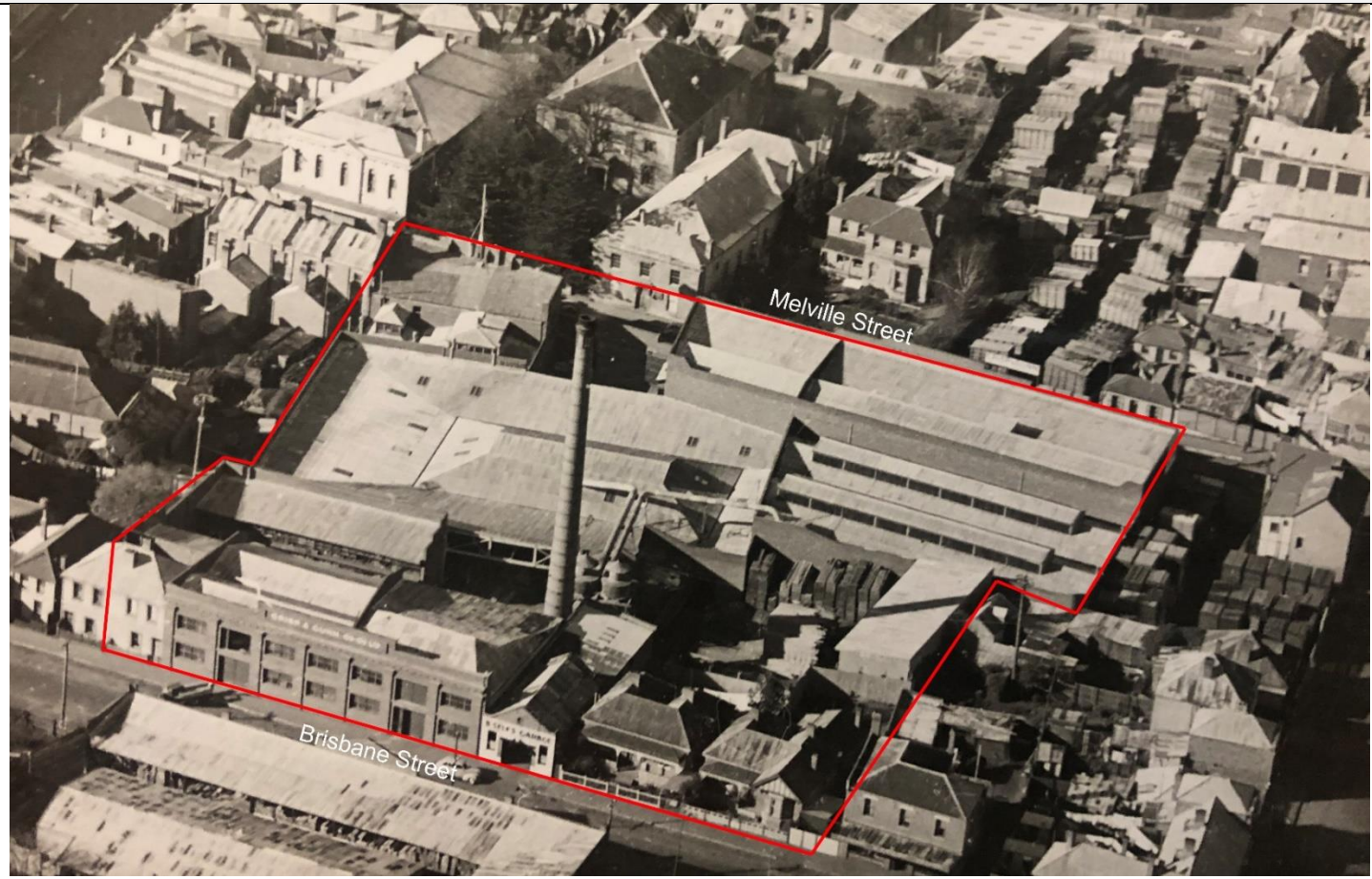

SECTION 2
SHEET 2
G
NEW PREMISES MELVILLE STREET
FOR MESSRS CRISP & GUNN CO-OP LTD
SCALE ONE INCH - EIGHT FEET
JOINERY
STORE
HARDWARE
STORE
FIRST FLOOR PLAN
OF MAIN BUILDING
SECOND FLOOR PLAN
OF HARDWARE STORE
FOR FIRST FLOOR PLAN
SEE SHEET 3

Figure 3.19 – Oblique aerial photograph from the north-west 1940s. Tasmanian Archive and Heritage Office NS3826/1/88.



An excerpt from a 1946 panorama of Hobart clearly shows the layout of the site at that time, with the 1923 warehouse, store and office fronting Melville, a similarly styled building fronting Brisbane Street (built c1922 – no plans for this building were found) and several remaining early residential properties fronting Brisbane Street. The central portion of the site including a post-1923 series of large sheds, the chimney (which survived the fire) and open yard space.

Figure 3.20 - Aerial photograph 1946. Lands Tasmania 1946 Hobart Run 1-10893.

The 1946 aerial photograph shows the layout of the site at that time, with the 1923 warehouse, store and office fronting Brisbane Street, a similarly styled building fronting Brisbane Street and several remaining early residential properties fronting Brisbane Street. The central portion of the site including a post-1923 series of large sheds, the chimney (which survived the fire) and open yard space.

Figure 3.21 – 1964 modifications of Crisp and Gunn workshops in central portion of the site (including retaining walls). Tasmanian Archive and Heritage Office AE417/4/97

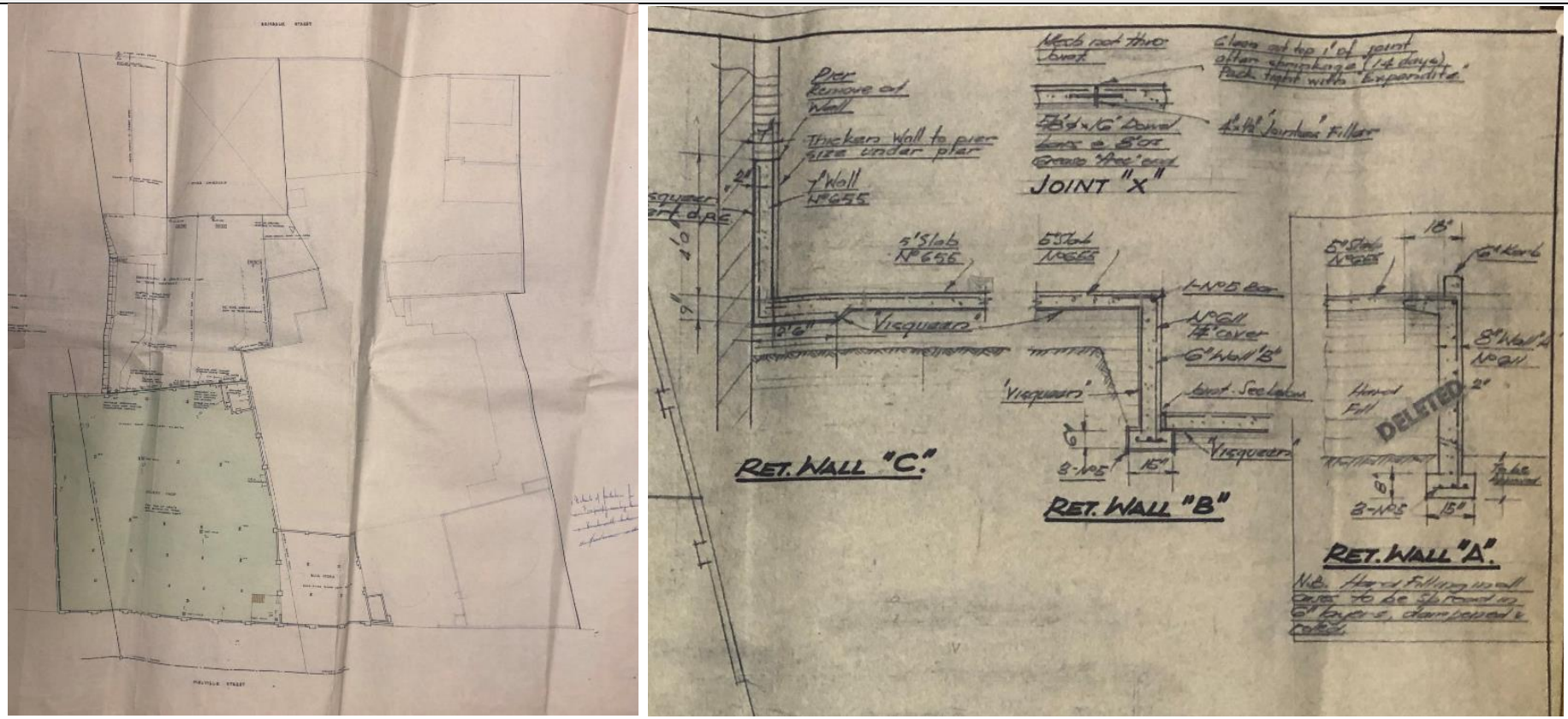


Figure 3.22 – 1972 Public Works Department plans for office conversion of the former Crisp and Gunn offices (existing condition). Tasmanian Archive and Heritage Office AE417/45/1478/

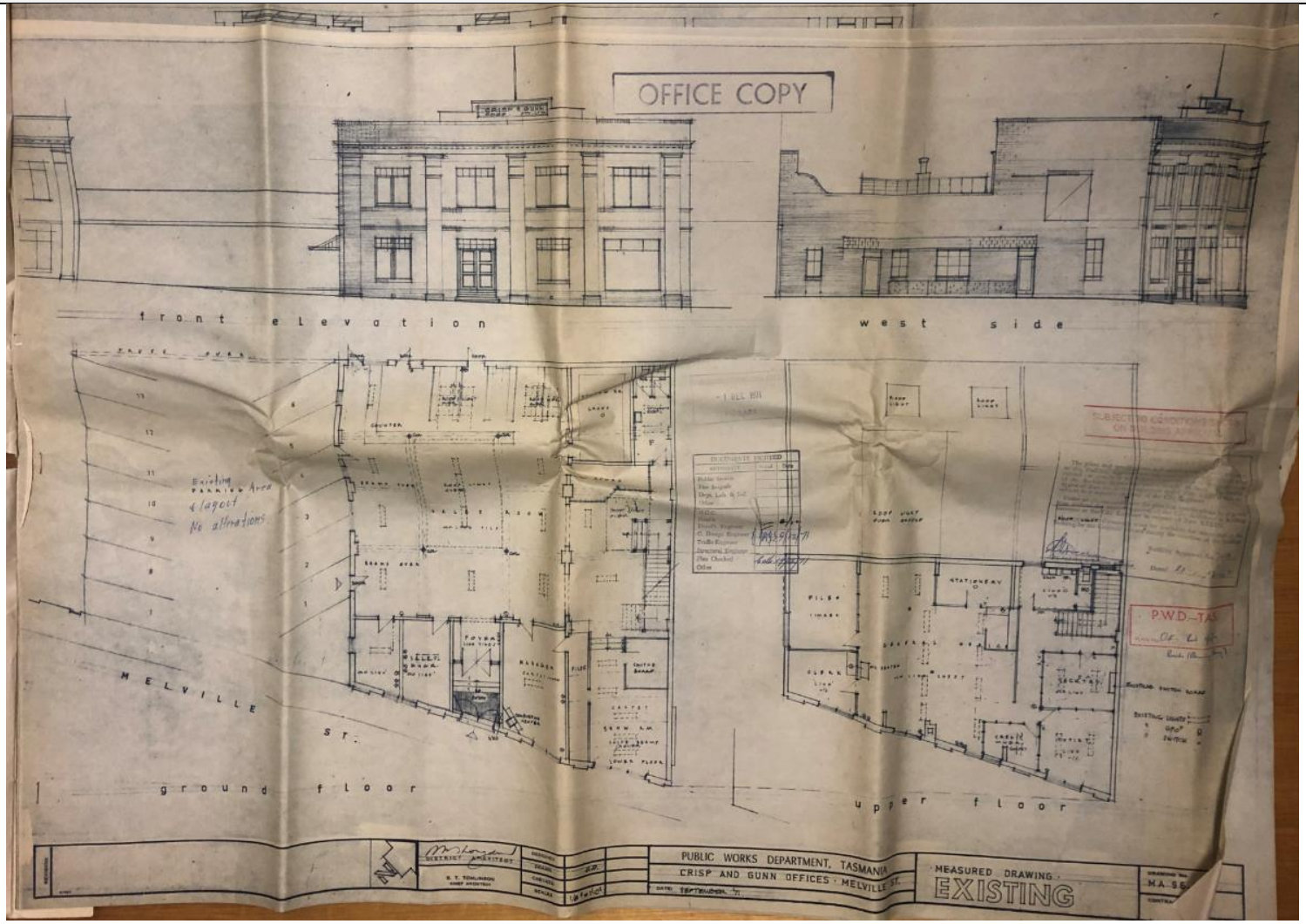
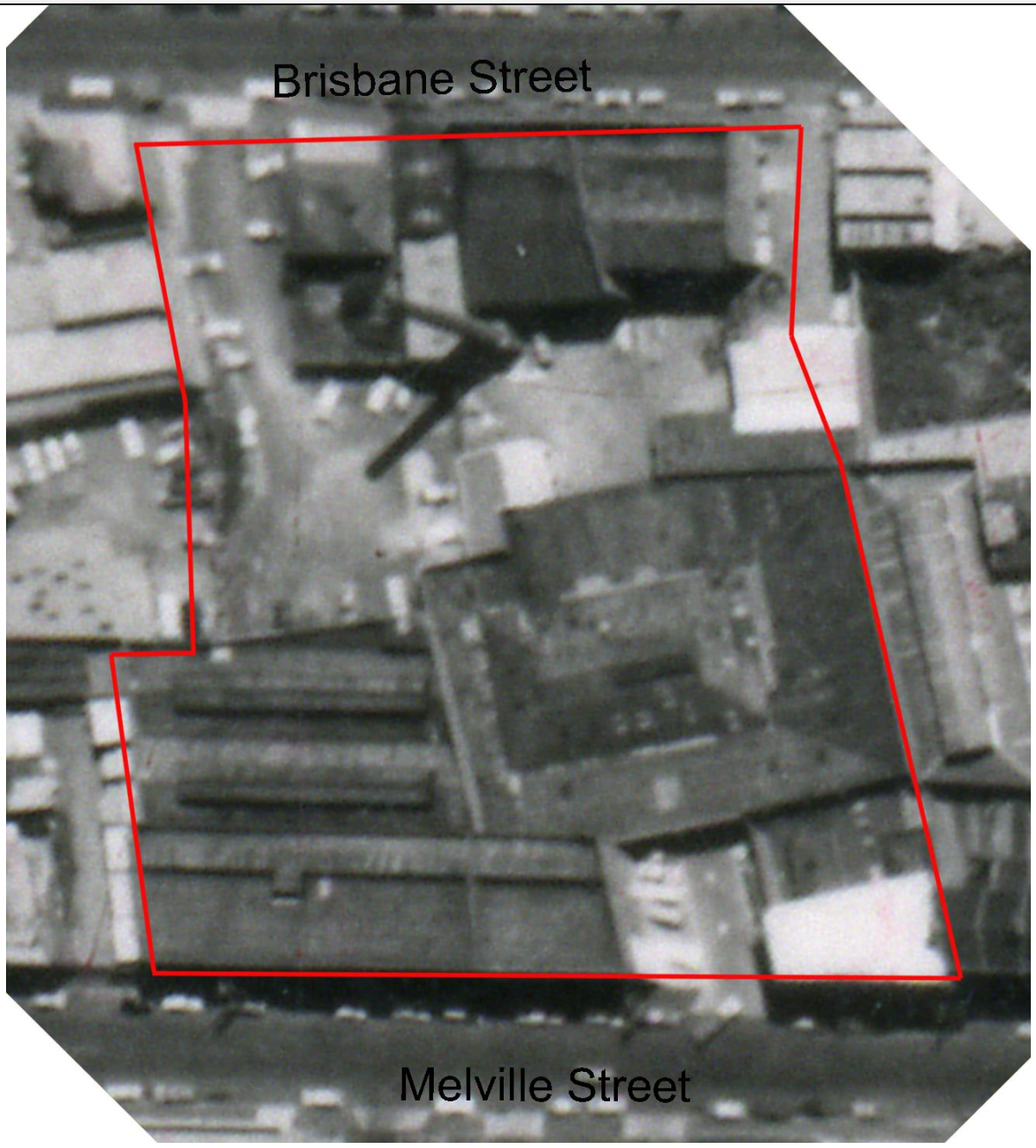


Figure 3.23 - Aerial photograph 1968. Lands Tasmania Hobart Metro Run 6-153.



This image shows the site at the end of almost 100 years (of parts) of Crisp (and later Crisp and Gunn) occupation.

3.3. TASMANIAN GOVERNMENT OCCUPATION AND DIVESTMENT

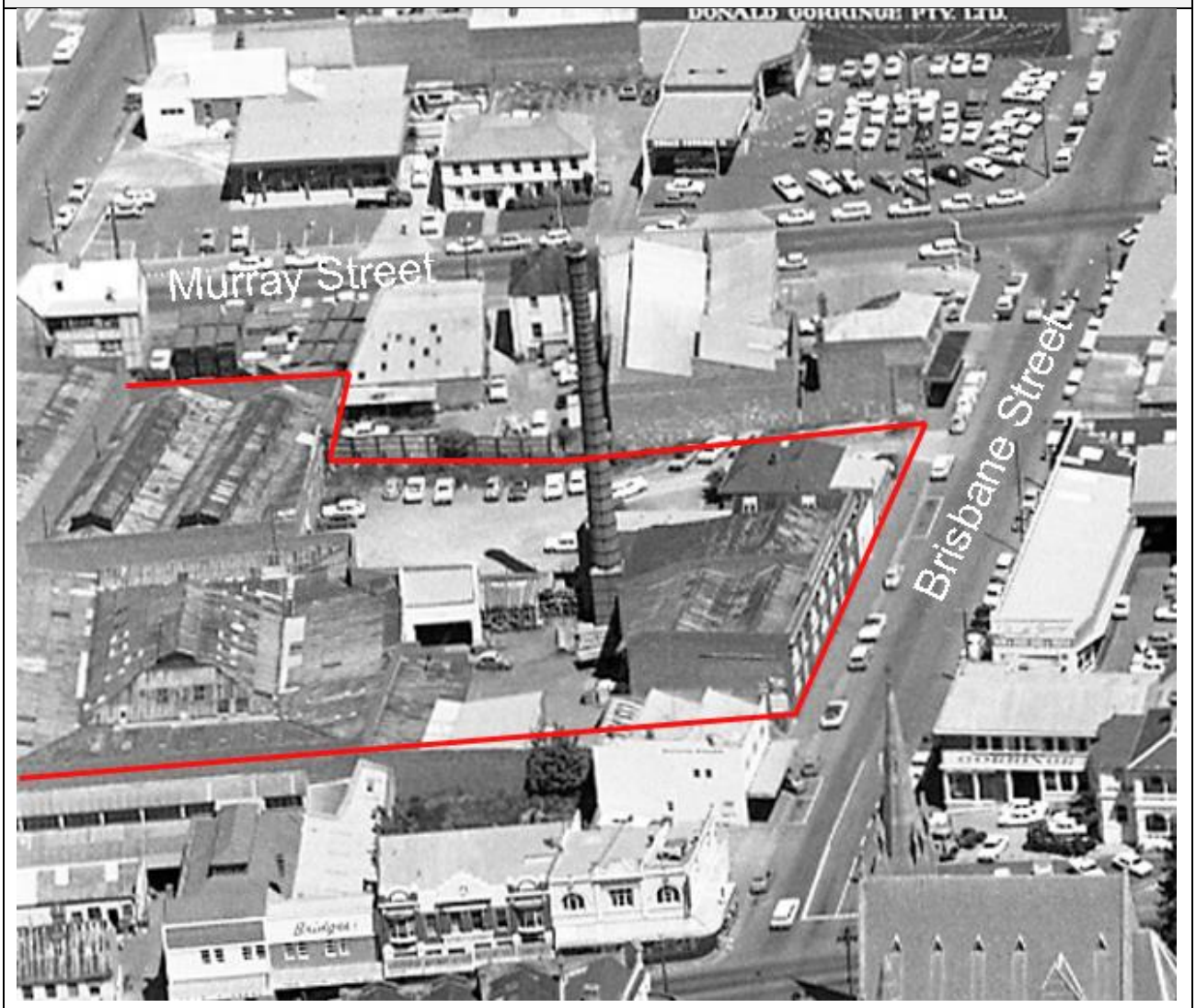
Following the 1960s sale to the Tasmanian Government, a series of works were undertaken to remove the timberyard buildings and to install Government offices into the Melville Street buildings. Modifications were made in 1971 to the former Crisp and Gunn office building including partitioning of the first floor and removal of the blackwood counters in the ground floor chamber.

Since that time the buildings were used for the State Emergency Service and the Tasmanian Fire Service. Various Government departments utilised the former timber yard buildings in the central part of the site.

In 1997 the site was redeveloped, and strata titled. The Brisbane Street frontage was divested and the central portion of the site and former Crisp and Gunn buildings redeveloped for use by Forestry Tasmania. A distinctive domed structure linked the two buildings fronting Melville Street, designed by Morris-Nunn and Associates in conjunction with Gandy and Roberts Engineers. The project was awarded the 1998 BHP Colourbond Award (outstanding use of steel) and the Recycling and Conservation Award by the Australian Institute of Architects.

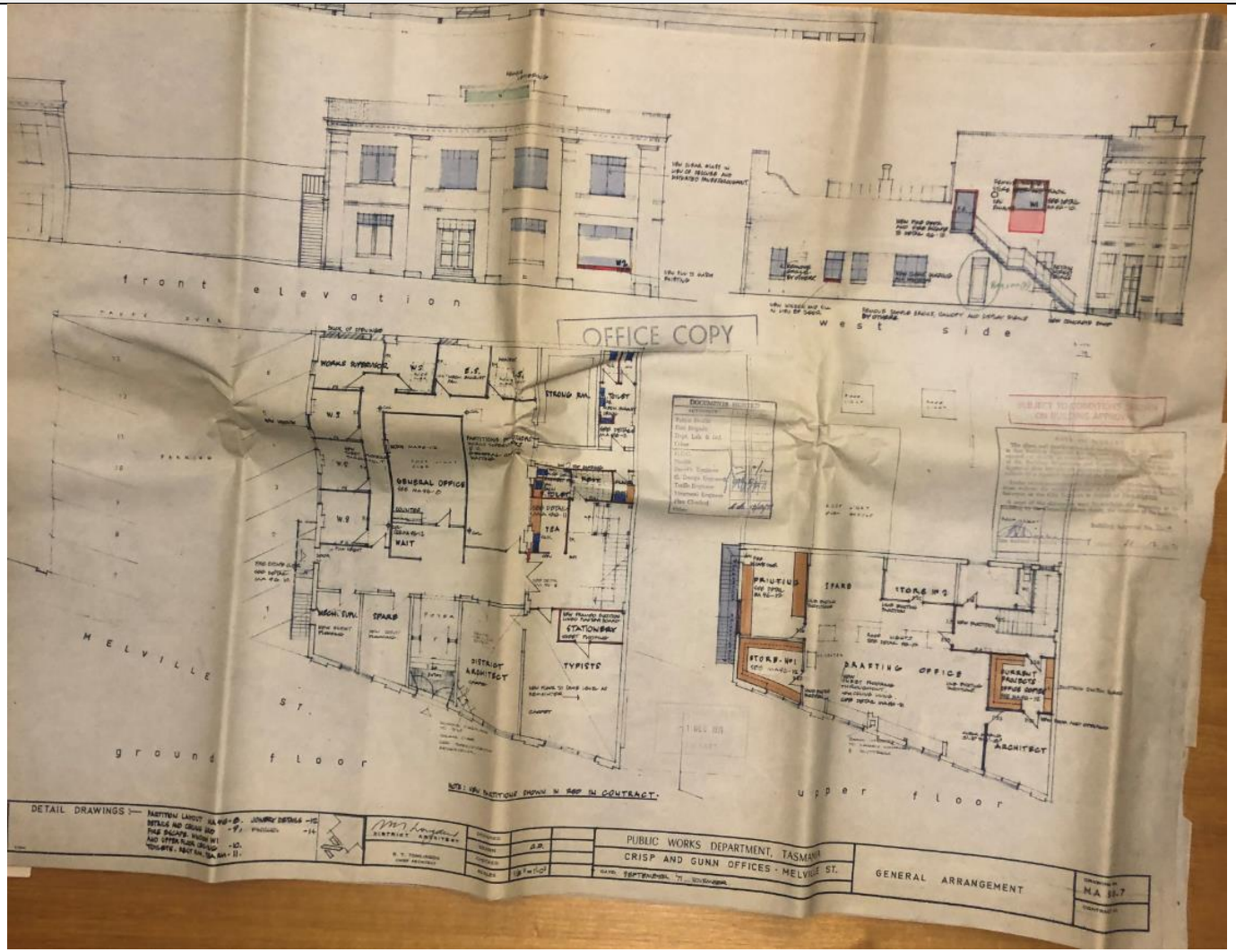
Forestry Tasmania operated from the building until 2017. In 2018 the University of Tasmania purchased the former Crisp and Gunn Buildings and added the Brisbane Street building (Freedom Furniture) back to the holding in mid-2021.

Figure 3.24 – Oblique aerial photograph from the north east c1970. Tasmanian Archive and Heritage Office AB713/1/12044.



Note the retaining wall and cut in the centre of the photograph (with cars parked against) which derives from the 1964 workshop renovations/additions which required bulk excavation of the central portion of the site (see Section 7.3).

Figure 3.25 – 1972 Public Works Department plans for office conversion of the former Crisp and Gunn offices (proposed). Tasmanian Archive and Heritage Office AE417/45/1478.




Works Supervisor
Works Supervisor
Electrical Supervisor
Electrical Supervisor
Strong Room
Toilet
Works Supervisor
Works Supervisor
General Office
Female Toilet
Rest Room
Cleaner
Tea Room
Waiting
Stationery
Mechanical Supervisor
Spare
District Architect
Typists
TYPE D1
TYPE D2
TYPE D3
TYPE D4
TYPE D5
TYPE D6
DOOR SCHEDULE
GROUND FLOOR PLAN
ELEVATION TOP LIT PARTITION TO OFFICE
ELEVATION GLAZED PARTITION TO WAITING
ELEVATION TYPICAL PARTITION
ELEVATION DIVIDING PARTITION TO SUPERVISORS
OFFICE COPY
CRISP & GUNN BUILDING
MELVILLE STREET, HOBART
ALTERATIONS & ADDITIONS
MA 96 - 8

Ref. (AE417)	Year	Proposal as per the plans	Use in the current document
4/97	1964	New workshops.	Alterations workshops at the rear of the former rear warehouse behind the Crisp and Gunn workshops (i.e. existing building) in the central portion of the block (i.e. half way between Melville and Brisbane Streets. Also concrete floor to the ground floor level of the workshops. Of use in demonstrating excavation and gravelling in that area (approx. 600mm deep) which would have had archaeological impact – and all now further excavated and removed by the 1997 works. Depicts a site plan at that time.
10/1594	1988	New showers, staff facilities and fire stairs – eastern end of the upper floor of the former workshops. State Emergency Service.	None – demolished as part of the 1997 renovations.
10/1541	1988	New workshop, toilets, general store and tea room, State Emergency Service.	None - presumed demolished as part of the 1997 renovations.

Figure 3.26 – Ground floor plan of the former Crisp and Gunn Offices, c1990. From Court and Edwards (as cited in Section 2.5).

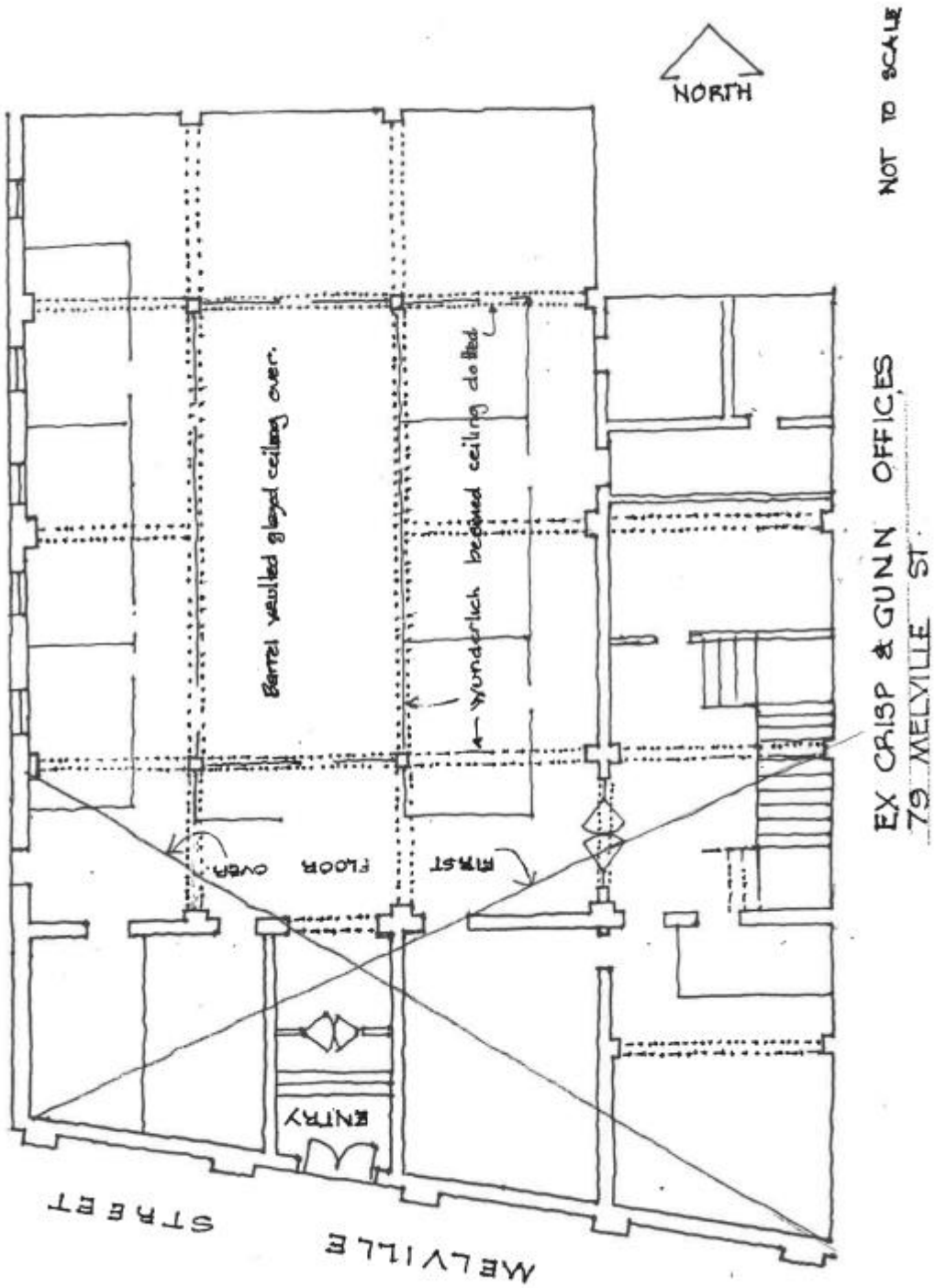


Figure 3.27 – Site plan, 1990s. From Vincent and Grant as cited in Section 2.5.

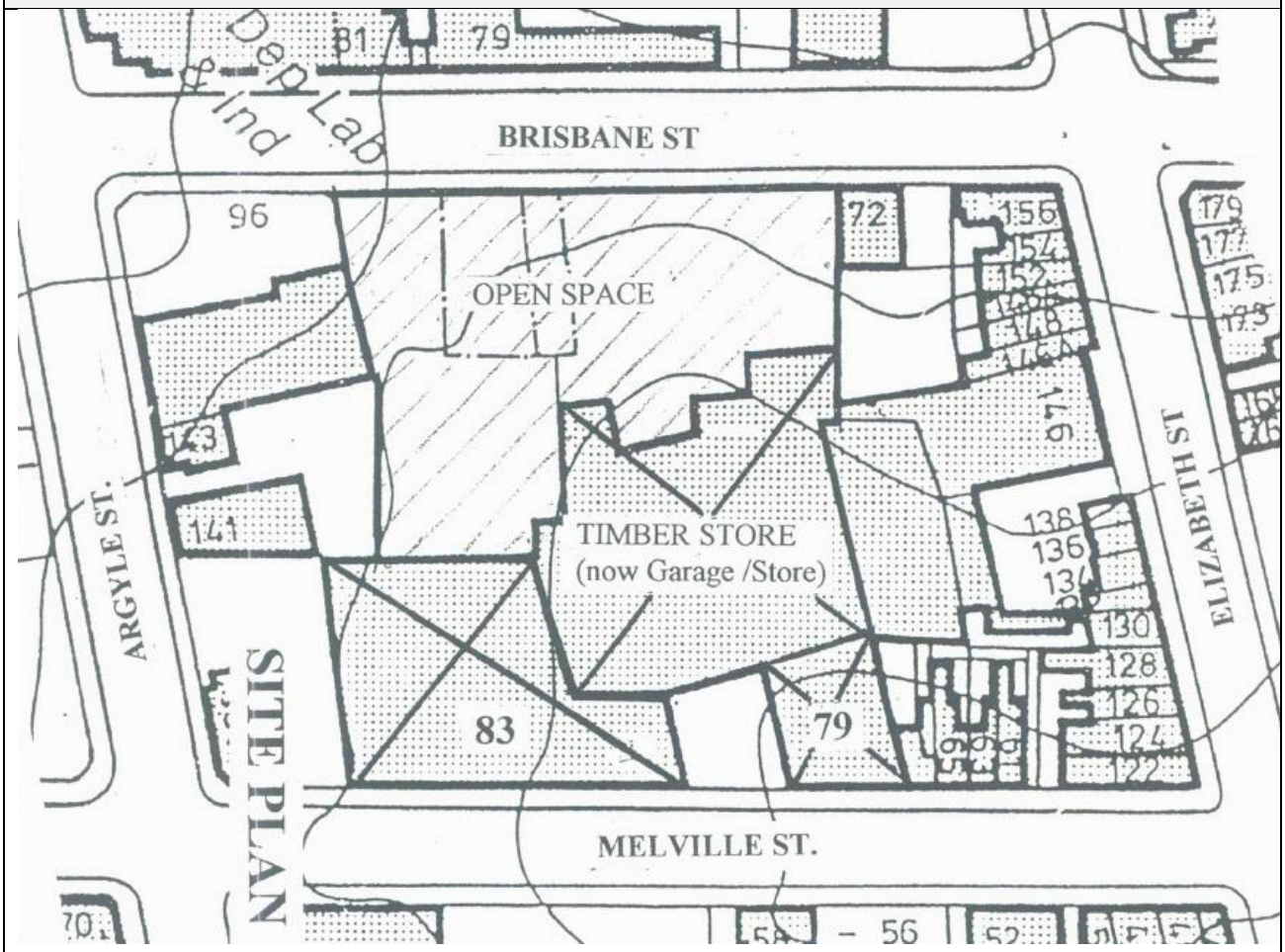


Figure 3.28 – Ground floor plan and southern elevation, former Crisp and Gunn Offices, 1990s. From Vincent and Grant as cited in Section 2.5.

Figure 3.29 – First floor plan and western elevation, former Crisp and Gunn Offices, 1990s. From Vincent and Grant as cited in Section 2.5.

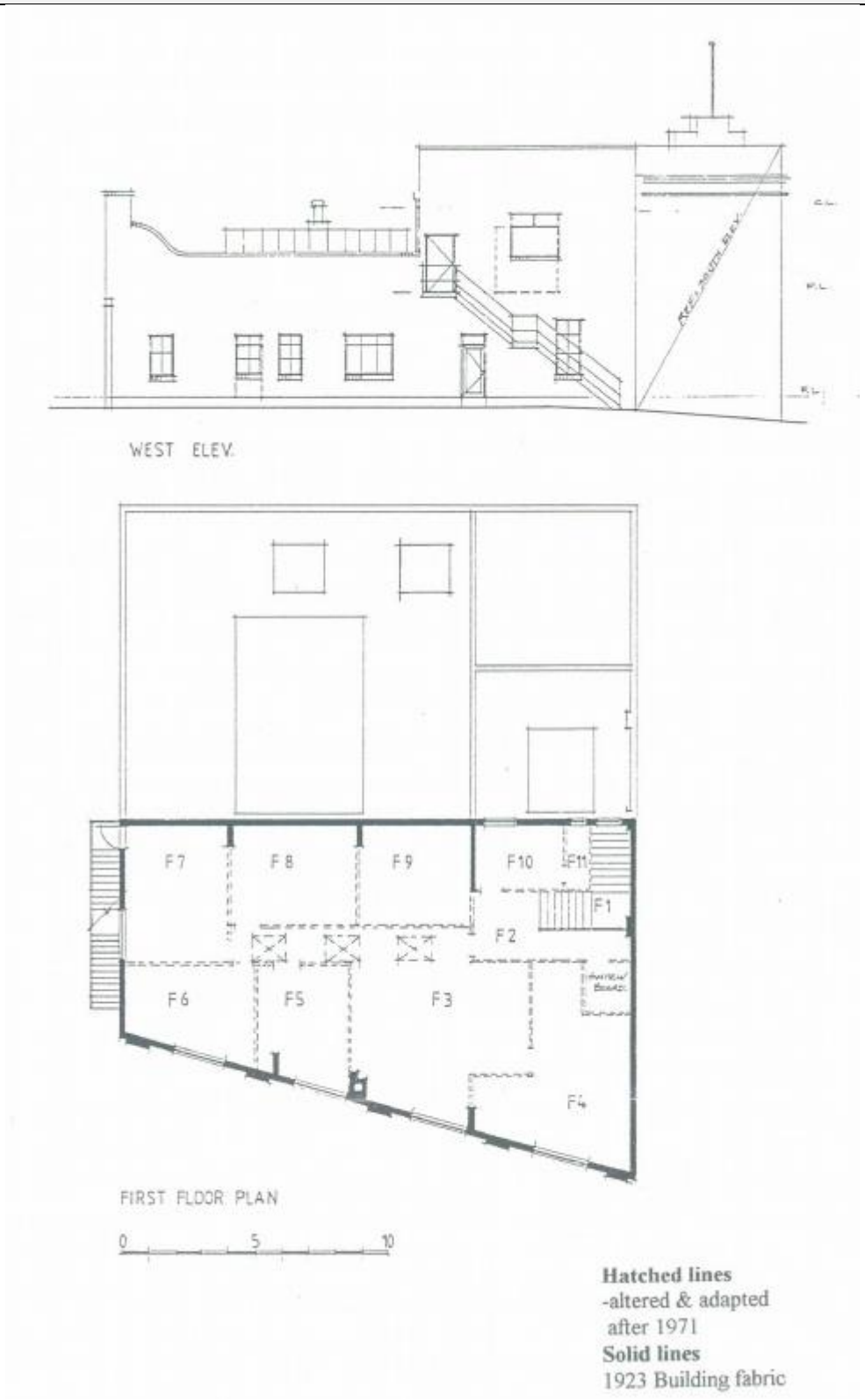


Figure 3.30 – Overview photograph, former Crisp and Gunn Offices, 1995. From Vincent and Grant as cited in Section 2.5.

4. DESCRIPTION OF THE CURRENT FORM OF THE PLACE

Note that for the purpose of this assessment, the subject site will be separated into individual buildings as these have invariably evolved in different phases and have had different uses/modifications during their lives, however reference to related buildings will be made where relevant, namely:

1. The former Crisp and Gunn workshops, 1923.
2. The former Crisp and Gunn offices, 1923.
3. The former Forestry dome and offices, 1997
4. The Freedom building, 1997. Not described here as no heritage listings apply to that place (apart from possible underlying archaeology).

Figure 4.1 depicts these buildings annotated as per the numbering above:

Figure 4.1 – Main built features of the subject site (www.thelist.tas.gov.au)

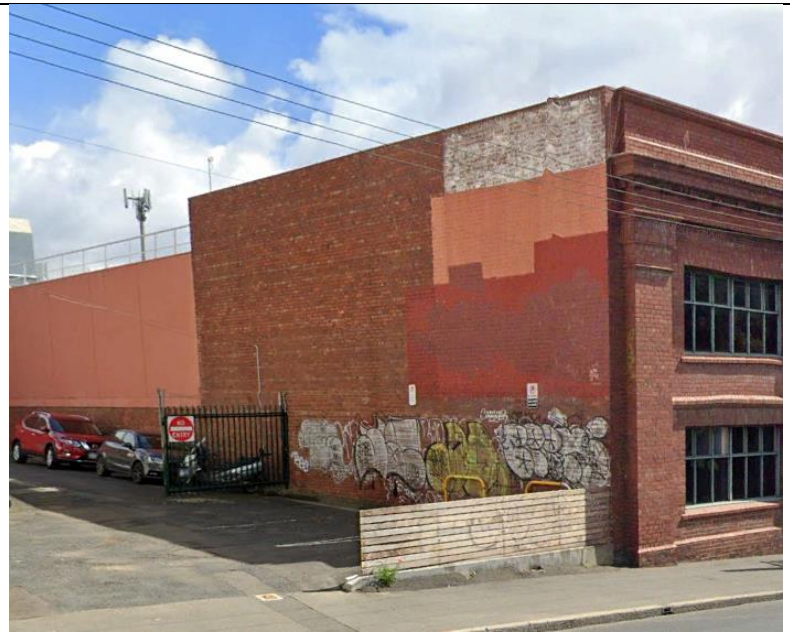
4.1. THE FORMER CRISP AND GUNN WORKSHOPS (1923)

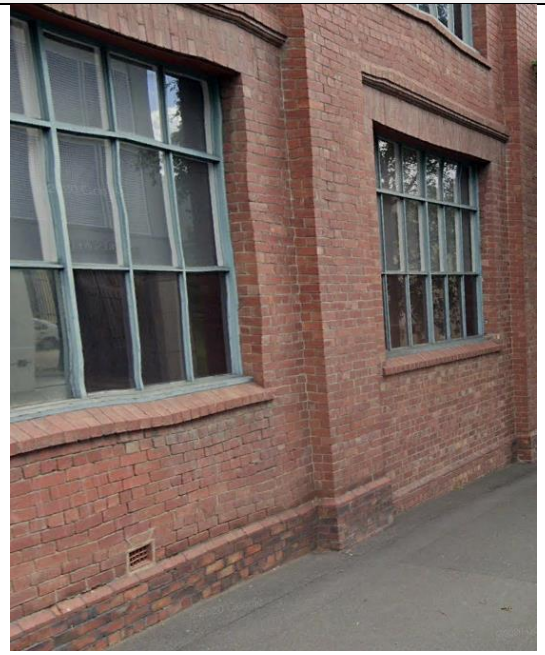
Figure 4.2 – The former Crisp and Gunn workshops and store footprint. Adapted from www.thelist.tas.gov.au

Figure 4.3 – Distinct areas of the workshops and store (adapted from Morrison Breytenbach Architects as-existing drawing, supplied by UTas).

GENERAL FORM, EVOLUTION AND DESCRIPTION	
Development phase	**Description, integrity etc.**
Crisp and Gunn 1923 - 1968	The building wholly derives from the 1923 construction following the fire which destroyed the earlier Crisp and Gunn buildings. The western end is two storey (former workshops) with the eastern end (former hardware store) being three storey (all under the same line of roof - owing to ground slope and lower floor-to-ceiling heights on the eastern end). This period of development is typified by generally clear floor plates in each of the eastern and western sections (excluding the timber column grid) and raw finishes including painted brick walls, no detailed joinery, lack of ceilings etc. The former single-storey rear warehousing contemporary with this development has been demolished. Particularly the remaining larger and open spaces of the building are very legible in demonstrating a former utilitarian workshop area.
SES and State Fire Commission 1968-1994	It is likely that some of the office partitioning/fitout on the ground floor of the western end of the building derives from this later phase of use.
Forestry Tasmania 1997-2017	As per above all of that partitioning and fitout on the ground floor of the western of the building derives from the earlier government and Forestry Tasmania use.

EXTERIOR DESCRIPTION		
Element	**Description**	**Image**
Elevations		
Northern	The northern elevation is obscured by the 1997 additions, however is unlikely to have had/have any notable architectural qualities – the western portion formerly leading to the rear warehouse/workshop.	
Eastern	The eastern elevation formerly had three large openings into the Crisp and Gunn driveway (i.e. for goods loading). These have been modified and glazed for a series of windows/doors in later development. This elevation offers no remarkable architectural qualities.	
Southern	The southern elevation is the principal street frontage of the building and is a simply yet effectively detailed treatment of the elevation utilising brick. The elevation features an upper floor row of ten windows, each corresponding with one or two windows below (noting that the eastern end is three storey and the western end two). Each bay of windows are separated by a brick engaged column with simple	

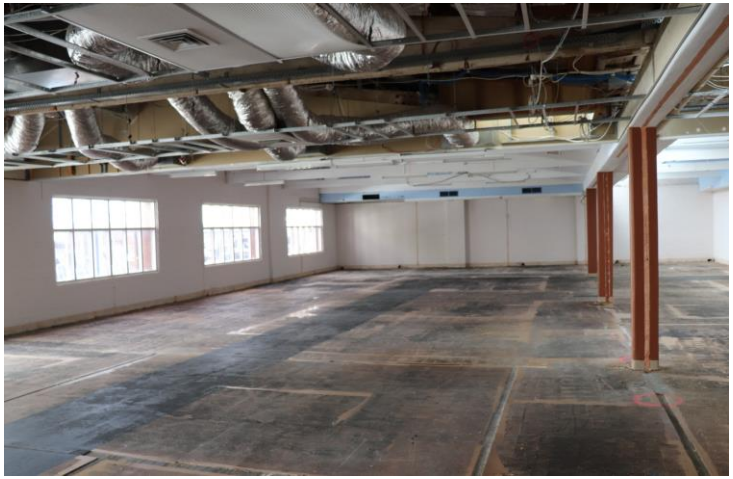
	brick bases and capitals. There is a brick stringcourse between the major floors and a more substantial capital course beneath the parapet. The centre of the parapet is heightened to include a brick-framed signboard. There is one original door opening in this elevation towards the western end – formerly timber 'barn' doors this is now a recessed glazed entrance.	
Western	The western elevation is a completely blank and unarticulared brick party wall .	

Roof		
Form	The roof retains its original simple sawtooth form with two 'teeth' – the front one being a larger span than the rear.	
Framing	The Oregon timber truss framing can be seen from the upper floor throughout the building.	
Cladding	The cladding is assumed to be either zincalume or corrugated galvanised iron.	
Rainwater goods	The rainwater goods were not inspected due to the roof parapet.	
Walls		
Foundations	The foundations are assumed to be brick and concrete as per the 1920s specifications.	
Masonry	The walls are of hard-fired brick (likely triple—skin and thicker in the areas of the engaged columns). There is a distinctly thicker foundation course, stringcourse at upper floor levels, simple capitals to the columns, and upper dentilled stringcourse, vertically laid brick lintels and a brick-framed top signboard.	

Exterior doors and windows		
Exterior doors	The original 'barn' doors leading to Melville Street have been removed (probably c1968) and replaced with a recessed and glazed porch.	
Exterior windows	The windows on the Melville Street frontage appear to be the originals, matching the depiction on the original plans.	

INTERIOR DESCRIPTION		
Element	**Description**	**Image**
Eastern end semi-basement		
Form/spaces	This is a large single room as it originally was as part of the hardware store.	
Ceilings/finishes	The ceiling is the underside of the timber flooring of the first floor.	
Walls/finishes	The walls are unlined painted brick.	
Floors	The floors were concreted in 1964.	
Joinery	The room is generally devoid of joinery as per the utilitarian original nature. Any detailed joinery appears to be post-1960s. Many of the timber posts on this level have been replaced with concrete.	

Element	Description	Image
Ground floor		
Form/spaces	The eastern end of the building (the former hardware store) is a single large room as it originally was. The larger western end (former workshop) has been partitioned into a large number of rooms, hallways etc. as well as an entrance hall.	
Ceilings/finishes	The ceilings have all been plastered and/or false ceilings added, obscuring the original lack-of ceiling configuration.	
Walls/finishes	Generally, the inside of the exterior walls remain as painted brick, however some linings have been added as part of office partitioning.	
Floors	The floor was concreted in 1964.	
Joinery	The room is generally devoid of joinery as per the utilitarian original nature. Any detailed joinery appears to be post-1960s. Many of the timber posts on this level gave been replaced with concrete.	

Element	Description	Image
First floor		
Form/spaces	Both the eastern and western ends of the building remain as large rooms (although the western end has been partitioned, with these having been removed).	
Ceilings/finishes	The ceilings have had a range of false ceilings added (to obscure ducting) and subsequently removed. Some ceilings have been installed between trusses. Generally, the sawtooth roof form and open trusses are legible.	
Walls/finishes	Generally the inside of the exterior walls remain as painted brick, however some linings have been added as part of office partitioning.	
Floors	The timber floors appear to be all original and largely intact (although obscured by a range of floorcoverings). There is evidence of earlier openings (lifts, hoists etc.).	
Joinery	The room is generally devoid of joinery as per the utilitarian original nature. Any detailed joinery appears to be post-1960s.	

Summary Descriptive comments

The Exterior envelope of the building largely retains the original 1923 form, however there has been some reconfiguration of openings on the northern (rear) and eastern walls to connect to subsequent development. The façade is practically wholly original with only minor reconfiguration of the main entrance door. The streetscape presence remains unaltered from the time of its construction. Key attributes of the exterior of the building are the sawtooth roof, finely executed brick façade and fenestrative pattern.

The interior of the building retains the ability to read as a simple and utilitarian workshop/store building. There is practically no adornment in the detailing with a lack of linings, decorative joinery etc. Key attributes of the interior are the timber floors, exposed timber structure, lack of linings and larger open spaces. The entire ground floor has been replaced with concrete, some of the structural elements have been replaced with steel and concrete however the construction methods of the building are still evident. If stripped of modern linings, services etc. the building still has the potential to read as an Inter-War commercial/industrial building interior.

4.2. THE FORMER CRISP AND GUNN OFFICES

Figure 4.4 – The former Crisp and Gunn offices footprint. Adapted from www.thelist.tas.gov.au

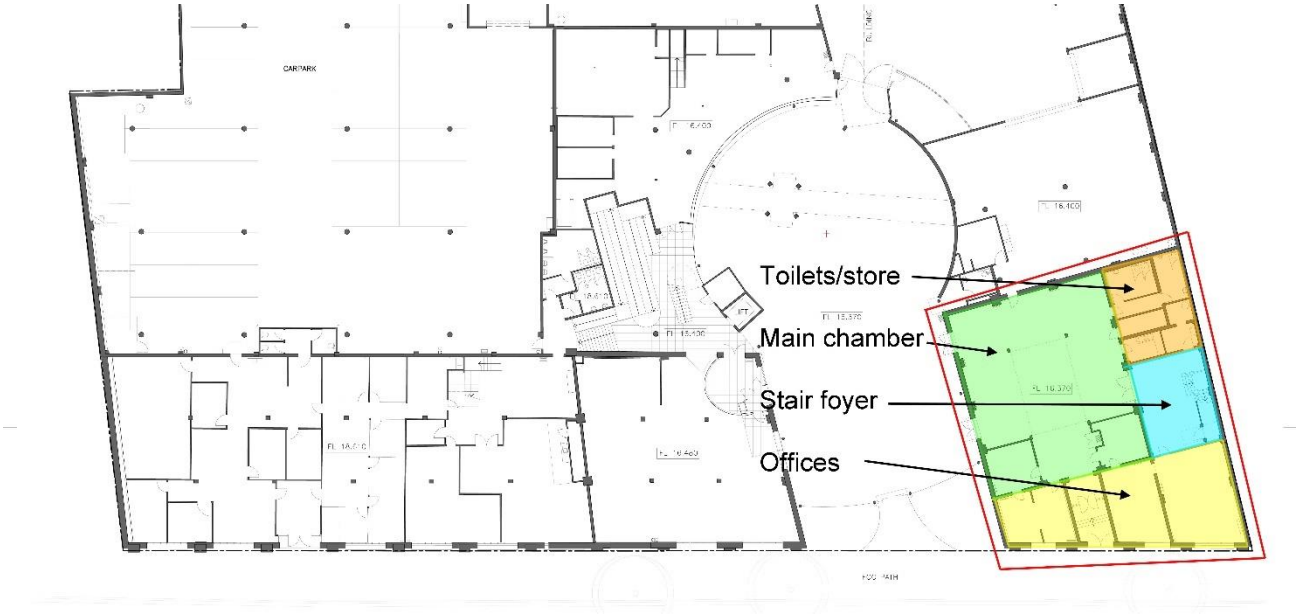


Figure 4.5 – Ground floor of the former Crisp and Gunn offices with areas as discussed here (adapted from Morrison Breytenbach Architects as-existing drawing, supplied by UTas).

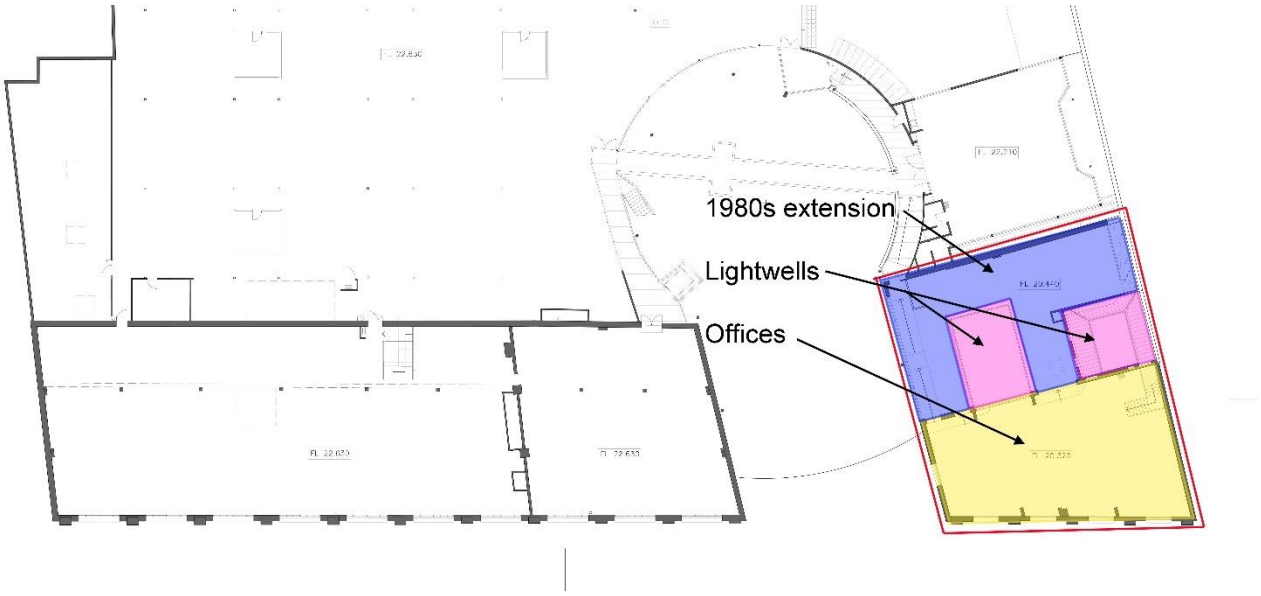


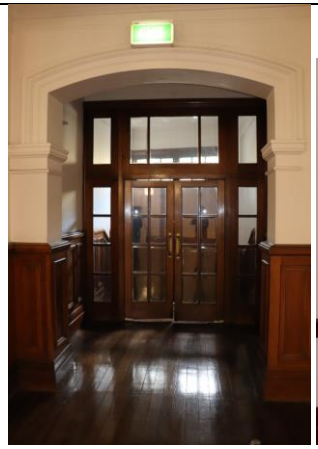
Figure 4.6 – Upper floor of the former Crisp and Gunn offices with areas as discussed here (adapted from Morrison Breytenbach Architects as-existing drawing, supplied by UTas).

GENERAL FORM, EVOLUTION AND DESCRIPTION	
Development phase	**Description, integrity etc.**
Crisp and Gunn 1923 - 1968	The building wholly derives from the 1923 construction following the fire which destroyed the earlier Crisp and Gunn buildings. The building has a notable higher level of articulation than the adjacent workshops/store building, in particular the ground floor which would have been the public face of the business.
SES and State Fire Commission 1968-1994	It is likely that minimal change occurred to the ground floor (at least) of the building during this period, with the finely articulated Crisp and Gunn office fitout remaining. The upper floor was substantially modified in the 1980s with a rearward extension which internalised the lightwells.
Forestry Tasmania 1997-2017	As per above it is likely that the ground floor was not substantially modified during this period, with the exception of the opening up of the western wall for connectivity to the new dome structure.

EXTERIOR DESCRIPTION		
Element	**Description**	**Image**
Elevations		
Northern	The ground level of the northern elevation is obscured by the 1997 workshop additions, however is unlikely to have had/have any notable architectural qualities. The original northern elevation of the upper floor has been wholly removed as part of the 1980s additions.	
Eastern	The eastern elevation is a completely blank and unarticulated brick party wall .	
Southern	The southern elevation is the principal street frontage of the building and is a simply yet effectively detailed treatment of the elevation utilising brick. The elevation features an upper floor row of four windows, each corresponding with a window below. Each bay of windows are separated by a brick engaged column with simple brick bases and capitals. There is a brick stringcourse between the floors and a more substantial capital course beneath the parapet with dentilling. There is an intermediate decorative course of brick featuring a chequerboard pattern of a mix of horizontally and vertically laid bricks. The centre of the parapet is heightened to include a brick-framed signboard surmounted by a flagpole. There is one original door opening in this elevation towards the western end with the original timber double doors.	

Western	The western elevation has been heavily modified with a pair of double doors on the ground level and a large and modern window on the upper floor spanning the original 1920s and 1980s portions of that floor.	
Roof		
Form	The roof retains its original skillion form behind the parapet which has been extended rearwards with a sawtooth and hipped form in the 1990s.	
Framing	The Oregon timber truss framing can be seen from the upper floor throughout the building.	
Cladding	The cladding is assumed to be either zincalume or corrugated galvanised iron.	
Rainwater goods	The rainwater goods were not inspected due to the roof parapet.	
Walls		
Foundations	The foundations are assumed to be brick and concrete.	

Masonry	The walls are of hard-fired brick (likely triple—skin and thicker in the areas of the engaged columns). There is a distinctly thicker foundation course, stringcourse at upper floor levels, simple capitals to the columns, and upper dentilled stringcourse, vertically laid brick lintels and a brick-framed top signboard.	
Exterior doors and windows		
Exterior doors	The original blackwood double doors	
Exterior windows	The windows on the Melville Street frontage appear to be the originals.	

INTERIOR DESCRIPTION		
Element	**Description**	**Image**
Ground floor offices		
Form/spaces	The four offices and foyer retain their original form.	
Ceilings/finishes	The ceilings are ornate pressed tin.	
Walls/finishes	The walls are rendered in hard plaster.	
Floors	The floors appear to be the original timber floors. The entrance has a tiled mosaic floor which is likely to be original.	
Joinery	These rooms have very high-quality blackwood joinery – clearly exhibiting the products of the original owner (i.e. finely executed joinery from Tasmanian timber. The glazed double doors leading from the entrance hall to the main chamber are very finely executed and retain their original brass hardware and the entrance hall has a panelled timber dado and an ornate entrance arch. The offices feature blackwood three-panel doors, skirtings and architraves as well as chair rails and picture rails.	 

Ground floor main chamber		
Form/spaces	The main chamber was formerly a single large room, however two smaller offices have been partitioned off the front section. Doors have been added to link this room with the dome and the workshops at rear.	
Ceilings/finishes	The ceiling is elaborate pressed tin with an arched central roof lantern.	
Walls/finishes	The walls are hard plaster rendered onto the masonry.	
Floors	The floors are the original Tasmanian Oak boards.	
Joinery	The room has very high-quality blackwood joinery – clearly exhibiting the products of the original owner (i.e. finely executed joinery from Tasmanian timber). The glazed double doors leading from the entrance hall to the main chamber, as well as those leading to the stair hall, are very finely executed and retain their original brass hardware. The chamber features blackwood three-panel doors, skirtings and architraves and the structural columns are clad in blackwood.	

Ground floor stair foyer		
Form/spaces	This room retains its original form, entered via a single door from one of the front offices and by double doors from the main chamber. A later door to the rear store has been added.	
Ceilings/finishes	The ceiling is elaborate pressed tin with a roof lantern.	
Walls/finishes	The walls are hard plaster rendered onto the masonry.	
Floors	The floors are the original Tasmanian Oak boards with a modern floating floor installed.	
Joinery	The room has very high-quality blackwood joinery – clearly exhibiting the products of the original owner (i.e. finely executed joinery from Tasmanian timber). The glazed double doors leading from the main chamber, as well as those leading to the stair hall, are very finely execute. The room features blackwood three-panel doors, skirtings and architraves and the structural columns are clad in blackwood. The stairs are very elaborate and Arts and Crafts in styling with oversized panelled newel posts and a decorate balustrade. The panelled understair has been partially infilled for a service room.	

Ground floor store/kitchen/toilets		
Form/spaces	This area has been divided into several small rooms – a kitchenette, switchboard room, store, toilets and also includes an early safe.	
Ceilings/finishes	False ceilings have been installed however it appears that at least part of an earlier ceiling remains above.	
Walls/finishes	The walls have been re-lined however it is likely that earlier hard plastered linings remain underneath.	
Floors	The floors have modern floorcoverings however there may be some original flooring beneath.	
Joinery	No early/original joinery can be seen in these rooms, however it may have survived beneath modern linings.	

Upper floor offices		
Form/spaces	The form of this room has been completely modified to be a single large room (some nibs remain indicating the lines of former walls). The 1972 plans show a series of offices and partitions which are likely to have been original. With that wall removal it appears that all original joinery has also been removed. In the 1980s most of the rear wall was removed for an extension over the former rear rooftop.	 
Ceilings/finishes	All ceilings have been removed.	
Walls/finishes	The walls are a combination of painted brick and modern linings.	
Floors	The original timber floor remains with a sheet covering.	
Joinery	Apart from the top railing of the stairs, no original/early joinery remains.	

Upper floor rear extension		
Form/spaces	This area was added during the State Emergency Service occupation of the building onto the former roosfpace of the rear of the office building. This enclosed the formerly rooftop lightwells with modern glazed partitions and artificial lighting.	
Ceilings/finishes	Modern plaster with exposed beams.	
Walls/finishes	A variety of painted masonry and modern linings.	
Floors	Compressed sheet.	
Joinery	Modern minimalist joinery.	

Summary Descriptive comments

The Exterior envelope of the building largely retains the original 1923 form, however there has been some reconfiguration of openings on the northern (rear) and western walls to connect to subsequent development and the upper floor has been extended rearward across former roofspace and enclosing the former roof lanterns. The façade is wholly original. The streetscape presence remains unaltered from the time of its construction. Key attributes of the exterior of the building are the finely executed brick façade and fenestrative pattern.

The interior of the building (ground floor) retains the ability to read as a well-fitted 1920s office building which has utilised fine Tasmanian timber joinery to highlight its original business. The ground floor remains wholly legible and is in largely original condition (although note some earlier and non-original openings around the entrance hall have been re-blocked). Key attributes of the interior are the timber floors, pressed tin ceilings, fine blackwood joinery, tiled entrance hall, impressive stairs, large main chamber and roof lanterns. and larger open spaces. The upper floor has been practically entirely stripped and does not resemble its original form or detailing and has been extended rearward

4.3. THE FORESTRY DOME AND OFFICES

Figure 4.7 – The 1997 Forestry building footprint. Adapted from www.thelist.tas.gov.au

GENERAL FORM, EVOLUTION AND DESCRIPTION	
Development phase	**Description, integrity etc.**
1997 -	The dome and associated office building are generally as per their 1997 construction, although the plantings of the dome have recently been removed.

The following description of the Forestry dome and wider complex is drawn from the Tasmanian Heritage Register datasheet. Note also that the full series of original plans for that building exist in the Tasmanian Archive and Heritage Office (AE417

Slightly set back from the Brisbane Street footpath, the Forestry Tasmanian dome marks the current formal entrance to the complex and connects the Crisp & Gunn offices and workshop buildings; it was designed to function as a microclimate of Tasmanian rainforest. The 22-metre dome structure is constructed from 16 segments of curved laminated Tasmanian oak beams, with steel rod bracing and faceted glass cladding, and a 'tail' that continues the curved spherical surface a further 15 metres out, and down towards the front entrance. A highly modified natural rivulet runs through stormwater piping beneath the Crisp and Gunns site, including the area of the dome. Internally the structure forms a high open space; the original rainforest plantings were removed in 2018. The Forestry Tasmania dome is of high historic cultural heritage significance.

Structural timbers from the Crisp & Gunn timber store and outbuildings were reused in the 1997 redevelopment of the site, they provide an ongoing connection to the original and evolving use of the site.

5. ASSESSMENT OF HISTORIC CULTURAL HERITAGE SIGNIFICANCE

The following statements of significance are based on the national HERCON standard for statements of significance, based on the amount of information currently at-hand as detailed in this document. Note that natural history and indigenous heritage values have not been assessed here, as these are beyond the scope of this assessment.

The assessment methodology for each criterion follows the methodology details in the Tasmanian Government's *Assessing Historic Heritage Significance for Application with the Historic Cultural Heritage Act 1995* (October 2011) which is considered to represent a sound approach to assessing values (and from which the expanded definitions in the table below are drawn).

A. IMPORTANCE TO THE COURSE, OR PATTERN OF OUR CULTURAL OR NATURAL HISTORY.
A place is of importance to the course or pattern of Tasmania's history if that place is the product of, or is an example of, or was influenced by, or has influenced, or is associated with, or has a symbolic association with, or is the site of – an event, phase, period, process, function, movement, custom or way of life (including values, aspirations, tastes and fashions) which has made a strong, noticeable or influential contribution to the evolution or pattern of the settlement and development of Tasmania.
THE FORMER CRISP AND GUNN WORKSHOPS, STORE AND OFFICES
The former Crisp and Gunn buildings are of historic heritage significance in their ability to demonstrate a long-running presence (some 80 years) of that business on the site, with these specific buildings being occupied by that business for some 45 years. Crisp and Gunn are a well-known Tasmanian business with strong associations with the forestry industry, timber milling and construction and these buildings represent the public front-face of that business. The buildings represent the Inter-War expansion of such businesses as a suite of such in the Hobart CBD with wider-reaching impacts upon the Tasmanian economy and industry. The continuing use of those buildings by Forestry Tasmania continued that association with the timber industry.
THE FORESTRY BUILDING
The forestry industry, and the Tasmanian Government's involvement with such, is a key historic theme in the development of Tasmania. The 1997 Forestry building represents the corporatisation of that Government enterprise with a city presence and the dome represents a desire for design excellence as an iconic building associated with that use. Please refer to Appendix A for further commentary on the historical association and symbolism of the dome as provided by Adj. Professor Robert Morris-Nunn AM.

B. POSSESSION OF UNCOMMON, RARE OR ENDANGERED ASPECTS OF OUR CULTURAL OR NATURAL HISTORY.

A place demonstrates rare or uncommon aspects of Tasmania's heritage if that place illustrates in its fabric an event, phase, period, process, function, movement, custom or way of life (including values, aspirations, tastes and fashions) which, or an aspect of which: (i) was considered uncommon or unusual at the time of its origin; (ii) is no longer practised AND is of special interest; or (iii) was once commonplace but for which there is little surviving evidence in Tasmania.

THE OVERALL SITE

The site does not appear to exhibit any particularly rare qualities. Note that the high-quality of the blackwood fitout and intact pressed tin ceiling linings of the former Crisp and Gunn Offices are probably an uncommon survivor of modern office fit outs which may be worthy of some further consideration in their rarity.

C. POTENTIAL TO YIELD INFORMATION THAT WILL CONTRIBUTE TO AN UNDERSTANDING OF OUR CULTURAL OR NATURAL HISTORY.

A place has the potential to yield information that will contribute to an understanding of Tasmania's history if, through analysis and further examination or research of the place and its fabric (including artefacts), it can provide information that could not be derived from any other source. While this criterion in Tasmania is most often used to define archaeological research potential, it may also be used for the research potential of architectural design, construction techniques, historical gardens, etc.

THE OVERALL SITE

As per Section 7 of this document, there are areas of the site that have the potential to yield information about early commercial enterprise and a range of early domestic residences and activity which may enhance knowledge of the site, as well as a range of thematic, regional and temporal lines of archaeological enquiry. Owing to large-scale disturbance on the site, it is likely that these areas are limited to the Melville Street frontage beneath the former Crisp and Gunn buildings and the Forestry dome only.

D. IMPORTANT IN DEMONSTRATING THE PRINCIPAL CHARACTERISTICS OF A CLASS OF CULTURAL OR NATURAL PLACES OR ENVIRONMENTS.

This criterion is concerned with representativeness. A place included under this criterion should demonstrate the principal characteristics of a particular class of cultural place if that place displays the defining features, qualities or attributes of its type, where type or class of place illustrates a range of human activities including a way of life, a custom, an ideology or philosophy, a process, a land use, a function, a form, a design, a style, a technique or some other activity or achievement. To be considered a good representative example, the place should have a high level of intactness.

THE FORMER CRISP AND GUNN WORKSHOPS AND STORE

The former Crisp and Gunn offices are of historic heritage significance in demonstrating the principal characteristics of an Inter-War Stripped Classical style office building. This is evident in features such as the division of the facade into emphasised vertical bays, use of simplified classical detailing (e.g. columns, entablature and cornice) etc. This tyle of architecture is considered important in representing the inter-war commercial boom in Hobart with the expansion of many historically established companies and is a distinctive element of the Hobart CBD. The interior of the building is much less distinctive – with significance deriving from its simplicity and warehouse-style large open spaces. The building is an excellent example of the work of G. Stanley Crisp – being one of few known largely intact utilitarian commercial buildings remaining of his design in Hobart.

THE FORMER CRISP AND GUNN OFFICES

The former Crisp and Gunn offices are of historic heritage significance in demonstrating the principal characteristics of an Inter-War Stripped Classical style office building. This is evident in features such as the division of the facade into emphasised vertical bays, use of simplified classical detailing (e.g. columns, entablature and cornice) etc. This tyle of architecture is considered important in representing the inter-war commercial boom in Hobart with the expansion of many historically established companies and is a distinctive element of the Hobart CBD. The ground-floor interior of this building is particularly important in having a higher degree of ornate detailing which was clearly designed to provide the front public face of the company with an element of style absent in the more industrial areas of the site. The building is an excellent example of the work of G. Stanley Crisp – the ground floor and associated lightwells probably representing the most intact remaining commercial building by his design in Hobart (noting several other of his buildings have been demolished or destroyed by fire).

THE FORESTRY BUILDING

The Forestry dome and building is not considered to demonstrate any particular class of place of importance in the heritage or history of Tasmania, although its architectural and engineering merit is recognised as a somewhat unique approach to a Government office building.

E. IMPORTANCE IN EXHIBITING PARTICULAR AESTHETIC CHARACTERISTICS
This criterion may be interpreted as a place being important because of its aesthetic significance if that place exhibits sensual qualities that can be judged against various ideals including beauty, picturesqueness, evocativeness, expressiveness, landmark presence, symbolism or some other quality of nature or human endeavour.
THE OVERALL SITE
No part of the subject site is considered to exhibit any particularly notable aesthetic characteristics worthy of the assignment of historic heritage significance.

F. IMPORTANCE IN DEMONSTRATING A HIGH DEGREE OF CREATIVE OR TECHNICAL ACHIEVEMENT AT A PARTICULAR PERIOD.
A place is important in demonstrating a high degree of creative or technical achievement if that place illustrates artistic or technical excellence, innovation, accomplishment, extension or creative adaptation in a variety of fields of human endeavour including but not exclusive to art, engineering, architecture, industrial or scientific design, landscape design, evolved design, construction, fabrication, manufacture, or craftsmanship.
THE OVERALL SITE
It is likely that the former Forestry Dome exhibits a high degree of creative and technical achievement in its unusual and innovative design and construction. Please refer to Appendix A for further commentary on the technical aspects and design thinking of the dome as provided by Adj. Professor Robert Morris-Nunn AM. The former Crisp and Gunn buildings are not considered to exhibit any distinctive degree of creative or technical achievement.

G. STRONG OR SPECIAL ASSOCIATION WITH A PARTICULAR COMMUNITY OR CULTURAL GROUP FOR SOCIAL, CULTURAL OR SPIRITUAL REASONS.

A place has a special associational value if it is associated with a person, organisation or group of people who or which is of importance to the history of Tasmania. In this context, importance may relate not only to the great and well-known, but also to the influential, the exemplary, and the innovative.

THE OVERALL SITE

The site is not considered to have any particular special association with any particular community or cultural group for social, cultural nor spiritual reasons.

H. SPECIAL ASSOCIATION WITH THE LIFE OR WORKS OF A PERSON, OR GROUP OF PERSONS, OF IMPORTANCE IN OUR HISTORY.

A place has a special associational value if it is associated with a person, organisation or group of people who or which is of importance to the history of Tasmania. In this context, importance may relate not only to the great and well-known, but also to the influential, the exemplary, and the innovative.

THE OVERALL SITE

The site has links to a number of prominent organisations and persons of importance in our history, including:

- The Crisp and Gunn empire
- G. Stanley Crisp, with the warehouse/store and offices representing a largely intact example of his Hobart commercial work, of which few examples remain.
- Tasmanian forestry, government involvement and as a business unit.
- And more recently with prominent Architect Robert Morris-Nunn and Engineering firm Gandy and Roberts.

The Forestry Dome is the work of well-known architecture firm Morris-Nunn & Associates as well as similarly well-known engineering firm Gandy and Roberts. Please refer to Appendix A for further commentary on the various associations of the dome as provided by Adj. Professor Robert Morris-Nunn AM.

6. FABRIC ANALYSIS & ABILITY TO DEMONSTRATE SIGNIFICANCE

6.1. DEGREES OF SIGNIFICANCE

Based on the overall statements of significance outlined in Section 8, as informed by the key historic themes and comparative analysis of Section 7 and the analysis of the evolution of the place as detailed in Section 5, individual and collective elements, and other possible heritage values (e.g. intangible values) of the place will be assessed here, in order to assign or rank specific levels of significance, upon which heritage management policies will be formulated in Section 11, to inform the implementation strategy in Section 12.

For the purposes of this section the following scale will be used to assign degrees of significance to individual elements of the fabric and form of the place:

High – Elements, forms or spaces which readily demonstrate important aspects of the significance of the place or related important historic theme.

Medium – Elements, forms or spaces which less-readily demonstrate important aspects of the history of the place, or readily demonstrate aspects of lower significance (or related important historic theme).

Low – Elements, forms or spaces which less demonstrate less important aspects of the history of the place.

Neutral – Elements, forms or spaces which neither contribute to, nor detract from, the significance of the place.

Intrusive – Elements, forms or spaces which obscure the significance or are likely to threaten the longevity/integrity of significant elements, forms or spaces. Examples:

Whilst it is noted that the significance of any place need not necessarily be solely embodied in original fabric (i.e. later modifications can contribute to significance through demonstrating the evolution of the place), it is relevant to consider the impact that later modifications may have had on the integrity of more significant elements and whether that has diminished the significance of such. Similarly, decay of significant elements may also have an impact on their ability to

demonstrate significance. Accordingly, following scale will be used to rank **levels of integrity** of elements, forms or spaces within the context of the overall significance of the place:

> ***High:*** *Elements which are highly intact and readily demonstrate their respective significance.*
>
> ***Medium:*** *Elements which subsequent modification have obscured or reduced their ability to readily demonstrate their respective significance, however this may be retrievable through restoration without the need for introduction of substantial new fabric which may reduce or obscure significance.*
>
> ***Low:*** *Elements which have lost the ability to demonstrate any significance and could not feasibly be restored without conjecture or substantial addition of new fabric.*

The following matrix represents the interplay of integrity and significance and introduces colour coding as used in the following table:

	Integrity		
Significance	High	Medium	Low
High	**1**	**1**	**2**
Medium	**2**	**2**	**3**
Low	**3**	**3**	**4**
Neutral	**4**	**4**	**4**
intrusive	**5**	**5**	**5**

Accordingly, the following colour code has been adopted to consider significance in-light of the integrity of that particular element:

Red – High significance (Rank 1)

Orange – Medium significance (Rank 2)

Green – Low significance (Rank 3)

Grey – Neutral (Rank 4)

Blue – Intrusive (Rank 5)

The table below will further examine the specific fabric of the former Crisp and Gunn buildings with view of providing such recommendations for the future management of the heritage values of that place.

EXTERIOR – THE FORMER CRISP AND GUNN WORKSHOPS/STORE		
Element	**Significance**	**Recommendation**
Northern elevation		Retain the general tenor of the wall however modifications for new attachments/penetrations are likely to be acceptable.
Western elevation		Retain the general tenor of the wall however modifications for new attachments/penetrations are likely to be acceptable (noting however this is a boundary wall.
Eastern elevation		Retain the general tenor of the wall however modifications for new attachments/penetrations are likely to be acceptable.
Southern elevation		Generally retain as existing. Modifications/additions to the door aperture are likely to be acceptable within the existing opening.
Roof (form, cladding, rainwater goods)		Ideally retain as existing, however some modification may be acceptable given the parapet wall generally hides the roof from public view.
Eaves, fascias, barges etc.		Repair as necessary, preferably in like-for-like materials.
Walls generally		The exterior envelope is generally of high significance (noting that the northern and eastern elevations may sustain some modification particularly if that assists in a viable adaptive reuse in connectivity to other development).
Doors		Modify existing doors as desired within existing opening on the southern elevation. Doors on other elevations may be modified as desired and it is likely that rearrangement/enlargement of apertures would be acceptable.
Windows		Retain and repair as necessary. Modification should be limited only to works essential for security, thermal or acoustic improvement.

INTERIOR - THE FORMER CRISP AND GUNN WORKSHOPS/STORE (ALL FLOORS)		
Element	**Significance**	**Recommendation**
Form		The form and spatial qualities of the interior – representing large and open commercial/industrial spaces are of some significance in understanding the context of the building. However, in order to facilitate a suitable adaptive reuse it is considered that reconfiguration and subdivision of that form may be acceptable.

Modern partitioning		This should be removed in favour of either open space or a better resolved approach suited to an adaptive reuse.
Floors		The remaining timber floors should be retained and preferably exposed/polished to highlight the use of timber in the building (associated with its long association with the timber industry). Noting however that there may be thermal/acoustic/functional reasons why this might not be achieved. Some penetrations in the floor are likely to be acceptable (e.g. for new access points etc.).
Walls		The walls should ideally be retained as painted brick, although if linings are required for functional reasons this is likely to be acceptable.
Ceiling		The lack of ceilings reflect the utilitarian nature of the building and allow an unimpeded view of the floor/ceiling structure. Ideally these should remain exposed, however there may be thermal/acoustic/ functional reasons why this might not be achieved.
Original structural timber		The original structure reflects the use of timber in the building and the exposure of such is an integral part of interpreting the utilitarian nature of the building. Ideally this should be retained as visible. Note the modern interventions (e.g. concrete posts) would benefit from being better resolved.

EXTERIOR – THE FORMER CRISP AND GUNN OFFICES		
Element	**Significance**	**Recommendation**
Northern elevation		Given the extent of prior modification of this wall (particularly the upper level) adapt or modify as desired to promote any necessary connection to any new rear development.
Eastern elevation		Retain the general tenor of the wall however modifications for new attachments/penetrations are likely to be acceptable (noting however this is a boundary wall.
Western elevation		Retain the general tenor of the wall however modifications for new attachments/penetrations are likely to be acceptable.
Southern elevation		Retain as existing.
Roof (form, cladding, rainwater goods)		Ideally retain as existing, however some modification may be acceptable given the parapet wall generally hides the roof from public view. Noting also that the rear portion of the roof is an entirely new structure then this has a higher tolerance to modification.
Eaves, fascias, barges etc.		Repair as necessary, preferably in like-for-like materials.
Walls generally		The exterior envelope is generally of high significance (noting that the northern and western elevations may sustain some modification particularly if that assists in a viable adaptive reuse in connectivity to other development).

Doors		The front door is of high significance and should be retained as existing. All other doors are of no significance and may be adapted as desired.
Windows (front)		Retain and repair as necessary. Modification should be limited only to works essential for security, thermal or acoustic improvement.

INTERIOR – THE FORMER CRISP AND GUNN OFFICES (GROUND FLOOR)		
Element	**Significance**	**Recommendation**
Form		Retain the form of the front rooms, large chamber and stairs hall. Some modification of the rear kitchen, store, safe and toilet area is likely to be acceptable.
Modern partitioning (in the large chamber)		Retain, remove or modify as desired.
Toilets and kitchen fitout		Retain, remove or modify as desired.
Safe		Ideally retain unless this severely inhibits a suitable adaptive reuse.
Floors		The timber floors should be retained and preferably remain exposed/polished to highlight the use of timber in the building (associated with its long association with the timber industry). Remove the floating floor in the stairs hall and assess underlying flooring. Retain the tiled entry foyer.
Walls		The walls should ideally be retained as painted brick, although if linings are required for functional reasons this is likely to be acceptable.
Ceilings		Retain the distinctive pressed tin ceilings.
Joinery (doors, dados, chair rails, architraves, skirtings etc).		Retain all original joinery unless modification is absolutely necessary to facilitate a suitable adaptive reuse. Note that the joinery on the partitioning of the larger chamber is well-executed replica and may be removed or modified as desired (subject to the future of those partitions).
Stairs		Retain. Note that it is likely that a lift will be required, this may be achieved in the rear portion of the building, or possibly outside the footprint of the original building.
Lightwells		Retain and maintain solar access.

INTERIOR – THE FORMER CRISP AND GUNN OFFICES (FIRST FLOOR)

Element	Significance	Recommendation
Form (rear addition portion)		Retain as larger open spaces or subdivide as desired.
Form (front original portion)		Retain as larger open spaces or subdivide as desired.
Floors		The timber floors in the front section should be retained and preferably remain exposed/polished to highlight the use of timber in the building (associated with its long association with the timber industry). The rear may be modified as desired.
Walls		The walls should ideally be retained as painted brick, although if linings are required for functional reasons this is likely to be acceptable.
Ceilings		Replace as desired.
Joinery		Retain, remove or modify as desired.
Stairs landing		Retain as existing.
Lightwells		Retain and maintain solar access. Modify enclosures as desired.

EXTERIOR – THE FORESTRY COMPLEX		
Element	**Significance**	**Recommendation**
General form of the dome		As an iconic entrance statement and circulation space that exhibits a high degree of architectural and engineering excellence, the dome should remain largely unchanged, and its streetscape presence maintained.
Remainder of the 1997 Forestry buildings		Adapt or replace as desired, subject to consideration of impact upon the dome itself and any relevant adjacency/backdropping issues with the former Crisp and Gunn buildings.

INTERIOR – THE FORESTRY COMPLEX		
Element	**Significance**	**Recommendation**
Form of the dome		Retain the interior form of the dome as a key entry and circulation space. Note that the elevated walkway may be reconfigured or removed if required for an adaptive reuse.

Plantings within the dome		Although now removed, planting within the dome is a key attribute of its design intent. A reproduced or new planting scheme should be reinstalled.
All other interiors generally		Retain, remove or modify as desired to rationalise for a new use.
Lift, stairs and vertical circulation within/adjacent to the dome		Retain, remove or modify as desired to rationalise for a new use.
Recycled material from earlier buildings within the dome/forestry buildings		Encourage the retention and/or reuse of this elsewhere within the complex.

The analysis and recommendations above are to be read in conjunction with the conservation policy in Section 9. Where the conservation policy is at-odds with these recommendations, e.g. if additional information comes to hand which reveals further information about a particular element, then the conservation polices take precedence over these recommendations and is to be applied in a heritage impact assessment.

7. STATEMENT OF HISTORICAL ARCHAEOLOGICAL POTENTIAL

7.1. ARCHAEOLOGICAL METHODOLOGY

This statement of archaeological potential is derived from a process which identifies the potential of the site to yield archaeological remains, the significance of any remains, and their potential to yield meaningful information about the site, and which might contribute to relevant key archaeological and historical themes. The following briefly outlines the methodology followed:

Determining general archaeological potential: Through a desktop analysis of historical data and secondary sources, as well as non-invasive site observations, an understanding of the evolution of the site has been gained which has allowed an assessment of the archaeological potential (however significant) of any part of the site - resulting in substantiated predictions of the likelihood of finding something upon any particular part of the site. This has been done by analysing primary source material, summarising the developmental history of the site and developing a chronological narrative detailing an overview of the history of all known features to have ever existed on the site. Where possible, developmental overlays have been developed from historic maps, plans, photographs and other visual documentation. This overlay has been supported by other observations providing supplementary information, and also includes processes such as demolition and disturbance which may have removed or destroyed potential remains – and may have diminished the archaeological potential.

Assessing the significance and potential of any likely archaeological resources to yield meaningful information: Upon understanding the archaeological potential through desktop and site analysis, the next step was to understand its relationship to any aspect of the identified significance of the place – e.g. do the remains have the potential to demonstrate an aspect of the significance of the site or related key historic theme? The potential for any of the archaeological remains to demonstrate important aspects of the history of the site, whether in a state, regional or thematic context, is to be considered.

Understanding possible impact of development and formulation of management strategies: Based on any identified archaeological potential and significance of the site, consideration will be given as to whether the proposed development will impact upon any likely archaeological remains and if necessary broad management strategies will be proposed to manage any impact.

Table 1 (below) demonstrates the steps of this assessment:

Methodology for formulation of the statement of archaeological potential		
	If 'no'	**If 'yes'**
1. Archaeological potential. Are you likely to find something if you dig here? (i.e. a Statement of Archaeological Potential).	Further action may not be required, although a contingency plan may be required for unexpected finds.	The significance of the archaeological potential should be investigated.
2. Significance. Could anything you find here greatly contribute to our understanding of the site or related significant theme?	Further action may not be required.	The likely integrity of the archaeological remains should be investigated.
3. Integrity. Are any archaeological remains likely to be intact?	Further action may not be required, although a contingency plan is required for unexpected integrity.	The likelihood of significant archaeological remains is confirmed.
4. Impact Will proposed works impact upon the significant archaeological remains? i.e. an Archaeological Impact Assessment.	Further action may not be required, although a contingency plan may be required for unexpected impacts.	An Archaeological Method Statement will be required to detail how impact will be managed/mitigated.

7.2. HISTORICAL BACKGROUND AND SUMMARY OF SITE DEVELOPMENT

As per the methodology above, the historical background of the subject site has been provided here in Section 3 – which provides the basis for the formulation of the statement of historical archaeological potential.

The Figures in Section 3 provide a visual indication of the early layout(s) of the site, which are considered here as the first step in understanding archaeological potential – i.e. the physical evolution of the site layout (on a two-dimensional plane at this stage). Figures 7.1 to 7.4 are overlays of site development as depicted on those plans, georeferenced to a range of known reference points both on the site and in the wider environs:

Figure 7.1 depicts the earliest known buildings on the subject site, which may be as early as the 1830s and are likely to have been residential (based on the c1832 and c1845 Sprent surveys). Figure 7.2 depicts these buildings as well as those from the later c19th as depicted on the 1908 Metropolitan Drainage Board plan.

Figure 7.1 – Overlay of the footprint of buildings depicted on the c1832 and c1845 survey (all following figures adapted from GoogleEarth).

As per Section 3, further development on the site occurred after 1870, when Crisp and Gunn established their timber yard on the Melville Street frontage and progressively acquired further land back towards Brisbane Street.

Figure 7.2 – Overlay of the c1870-c1910 development footprint (blue) in relation to the pre-1845 development (colours as per above).

7.3. LIKELY DISTURBANCE EVENTS

As per the archaeological methodology above, once the possibility of archaeological remains has been ascertained in a particular location, it is pertinent to consider any possible events which have acted to disturb any such archaeological remains. In the case of this wider site, the 1997 works to create the basement parking are a very obvious event which is likely to have had major and widespread implications for the survival of any archaeological remains – therefore this will first be considered in order to narrow down what part(s) of the site may retain the ability to yield archaeological remains consistent with the historical depictions – put simply, what extent and depth of mass excavation occurred at the end of the c20th which would have destroyed any archaeological remains?

The 1920s fire destroyed most of the built structures on the site – and it is not known how thoroughly the site may have been cleared post-fire. The plans for the existing buildings do not give specific information about site clearance or excavation at the time of their construction.

A 1964 plan for alterations to the Crisp and Gunn workshops is held by the Tasmanian Archive and Heritage Office which depicts excavation of the central (western) portion of the site for those workshops, and also includes specifications for retaining walls (600mm high) along the western edge of that part of the site. This would indicate widespread and moderately deep bulk excavation at the time, affecting the area depicted in the figure below:

Figure 7.3 – Area affected by bulk excavation and grading, 1964 (blue), as depicted on TAHO AE417/4/97.

Note that the above area of 1964 works would have been further excavated and impacted as part of the 1997 works.

The sources relied upon here to ascertain the extent and depth of 1997 excavation are:

- Civil & Civic, 79-85 Melville Street Hobart, Bulk Excavation Plan, Drawing 950504-C06-01, Issue D 28/8/96.
- Civil & Civic, 79-85 Melville Street Hobart Carpark Layout and Levels, Issue B 10/9/96.

The figure below depicts the depth of bulk excavation undertaken in certain locations to form the basement as part of the 1997 works as depicted on those drawings (noting that the finish level depicts carpark surface – excavation would have been to a greater depth to prepare for that finished surface). Generally, it appears that the Brisbane Street frontage was excavated by around 2.5-3.5 metres, grading down to 1.0-2.0 metres further southward (i.e. following the natural slope of the land).

Figure 7.4 – Sampling of depth of excavation occurring as part of the 1990s redevelopment of the site (metres).

A civil works plan from c1997 indicates that there was a bowser and underground fuel tank on the Brisbane Street frontage of the site where the current driveway into the undercroft carpark is located. Whether or not this was removed at that time the installation of this tank would have had a major impact upon any archaeological remains in that area of the site which still resembles what is likely to have been historic ground level (i.e. not necessarily disturbed by the 1990s building, but previously disturbed:

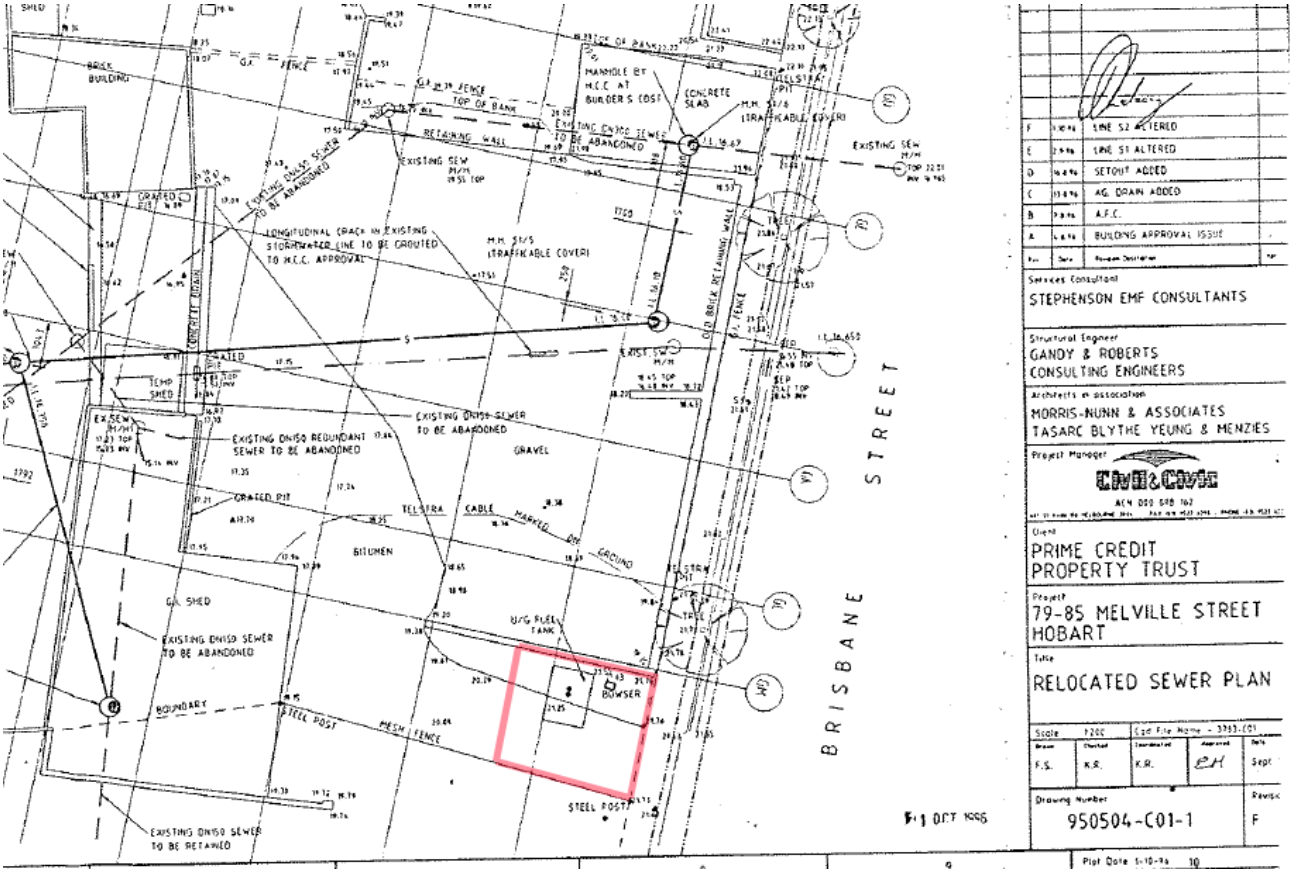


Figure 7.5 – Civil works plan c1997 showing the site of a bowser and underground tank on the Brisbane Street Frontage.

Figure 7.6 – Approximate area of the bowser and fuel tank depicted on Figure 7.5.

Site observations in the current basement parking area indicate that there has been a substantial degree of disturbance as per the levels indicated in Figure 7.4, with what appears to be an earlier wall (used as a retaining wall) having been underpinned by approximately a metre, suggesting that excavation in the late 1990s has exceeded historic ground level. Similarly, the edge of the driveway of the Freedom building to the west has been excavated to the sub-soil shale stone which his typical of sterile ground within some areas of the Hobart CBD:

Figure 7.7 – Underpinned earlier wall in the basement carpark.

Figure 7.8 – Sterile shale stone ground on the western edge of the Brisbane Street portion of the site.

Figure 7.9 – Areas of the site that appear to have been substantially disturbed.

7.5. ARCHAEOLOGICAL SIGNIFICANCE, RESEARCH FRAMEWORK & QUESTIONS

As discussed above, albeit limited to the Melville Street frontage, the subject site has the potential to yield archaeological remains associated with the following historic themes:

- Early (1820s) occupation of the site i.e. the early buildings fronting Melville Street. – albeit buildings of unknown early function, therefore their archaeological signatures are yet to be determined (most likely domestic).
- Late c19th commercial/light industrial development – i.e. the earliest occupation of the timberyard on the site – albeit probably highly disturbed and may only survive in vestiges under/close to the existing 1920s buildings.

Such analysis also has the potential to add depth to other similar such analyses of late Victorian Hobart domestic sites, particularly associated with prominent colonial Tasmanians - such as that undertaken as part of the Menzies Centre (Liverpool/Campbell Streets) excavations, which investigated several prominent 1820s-onwards inner-city residences, including Crowther's (Godden Mackay Logan/Arctas). Other sites such as Judge Pedder's house (173 Macquarie Street – Praxis Environment), Crowther's house/surgery (177 Macquarie Street – Praxis Environment) and Orr's house (3 Montpelier Retreat – Austral Tasmania). Similarly, investigations at Peter Degraves house in Collins Street (Hadleys Hotel development, Godden Mackay Logan), Anthony Fenn Kemp's house at 36 Argyle Street (Praxis Environment) and investigations at the original Hobart Port Officer's residence at 100 Salamanca Place (Praxis Environment) have investigated prominent early inner city residential sites and provide comparative datasets of early and substantial Hobart residences and their associated families.

The Melville Street frontage of the site represents what is likely to be at least eight c1830s-40s small residential buildings. There have been few examples of archaeological investigations into wider communities around the Hobart CBD, i.e. investigations which cover a wide number of adjacent sites representing different functions. Notable examples however are the range of Wapping investigations (e.g. Austral Archaeology 1996, 1998, 2002, 2009), the Whale Fishery Inn and adjacent housing in Watchorn Street (Praxis Environment 2019), 62 Patrick Street (Praxis Environment 2021) and the forthcoming report on the Montpelier Retreat excavations undertaken by Austral Tasmania in 2015.

From a wider regional perspective, archaeological data and remains yielded from the subject site, whether coupled with other Hobart/Tasmanian data, has the potential to strengthen a comparative dataset for research into intra-colonial society through comparison with mainland (and indeed inter-colonial society on an international level). For example early inner-city working-class communities such as Broadway, Cumberland/Gloucester Streets and the Rocks (Sydney) and Little Lonsdale Street (Melbourne) and portside working-class areas such as Port Adelaide, all of which have had substantial archaeological works undertaken, would provide useful datasets for the analysis of any data yielded from the earlier occupation of the current site, which would in-turn add to the depth and scope of the analysis of those collections on the range of themes as outlined above (and others).

From a temporal perspective, any remains from the earlier occupation of the site (i.e. pre-1830) represent a very formative period of Hobart's European settlement and are likely to be of significance when considering their research potential.

Consistent with the 'Tiered research question' approach outlined in the Tasmanian Heritage Council's *Guidelines for Historical Archaeological Research on Registered Places*[40], the following questions could be investigated in the archaeological remains expected to be present within the subject site:

Tier 1 Questions: These questions outline the essential knowledge base needed for any site research or significance evaluations. Such questions are often empirical in nature, and straightforward answers can be sought and often identified – generally limited to a physical knowledge of that particular place. Questions relevant to the subject site may include:

- How closely did the buildings and site features (including outbuildings, fences etc.) conform to the historic plans?
- Can the earliest date of occupation of the place be identified? (i.e. known to be earlier than 1830s, but not historically conclusive).
- What construction methods were used in the buildings and other infrastructure (in particular the industrial infrastructure)?
- What evidence of alteration of the natural landscape is archaeologically determinable (e.g. cutting/filling of the site etc.).
- Are the distinct use/development phases of the buildings distinguishable?
- Can the layout and function of the buildings, and indeed individual rooms or yard spaces be ascertained?
- How thoroughly were the buildings demolished? And what subsequent disturbance is evident?

Answers to these questions provide a foundation of information about the structure, type, use and duration of site occupation which enables the researcher to consider a second tier of questions.

Tier 2 Questions: Conclusions that can be drawn about a site that connect the material remains found on a site to specific behavior. For instance:

- How do artifacts relate to the lifeways of the households that lived on the site, or occupations, hobbies or recreation undertaken on the site?
- Do any artifacts represent class, gender, taste and health/hygiene of those living on the site?
- Particularly if artifacts can be specifically dated, and with supplementary historical research, artifact assemblages from this site may contribute knowledge and provide tangible connectedness to known inhabitants and their families, and how they lived.

[40] http://www.heritage.tas.gov.au/media/pdf/Archae%20ResGlines%20%20FINAL%20-%20June%202009.pdf

- Similarly, do artifacts or structural remains correlate with the known activities and occupations undertaken on the site. The material culture evident through archaeological remains on this site (noting however the possibility of disturbance) has the potential to provide a range of analytical approaches that may supplement, and/or refute, the historical record (particularly industrial heritage) and be a very important research tool.

Tier 3 Questions: These questions represent the highest level of inquiry. Such questions associate the activities and behavior at individual sites with broad social, technological and cultural developments – which can be of interest on local, national or global lines of enquiry. Whilst these questions posed for a single site may not reach conclusions in the short term (as Tier 1 and 2 questions might) – the collection of data can contribute to future research by the provision of a comparable dataset. The goal of such research is to develop increasingly refined and tested understandings of human cultures within broader theoretical or comparative contexts. Lines of wider enquiry that findings from within the subject site may contribute to are:

- Do the conclusions on gender, class, economic and social status of the inhabitants of the buildings conform to the 'normal' Victorian household?
- Are there class or status differences evident in the material culture of the inhabitants of this area (subject to further historical research) when compared to, say, other early Hobart residents or residents in contemporary rural areas and/or other cities.
- Did any changes in material culture through time in the residences coincide with wider Tasmanian or local events or technology (e.g. end of convict labour, urbanisation/development of Hobart, port/railway upgrades, start of rubbish collection etc.)?

7.6. ARCHAEOLOGICAL ZONING PLAN AND POLICIES

As per the methodology outlined above, this section has drawn upon the chronology of site development which has detailed the physical evolution of the site and events/processes which would have acted to build the archaeological record. Above has discussed the likely significance of those archaeological remains and what they may yield in terms of research potential alongside key historic, regional, thematic and temporal lines of enquiry. This has been coupled with provided an assessment of the events which are likely to have impacted upon the integrity of those archaeological remains.

From the above, it is therefore possible to formulate an archaeological zoning plan, which provides an indication of the parts of the site which are likely to yield significant archaeological remains. The spatial reference provided by the zoning plan can then be coupled with archaeological management policies, which are guided by the significance of the particular remains expected and their ability to yield information as per the research questions.

Figure 7.4 depicts the areas of archaeological potential as per the above discussion:

Figure 7.10 – Archaeological zoning of the subject site, as per the table below (note that the non-shaded areas are considered to have low/no archaeological potential). Adapted from www.thelist.tas.gov.au

Area	General level of archaeological potential	Management policy
General policies	Where possible, the preference is to not disturb archaeological remains, however it is acknowledged that the feasible redevelopment of the site may not be possible without doing so. Consideration should be given to any development design to minimise potential impact, however if this is not feasible the above policies (and implementation of method statements pursuant to those policies) are considered sufficient to yield the archaeological potential of the site. An archaeologist should be included in the project design team in order to manage archaeology as part of an iterative process between the client, archaeologist, designer(s) and permit authorities.	
	Consideration should be given in any redevelopment of the site to incorporate archaeological remains (e.g. as interpretation) however this should not inhibit the feasible redevelopment of the site.	
	A test-trenching program, or geophysical investigations may be employed to refine the archaeological judgments outlined in this document and to better guide the design and implementation process (note that test-trenching may require development approval).	
	All results from any archaeological work on the site should be made widely available in order to support the ongoing research of the place and associated themes.	
Red	High	Any excavation proposed in areas of **high archaeological potential** (i.e. red) must be preceded by an archaeological impact assessment, and if necessary an archaeological method statement, which details measures to be taken to avoid or mitigate impact upon the archaeological resource. That method statement must be in accordance with industry standard (e.g. the Tasmanian Heritage Council's Practice Note 2 – *Managing Historical Archaeological Significance in the Works Application Process*) and implemented in the works process (preferably ahead of any construction works program in order to allow rollout of archaeological inputs outside of any immediate critical timelines). Recording and curatorial inputs are to be as per the highest industry practice as per below and consideration should be given to the retention in-situ of any remains for perseveration or interpretation unless this is not considered prudent or feasible in an overall development process or where it is necessary to remove overlying significant remains to investigation those underlying.

Remainder of site	Low/no	All works crew involved in excavation elsewhere on the site must be brief for precautionary 'call-in' provisions for the site in the event that any unanticipated archaeological remains are present – e.g. wells, cesspits, drains, undocumented outbuildings etc. If any such possible remains are found, works must cease in that area (may continue elsewhere) and an archaeologist called-in to assess significance and manage as per the policies and directions of this document.

8. CONSERVATION POLICY

8.1. PURPOSE OF POLICY AND DEFINITIONS

It is expected that any administrators and professionals planning and undertaking physical works on site will first familiarise themselves with all general conservation policies, then the specific implementation recommendation (based on these policies) relating to the particular element on which works are being planned.

8.2. ROLE OF STATEMENT OF SIGNIFICANCE

Any conservation policy strongly favours the conservation of elements of primary significance, and the removal of elements which may be of detriment to the conservation or interpretation of elements of a higher significance. A thorough understanding of the statement of significance, and the specific significance of individual items, is therefore essential in appreciating how specific policies have been developed, and how these should be applied to the physical attributes of the place.

The statement of significance has defined and ranked the periods and themes which that place represents, and the analysis of the physical attributes has detailed exactly what has survived to represent such. Each element of the physical fabric has been assigned its own significance level, based on its ability to demonstrate the significance of the place, and thresholds for assignment of this significance have been kept consistent in the assessment of all elements.
The policies below, therefore, broadly guide how this fabric should be treated in order to allow it to better conserve and demonstrate the statement of significance.

8.3. DEVELOPMENT OF POLICY

Having ascertained the ability for fabric to demonstrate the statement of significance, constraints, opportunities and requirements are considered, alongside stakeholder requirements, to develop the broad conservation policies below. Whilst conservation policies may be contrary to the constraints, opportunities or requirements, the polices aim to best address these whilst still maintaining appropriate conservation practice. Any unresolved conflict is then specifically debated in the implementation strategy.

8.4. POLICIES

The underlying principle, by which all conservation practices should be guided, is the ICOMOS Australia *Burra Charter*. The statement of significance has defined the attributes of the site of which greatest significance is assigned, thereby the priority of conserving attributes associated with such should be considered paramount compared to those of lesser significance. This, however, must be balanced with retention of elements of lesser significance where guided by the conservation policies. With the statement of significance in mind and with the adoption of Burra Charter principles this section will introduce the conservation policies developed specifically for the subject site.

1	**General Policies**	
1.1	Approach to works	The approach to managing any works on the place must be guided by the principles of the ICOMOS Australia *Burra Charter.*[41]
1.2	Use/development	Any use or development of the place must not have any unreasonable adverse heritage impact upon identified values of the place. The site requires a suitable use or adaptive reuse in order to sustain its future maintenance.
1.3	Supervision	All works to the significant elements of the place, and planning for such works, must be guided by a conservation architect, heritage consultant or other person(s) qualified and experienced in the conservation of historic heritage places.

2	**Significant Buildings and Fabric**	
2.1	Significant buildings and fabric	Buildings deemed to be of high significance must be conserved, restored and maintained (namely the former Crisp and Gunn buildings). Significant fabric associated with those buildings must also be conserved, restored and maintained.
2.2	Non-significant buildings and fabric	Buildings and fabric which are of low or no significance may be retained, modified or demolished as desired.
2.3	Intrusive buildings and fabric	Intrusive building and fabric should be removed, unless these are providing critical supporting infrastructure to enable ongoing use of the overall buildings.

[41] http://australia.icomos.org/wp-content/uploads/The-Burra-Charter-2013-Adopted-31.10.2013.pdf

3	The former Crisp and Gunn Workshops and Store	
Exterior		
3.1	Exterior form	The overall exterior form of the building should be maintained.
3.2	Exterior walls and apertures	The northern, eastern and western walls may be adapted for the addition or modification of apertures as desired, however the general line of these walls should be maintained. The form of the southern (Melville Street) wall must be generally maintained.
3.3	New extensions	There is scope for extensions to this building on the eastern and in particular northern walls (as precedented by the 1997 Forestry extensions). The scale of any rear extension is not considered critical from a heritage perspective and is likely to be acceptable as directed by general planning provisions.
3.4	Windows	All original windows must be maintained unless modification is absolutely necessary for thermal, acoustic, fire rating or safety reasons. Any modifications should be retained within existing apertures.
3.5	Doors	The front door arrangement may be modified as desired within the existing aperture (whether flush to the façade or recessed).
3.6	Detailing	Significant exterior detailing should be retained, unless replacement is necessary for repair, weatherproofing or security purposes, in which case compatible styling and materials must be used. New work should be sympathetic to, but not necessarily imitative of, the original form, detailing and materials.
Interior		
3.7	Form	Ideally the interior of the building should retain the ability to read as a large and open form (i.e. one smaller room on the semi-basement level and one large + one smaller room on the ground and first floors). Subdivision of these spaces to suit an adaptive reuse is likely to be acceptable however some legibility of the larger spaces should remain.

3.8	Detailing	Fitout of the building should respond to the utilitarian nature of the original fitout and take a minimal approach. Do not attempt to introduce 'period' detailing that is false to the context of the building.
3.9	Services	Owing to the low integrity of the interior, installation of modern services (e.g. kitchens, toilets, electrical, fire safety) etc. are likely to be possible without heritage detriment.
3.10	Access	If a lift is required in the future, this is likely to be acceptable given the low integrity of detailing of the interior. Options for an external lift that is discrete and sympathetic to the building may be considered.

4	**The former Crisp and Gunn Offices**	
Exterior		
4.1	Exterior form	The overall exterior form of the building should be maintained.
4.2	Exterior walls and apertures	The northern, eastern and western walls may be adapted for the addition or modification of apertures as desired, however the general line of these walls should be maintained. The form of the southern (Melville Street) wall must be generally maintained.
4.3	New extensions	There is scope for extensions to this building on the western and in particular northern walls (as precedented by the 1997 Forestry extensions). The scale of any rear extension is not considered critical from a heritage perspective and is likely to be acceptable as directed by general planning provisions.
4.4	Windows	All original windows must be maintained unless modification is absolutely necessary for thermal, acoustic, fire rating or safety reasons. Any modifications should be retained within existing apertures.
4.5	Doors	The front door must be retained.

4.6	Detailing	Significant exterior detailing should be retained, unless replacement is necessary for repair, weatherproofing or security purposes, in which case compatible styling and materials must be used. New work should be sympathetic to, but not necessarily imitative of, the original form, detailing and materials.
Interior		
4.7	Ground floor form	The interior of the ground floor should be largely retained as existing, with the ability to read the original layout retained. Modification of the kitchen/toilets area may be possible and restoration of the larger volume of the main chamber is desirable.
4.8	Upper floor form	Adapt/refit the upper floor as desired (retain stairs landing and solar access to lightwells).
4.9	Ground floor detailing	Retain all detailing in the front rooms and generally of that in the main chamber and stairs hall (elements identified of low/no significance may be removed/modified).
4.10	Upper floor detailing	Fitout of the upper floor should respond to the utilitarian nature of the original fitout and take a minimal approach. Do not attempt to introduce 'period' detailing that is false to the context of the building.
4.11	Services	Installation of modern services (e.g. kitchens, toilets, electrical, fire safety) etc. are likely to be possible without heritage detriment. Ideally larger service installations should be limited to the existing toilet/kitchen area and/or the upper floor.
4.12	Access	If a lift is required in the future, this is likely to be acceptable given the low integrity of detailing of the rear portion of the interior. Options for an external lift that is discrete and sympathetic to the building may be considered.

5	The Forestry buildings	
Exterior		
5.1	The Forestry Dome	Although not considered a 'heritage building', given the prominence of the structure as well as the recognised design excellence in its execution, consideration should be given to retaining the dome in any future development as an entry statement to the heritage buildings and any new development at rear. Ideally plantings should be reinstated.
5.2	The rear 1997 building.	This building is not considered to have any heritage value and does not exhibit that same design excellence as the dome itself. Whilst it has an association with the dome, in the absence of that association it would not offer any remarkable qualities that warrant retention. Accordingly this building may be retained/modified/removed as desired.

6	Maintenance of Curtilage, Streetscape Values and New Development Guidelines	
6.1	Curtilage of existing buildings	The important curtilage to the former Crisp and Gunn buildings are their streetscape presence, which is likely to endure any development rearward permissible under the planning scheme (i.e. is not necessarily a heritage issue). The site can sustain higher/larger-scale development internal to the site which retains the streetfront scale of the existing buildings. Overall height of any internalized development becomes more a wider-townscape planning issue rather than a site-specific heritage issue particularly if this maintains the existing heritage buildings as the main streetscape elements.
6.2	Style of new development	New development need not emulate any particular architectural style of any building on the subject site, however if desired architectural form/treatments may 'borrow' stylistic elements from the existing buildings.

7	Archaeology	
7.1	Historical archaeology	Further to Section 8, any proposals for works in the areas of high archaeological potential must be accompanied by an archaeological impact assessment and, if necessary, an archaeological method statement

		consistent with the requirements of the Tasmanian Heritage Council's Practice Note 2 (archaeology) or other industry standard.
7.2	Interpretation of archaeological values	Further to the statement of archaeological potential, opportunities to interpret the archaeological value (and results of any archaeological work) in any future development should be taken (whether by in-situ interpretation of archaeology, use of artifacts, and or other interpretive devices and publications.

8	**Other policies**	
8.1	Subdivision	The subdivision pattern of the site is not considered significant, having been reconfigured several times, therefore any future subdivision/ consolidation is likely to be acceptable.
8.2	Interpretation	Any development on site should include interpretation of heritage values, in particular the Crisp and Gunn occupation and Forestry occupation – both with wider links to the Tasmanian timber and building industries.

The following tables consider how these policies may be applied in compliance with the performance criteria of the scheme provisions, with additional commentary where necessary. Where possibly relevant to any proposed development of the subject site, the Acceptable Solutions have been included here as initial guidance:

Clause E.13.7 (1-3) – Heritage Place

	Policy Guidance	**Performance Criteria**
E.13.7.1 - Demolition	Policy 2.1 – Retain the former Crisp and Gunn buildings. Policies 2.2-3 – Remove any non-significant/intrusive buildings/elements. Policies 3.8 & 4.6-10 – Retain significant interior detailing.	*Demolition must not result in the loss of significant fabric, form, items, outbuildings or landscape elements that contribute to the historic cultural heritage significance of the place unless all of the following are satisfied;* *(a) there are, environmental, social, economic or safety reasons of greater value to the community than the historic cultural heritage values of the place;* *(b) there are no prudent and feasible alternatives;* *(c) important structural or façade elements that can feasibly be retained and reused in a new structure, are to be retained;* *(d) significant fabric is documented before demolition.*
E.13.7.2 – Building and Works other than Demolition	Policies 3.1 & 4.1 – maintain the overall original form of the former Crisp and Gunn buildings. Policies 3.2 & 4.2 – limit adaptations to any walls but the façade. Policies 3.3 & 4.3 – Limit new extensions to the rear. Policies 3.4-5 & 4.4-5 – Retain significant doors and windows. Policies 3.8 & 4.9-4.10 – New detailing to respond to context. Policy 6.2 – New development need not emulate existing heritage styles.	*P1. Development must not result in any of the following:* *(a) loss of historic cultural heritage significance to the place through incompatible design, including in height, scale, bulk, form, fenestration, siting, materials, colours and finishes;* *(b) substantial diminution of the historic cultural heritage significance of the place through loss of significant streetscape elements including plants, trees, fences, walls, paths, outbuildings and other items that contribute to the significance of the place.* *P2. Development must be designed to be subservient and complementary to the place through characteristics including:* *(a) scale and bulk, materials, built form and fenestration;* *(b) setback from frontage;* *(c) siting with respect to buildings, structures and listed elements;* *(d) using less dominant materials and colours.*
	Policies 3.3 & 4.3 – Limit new extensions to the rear.	*P3. Materials, built form and fenestration must respond to the dominant heritage characteristics of the place, but any new fabric should be readily identifiable as such.*

	Policies 3.4-5 & 4.4-5 – Retain significant doors and windows. Policy 6.2 – New development need not emulate existing heritage styles.	*P4. Extensions to existing buildings must not detract from the historic cultural heritage significance of the place.*
	Not applicable.	*P5. New front fences and gates must be sympathetic in design, (including height, form, scale and materials), to the style, period and characteristics of the building to which they belong.*
		P6. The removal of areas of landscaping between a dwelling and the street must not result in the loss of elements of landscaping that contribute to the historic cultural significance of the place.
E.13.7.3 - Subdivision	Policy 8.1 – The current title configuration is not considered significant.	*P1. A proposed plan of subdivision must show that historic cultural heritage significance is adequately protected by complying with all of the following:* *(a) ensuring that sufficient curtilage and contributory heritage items (such as outbuildings or significant plantings) are retained as part of any title containing heritage values;* *(b) ensuring a sympathetic pattern of subdivision;* *(c) providing a lot size, pattern and configuration with building areas or other development controls that will prevent unsympathetic development on lots adjoining any titles containing heritage values, if required.*

C

Appendix C:

Civil Engineering Documentation

FLOOD ANALYSIS AND STORMWATER REPORT BRISBANE STREET PEDESTRAIN BRIDGE

UNIVERSITY OF TASMANIA

FORESTRY / TIMBER YARDS & FREEDOM BUILDINGS DEVELOPMENT

79-83 Melville Street & 80 Brisbane Street, Hobart

September 2022

ARUP

JMG Engineers & Planners

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JMG Project No. J205082SH

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1	27.09.2022	Addendum to Flood Analysis and Stormwater Report – August 2022	CG	CG	GLA	GA.	CJM	

TABLE OF CONTENTS

Figures and Tables

1. Introduction

This report is provided as an addendum to the Flood Analysis and Stormwater Report (79-83 Melville Street & 80 Brisbane Street – Hobart); Johnstone McGee & Gandy Pty Ltd August 2022, to provide an assessment of the impact on overland flows for the construction of a new footbridge off Brisbane Street into the University of Tasmania's Forestry / Timber Yards and Freedom Building Project (PLN-21-869)

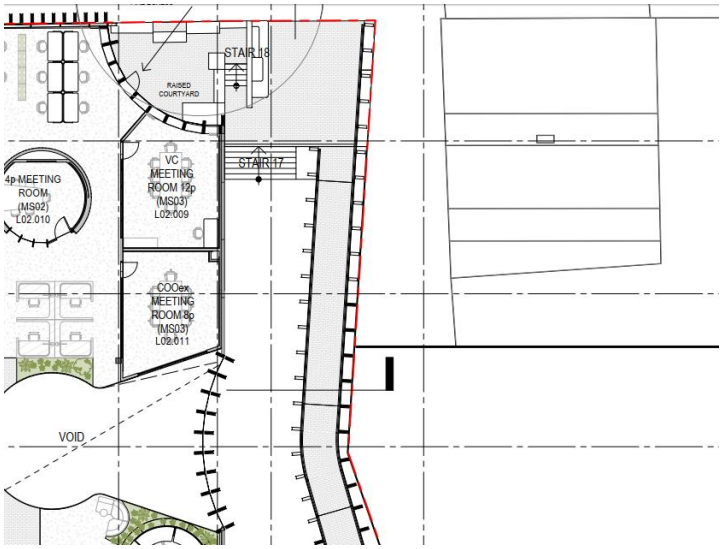


Figure 1 – Brisbane Street Pedestrian Ramp

The proposed ramp is located on the eastern side of the new pedestrian walkway connecting the site from Melville Street to Brisbane Street and will provide compliant DDA pedestrian access from Brisbane Street into level 2 of the new development, as shown in Figure 1.

Overland flows impacting the site from Brisbane Street, for the 1% AEP plus climate change event used in this analysis, are based on those presented in Table 7 of the above mentioned report.

2. Hydraulic Analysis

A new 3D surface has been generated to match the proposed architectural levels at the northern end of the ramp and used for a new hydraulics analysis in HEC-RAS software for the post-development calculations. It is better described in the following paragraph.

The new model has resulted in the same split of post-development flows through the site and along Brisbane Street as was reported in the PLN-21-869 Stormwater Report, Table 7. In addition, the new model's velocity vectors and depths are not affected since the new pedestrian structure is located 7 meters away and below the levels of the back of the footpath on Brisbane Street.

In summary, the overland flow has presented no difference from the previous analysis, and no adjacent or nearby structures/property should be affected per the above development.

Pre-Development (Prior to Utas Forestry Development)	
Location	m^3/s
Inflow	3.100
Brisbane St.	2.100
Top of the Ramp (Forestry Building)	0.460
Top of the Ramp 146A-150 Elizabeth St.	0.450
Bottom of the Forestry Building Ramp	0.870

Post Development of Pedestrian Bridge	
Location	m^3/s
Inflow	3.100
Brisbane St.	2.340
Top of the Ramp (Forestry Building)	0.410
Top of the Ramp 146A-150 Elizabeth St.	0.310
Bottom of the Forestry Building Pedestrian Access	0.720

Table 1- Comparison of Pre-Development and Post-Development Flows (1% AEP + CC)

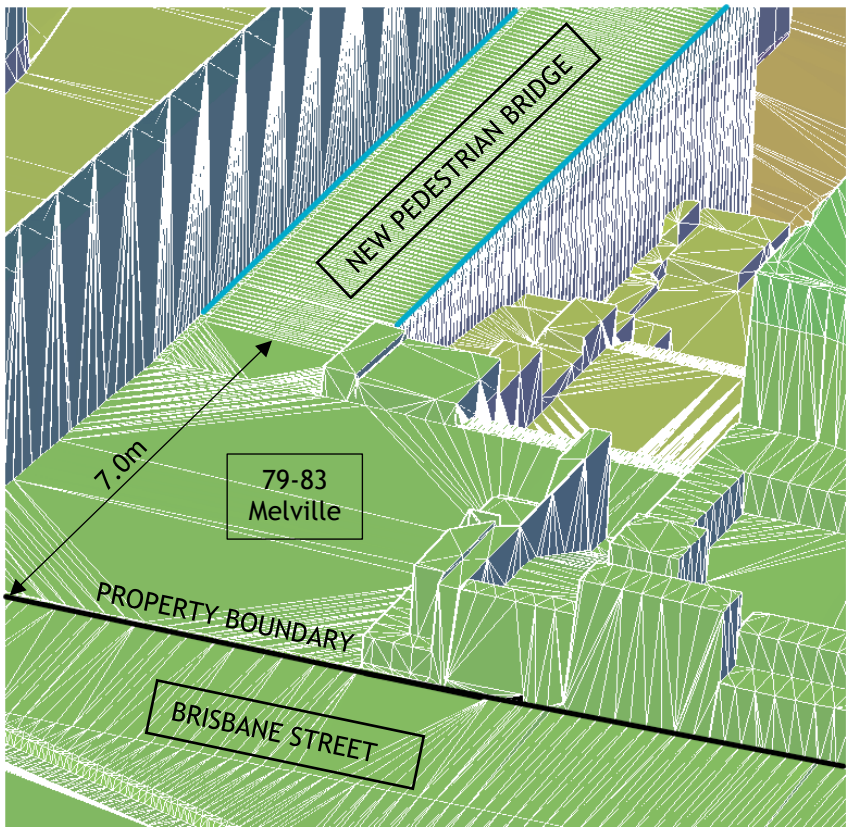


Figure 2 - 3D View of New Surface with the Pedestrian Bridge through the Site for HEC-RAS Site Model

Flow paths and hence velocities and depths are altered marginally within the site at the top of the ramp. New velocities are still generally low, staying well below 2m/s along the pedestrian path ramps and landings. 4 below shows velocities in the updated upper section of the site that includes the pedestrian bridge, steps and courtyard area. A velocity of 2 m/s or higher are shown in yellow, with an increasing rate changing to orange or red, with red

being 5m/s or greater. In addition, as the new bridge grades up to access the upper level of the building, the vector velocity gradually reduces with this changing of grade.

Therefore, as the area around the start of the proposed pedestrian bridge contain a maximum (depth * velocity) no greater than 0.3, the region corresponds to H1 levels according to the Australian Flood Resilience and Design Handbook, not presenting vulnerability constraints.

Finally, the regions with peak velocities of approximately 5.0m/s on the steps, remain with the same explanation of the original report. HEC-RAS software calculates these areas without considering a vertical drop in the cells, rather than representing the actual energy dissipation along the falls. The HEC-RAS velocity labels in these areas can be regarded as lower than presented.

HEC-RAS drawings (depths, velocities, and water surface elevation) are attached in Appendix A

Hazard Classification	Description (and defined limits)
H1	Relatively benign flow conditions. No vulnerability constraints. (D < 0.3 m, V < 2.0 m/s, or V x D < 0.3)
H2	Unsafe for small vehicles. (D < 0.5 m, V < 2.0 m/s, or V x D < 0.6)
H3	Unsafe for all vehicles, children and the elderly. (D < 1.2 m, V < 2.0 m/s, or V x D < 0.6)
H4	Unsafe for all pedestrians and vehicles. (D < 2.0 m, V < 2.0 m/s, or V x D < 1.0)
H5	Unsafe for all pedestrians and vehicles. Buildings require special engineering design and construction. (D < 4.0 m, V < 4.0 m/s, or V x D < 4.0)
H6	Unconditionally dangerous. Not suitable for any type of development or evacuation access. All building types considered vulnerable to failure. (D > 4.0 m, V > 4.0 m/s, or V x D > 4.0)

Figure 3 - Hazard Categories Australian Disaster Resilience Handbook

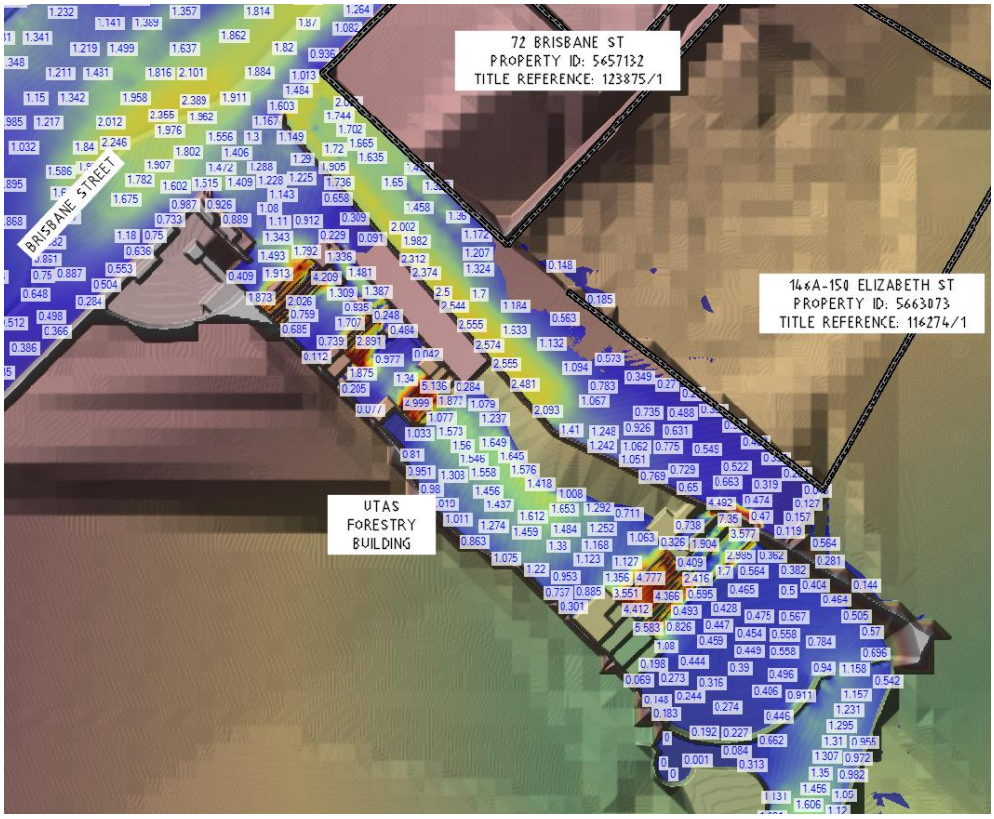


Figure 4 - HEC-RAS Model Results Flow Velocity Upper Site - Overview

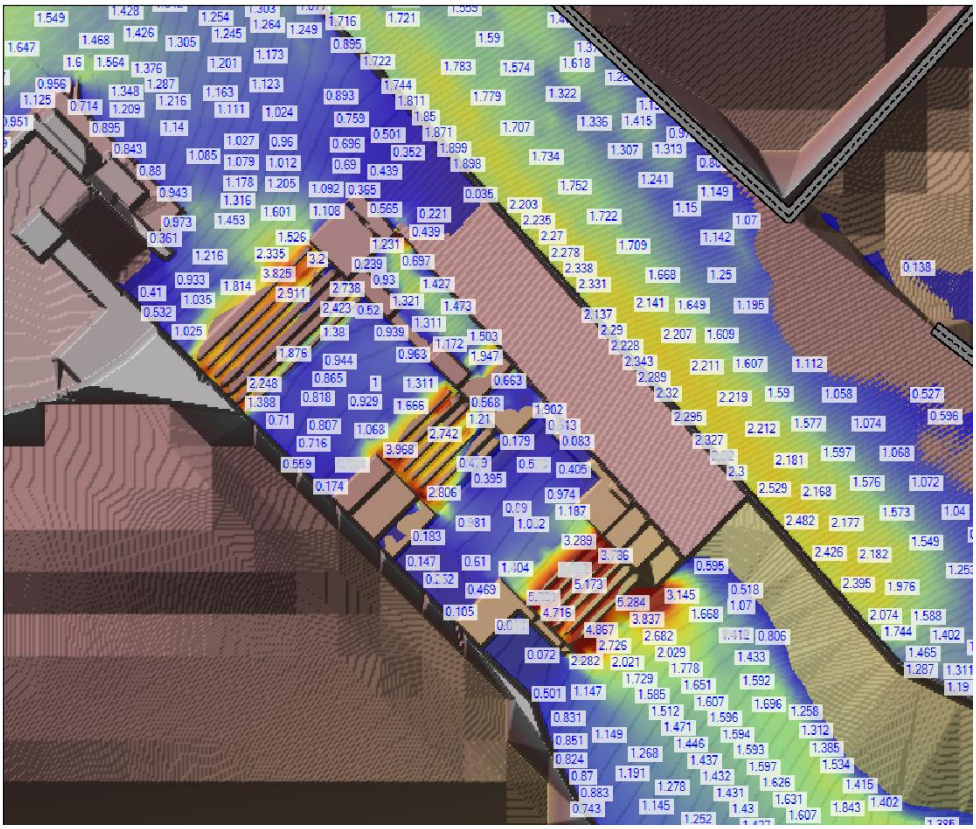


Figure 5 - HEC-RAS Model Results Flow Velocity Upper Site - Bridge and Steps

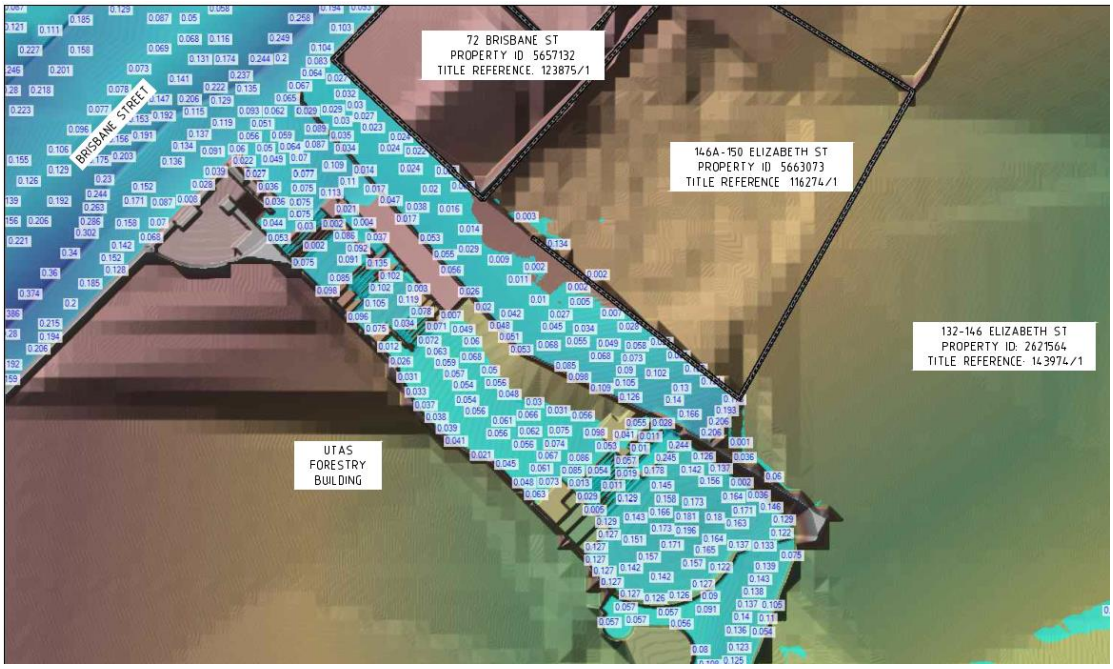


Figure 6 - HEC-RAS Model Results Flow Depth Upper Site – Bridge, Steps and Courtyard

3. Conclusions

This report is submitted as an addendum to update the hydraulic analysis for the inclusion of the new pedestrian bridge as proposed in this development application.

The following conclusions were derived in this report:

-The addition of the pedestrian bridge will not increase the risk of flooding to the neighboring properties.

-Overland flows associated with the 1% plus climate change AEP flood event can be managed through the site safely, including some mitigation measures necessary for traversing the steps.

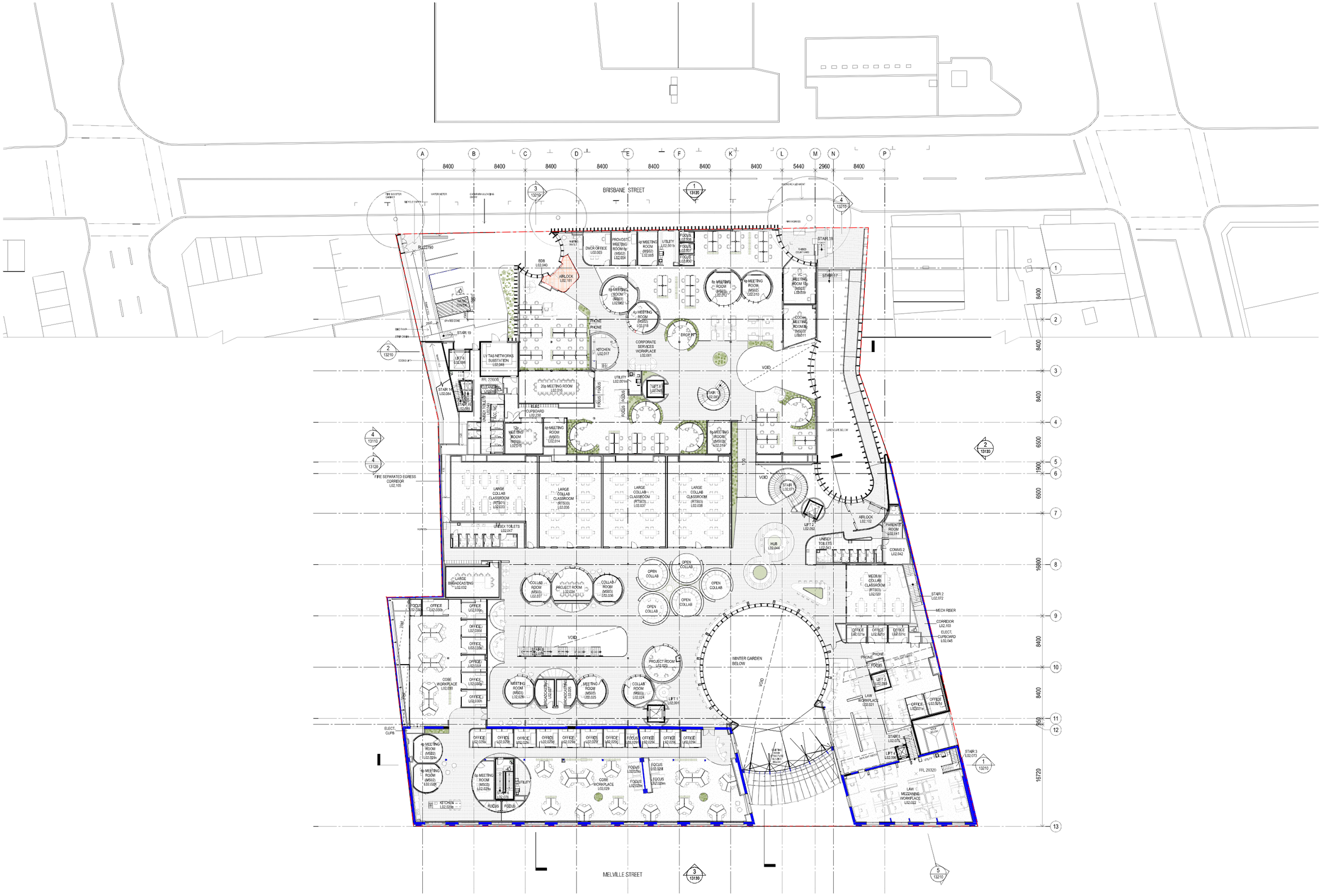
- Provision is still required to be made in the design of the site boundary wall adjacent to 146A-150 Elizabeth Street and 72 Brisbane Street for overland flow to enter the site from the existing carpark

4. References

Australian Flood Resilience and Design Handbook

APPENDIX A

Architects Drawing



Recent revision history

#	Status	Description	Date
A	For Information	For Information	01.10.21
B	For Information	For Information	07.10.21
C	For Information	Draft DA Issue	10.11.21
D	For Information	For Information	16.12.21
E	For Information	SD Update Issue	21.12.21
F	For Information	DESIGN DEVELOPMENT ISSUE	14.04.22
G	For Information	Post DD Updates	11.05.22
H	For Information	100% CONTRACT DOCUMENTATION	29.07.22

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

Existing

Title Boundary

ABBREVIATIONS:

(E)	Existing
FFL	Finished Floor Level
SSL	Structural Setout level
(N)	New
RL	Relative Level to AHD
TBC	To Be Confirmed
TME	To Match Existing
WF	Floor Waste Gully
DP	Downpipe

Refer to AR Schedules for details of all coded items

Project
Southern Futures: Forestry / Timber Yards

Address
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Client
University of Tasmania

Issuer
W–B
WOODS BAGOT

Project number	Size check
130807	25mm

Checked	Approved	Sheet size	Scale
AF	SB	A0	1 : 200

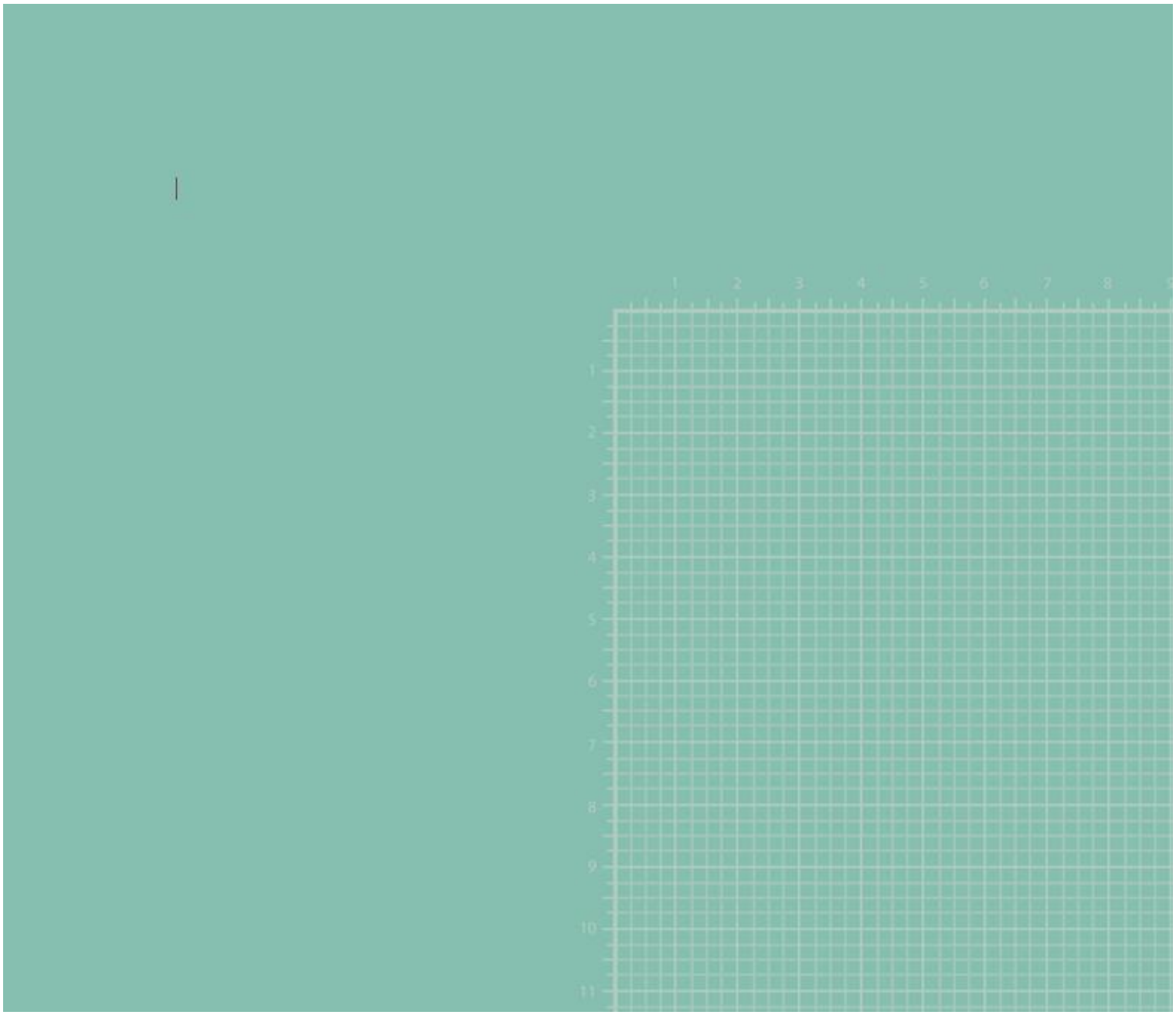
Sheet title
Overall Plan
Level 02

Sheet number
AR-12029

Revision
H

Status
CONTRACT DOCUMENTATION

UNCONTROLLED



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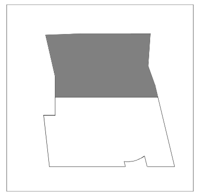
Appendix D:

Structural Documentation



KEY PLAN

EXISTING PAD FOOTING SCHEDULE

MARK	WIDTH	DEPTH	COMMENTS
EX1	800	500	EXISTING INDICATIVE ONLY
EX2	2000	500	EXISTING INDICATIVE ONLY
EX3	500	500	EXISTING INDICATIVE ONLY
EX4	1000	500	EXISTING INDICATIVE ONLY
EX5	1000	500	EXISTING INDICATIVE ONLY

NOTE: ALL DEPTHS TO ROCK ARE NOMINAL FROM ORIGINAL FFL - ALL DIMENSIONS ARE TO BE CONFIRMED ON SITE BY CONTRACTOR.

FOOTING SCHEDULE

MARK	DESCRIPTION	COMMENTS
EB1	300w x 200d	3L11TM BOT 50 COVER
SF1	600w x 600d	5N16 TOP & BOT R10 LIGS @150CRS
SF2	450w x 450d	5N16 TOP & BOT N10 LIGS @150CRS
SF3	2000 x 500d	N16 U-BARS @ 150 TOP & BOT IN TRANVERSE DIRECTION. N16 @ 175 TOP & BOT. IN LONGHITUDINAL DIRECTION. 3N12 INTERNAL STIRRUPS @ 150.
SF4	1700 x 500d	N16 U-BARS @ 150 TOP 7 BOT. IN TRANVERSE DIRECTION. N16 @ 175 TOP & BOT. IN LONGITUDINAL DIRECTION. 3N12 INTERNAL STIRRUPS @ 150.
TB1	450w x 450d	5N16 TOP & BOT R10 LIGS @150CRS

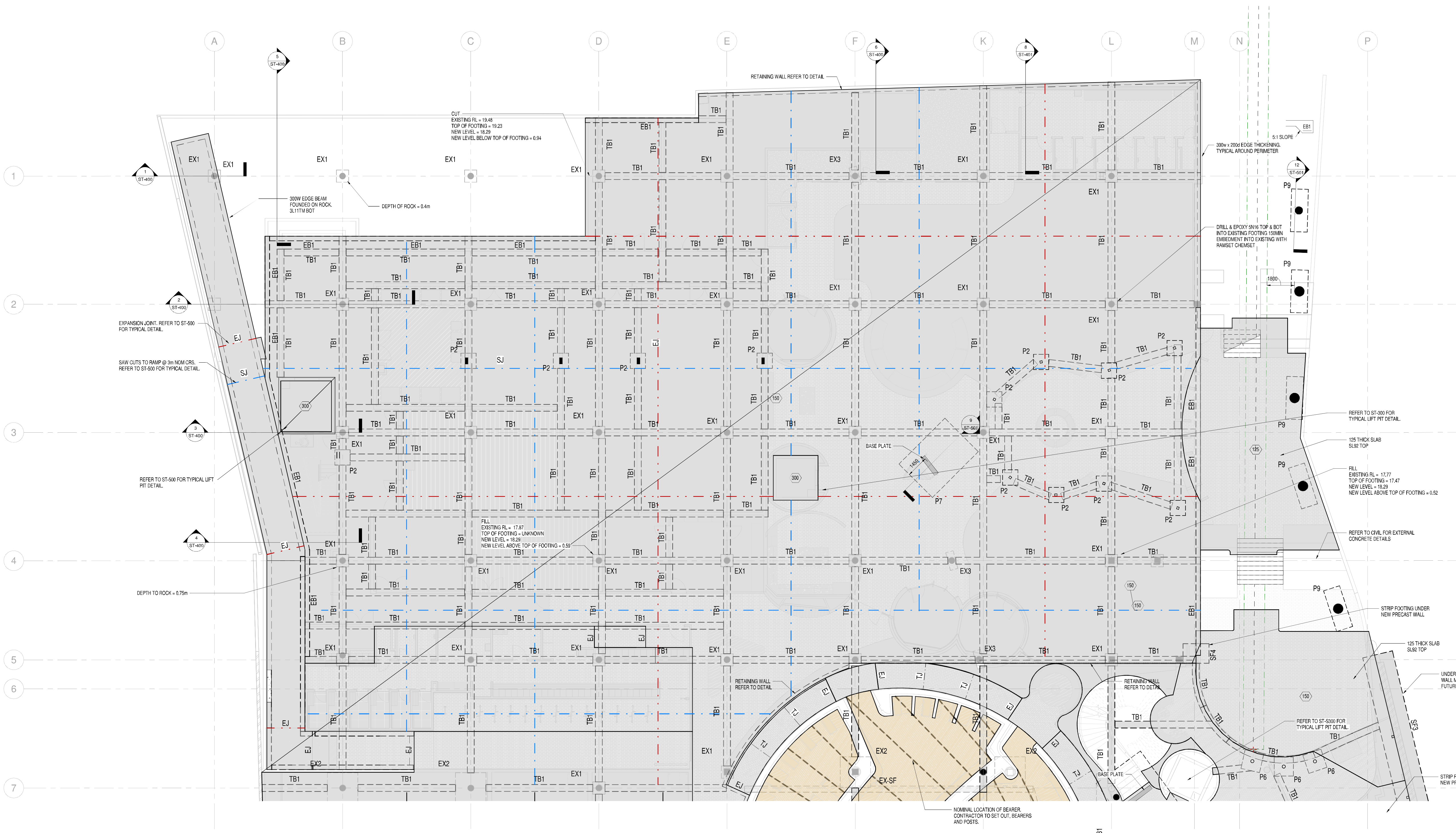
PAD FOOTING SCHEDULE

MARK	SIZE	COMMENTS
BP1	600 BORED PIER	1000mm EMBEDED INTO ROCK (1250min. BELOW THE PIT) 10N16. R8 STIRRUPS @200
P1	2000 x 2000 x 500d	N20 @ 200 EW TOP & BOT
P2	1000 x 1000 x 500d	N16 @ 200 EW TOP & BOT. ON ROCK 500 kPa
P3	1000 x 1000 x 400d	N16 @ 200 EW TOP & BOT. ON ROCK 500 kPa
P4	1800 x 1800 x 600d	N12 @ 250mm EW TOP & BOT ON ROCK
P5	1000 x 1000 x 500d	N12 @ 250mm EW TOP & BOT ON ROCK
P6	1250 x 1250 x 500d	N16 @ 200 EW TOP & BOT ON ROCK
P7	3100 x 4250 x 1000d	N20 U-BARS @175 TOP & BOT EW
P8	3600 x 5000 x 1000d	N20 U-BARS @ 175 TOP & BOT EW.
P9	1100 x 3800 x 1000d	7N28 U-BARS TOP & BOT WITH N16 STIRRUPS @ 150 REFER TO SECTION FOR DETAILS & PILE.

LEGEND :

SJ - SAWN JOINT

EJ - EXPANSION JOINT



REFER TO DRAWING ST-201 FOR CONTINUATION

LEVEL 1 FOOTINGS AND SLAB PLAN SHEET 1

SCALE 1 : 100

REV	DATE	REMARK
T1	29.07.2022	TENDER ISSUE
P2	14.04.2022	DESIGN DEVELOPMENT ISSUE
P1	31.03.2022	DRAFT DD ISSUE

SAFETY IN DESIGN REPORT PER WHS REGULATIONS

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www.jmg.net.au infohbt@jmg.net.au infoltn@jmg.net.au

PROJECT
UNIVERSITY OF TASMANIA
80 BRISBANE & 79-83 MELVILLE ST
FORESTRY/ TIMBER YARDS

TITLE
STRUCTURAL
LEVEL 1 FOOTINGS AND SLAB PLAN SHEET 1

Accepted (Discipline Head)	RAJC	Date
Accepted (Team Leader)	CCH	Date
Approved (Principal)	CCH	Date

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	PLOT DATE	29/07/2022 1:56:33 PM

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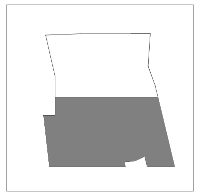
PROJECT NO. J205082SH

DWG NO. ST-200 REVISION T1

TENDER ISSUE



KEY PLAN

REFER TO DRAWING ST-200 FOR CONTINUATION

EXISTING PAD FOOTING SCHEDULE			
MARK	WIDTH	DEPTH	COMMENTS
EX1	800	500	EXISTING INDICATIVE ONLY
EX2	2000	500	EXISTING INDICATIVE ONLY
EX3	500	500	EXISTING INDICATIVE ONLY
EX4	1000	500	EXISTING INDICATIVE ONLY
EX5	1000	500	EXISTING INDICATIVE ONLY

FOOTING SCHEDULE		
MARK	DESCRIPTION	COMMENTS
EB1	300w x 200d	3L11TM BOT 50 COVER
SF1	600w x 600d	5N16 TOP & BOT R10 LIGS @150CRS
SF2	450w x 450d	5N16 TOP & BOT N10 LIGS @150CRS
SF3	2000 x 500d	N16 U-BARS @ 150 TOP & BOT IN TRANVERSE DIRECTION. N16 @ 175 TOP & BOT. IN LONGHITUDINAL DIRECTION. 3N12 INTERNAL STIRRUPS @ 150.
SF4	1700 x 500d	N16 U-BARS @ 150 TOP 7 BOT. IN TRANVERSE DIRECTION. N16 @ 175 TOP & BOT. IN LONGITUDINAL DIRECTION. 3N12 INTERNAL STIRRUPS @ 150.
TB1	450w x 450d	5N16 TOP & BOT R10 LIGS @150CRS

PAD FOOTING SCHEDULE		
MARK	SIZE	COMMENTS
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P6	1250 x 1250 x 500d	N16 @ 200 EW TOP & BOT ON ROCK
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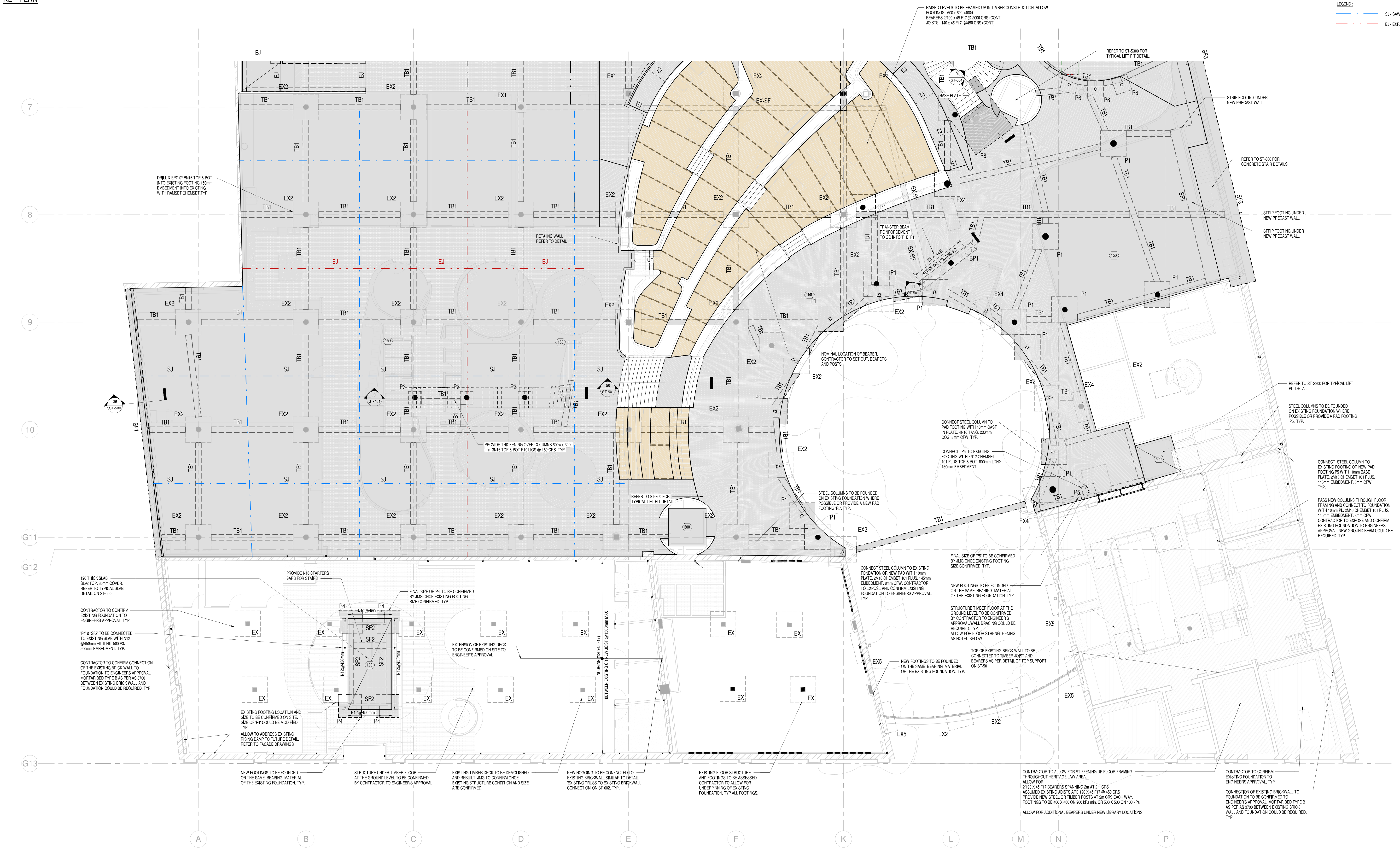
LEGEND :

SJ - SAWN JOINT

EJ - EXPANSION JOINT



LEVEL 1 FOOTINGS AND SLAB PLAN SHEET 2

SCALE 1 : 100

REV	DATE	REMARK
T1	29.07.2022	TENDER ISSUE
P2	14.04.2022	DESIGN DEVELOPMENT ISSUE
P1	31.03.2022	DRAFT DD ISSUE

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PROJECT
UNIVERSITY OF TASMANIA
80 BRISBANE & 79-83 MELVILLE ST
FORESTRY/ TIMBER YARDS

TITLE
STRUCTURAL
LEVEL 1 FOOTINGS AND SLAB
PLAN SHEET 2

Accepted (Discipline Head)	RAJC	Date
Accepted (Team Leader)	CCH	Date
Approved (Principal)	CCH	Date

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PROJECT NO. J205082SH

DWG NO. ST-201 REVISION T1

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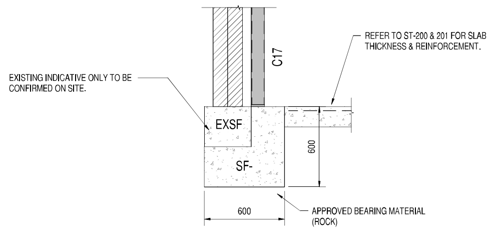
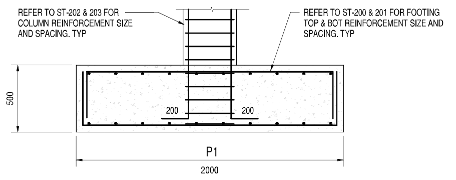
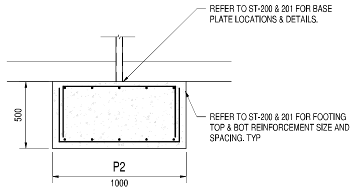
TENDER ISSUE



SECTION 35
1 : 20
ST-201



TYPICAL P1 DETAIL
SCALE 1 : 20



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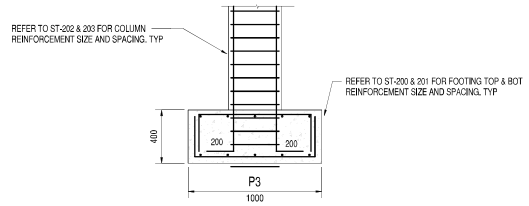

TYPICAL P3 DETAIL
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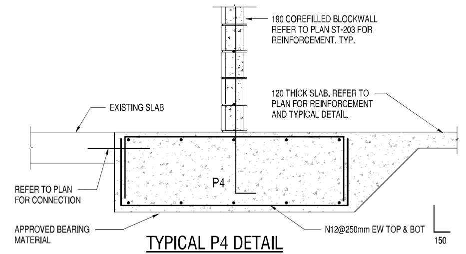

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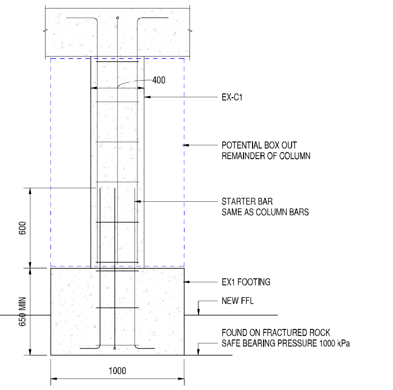

TYPICAL EX1 DETAIL
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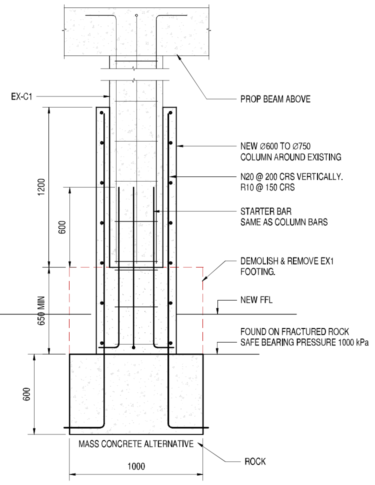
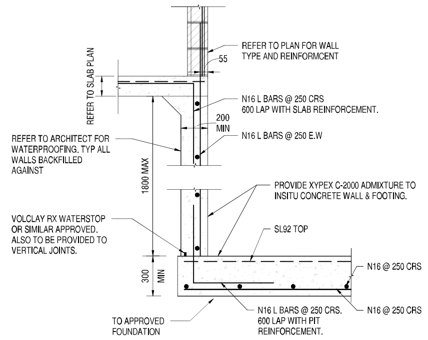
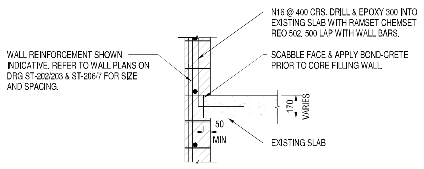
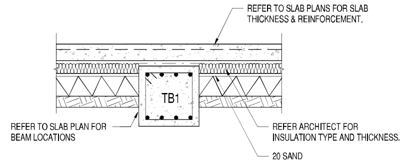




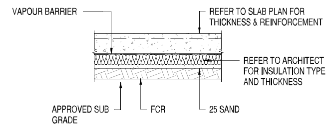
INSITU LIFT SHAFT BASE TYPICAL DETAIL
SCALE 1 : 20



LIFT SHAFT TO EXISTING SLAB TYPICAL DETAIL
SCALE 1 : 20



TYPICAL TB1 DETAIL
SCALE 1 : 20



TYPICAL SLAB DETAIL
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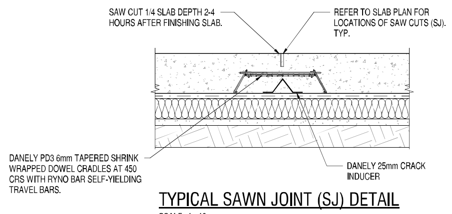
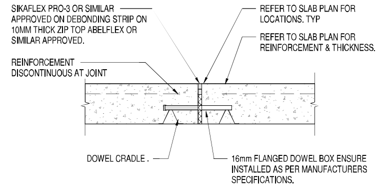


TYPICAL SAWN JOINT (SJ) DETAIL
SCALE 1 : 10



TYPICAL EXPANSION JOINT (EJ) DETAIL
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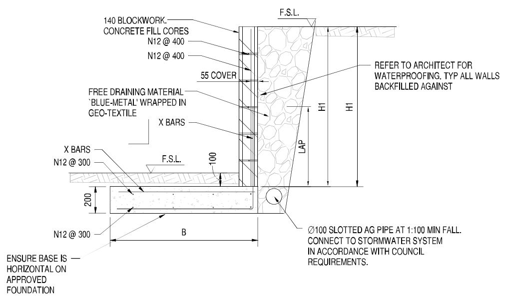
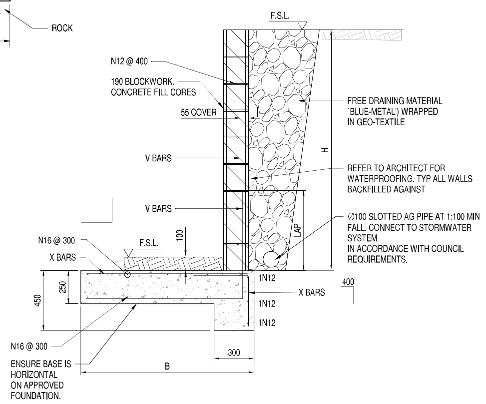


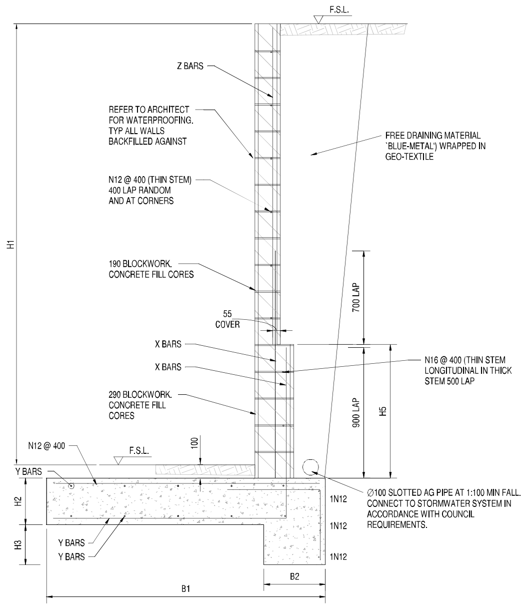
RETAINING WALL - TOE OUT - 800-1200 (NO SLOPE)
SCALE 1 : 20

RW TYPE SCHEDULE (800 - 1200)		
H	B	X bars
800	1100	N12 @ 400
1000	1250	N12 @ 400
1200	1400	N12 @ 400



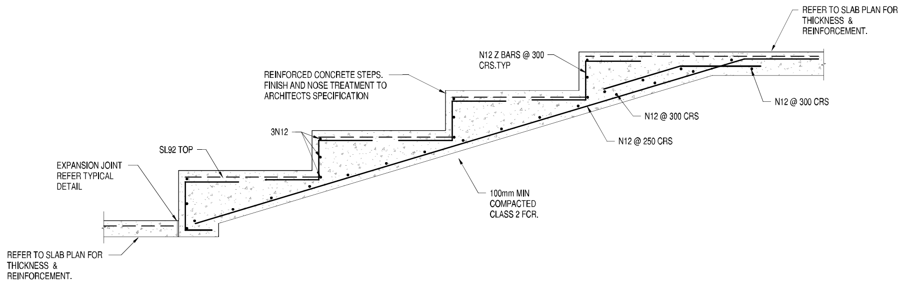
RETAINING WALL - TOE OUT - 1400-2000 (NO SLOPE)
SCALE 1 : 20

RW SCHEDULE (1400-2000)		
H	B	X and V bars
1400	1700	N16 @ 400
1600	1800	N16 @ 400
1800	2000	N16 @ 400
2000	2200	N20 @ 400

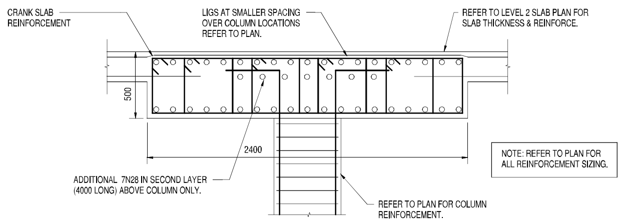


RETAINING WALL - TOE OUT - 2400-3200 (NO SLOPE)
SCALE 1 : 20

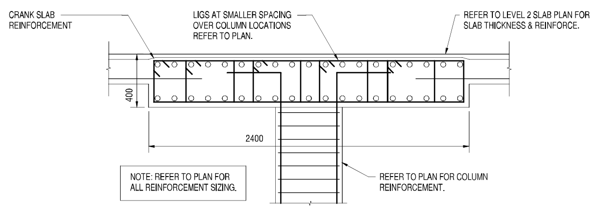
RW SCHEDULE (2400 - 3200)								
H1	H2	H3	H5	B1	B2	X BARS	Y BARS	Z BARS
2400	350	300	1000	2600	300	N20 @ 400	N16 @ 400	N16 @ 400
2800	350	300	1200	2900	300	N20 @ 400	N16 @ 400	N16 @ 400
3200	350	300	1600	3300	300	N20 @ 400	N16 @ 400	N16 @ 400



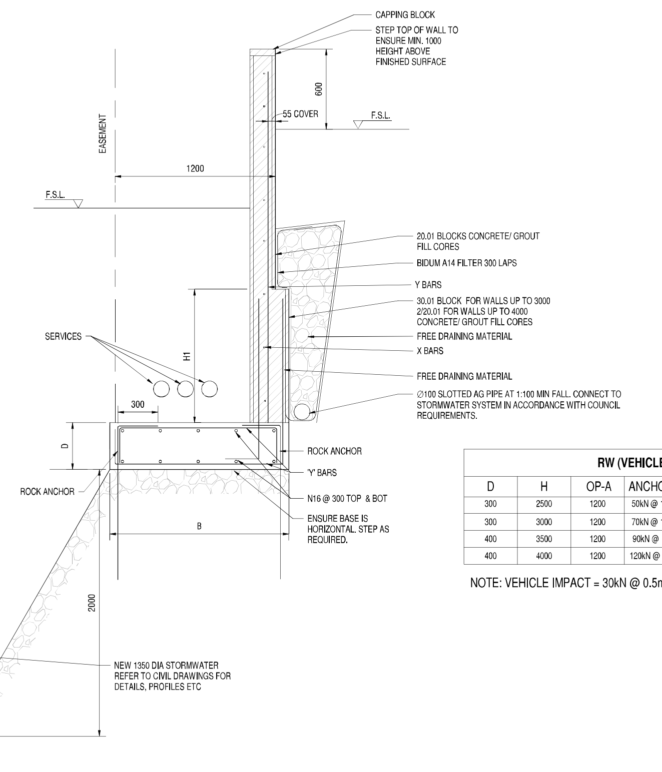
TYPICALL TIERED SEATING/ OVERSIZED STAIRS DETAIL
SCALE 1 : 20



BB1 TYPICAL DETAIL
SCALE 1 : 20



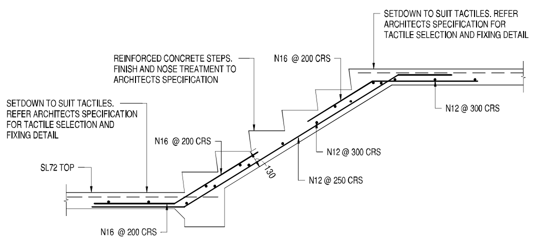
BB2 TYPICAL DETAIL
SCALE 1 : 20



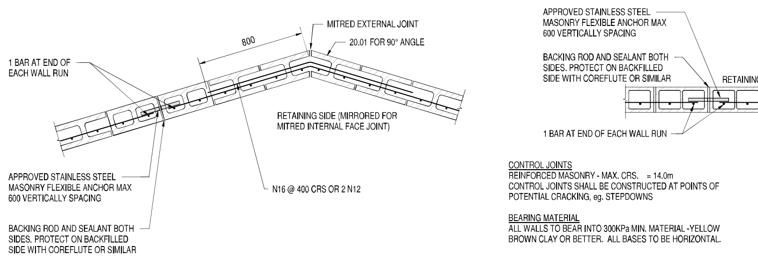
RW (VEHICLE IMPACT) TYPE A SCHEDULE							
D	H	OP-A	ANCHOR	OP-B	X BARS	Y BARS	H
300	2500	1200	50kN @ 1m	2500	N20 @ 400	N20 @ 400	1200
300	3000	1200	70kN @ 1m	2700	N20 @ 400	N24 @ 400	1400
400	3500	1200	90kN @ 1m	3000	N20 @ 400	N24 @ 400	1800
400	4000	1200	120kN @ 1m	3300	N20 @ 400	N32 @ 400	2300

NOTE: VEHICLE IMPACT = 30kN @ 0.5m

RW1 TYPICAL DETAIL
SCALE 1 : 20



TYPICAL EXTERNAL STAIR DETAIL
SCALE 1 : 20



TYPICAL RETAINING WALL CONTROL JOINT
SCALE 1 : 20

REV	DATE	REMARK
T1	29.07.2022	TENDER ISSUE
P2	14.04.2022	DESIGN DEVELOPMENT ISSUE
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TITLE
STRUCTURAL
CONCRETE DETAILS SHEET 1

Accepted (Discipline Head)	RAJC	Date
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Approved (Principal)	CCH	Date

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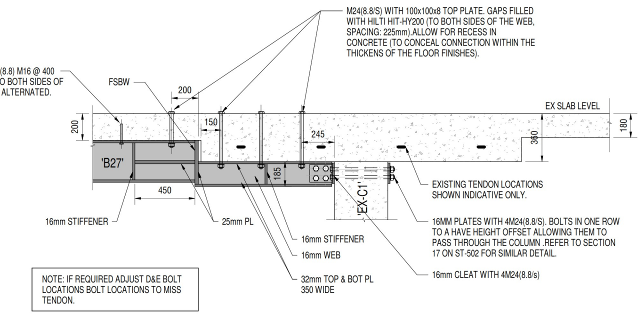
TENDER ISSUE

PROJECT NO. J205082SH

DWG NO. ST-500
REVISION T1



SECTION 1
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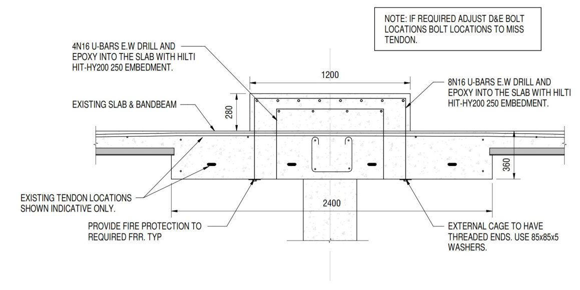
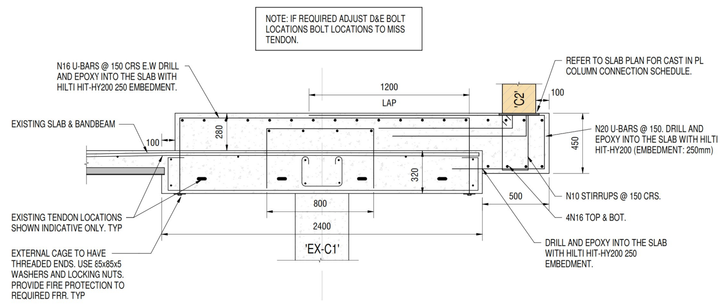


SLAB STENGTHENING B
SCALE 1 : 20



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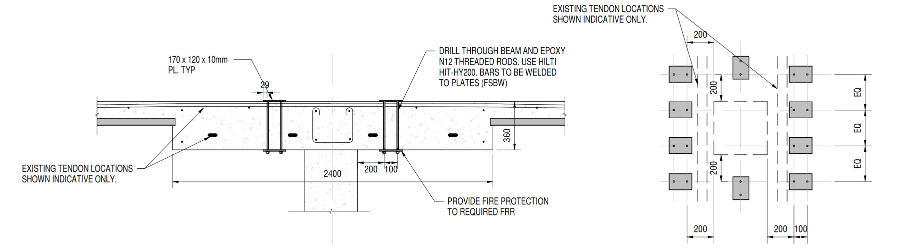

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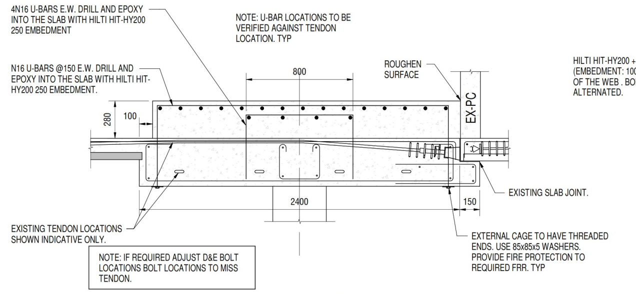

SLAB STENGTHENING E
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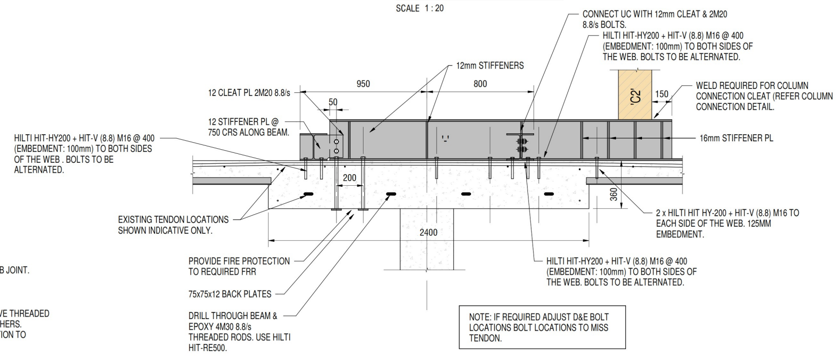
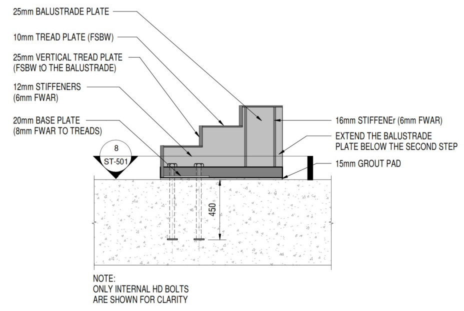
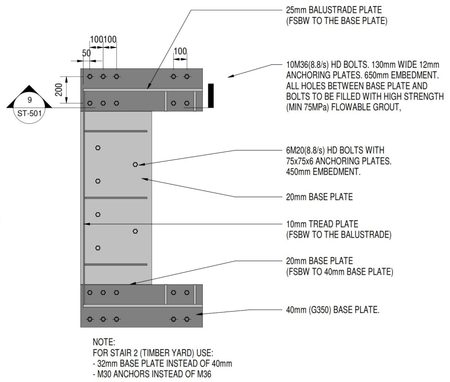


SLAB STENGTHENING F
SCALE 1 : 20



STAIR 1 & 2 (STRINGER BASE)
SCALE 1 : 20



SECTION 8
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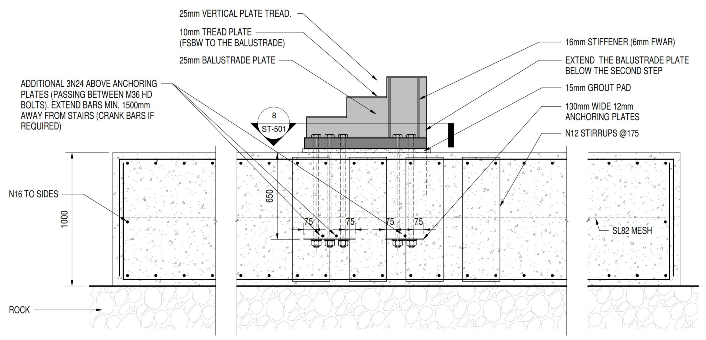

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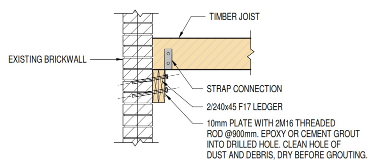

DETAIL OF TOP SUPPORT
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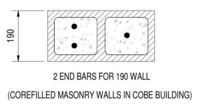
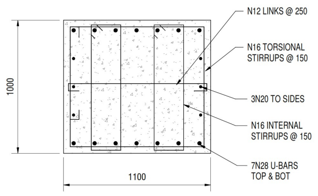


BLOCKWALL ENDBARS
SCALE 1 : 10



SECTION 13
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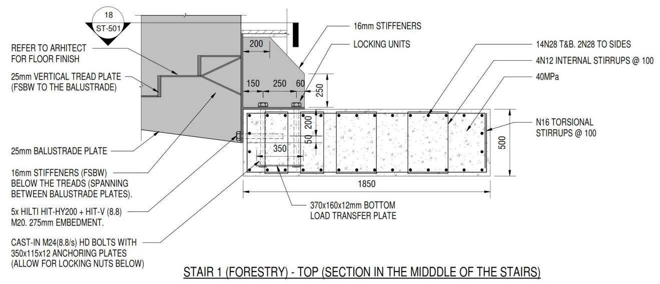
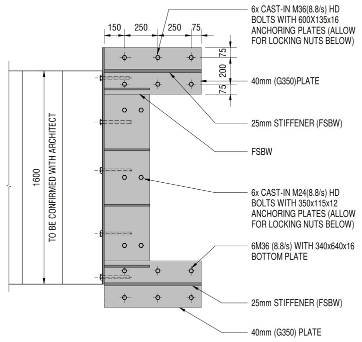


STAIR 1 (FORESTRY) - TOP (SECTION IN THE MIDDDLE OF THE STAIRS)

SECTION 17
1 : 20 ST-204



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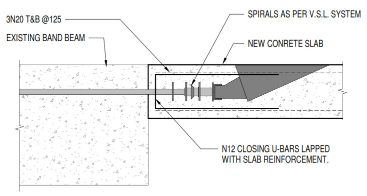

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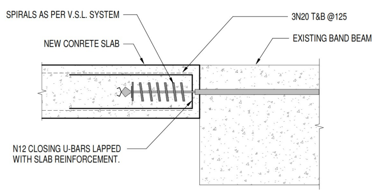

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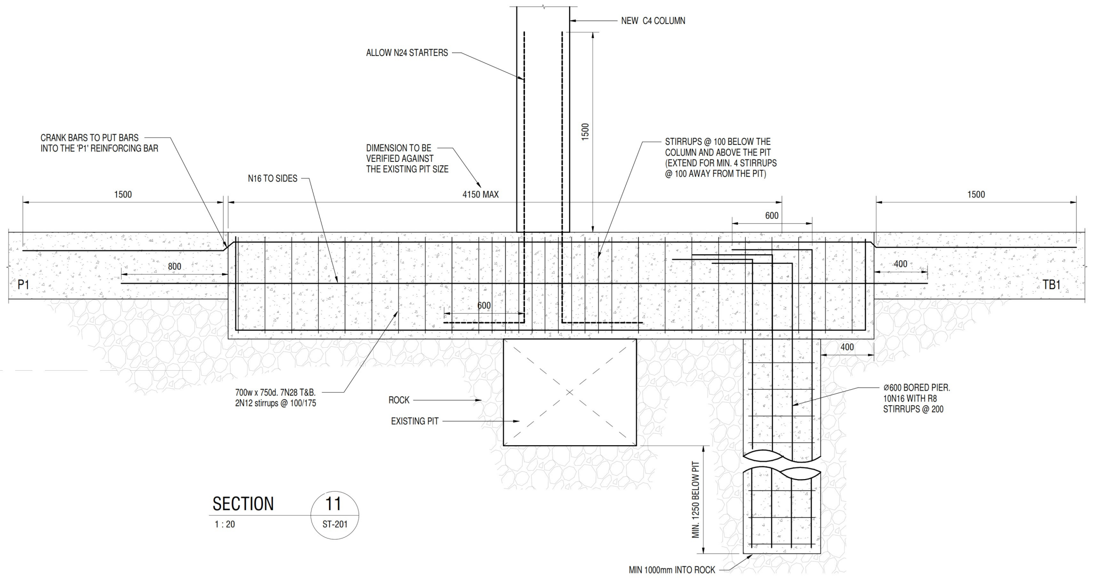

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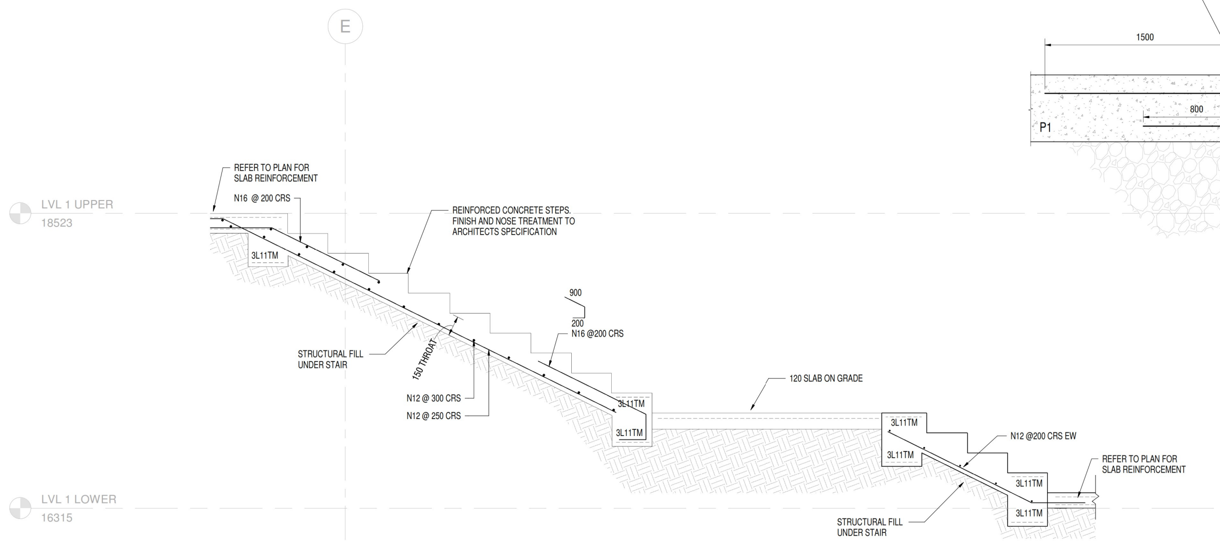

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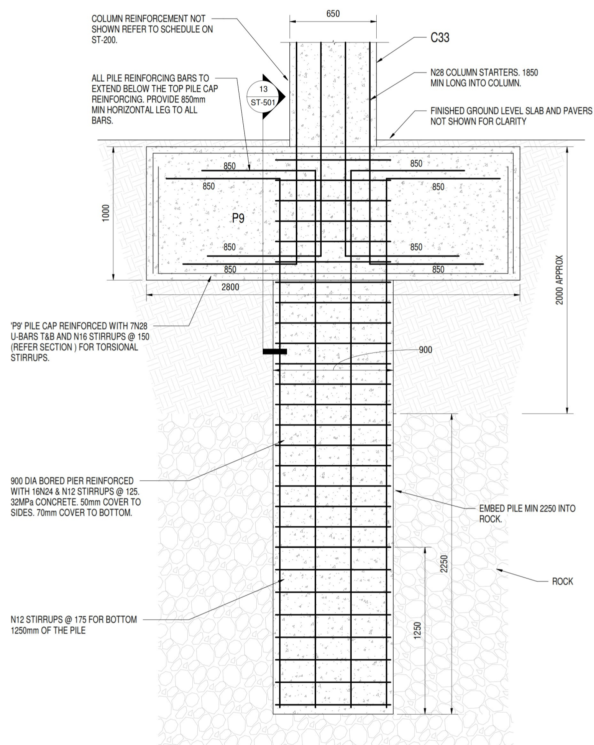

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REV	DATE	REMARK
T1	29.07.2022	TENDER ISSUE
P2	14.04.2022	DESIGN DEVELOPMENT ISSUE
P1	31.03.2022	DRAFT DD ISSUE

SAFETY IN DESIGN REPORT PER WHS REGULATIONS

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PROJECT
UNIVERSITY OF TASMANIA
80 BRISBANE & 79-83 MELVILLE ST
FORESTRY/ TIMBER YARDS

TITLE
STRUCTURAL
CONCRETE DETAILS SHEET 2

Accepted RAJC
Accepted CCH
Approved CCH

SCALES @ A0: As indicated
DESIGNED BY: S.S / R.C / G.H.
DRAWN BY: N.L / G.C
PLOT DATE: 29/07/2022 2:03:04 PM

DO NOT SCALE DIMENSIONS FROM THIS DRAWING
DO NOT CONSTRUCT WORKS DIRECTLY FROM THIS DRAWING
CONTRACTOR to site measure and prepare coordinated working drawings for construction. Refer to PROJECT SPECIFICATION.

PROJECT NO. J205082SH
DWG NO. ST-501
REVISION T1

THIS IS A COLOR DRAWING AND MUST BE REPRODUCED IN COLOR AT ALL TIMES

TENDER ISSUE

F

Appendix F:

Site Contamination Report

Environmental Site Assessment for DA

Old Forestry Building - 79-83 Melville Street and 80 Brisbane Street, Hobart

University of Tasmania

7 July 2022

→ The Power of Commitment

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Project manager	Nicole Reineker
Client name	University of Tasmania
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Revision version	Rev B
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Document status

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S4	0	Nicole Reineker	Peter Topliss		Peter Topliss		13/04/2022
S4	A	Nicole Reineker	Peter Topliss		Peter Topliss		23/06/2022
S4	B	Nicole Reineker	Peter Topliss		Peter Topliss		07/06/2022

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1. Introduction

University of Tasmania (GHD) has engaged GHD Pty Ltd (GHD) to undertake an Environmental Site Assessment (ESA) of 'Old Forestry Building' 83 Melville Street & 80 Brisbane Street and adjacent road reserve (the Site) (Figure 1 Appendix A).

This assessment was commissioned for the Development Application (DA) No. PLN-21-869 83, which required an assessment against the Potentially Contaminated Land Code - E2.6.2. of the Hobart Interim Planning Scheme 2015.

1.1 Background

A Development Application (No. PLN-21-869 83) has been submitted to council for the University of Tasmania to develop the Site and adjacent road reserve. Condition ENVHE1 of the planning permit requires an updated Environmental Site Assessment addressing the requirements of Potentially Contaminated Land Code - E2.6.2. of the Hobart Interim Planning Scheme 2015. This report summarises this assessment.

The scope of works focused of areas of the site subject to ground disturbance as a result of the planned redevelopment program (i.e. sections of the site subject to localised excavation as per the Wood Baggot plans in Appendix B). This is in the context that there would be no material increase in risk to future users of the site for the remainder of the footprint outside of areas of ground disturbance.

This assessment program has been designed, overseen and reviewed by Peter Topliss EIANZ Certified Site Contamination Specialist (CEnvP SC41076).

1.2 Objective

To undertake an Environmental Site Assessment to address the requirements of the Potentially Contaminated Land Code (E2.6.2), and specifically potential risks to redevelopment workers, future users of the site and the environment.

1.3 Scope of works

The was undertaken in general accordance with the National Environment Protection Council (NEPC) (2013) Schedule B2 Guideline on Site Characterisation of the *National Environmental Protection (Assessment of Site Contamination Measure 1999 (as amended April 2013)* (NEPM, 2013), and contained the following components:

- Review of previous investigations at site.
- Soil investigation to assess the contamination status of soils at the Site in the areas marked as to be excavated during construction. As such this scope is a not an assessment for the broader site, but rather a targeted assessment specifically to inform any associated risks relating to the limited ground disturbance required for site development activities. The investigation involved:
  - the advancement of 17 bore holes with samples collected down the soil profile and one grab surface sample.
  - Submission of select samples for analysis for identified chemicals of potential concern (CoPC)
    - Metals (arsenic, cadmium, chromium, copper, nickel, lead, zinc)
    - Total recoverable hydrocarbons (TRH)
    - Benzene, toluene, ethyl-benzene, xylene and naphthalene (BTEXN)
    - Polycyclic aromatic hydrocarbons (PAH)
- Tabulation of soil data and comparison with applied assessment criteria to assess potential risks to construction workers and future site users, and comparison to EPA Tasmania *Information Bulletin No 105 Classification and Management of Contaminated Soil for Disposal* (November 2007)

- Preparation of a Targeted Environmental Site Assessment report, which will describe the investigation and present the findings (this report)

1.4 Limitations

This report: has been prepared by GHD for University of Tasmania and may only be used and relied on by University of Tasmania for the purpose agreed between GHD and University of Tasmania as set out in section 1 of this report.

GHD otherwise disclaims responsibility to any person other than University of Tasmania arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by University of Tasmania and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

2. Potentially Contaminated Land Code E2.6.2 – Hobart Interim Planning Scheme 2015

Table 1 Summary of E2.6.2 requirements and

PCL1 ENVIRONMENTAL SITE ASSESSMENT - Excavation	
PCL1 ENVIRONMENTAL SITE ASSESSMENT - Excavation	
A contamination Environmental Site Assessment report prepared by a suitably qualified and accordance with the procedures and practices detailed in the National Environment Protection Contamination) Measure 1999 (NEPM) as amended 2013 must be provided	This report: prepared by GHD Pty Ltd and reviewed by Peter Topliss EIANZ Certified Site Contaminated Specialist [CEnvP No.SC41076]),
The report must address:	
Whether any site contamination presents a risk to workers involved in redevelopment of the as a result of proposed excavation of the site.	Section 6.1.1
Whether any site contamination presents an environmental risk from excavation conducted • Whether any specific remediation and/or protection measures are required to ensure proposed excavation of the site adversely impact human health or the environment before excavation commences.	Section 6.1.1
REMEDIATION AND PROTECTION MEASURES	
If the Environmental Site Assessment report concludes that remediation and/or protection measures risks to human health or the environment, a proposed remediation and/or management plan remediation or management plan involving soil disturbance must include a detailed soil and prevent offsite transfer of potentially contaminated soil or stormwater.	No unacceptable risk to human health or environment. No remediation plan required. Sections 6.1.1. Management of soil disturbance: Groundwater and stormwater- Section 7.1 Stockpile Control – Section 7.2 Dust Control – Section 7.3
STATEMENT OF SUITABILITY	
A statement based on the results of the Environmental Site Assessment that the excavation not adversely impact on human health or the environment is to be provided (subject to implementation remediation and/or protection measures as required).	Section 6.4
THE ASSESSMENT - Proposed Use	
A contamination Environmental Site Assessment report prepared by a suitably qualified and accordance with the procedures and practices detailed in the National Environment Protection Contamination) Measure 1999 (NEPM) as amended 2013 must be provided.	This report and the Contamination assessment (Appendix F)
The report must:	
Whether any site contamination presents a risk to the health of users of the development in use. Whether any site contamination presents an environmental risk.	No unacceptable risk to human health or environment from the soils on Site. See Section 5.4 for why ecological criteria not applied to Site
Whether any specific remediation and/or protection measures are required to be implemented commences	No remediation of Site is required. Only standard construction protection measures are required for protection of workers and environment. Section 7 summarises these.
REMEDIATION AND PROTECTION MEASURES	

PCL1 ENVIRONMENTAL SITE ASSESSMENT - Excavation	
If the Environmental Site Assessment report concludes that remediation and/or protection measures risks to human health or the environment, a proposed remediation and/or management plan remediation or management plan involving soil disturbance must include a detailed soil and prevent offsite transfer of potentially contaminated soil or stormwater.	No remediation of soils is required. Section 7 summaries the stockpile controls, stormwater and groundwater management and dust control.
STATEMENT OF SUITABILITY A statement based on the results of the Environmental Site Assessment that the proposed use impact on human health or the environment is to be provided (subject to implementation remediation and/or protection measures as required).	Section 6.4

3. Site Setting

3.1 Site identification

Table 2 Site details

Item	Details
Site Address	79 – 83 Melville Street, Hobart, Tasmania, 7000 (including adjacent road reserve) and 80 Brisbane Street, Hobart, Tasmania, 7000 (including adjacent road reserve)
Property Identifiers (Melville St)	Title Reference Number/s: 149231/2 Property ID Number (PID): 2911798
Property Identifiers (Brisbane St)	Title Reference Number/s: 149231/1 Property ID Number (PID): 2811771
Site Area	Approximately 7000 m^2
Site Owner/ Operator	University of Tasmania
Current Zoning	22.0 Central Business (Hobart Interim Planning Scheme 2015)
Current Land Use Melville St: Brisbane St	 Not currently in use- previously Forestry Tasmania Freedom Furniture- Home wears retail outlet Underground car parking
Surrounding Land Uses	The site is located approximately 550 m west northwest of the Hobart GPO in the Hobart CBD. Current land uses surrounding the site comprise: North: Brisbane Street -Retail businesses East: Murray Street- Retail, business offices and a mechanics West: Elizabeth Street- retail and lifestyle businesses South: Melville Street- Wesley Centre (Chapel, Hall and Museum), multistorey car parking and retail business.

3.2 Site layout

The site is located on the periphery of Hobart's Central Business District with frontage to Melville Street and vehicle access from Brisbane Street. The layout of the site is shown on Figure 1 Appendix A. It is essentially an irregular rectangular shape with very little open space, apart from a drive-way located on the north-eastern boundary leading to the service yard. Buildings cover the rest of the extent of the site, with two converted redbrick warehouses joined by a large glass atrium along Melville Street. This building extends back to Brisbane Street with car parking on the lower ground floor, a service yard, workshops and laboratory leading to the offices along Melville Street. All ground is covered with buildings or asphalt.

The extent/boundary of the Site and the associated redevelopment activities been extended for this investigation to include work in adjacent road reserves to attach the realigned stormwater and sewage pipes to the mainlines in the road.

3.3 Site environmental setting

3.3.1 Elevation and topography

The site slopes gently from the northeast to the south west and has an approximate elevation ranging from 15 – 20 m AHD. It is considered likely that the rear of the site (northern end) has been excavated into natural ground to facilitate development of the basement car parking.

3.3.2 Soils

In general across the Site the soils are fairly consistent with the exception of the three locations within the dome (SB02-SB04) and the location in the Brisbane Street ground level carpark (SB05). In general the soils across the Site consist mainly of fill comprising of gravel (including sandy gravel and clayey gravel), gravelly clay and clays, with natural clays directly above the bedrock. Refer to the Bore logs in Appendix C for full descriptions of the soils encountered across the Site.

3.3.3 Geology

Geology has been mapped by TheList as comprising four units as follows:

– Northern section of the site mapped as alluvial gravel, sand and clay (Qa).
– South eastern section is mapped as undifferentiated quaternary deposits (Q).
– South western portion of the site is mapped as comprising poorly sorted boulder to pebble grade deposits with boulders up to 3 m length, clasts generally dominantly of dolerite with traces to rarely dominant amounts of Upper Parmeener mudstone and other rocks and less commonly Lower Parmeener rocks, clayey material (Tcbd).
– A small area around the service yard is mapped as dolerite and related rocks (Jd).

3.3.4 Surface water and groundwater

The site is located approximately 900 m northeast of the Sullivans Cove, River Derwent. While the Skolsa 1994 report noted groundwater observed at between 1 and 4 metres below ground level (m bgl) no groundwater was encountered during the field investigations.

On the basis of topography in the vicinity of the site and proximity to the Derwent Estuary, it is anticipated that the groundwater flow direction at the site is towards the Derwent Estuary to the southeast.

4. Site use history

Originally a land grant acquired by the Crisp family, the site, which extends through to Brisbane Street, operated as a sawmill and timber and hardware outlet until 1968. Following a fire at the site in 1922 the two redbrick warehouses on Melville Street were constructed, the eastern one was used as a warehouse store for dry and finished timber products and smaller western one housed the hardware emporium business.

The site was sold to the Tasmanian State Government in the late 1960s and was used as stores and offices including the State Emergency Service, and The State Fire Commission. In 1997 the site was redeveloped to be Forestry Tasmania Office and showroom. This redevelopment retained the two redbrick warehouses and incorporated into the design a glazed, domed foyer joining them together. This development comprised the refurbishment of the two warehouse buildings; construction of new office and amenities areas; a retail showroom and the foyer dome. In 2018 the building was sold to University of Tasmania and has been unoccupied since then.

For a full site history including WorkSafe Dangerous Good Register, City of Hobart Council Records and EPA records see Preliminary Site Investigation Document (GHD 2022) in Appendix F.

4.1.1 Previous contamination assessments at the Site

Site has been subject to various phases of prior contamination assessment including:

– Richard Stoklosa Engineering Practice Pty Ltd (1994) *Screening level Environmental Site Assessment of 79-83 Melville Street, Hobart*. Report prepared for James Douglas & Associates on behalf of Tasmania State Property Services, dated 2 December 1994.
– Stoklosa Engineering Pty Ltd (1996) *Forestry Tasmania Redevelopment Project, 79-83 Melville Street, Hobart*. Letter to Forestry Tasmania, dated 18 September 1996.

– Stoklosa Engineering Pty Ltd (1996) *Environmental Remediation and Validation, December 1996* (report not available for this review).
– GHD (2018) *78-83 Melville St, Limited Preliminary Site Investigation.* Report prepared for the University of Tasmania.
– GHD (2022) Contamination Assessment 79-83 Melville Street Hobart and 80 Brisbane Street Hobart.

In summary, the development site has been subject to extensive background investigation and targeted assessment and remediation (i.e. removal of underground petroleum storage systems [UPSS]). This provides increased confidence that key potential aspects of concern have subsequently been identified and addressed to varying degrees and that this investigation was designed to validate this assumption.

4.1.2 Site contamination and potential risks from the desktop assessment

The site history and potential contamination risk is typical of most urban sites in Hobart and based on available information, has not shown any higher risk issues than other CBD locations. These include:

– Imported fill used across the site generally (and historical use of hydrocarbons on site), and likely representing a low risk, consistent with other urban sites in Hobart (i.e. a mixture of fill material and typically low level contaminated soil)
– A residual risk remains for many streets in central Hobart associated with the potential for buried old town gas infrastructure (pipework), including both Brisbane Street and Melville Street. There is no information to suggest the associated risk is any higher at this location than in any other areas of the city.

For areas of proposed excavation for redevelopment (where potential exposure risk is higher) the following key aspects are to be considered in addition to the two above:

– Former UPSS near Brisbane Street - While unconfirmed, available evidence suggests it was likely removed and possibly remediated (circa 1996).
– Former UPSS near Melville Street - Removed and residual contaminated soil identified as “localised” and “unlikely that the contamination has migrated off site” (Stoklosa 1996).
– Potential localised contamination aspects were identified on-site including the capped oil sump, triple interceptor trap and electrical substation. However, as they are not located in proximity to the proposed areas of excavation, and represents relatively low risk profiles, there is no material increased risk to construction workers, futures site users or the environment associated with the proposed development works.
– The residual risk to site from potential off-site contamination risk (i.e. surrounding automotive and fuel storage activities) migrating on-site is primarily relating to scenarios where excavation works are conducted into, or in close proximity to the underlying groundwater.

In context of the broader site footprint outside of proposed areas of excavation, the proposed development represents a low risk profile. As the exposure setting and land use do not materially change (commercial setting to commercial setting) there is no material increased risk to construction workers, futures site users or the environment associated with the broader site footprint.

4.1.3 Contaminants of potential concern

From the desktop review of the Site history and previous investigations, the contaminants of potential concern for the Site are related to the two former USTs onsite (one near driveway on Brisbane St and one near the entrance to the building on Melville St), uncontrolled fill across the Site, potential old Hobart Town gas pipes and general hydrocarbon presence.

Based on the site history, the contaminates of potential concern for this site are: Total recoverable hydrocarbons, BTEXN, PAH, and metals.

5. Soil quality assessment

The work was undertaken in general accordance with the National Environment Protection Council (NEPC) (2013) Schedule B2 Guideline on *Site Characterisation of the National Environmental Protection (Assessment of Site Contamination Measure 1999* (as amended April 2013) (NEPM, 2013).

5.1 Target areas identified in GHD (2022[1])

The following areas were identified as representing areas potential site contamination that requires further assessment:

– Area of proposed utility trenching next to the former UPSS near Brisbane Street;
– Area of proposed utility trenching next to the former UPSS near Melville Street;
– Areas of prosed utility trenching in road reservations on both Brisbane and Melville Streets, and accounting for associated potential risks from old town gas;
– General assessment (grid and/or judgemental sampling patterns) for soil characterisation of proposed excavation areas required for the redevelopment including areas of ground levelling, lift pits, and remaining utility trenches not addressed above .

5.2 Areas of investigations

The areas investigated for this assessment were targeted towards areas where excavation are planned to take place. The excavations on site are for either utility trenching for the realignment of the sewage and stormwater pipes across the site and general excavations for building works. For assessment purposes these have been split into the areas that will excavated for utility trenching or general excavation and then grouped within these two main areas into sections that had similar potential sources of potential contamination, similar soils and are in the vicinity of each other. These APECs are summarised in Table 3 below and can be seen on Figure 2 in Appendix A.

Any areas where the excavations were to be less than 0.015 m bgl were not targeted in this investigation due to shallow nature.

The locations sampled within the driveway are discussed both within the driveway and the realignment of sewage and stormwater pipe APECs as these two purposes of excavations occur within the area.

Table 3 Summary of locations sampled, sample recovery method and potential source of contamination

Area	Potential source of contamination	Excavation method	Locations	Comment on location choice
Utility trenching / Sewage and stormwater realignment				
Brisbane Street Road reserve	Decommissioned UST (1000 gallon UST and metered pump) likely removed 1996. General hydrocarbon and uncontrolled fill	Test pits	GTP01, GTP02	GTP02 is assessing both general contamination status of road reserve as well as checking for residual impacts from decommissioned UST from driveway area
Melville Street – entrance of building and road reserve	Decommissioned UST (500 gallon and bowser) removed 1996. General hydrocarbon and uncontrolled fill	Soil bore	SB01	SB01 was drilled near edge of cadastral parcel and the sidewalk. No locations were able to be advanced within the sidewalk or road reserve for this investigation. SB01 is taken as being representative of the soils within this area- front of building, sidewalk and road reserve, in

[1] GHD 2022 Cover Letter to Contamination Assessment submitted to City of Hobart Council (copy in Appendix F)

Area	Potential source of contamination	Excavation method	Locations	Comment on location choice
Utility trenching / Sewage and stormwater realignment				
				addition as to checking residual hydrocarbons from decommissioned UST.
Driveway	Decommissioned UST, general hydrocarbon and uncontrolled fill	Test pits and soil bores	GTP03, GTP04, SB07, SB09, SB10	The driveway has both utility trenching for the pipe realignment and bulk excavation of the area (to a much shallower depth). These bores assess soils from the area being trenched.
Underground carpark	General hydrocarbon and uncontrolled fill	Soil bore	SB11, SB12	Two locations chosen to be accessible and spread across the accessible area.
Inside building	Uncontrolled fill	N/A	N/A	While the utility trench does go into the building between the underground car park and the dome, it was not possible to get the excavator into that area. The soils beneath this section of the building would have been very similar to other soils across the Site and the Site history did not raise any increased risks with these areas. It can be assumed that the soil that will be encountered during trenching will be very similar to those in BH11 and BH12.
Forestry yard	General hydrocarbon and uncontrolled fill	Soil bore	SB06.2	The soil bore in this location is a couple of metres out of the pipe alignment. The location for SB06 was chosen as due to its approximate distance between SB07 and SB04, while maintaining safe distances from all underground services. These samples are representative of the soils along the utility trench within the yard.
Forestry dome	Uncontrolled fill	Soil bore	SB02, SB03, SB04	Three locations chosen to adequality cover the area to be trenched inside the domed area. The soils in this area are expected to be different to those across rest of site due to previous use as greenhouse
Other areas of Site to be excavated during development works				
Driveway	Decommissioned UST, general hydrocarbon and uncontrolled fill	Test pits and soil bores	GTP03, GTP04, SB07, SB08, SB09, SB10.	The driveway has both utility trenching for the pipe realignment and bulk excavation of the area (to a much shallower depth). These bores and test pits assess soils from the area excavated (this area is only excavated to less than 0.8 m bgl).
Workshop/Lift Pit	General hydrocarbon and uncontrolled fill	Soil bore	SB16	The lift pit that is located in the workshop off the forestry yard.
Underground carpark under freedom	General hydrocarbon and uncontrolled fill	Soil bores	SB13, SB14, SB16, SB17	The area of excavation in the underground carpark under Freedom Furniture. SB14 is the lift pit in this area. The third closest to Melville St is being excavated 0.1 m bgl so no samples were taken from this area.

Area	Potential source of contamination	Excavation method	Locations	Comment on location choice
Utility trenching / Sewage and stormwater realignment				
				The rest of this area is to be excavated 0.4 -1 m bgl.
Lift Pit (main building)	General hydrocarbon and uncontrolled fill	Soil bores	SB18	It was not possible to get the excavator into this area. The soils beneath this section of the building would have been very similar to other soils across the Site and the Site history did not raise any increased risks with these areas. It can be assumed that the soil that will be encountered during trenching will be very similar to those in BH11 and BH12 and across the Site. A previous investigation concrete cut the flooring. A sample was taken of the fill beneath the concrete. No additional samples were recovered.

5.3 Methodology

It was originally intended that each location would be investigated using a combination of Non-destructive drilling (NDD) and push tube drilling, however drill rigs were unavailable to undertake the work until mid-April/early May, so alternative options were investigated.

These options were using an augur attachment on a small excavator or a NDD rig across the Site- the excavator was chosen due to:

– the NDD rig having a maximum depth of 1.5 m bgl, while the excavator with augur attachment has a maximum depth of 3 m bgl.
– limited access into the underground carpark due to the height of the NDD rog (2.9m) and would cause noise disruptions to Freedom Furniture (Building tenant).

The limitations of the auger attachment on the excavator is that the entire soil profile is subject to limited logging, with only samples at target depths to be logged.

This methodology (excavator with auger attachment) is only for SB01-SB18 which are the soil bores advanced by GHD as part of this investigation. In addition to the 18 soil bores advanced during this investigation four (4) test pits (GTP1-GTP4) were advanced as part of the JMG geotechnical investigation. For details on the test pitting methodology of this work see the report in Appendix G. The sampling including density, screening, handling, transport, analysis and QA/QC procedures were undertaken as per Table 4 below.

Table 4 Field methodology

Item	Description
Technical guideline	Australian Standard 4482.1:2005 *Guide to the investigation and sampling of sites with potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds (AS 4482.1:2005); and* NEPC (2013) *National Environmental Protection (Assessment of Site Contamination) Amended Measure (NEPM) No. 1 - Schedule B2, Guideline on Site Characterisation* (NEPC 2013)
Sub-contractors	**Excavator hire including operator and off sider**: Hazel Bros Pty Ltd **Service clearance**: Protech Underground Clearance **Concrete Cutting**: Bay Hire (engaged by Hazel Bros for GHD)
Service clearance	Service clearance undertaken on 01/03/2022. 18 locations cleared and marked out in pink paint – 7 in underground car park (2 utility trenching), 1 in forestry yard, 1 in workshop, 3 in dome, 1 out front of building on Melville St, 4 on driveway, 1 in near Freedom loading bay. All locations have been cleared to allow bore to be moved slightly if required due to field conditions. Some locations have more leeway than others due to proximity of services.
Concrete cutting	Slabs in the workshop and forestry yard were concrete cut by Bay Hire on 04/03/2022. They had to be recalled on Sunday 06/03/2022 to open an additional hole in slab after a buried slab was encountered in the Forestry yard. All SB asphalt surfaces were cut except for SB12 to facilitate ease of opening on the Sunday during field works.
Bore advancement	17 soil bores were advanced across the Site on Sunday 06/03/2022. Soil bores were advanced using an excavator with a 200 mm solid flight augur attachment. The maximum depth of this equipment was 3 m bgl. The excavator and driver were supplied by Hazel Bros Pty Ltd.
Sampling density	Soil samples were recovered at approximately 0.0-0.10 metre below ground level (m bgl), 0.4-0.5 m bgl, 0.9-1.0 m bgl 1.4-1.5 m bgl, 2 – 2.1 m bgl and thereafter at 1 m intervals to the until target depth reached or refusal of augur. Soil samples are also to be preferentially targeted to assess for contamination and the sampled intervals are likely to reflect visual and olfactory observations, especially where hydrocarbons are a CoPC. As such, the sampled intervals was adapted on the basis of observations and the potential for vertical contaminant migration.
Screening	Soil samples were screened for volatile hydrocarbons using a calibrated photo-ionisation detector (PID). Results were recorded on field sheets and used to support sample selection.
Sampling	Soil samples were taken using a fresh pair of nitrile gloves, and placed in a clean jar that had been scanned using the ALS Compass App and the job number, sample field identification, date collected and sampler's name were assigned to that jar. Each jar was also clearly marked with sample identification as a secondary check. In summary, investigations were biased to the top metre of the soil profile to address risks associated with surficial leaks and spills and the potential use of imported fill. Deeper sampling was conducted where potential sources included underground infrastructure such as fuel storage tanks (i.e. sampling extended to depths below the likely base of the former tank) in areas where utility trenching is required.
Sample handling and transport	Following collection, soil samples were immediately placed on ice and stored in a insulated chilled, dark environment (cooler/esky) prior to being forwarded to the analytical laboratory within the specified holding times.
Sample analysis	8 metals (arsenic, cadmium, chromium, cobalt, copper, lead, mercury, nickel, and zinc) total recoverable hydrocarbons (TRH); benzene, toluene, ethyl-benzene, xylene and naphthalene (BTEXN); polycyclic aromatic hydrocarbons (PAH) Laboratory results and certificates of analysis are included in Appendix E
Quality assurance and quality control (QA/QC)	A program wide QA/QC sampling procedure was implemented, and further details are detailed in Section 5.5

5.4 Assessment criteria

Site assessment in Australia is generally undertaken in accordance with The National Environment Protection (Assessment of Site Contamination) Measure 2009, as amended 2013 (the NEPM), which presents risk-based assessment criteria that has been developed to protect human health and the environment in various environmental and land-use settings. Soil analytical results have been compared with assessment criteria presented in Schedule B1 Guideline on Investigation Levels for Soil and Groundwater (NEPM, 2013).

Assessment criteria for the protection of ecosystems (soils) are not relevant for this Site as the site is located within an urban area, the surface is predominantly sealed and will remain so. Where a site is predominantly surface sealed, and will remain so (i.e. typical commercial/industrial setting) it is reasonable to assume there is negligible sensitive ecological receptors in the soil requiring protection. However, if groundwater had been encountered during any of the intrusive investigations, then this would have triggered the comparison to the assessment criteria for the protection of ecosystems, as groundwater has the potential to migrate offsite impacting ecosystems downgradient.

Based on the objective of this investigation, the following assessment criteria were selected for comparison with soil quality data for the site. The criteria were selected to identify where concentrations of CoPC in soil pose a potential risk to receptors.

Human health (including ingestion, dermal contact, vapour risk)

– NEPM (2013) Schedule B1: Soil Health Investigation Levels (HILs) - HIL D Commercial/industrial (applies to depth of 3 m bgl)
– NEPM (2013) Schedule B1: Soil Health Screening Levels (HSLs) – HSL D Commercial/industrial; Sand (applies to a depth of 3 m bgl)
– CRC Care (2011) Soil Direct Contact Intrusive Works (all soils that may come in contact workers)
– CRC Care (2011) Soil HSL Vapour Intrusive works (0-<2m and 2-<4m Sand)

Management limits

– NEPM (2013) Management Limits for Commercial/Industrial soils (all soil depths)

Soil for disposal

– Tasmanian EPA (2018) Waste Classifications Guidelines; Information Bulletin No. 105

5.5 Quality assurance and quality control

5.5.1 Data Quality Objectives

A process for establishing DQOs for a site has been defined by the US EPA. That process has been adopted within the Australian Standard: AS 4482.1-2005 and referenced by the National Environmental Protection (Assessment of Site Contamination) Measure (NEPM, 2013).

The purpose of establishing Data Quality Objectives (DQOs) is to ensure that the field investigations and subsequent analyses are undertaken in a way that enables the collection and reporting of reliable data on which to base the assessment. DQOs are aimed at ensuring that a satisfactory level of quality assurance and quality control (QA/QC) is adhered to during the field and laboratory procedures implemented to collect data. This ensures that the data is reliable and that any subsequent conclusions and recommendations can be made with confidence. The DQO process was taken into account in designing the scope of work carried out over the course of the program. See below for a summary of the quality assurance/quality control results for this investigation.

5.5.2 Field program

A program-wide QA/QC sampling procedure was implemented, in order to assess the data for data quality indicators such as accuracy, precision and repeatability. This was done by collecting a number of quality control samples including a primary sample, a field duplicate and a split duplicate sample. The primary samples and field duplicates were analysed at the ALS Melbourne awhile the split sample was sent to ALS Sydney for analysis.

Three sets of quality control samples were collected during the field works and are summarised below:

- QA1/QA2 was collected in tandem with primary sample BH13_0.6
- QA3/QA4 was collected in tandem with primary sample BH01_0.5
- QA5/QA6 was collected in tandem with primary sample GTP01_2

Laboratory certificates of analysis are included in Appendix E. These laboratories also undertook internal quality control checks, which are detailed in the laboratory documentation.

Relative percent differences (RPDs) between primary and blind duplicate samples typically indicate acceptable precision in the majority of analytical duplicate pairs (within the adopted criteria of 50% for organic, 30% for inorganic analytes). Table 1 in Appendix D presents calculated RPDs for the primary and quality control samples collected during the field program.

In samples where RPD exceedances are identified, the exceedances are disregarded where both results are less than five times the laboratory limit of reporting (LOR). Where an RPD exceedance is measured and the blind/split sample is detected at a higher concentration than the parent, the highest concentration is always compared against the adopted site screening criteria.

There were some issues with sample receipt and analysis at ALS Melbourne, the samples from the geotechnical test pitting were accidently overlooked for analysis following receipt and placed into refrigerated hold at the laboratory. Unfortunately, this delayed the analysis until it was one day out of holding time. We have included communication from ALS Melbourne with the laboratory documentation in Appendix E explaining their error and that the laboratory doesn't believe that the exceedance of one day of the recommended holding time will have any significant impact on the results.

There were exceedances of the calculated RPDs and Table 5 below summarises these exceedances of the adopted precision criteria. However on the basis that:

a. the samples were from a soil horizon that is considered to likely have a heterogeneous chemical distribution (i.e. sample lithography described as FILL comprising of sandy/clayey gravels);
b. that metals by their nature, tend to have a heterogeneous distribution within soils; and
c. that the highest measured value from both the primary and secondary samples was used to determine soil classifications and potential risks to human health and the environment; it is considered that the results are suitable for decision-making for the site.

No variance in concentration between the duplicates were approaching any of the nominated investigation criteria trigger values.

Table 5 Summary of relative percent differences

Analyte	Primary sample	Field or split duplicate	Primary concentration	Duplicate concentration	RPD
Copper	BH01_0.5	Field	37 mg/kg	26 mg/kg	35
Copper	BH01_0.5	Split	37 mg/kg	18 mg/kg	69
Copper	BH13_0.6	Field	38 mg/kg	57 mg/kg	40
Nickel	BH13_0.6	Split	48 mg/kg	35 mg/kg	31
Zinc	BH01_0.5	Split	48 mg/kg	30 mg/kg	46

5.5.3 Laboratory program

The NATA certified laboratories used for this assessment (ALS Melbourne), implement internal QA/QC procedures during sample analysis, and provide a summary of checks of the adequacy of these in their analytical reports. GHD generally reviews the internal laboratory quality control data provided within the laboratory reports to confirm the data is acceptable for decision-making, before reporting the findings of site assessments. Copies of laboratory analytical reports, including their internal QC reports, are presented in Appendix D.

Review of the laboratory quality control reports indicates that no significant quality issues were identified with regard to the method blanks and control samples, and the frequency of the laboratories internal QC checks. There was some holding time exceedances of one day which was explained above in Section 5.5.2. This occurred at ALS Melbourne.

Review of the potential effects of these issues on the reported concentrations of the relevant analytes indicated that it is unlikely that decision-making for the site has been affected. On this basis, it is considered that the reported data is acceptable for decision making at the site.

5.5.4 Suitability of data

The QA/QC checks implemented both in the field and by the laboratory indicate that while there have been some issues with the data it is of suitable quality to be used for decision-making regarding the composition of the material and potential risks that material poses to human health and the environment.

5.6 Soil sampling - Utility trenching / Sewage and stormwater pipe realignment

5.6.1 Brisbane Street

Sources of potential contamination

– Potential residual hydrocarbon impacts from decommissioned UST (GTP02);
– Uncontrolled fill;
– General hydrocarbon impacts; and
– Old Hobart town gas.

This part of the investigation was carried out in tandem with the William Crommer geotechnical investigation for JMG. For further details of this investigation see Appendix G. GTP01 and GTP02 are Site 1 and Site 2 respectively in this report.

Field observations

– There were no obvious odours including hydrocarbon odours or staining of the soils observed during the field program.
– PID field screening values ranged from 0.0 -1.5 ppm (all PID readings are included in Table 2 in Appendix D)
– GTP01 reached target depth of 5m bgl and GTP02 approximately 15 m across and down the road hit bedrock with refusal of the augur at 1m bgl.
– The majority of the soils in this area are FILL comprised of clay and gravels (see bore logs in Appendix C)
– No asbestos containing material was observed.
– No Old Hobart Town gas infrastructure was observed during any of the soil disturbance.
– Table 6 below summarises the samples recovered, target depth of bore, if bedrock was encountered and depth.

Analytical results

For a full tabulated comparison of all samples analysed from this area compared to all of the nominated assessment criteria see Table 3 in Appendix D. Table 6 below summarises the exceedances of the nominated assessment criteria.

There were no exceedances of the nominated assessment criteria for the protection of human health or management levels.

Table 6 Summary of samples from Brisbane Street

Location	Samples analysed (m bgl)	Target depth (m bgl)	Depth to bedrock (m bgl)	Samples exceeding protection of human health assessment criteria
GTP01	1, 2, 3, 4, 5	5	5	-
GTP02	0.5	5.5	1	-

5.6.2 Driveway

Sources of potential contamination:

– Potential residual hydrocarbon impacts from decommissioned UST
– Uncontrolled fill;
– General hydrocarbon impacts; and
– Old Hobart town gas.

Field observations:

– There were no obvious odours including hydrocarbon odours or staining of the soils observed during the field program.
– PID field screening values ranged from 0.0 – 1.3 ppm (all PID readings are included in Table 2 in Appendix D).
– The majority of the soils in this area are FILL comprised of clay and gravels (see bore logs in Appendix C).
– The bedrock was very shallow with target depths not reached.
– No asbestos containing material was observed.
– No Old Hobart Town gas infrastructure was observed during any of the soil disturbance. A freshly broken edge of a flanged piece of terracotta pipe did come to the surface in BH09. This resulted in short shutdown of site works while the hole was cleared and it was determined that this was a bit of old pipe that was in the fill that had broken during auguring. There was no additional pipework's observed.
– Table 7 below summarises the samples recovered, target depth of bore, if bedrock was encountered.

Analytical results

For a full tabulated comparison of all samples analysed from this area compared to all of the nominated assessment criteria see Table 3 in Appendix D.

– Table 7 below summarises the exceedances of the nominated assessment criteria.
– There were no exceedances of the nominated assessment criteria for the protection of human health or management limits.
– No hydrocarbons or BTEXN were detected in concentrations above the laboratory LOR.
– PAH were detected in the 0.5m bgl sample of both BH07 and BH09. No other samples had concentrations of PAH's above the laboratory LOR

Table 7 Summary of samples from driveway

Location	Samples analysed (m bgl)	Target depth (m bgl)	Depth to bedrock (m bgl)	Samples exceeding protection of human health assessment criteria
BH07	0.5, 1.3	3	1.3	-
BH09	0.5, 1	3	0.9	-
GTP03	1, 2	5	2.5	
GTP04	0	3	0.65	

5.6.3 Underground carpark area – pipe realignment

Sources of potential contamination

– Uncontrolled fill; and
– General hydrocarbon impacts.

Field observations

– There were no obvious odours including hydrocarbon odours or staining of the soils observed during the field program.
– PID field screening values ranged from 4.6 - 6.9 ppm (all PID readings are included in Table 2 in Appendix D).
– No asbestos containing material was observed.
– The majority of the soils in this area are FILL comprised of clay and gravels (see bore logs in Appendix C)
– The bedrock was very shallow with target depths not reached
– No Old Hobart Town gas infrastructure was observed during any of the soil disturbance (this was unlikely in this location).
– Table 6 below summarises the samples recovered, target depth of bore, if bedrock was encountered.

Analytical results

For a full tabulated comparison of all samples analysed from this area compared to all of the nominated assessment criteria see Table 3 in Appendix D.

– Table 8 below summarises the exceedances of the nominated assessment criteria.
– There were no exceedances of the nominated assessment criteria for the protection of human health or management limits.
– F4 fraction hydrocarbons (>C34-C40 Fraction) were detected at low concentrations in sample BH12_0.8, however were not detected in the above sample (BH12_0.5). However, benz(a)anthracene was detected in this sample (BH12_05) and not in any other samples in this area. This was the only PAH detected above the laboratory LOR.

Table 8 Summary of samples from underground carpark area

Location	Samples analysed (m bgl)	Target depth (m bgl)	Depth to bedrock (m bgl)	Samples exceeding protection of human health assessment criteria
BH11	0.5	3	0.5	-
BH12	0.5, 0.8	3	0.8	-

5.6.4 Forestry yard

Sources of potential contamination

– Uncontrolled fill; and
– General hydrocarbon impacts.

Field observations

– The soil bore was located to the west of the proposed pipe realignment, it was not possible to sample directly above the pipe location due to existing services at the site (mainly current stormwater pipes). This location was chosen as it is located adjacent to the proposed pipe location and was assumed that the soil properties would be relatively consistent across this area.
– There were no obvious odours including hydrocarbon odours or staining of the soils observed during the field program.
– PID field screening values ranged from 0.1 – 4.5 ppm (all PID readings are included in Table 2 in Appendix D)
– No asbestos containing material was observed.
– The majority of the soils in this area are FILL comprised of clay and gravels (see bore logs in Appendix C)
– A buried slab was encountered approximately 0.6m bgl down the augur hole. This slab appeared to be relatively old with uneven edges and breaking up slightly. The slab was across about ½ of the hole. Bay hire had to be called to come and cut another concrete core to allow depth to bedrock to be reached. The new hole was within the cleared area and approximately 0.4m away from the original hole. The new bore hole was called BH6.2
– Table 9 below summarises the samples recovered, target depth of bore, if bedrock was encountered.

Analytical results

For a full tabulated comparison of all samples analysed from this area compared to all of the nominated assessment criteria see Table 3 in Appendix D.

– Table 9 below summarises the exceedances of the nominated assessment criteria.
– There were no exceedances of the nominated assessment criteria for the protection of human health or management limits.
– Elevated metals above the laboratory LOR were recorded, however these were very low and below all assessment criteria.
– No hydrocarbons, BTEXN, or PAHs were detected in concentrations above the laboratory LOR.
– PAH were detected in both the 0.5m bgl and 1 m bgl samples of BH04, however concentrations are below all nominated assessment criteria. No other samples had concentrations any PAH above the laboratory LOR.

Table 9 Summary of samples from forestry yard

Location	Samples analysed (m bgl)	Target depth (m bgl)	Depth to bedrock (m bgl)	Samples exceeding protection of human health assessment criteria
BH6.1		2.1	N/A refusal on buried slab	-
BH6.2	1, 1.5	2.1	1.5	-

5.6.5 Forestry dome

Sources of potential contamination

– Uncontrolled fill; and
– General hydrocarbon impacts.

Field observations

– There were no obvious odours including hydrocarbon odours or staining of the soils observed during the field program.
– PID field screening values ranged from 0.0 – 8.9 ppm (all PID readings are included in Table 2 in Appendix D).
– No asbestos containing material was observed.
– BH04 had to be moved a couple of times within the cleared area due to buried slab for gantry being encountered resulting in refusal at around 1 m bgl.
– The majority of the soils in this area are FILL comprised of sandy clays, clays and gravelly clays (see bore logs in Appendix C)
– No Old Hobart Town gas infrastructure was observed during any of the soil disturbance (this was unlikely in this location).
– Table 10 below summarises the samples recovered, target depth of bore, if bedrock was encountered.

Analytical results

For a full tabulated comparison of all samples analysed from this area compared to all of the nominated assessment criteria see Table 3 in Appendix D.

– Table 10 below summarises the exceedances of the nominated assessment criteria.
– There were no exceedances of the nominated assessment criteria for the protection of human health or management limits.
– No hydrocarbons or BTEXN were detected in concentrations above the laboratory LOR.
– PAH were detected in both the 0.5m bgl and 1 m bgl samples of BH04, however concentrations are below all nominated assessment criteria. No other samples had concentrations any PAH above the laboratory LOR.

Table 10 Summary of samples from dome

Location	Samples analysed (m bgl)	Target depth (m bgl)	Depth to bedrock (m bgl)	Samples exceeding protection of human health assessment criteria
BH02	0.5, 1.5, 2.9	3	N/A Target depth reached	-
BH03	0.5, 2	3	N/A Target depth reached	-
BH04	0.5, 1, 1.5	3	2.5	

5.6.6 Melville Street

Sources of potential contamination:

– Potential residual hydrocarbon impacts from decommissioned UST;
– Uncontrolled fill;
– General hydrocarbon impacts; and
– Old Hobart town gas.

Field observations:

– There were no obvious odours including hydrocarbon odours or staining of the soils observed during the field program.
– PID field screening values ranged from 4.7 – 8.3 ppm (all PID readings are included in Table 2 in Appendix D).
– The majority of the soils in this area are FILL comprised of clay, gravels, and broken bricks/terracotta.
– Target depth reached
– No asbestos containing material was observed.
– No Old Hobart Town gas infrastructure was observed during any of the soil disturbance.
– Table 11 below summarises the samples recovered, target depth of bore, if bedrock was encountered.

Analytical results

For a full tabulated comparison of all samples analysed from this area compared to all of the nominated assessment criteria see Table 3 in Appendix D.

– Table 11 below summarises the exceedances of the nominated assessment criteria.
– There were no exceedances of the nominated assessment criteria for the protection of human health, or management limits.
– No hydrocarbons, BTEXN or PAHs were detected in concentrations above the laboratory LOR.
– Elevated concentrations of metals above the laboratory LOR were recorded, however these were all below the nominated assessment criteria.

Table 11 Summary of samples from Melville Street

Location	Samples analysed (m bgl)	Target depth (m bgl)	Depth to bedrock (m bgl)	Samples exceeding protection of human health assessment criteria
BH01	0.5, 1.5, 3	3	N/A Target depth reached	-

5.7 Other areas to areas to be excavated during site works

5.7.1 Driveway

Sources of potential contamination:

– Potential residual hydrocarbon impacts from decommissioned UST
– Uncontrolled fill;
– General hydrocarbon impacts; and
– Old Hobart town gas.

Field observations:

– There were no obvious odours including hydrocarbon odours or staining of the soils observed during the field program.
– PID field screening values ranged from 0 – 1.1 ppm (all PID readings are included in Table 2 in Appendix D)
– The majority of the soils in this area are FILL comprised of clay, gravels, and broken bricks/terracotta.
– The bedrock was very shallow with target depths not reached.
– No asbestos containing material was observed.
– No Old Hobart Town gas infrastructure was observed during any of the soil disturbance. A freshly broken edge of a flanged piece of terracotta pipe did come to the surface in BH08. This resulted in short shutdown of site works while the hole was cleared and it was determined that this was a bit of old pipe that was in the fill that had broken during auguring. There was no additional pipework's observed.
– Table 12 below summarises the samples recovered, target depth of bore, if bedrock was encountered.

Analytical results

– Table 12 below summarises the exceedances of the nominated assessment criteria.
– There were no exceedances of the nominated assessment criteria for the protection of human health or management limits.
– No hydrocarbons or BTEXN were detected in concentrations above the laboratory LOR.
– PAH were detected in the 0.5m bgl sample of both BH07 and BH09. No other samples had concentrations of PAH's above the laboratory LOR.

Table 12 Summary of samples from driveway

Location	Samples analysed (m bgl)	Target depth (m bgl)	Depth to bedrock (m bgl)	Samples exceeding protection of human health assessment criteria
BH07	0.5, 1.3	3	1.3	
BH08	0.5, 0.9	3	0.9	
BH09	0.5, 1	3	0.9	
BH10	0.5	3	0.7	
GTP03	1, 2	5.5	2.5	
GTP04	0	3	0.65	

5.7.2 Underground carpark area to be excavated

Sources of potential contamination:

– Uncontrolled fill; and
– General hydrocarbon impacts.

Field observations:

– Two of the original soil bore locations had to be adjusted and a location approximately halfway between the two original locations was chosen. The locations were unable to be accessed safely due to combination of overhead pipework and a low ceiling and a parked car. The area where the new soil bore locations (BH17) was in an area that was cleared of services.
– There were no obvious odours including hydrocarbon odours or staining of the soils observed during the field program.
– PID field screening values ranged from 3.9 – 7.1 ppm (all PID readings are included in Table 2 in Appendix D).
– No asbestos containing material was observed.
– The majority of the soils in this area are FILL comprised of clay, gravels, and broken bricks/terracotta.
– The bedrock was very shallow with target depths not reached
– Table 13 below summarises the samples recovered, target depth of bore, if bedrock was encountered.

Analytical results

– Table 13 below summarises the samples recovered, target depth of bore, if bedrock was encountered.
– There were no exceedances of the nominated assessment criteria for the protection of human health or management limits.
– No hydrocarbons, BTEXN or PAHs were detected in concentrations above the laboratory LOR.

Table 13 Summary of samples from underground carpark

Location	Samples analysed (m bgl)	Target depth (m bgl)	Depth to bedrock (m bgl)	Samples exceeding protection of human health assessment criteria
BH13	0.3, 0.6	1	0.6	-
BH14	0.5	1	0.5	-
BH15	0, 0.5	1	0.5	-
BH17	0.3, 0.6	1	0.6	-

5.7.3 Lift pits

There are two lift pits that are described in this section, one in the old workshop area and the other at the base of the stairs. There was access issues with the location inside the building at the base of the stairs with the excavator unable to access this location. A previous investigation at the Site had concrete cored the floor in the approximate location of where the lift pit is planned, and a sample was taken by hand from the fill layer below the concrete surface. The workshop soil bore was advanced by the standard method.

Sources of potential contamination:

– Uncontrolled fill; and
– General hydrocarbon impacts

Field observations:

– There were no obvious odours including hydrocarbon odours or staining of the soils observed.

– PID field screening values ranged from 0.0 – 11.1 ppm (all PID readings are included in Table 2 in Appendix D).
– No asbestos containing material was observed.
– The majority of the soils in this area are FILL comprised of clay, gravels.
– The gravels sampled in BH18 appeared to be identical to the gravels below the ground surface across the majority of the Site, with the exception of BH01-BH04.
– The bedrock was shallow with target depths not reached
– Table 14 below summarises the samples recovered, target depth of bore, if bedrock was encountered.

Analytical results

– Table 14 below summarises the samples recovered, target depth of bore, if bedrock was encountered.
– There were no exceedances of the nominated assessment criteria for the protection of human health or management limits.
– No hydrocarbons, BTEXN or PAHs were detected in concentrations above the laboratory LOR.

Table 14 Summary of samples from lift pits

Location	Samples analysed (m bgl)	Target depth (m bgl)	Depth to bedrock (m bgl)	Samples exceeding protection of human health assessment criteria
BH16	Workshop	0.5, 1	1.5	-
BH18	Inside building near staircase	0	0.05	-

5.7.4 Carpark near Freedom Furniture loading bay

Sources of potential contamination:

– Uncontrolled fill; and
– General hydrocarbon impacts.

Field observations:

– This sample was taken between the gap/trench between the boundary fence and the concrete slab.
– There were no obvious odours including hydrocarbon odours or staining of the soils observed during the field program.
– PID field screening values ranged from 0 – 0.1 ppm (all PID readings are included in Table 2 in Appendix D).
– There was general debris in the trench including food wrappers, and general rubbish
– No asbestos containing material was observed.
– The majority of the soils in this area are FILL comprised of clay, gravels, and broken bricks/terracotta.
– No Old Hobart Town gas infrastructure was observed during any of the soil disturbance (this was unlikely in this location).
– Table 14 below summarises the samples recovered, target depth of bore, if bedrock was encountered.

Analytical results

– Table 15 below summarises the samples recovered, target depth of bore, if bedrock was encountered.
– There were no exceedances of the nominated assessment criteria for management limits.
– There were exceedances of one of the nominated assessment criteria for the protection of human health with metals (see table 15 below) for the 1 m bgl sample. The shallower sample BH05_0.5 did not exceed any nominated assessment criteria. Lead concentration in the 1 m bgl sample are very high (11,400 mg/kg) and greater than three orders of magnitude higher than the above sample.

– Hydrocarbons in the F3 fraction (>C16-C34) were detected above the laboratory LOR in BH05_1 but not in the shallower sample.
– No BTEXN or PAHs were detected in concentrations above the laboratory LOR.

Table 15 Ground level carpark near Freedom Furniture loading bay

Location	Samples analysed (m bgl)	Target depth (m bgl)	Depth to bedrock (m bgl)	Samples exceeding protection of human health assessment criteria
BH05	0.5, 1	1	N/A Target depth reached	SB01_1

It is likely that the sample BH05_1 is not representative of the soils in this area to be excavated, due to the following reasons:

- The soil bore was taken from a narrow trench between the brick fence between Beaurepaires and Freedom Furniture. It is possible that this location has received runoff from both the slabs at Beaurepaires and Freedom Furniture and may have locally elevated concentrations of some analytes.
- The majority of the soils to be excavated are currently covered by the slab and would not have been exposed to as much potential run off as the soils in this trench.
- The sample taken 0.5 m bgl above this sample was significantly less concentrated in metals.

It is recommended that the spoil from this area be stockpiled separately to the other areas and to be retested prior to disposal.

6. Discussion and risk assessment

6.1 Nominated assessment criteria

6.1.1 Protection of human health

In general, there were no exceedances of any of the nominated assessment criteria for the protection of human health with the exception of lead in the BH05_1 sample (refer Section 5.7.4). This indicates that:

- there is no unacceptable risk to the health of Site users including construction workers from the soils on Site; and
- there is no requirement for additional management or mitigation measures including development of a remediation action plan, is needed to be implemented during the development activities. The requirement management of these soils is summarised below in Section 7.

The lead exceedance was discussed in Section 5.7.4 and is unlikely to be representative of the soils from the broader area and a very localised hot spot. This material from this area should be segregated from the other stockpiled material and retested to determine disposal options.

Protection of construction workers and the environment from the soils in this area would be covered by the measures outlined in Section 7.

6.2 Potential risks

6.2.1 Decommissioned USTs

One of the main potential issues with excavation required for the redevelopment of the Site, including the realignment of the sewage and stormwater pipes and to develop the driveway, was the potential for residual hydrocarbon to remain in the soils from the decommissioned UST's that were located in the driveway area off Brisbane Street and in the front garden on the Melville Street entrance.

Melville Street

BH01 on Melville Street was able to be excavated to the target depth of 3 m bgl, and while it had some of the higher PID readings across the Site they were very low compared to a what would be expected on an hydrocarbon impacted site. In addition the three (3) samples analysed (depths 0.5, 1.5 and 3 m bgl) did not detect any hydrocarbons, BTEXN or PAHs in concentrations above the laboratory LOR.

There is no evidence that there are any residual impacts in the soils from this decommissioned tank.

Brisbane Street

Four locations were used to assess the risk from this UST locations (GTP02, GTP03, SB09, SB10). GTP02 is upgradient of where the decommissioned tank was thought to be, GTP03 and SB09 are down gradient while SB10 is likely across the gradient with these samples surrounding the area.

None of the samples analysed detected any hydrocarbon or BTEXN above the laboratory LOR.

None of the sample targeting the UST in the driveway area off Brisbane Street reached the target depths before refusal on reaching the bedrock The depth to bedrock in the upgradient (GTP02) and across gradient bore (BH10) ranged between 0.5 and 0.7 m bgl with a target depth of 5.5 m bgl for GTP02 and 3 m bgl for BH10. While target depths for the down gradient locations were not reached, greater depths were able to be advanced (GTP03 to 2 m bgl and SB09 to 1 m bgl). These two locations are on the slope of the driveway and the ground surface is at a lower point than street level (and where UST would have been). If there was significant residual impacts from this UST these two locations would have been picked up at least some trace of hydrocarbon impacts.

There is no evidence that there are any residual impacts in the soils from this decommissioned tank.

6.2.2 Old Hobart Town gas

A residual risk remains for many streets in central Hobart associated with the potential for buried old town gas infrastructure (pipework), including both Brisbane Street and Melville Street. There was no evidence of the pipework's for this encountered during the field works- no pipes were encountered; no excess levels of gas were detected by either the PID; or gas odours noticed by field staff. This along with the other significant works that have occurred on the Site since the 1990's indicate that it is unlikely that there are any Old Town gas pipes in the areas to be excavated.

There is no evidence that there is any Old Town Gas pipework in the areas to be excavated. Standard controls addressing the risk of physical exposure such infrastructure such remain active for the duration of excavation within street area regardless, to manage any residual risk.

6.2.3 Uncontrolled fill

The majority of the soils across the Site are FILL (not natural soils). This comprises of predonmaintly gravels in the surface layers with clays in the deeper soils. Many of the soils are likely to have been insitu for a long time as indicated by presence of terracotta rubbles at depth. These soils are classified generally as either Fill or Low level contaminated soils (level 2) under the EPA Bulletin 105 Soils for Disposal (Table 4, Appendix D) due to the elevated metal concentrations.

There were no exceedances of any of the nominated assessment criteria for the protection of human health across any areas to be excavated either for utility trenching or general excavation that will require controls summarised below in Section 7. These are controls should be included the Construction Environment Management Plan.

6.3 Broader site (outside of target areas)

In context of the broader site footprint outside of proposed areas of excavation, the Site represents a low risk profile. As the exposure setting and land use do not materially change (commercial setting to commercial setting) there is no material increased risk to construction workers, futures site users or the environment associated with the broader site footprint.

6.4 Statement of suitability

This Environmental Site Assessment has indicated that there is no unacceptable risk to either human health or the environment (i.e. ultimately surface water to groundwater) from either the excavation (workers involved in redevelopment) or proposed future users of the Site. No specific remediation and/or protection measures are required to ensure no adverse impact human health or the environment before excavation commences.

7. Management of soil onsite during excavation

The information in this section of the report should be forwarded to the Contractor, who will be undertaking the excavation works on site and be included in their Construction Environment Management Plan (CEMP) for the project. It will be the responsibility of the Contractor to provide, install and maintain all required environmental control measures required to implement the works.

Specific information relevant to contractor

– No soil should be removed from site until it has been characterised under EPA Bulletin 105 Soils for Disposal. The majority of the soils on site are historic uncontrolled fill (not natural soils) which can be characterised as either Fill or Low level contaminated soils (level 2) under the EPA Bulletin 105 Soils for Disposal due to the elevated metal concentrations.

– The material to be excavated from the area in carpark at Brisbane Street near the Freedom Furniture loading bay should be segregated from the other spoil generated and retested to determine disposal options due to an elevated lead reading in one sample. Gloves should be worn when handling this material.
– Health risks to workers coming in contact with potentially contaminated material generated during excavation is negligible, as long as:
    - industry standard PPE for construction work (long sleeved shirt, long trousers, steel capped boots) is followed; and
    - facilities that allow hygiene practices are in place - i.e. workers can wash hands prior to eating and drinking after handling any soils. If hand washing facilities are not available, then baby wipes should be made available.

7.1 Groundwater and stormwater

Surface water control measures are to be implemented at the site prior to and during construction. These are to include systems for erosion and sediment control, and diversion, containment, and treatment prior to its release from within the Works Area.

The site surface is predominantly comprised of sealed concrete / asphalt with inbuilt stormwater drainage systems that is will be to be disturbed/realigned during site works to segregate the Works Area from its surrounds. Where appropriate, surface water should be diverted around the Works Area to maintain clean flows into formed drainage lines downstream. Suitable diversions drains or embankments should be constructed and maintained to divert clean uncontaminated stormwater from entering the work site and contaminating surface waters or groundwater.

Run off from stockpiled excavated material is unlikely as stockpiles will be covered with tarpaulins or HDPE to prevent rainfall ingress (and erosion, dust generation etc).

Inflow of surface water or rain into excavations, either during works or where they are open overnight, is possible during the works program. Groundwater inflow into excavations is unlikely given that no groundwater was observed during any of the recent intrusive investigations.

7.1.1 Controls

The following measures will be employed to minimise the risk imposed by stormwater run-off from impacted areas:

– Avoid generating contaminated stormwater by diverting stormwater away from areas of exposed soils
– Erosion control devices are to be developed with consideration to Best Practice Erosion and Sediment Control publications[2], be installed in accordance with manufacturer's instructions, and maintained in such a manner as to prevent sediment transportation to areas outside the site.
    - Sediment build up against barriers and within sediment traps is to be cleaned out on an 'as-needs' basis.
    - Sediment socks will be used as silt fences around drainage grates and across all areas where surface water could flow from the proposed excavation / stockpiles.
– All stockpiles of soil will be covered in order to prevent transport of sediments into the site drainage system.
– Key activities in the construction works such as excavation and stockpiling should be scheduled during periods of fine / dry weather, where possible.
– Off-site disposal of water (stormwater or groundwater), if required, will be conducted following testing and analysis to determine a suitable licensed location for disposal.

7.1.2 Monitoring

No visibly dirty water / sediment will be allowed to migrate from the site as surface water flow, or flow into stormwater drains.

[2] Best Practice Erosion and Sediment Control (International Erosion Control Association)- The Best Practice Erosion and Sediment Control publication contains strategies and techniques to reduce the degradation of land and water from uncontrolled erosion and sedimentation. Any erosion and sediment control plans and control measures for the Works should be developed in accordance with this publication.

7.2 Stockpile control

Controlling the handling and fate of excavated material is considered to be one of the highest priorities on site during the works, given the risk of dust generation, impact to stormwater and the requirement for off-site disposal.

No long-term storage of stockpiles on-site is anticipated, with all excavated soils being transported off-site following characterisation for disposal. These controls relate to short term management of excavated materials only.

7.2.1 Controls

Short-term control of stockpiles on site are recommended to reduce dust and/or run off (as below), such as:

- All excavated soils will be covered whilst on-site. All stockpiles will be covered with impermeable materials such as tarpaulin or HDPE plastic and weighed down.
- Design and designate an area for stockpiles before site works commence. Locate stockpiles away from stormwater runoff, residential areas, other sensitive receivers, in a location where they are protected from prevailing wind and away from drains and site boundaries, as far as possible.
- Stockpiles will be disposed of / removed from site immediately following receipt of soil classification data.
- Where dust generation becomes an issue, stockpiles can be wetted however, in this event hay bales or filter socks will be emplaced as temporary bunding on the down slope side of the stockpiling area (i.e. adjacent the excavation) to collect possible runoff.
- Shape stockpiles, taking into consideration width to height ratio, nature of stockpiled material, location, access and available area for the stockpile. Limit stockpile heights based on stability, manageability, dust and amenity impacts. More gentle slopes may be required for unstable soils.
- Stockpiled soils with a very high moisture content will be piled upgradient of the excavation on a tarpaulin, with bunded edging to promote any water from the soils to flow back into the excavation.

7.2.2 Monitoring

Any stockpiles placed on site will be monitored for any dust generation and run off. If there is any evidence of run-of or dust generation. If these noted then additional measures may be implemented – wetting down (dust), checking stockpile coverings, repositioning or adding additional stockpile coverings, increase of sedimentation controls (bunding, bales ect).

7.3 Dust

Dust generation from the excavation of the soils is considered unlikely given that the underlying fill material is dominated by gravels and moist clays, however dust is likely to occur during rock.

7.3.1 Controls

Where dust is, or is likely to become, a problem, the following measures should be implemented:

- Apply water spray to disturbed surfaces (including broken concrete/concrete intended to be broken, stockpiles, excavation walls and floors [where practicable]).
- Use dry clean-up techniques (e.g. sweeping) to minimise build-up of loose soils and clean-up dusty areas.
- Reduce speed or power of activity to minimise dust generated (e.g. reduce vehicle or cutting speeds, remove items gently).
- All soil stockpiles at the site will be covered with tarpaulin or HDPE.
- Where high wind conditions cause a potential dust issue, the stockpiles will be wetted.
- Loose material will not be allowed to build up in any portion of the site to minimise dust generated from vehicle movement.
- All vehicles will move at <10 km per hour whilst on site, to minimise potential dust generation as well as enhance safety.

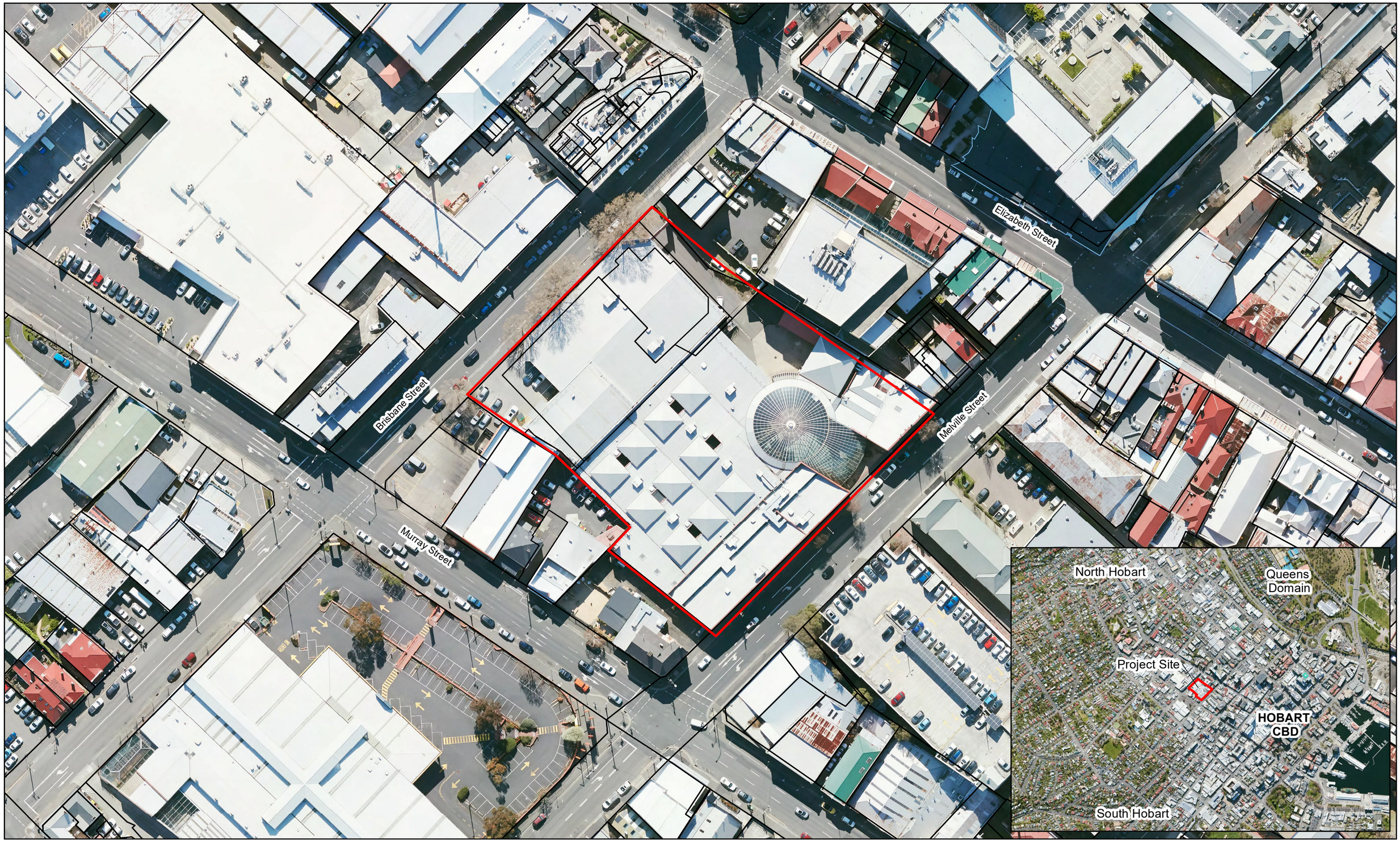
7.3.2 Monitoring

If visible dust is moving over site boundaries, work will be stopped, and control methods revised and reassessed. It should be noted that in times of high wind speeds, it may be necessary to discontinue certain dust generating tasks until the wind calms and the likelihood of significant dust generation is subsequently reduced.

Appendices

Appendix A

Figures



1:1,000 @ A3

0 10 20 30 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Project Site
- Cadastral parcels

University of Tasmania
UTAS Old Forestry Building Contamination Assessment

Job Number	12574014
Revision	A
Date	08 Apr 2022

Site Location

Figure 1

G:\32\12574014\GIS\Maps\Deliverables\12574014_01_SiteLocation_RevB.mxd

Data source: TheList, Transport segments, cadastre, 2021. Created by:tdcoates

2 Salamanca Square, Hobart Tasmania 7000 Australia **T** 61 3 6210 0600 **E** hbamail@ghd.com **W** www.ghd.com

1:600 @ A3

0 5 10 15 20

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Project Site
- Exacavation Areas
- Area of Decomissioned USTs
- Geotechnical Test Pits
- Borehole Locations

Service Infrastructure

- Proposed Sewer
- Proposed Stormwater
- Existing Sewer

University of Tasmania
UTAS Old Forestry Building Contamination Assessment

Job Number	12574014
Revision	C
Date	08 Apr 2022

Investigation Locations

Figure 2

G:\32\12574014\GIS\Maps\Deliverables\12574014_02_Sample_Locations_RevA.mxd

Data source: TheList, Transport segments, cadastre, 2021. Created by:tdcoates

2 Salamanca Square, Hobart Tasmania 7000 Australia **T** 61 3 6210 0600 **E** hbamail@ghd.com **W** www.ghd.com

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Appendix B

Woods Bagot – Overall Existing Site Plans

1 Level 1_Overall Plan Existing Site Investigation

Recent revision history

#	Status	Description	Date
A	For Information	For Information	24.01.22

Title Boundary
Excavation
Nominal Extent of Disturbance
- #### Civil Works

ABBREVIATIONS
CF Column Footing (-250+)
(E) Existing
FFL Finished Floor Level
(N) New
RL Relative Level
TBC To Be Confirmed
TME To Match Existing

GENERAL NOTES:
-EXCAVATION TO CLOSEST SURVEY POINTS AND IN RELATION TO PROPOSED LEVELS
-EXCAVATION BASED ON APPROXIMATE AND MAY VARY +/-100 OR MORE DEPENDING ON PROPOSED SUB-BASE LAYERS
-CIVIL ENGINNEER TO LOCATE PIPEWORK IN RELATION TO GRID
-CIVIL TO CONFIRM EXCAVATION DEPTH REQUIRED FOR NEW PIPEWORK

Project
Southern Futures: Forestry / Timber Yards

Address
80 Brisbane Street / 79-83 Melville Street, Hobart

Client
University of Tasmania

Issue
W–B
WOODS BAGOT

Project number 130807
Size check 25mm
Checked Checker
Approved Approver
Sheet size A0
Scale 1 : 200

Sheet title
Level 1 Overall Existing Site Investigation

Sheet number 12410
Revision A
Status

1 Level 2_Overall Plan Existing Site Investigation

Recent revision history

#	Status	Description	Date
A	For Information	For Information	24.01.22

Notes

Contractor must verify all dimensions on site before commencing work or preparing shop drawings.

Do not scale drawings.

Title Boundary
Excavation
Nominal Extent of Disturbance
Civil Works

ABBREVIATIONS
CF Column Footing (-250+)
(E) Existing
FFL Finished Floor Level
(N) New
RL Relative Level
TBC To Be Confirmed
TME To Match Existing

GENERAL NOTES:
-EXCAVATION TO CLOSEST SURVEY POINTS AND IN RELATION TO PROPOSED LEVELS
-EXCAVATION BASED ON APPROXIMATE AND MAY VARY +\-100 OR MORE DEPENDING ON PROPOSED SUB-BASE LAYERS
-CIVIL ENGINNEER TO LOCATE PIPEWORK IN RELATION TO GRID
-CIVIL TO CONFIRM EXCAVATION DEPTH REQUIRED FOR NEW PIPEWORK

Project
Southern Futures: Forestry / Timber Yards

Address
80 Brisbane Street / 79-83 Melville Street, Hobart

Client
University of Tasmania

Issuer
W–B
WOODS BAGOT

Project number
130807

Size check
25mm

Checked
Checker

Approved
Approver

Sheet size
A0

Scale
1 : 200

Sheet title
Level 2 Overall Existing Site Investigation

Sheet number
12420

Revision
A

Status

Appendix C

Bore logs

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH01

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 3.00
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
	SFA	7.3				TOPSOIL	D	S	no odour no staining	
0.2						Clayey GRAVEL fine to coarse, poorly graded, subrounded to rounded, brown- (FILL)				-0.2
0.4		8.8	BH-1/ 0.5			Clayey GRAVEL fine to coarse, poorly graded, angular to subangular, dark brown- (FILL)	D	F	no odour no staining	-0.4
0.6										-0.6
0.8										-0.8
1		5.7				Clayey GRAVEL fine to coarse, poorly graded, angular to subangular, dark brown- (FILL)	D	F	no odour no staining	-1
1.2										-1.2
1.4		8.3	BH-1/ 1.5			CLAY medium plasticity, poorly graded, grey- brown, with fine to coarse gravel (possible NATURAL - SOIL)	M	VS	no odour no staining	-1.4
1.6										-1.6
1.8										-1.8
2		5.3				Gravelly CLAY medium plasticity, dark brown, angular to subangular, fine to coarse, poorly graded gravel (possible NATURAL - SOIL)	M	F	no odour no staining	-2
2.2										-2.2
2.4										-2.4
2.6										-2.6
2.8										-2.8
3		4.7	BH-1/ 3.0			Gravelly CLAY medium plasticity, dark brown, angular to subangular, fine to coarse, poorly graded gravel (possible NATURAL - SOIL)	M	F	no odour no staining	-3
						Termination Depth at:3.00 m. Target depth achieved.				

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH02

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 3.00
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
	SFA	0.1				Sandy CLAY low to medium plasticity, poorly graded, dark brown, with fine to medium gravel (FILL)	D		no odour no staining	
0.2										-0.2
0.4		0.1	BH-2/ 0.5			Clayey SAND well graded, angular to subangular, dark brown, with fine to coarse gravel (FILL)	M	MD	no odour no staining	-0.4
0.6										-0.6
0.8										-0.8
1		0.1				Clayey SAND well graded, angular to subangular, dark brown, with fine gravel (FILL)	M	MD	no odour no staining	-1
1.2										-1.2
1.4		0.4	BH-2/ 1.5			Sandy CLAY medium to high plasticity, angular to subangular, dark brown mottled black, with brick fragments (possible FILL)	M	S	no odour no staining	-1.4
1.6										-1.6
1.8										-1.8
2		0.1				Sandy CLAY medium plasticity, angular to subangular, dark brown mottled red- black (possible FILL)	M	S	no odour no staining	-2
2.2										-2.2
2.4										-2.4
2.6										-2.6
2.8			BH-2/ 2.9			Sandy CLAY low to medium plasticity, angular to subangular, dark brown mottled red- black (possible FILL)	M	S	no odour no staining	-2.8
3		0.1				Termination Depth at:3.00 m. Target depth achieved.				-3

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH03

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 3.00
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	SFA	0.1				Sandy CLAY pale brown, with fine to coarse gravel, angular to subangular, poorly graded gravel (FILL)	D	MD	no odour no staining, Gravels decreasing with depth in size and quantity	0
0.2										-0.2
0.4		0.3	BH-3/ 0.5			Sandy CLAY dark brown white, with fine gravel, poorly graded gravel (FILL)	D	MD	no odour no staining	-0.4
0.6										-0.6
0.8										-0.8
1		0.2				Sandy CLAY medium to high plasticity, dark brown (FILL)	M	S	no odour no staining	-1
1.2										-1.2
1.4						Sandy GRAVEL fine to coarse, angular to subangular, brown (possible FILL)	D	VD	no odour no staining	-1.4
1.6										-1.6
1.8										-1.8
2		0.3	BH-3/ 2.0			Sandy GRAVEL fine to coarse, angular to subangular, brown (possible FILL)	D	VD	no odour no staining	-2
2.2										-2.2
2.4										-2.4
2.6										-2.6
2.8										-2.8
3		0.2				Gravelly CLAY low to medium plasticity, dark brown-black (possible NATURAL - SOIL)	W	S	no odour no staining	-3
						Termination Depth at:3.00 m. Target depth achieved.				

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH04

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. GeorgeP. George
Rig Type Excavator with augur attachmen
Total Depth (m) 2.50
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	SFA	5.6				GRAVEL medium to coarse, well graded, angular to subangular, white (FILL)	D	H	no odour no staining	0
0.4						Sandy CLAY dark brown white, with fine gravel, poorly graded gravel (FILL)	D	MD	no odour no staining	-0.4
0.5		8.5	BH-4/ 0.5							-0.5
0.9						Sandy CLAY dark brown, with cobbles (FILL)	D	S	no odour no staining	-0.9
1		7.8	BH-4/ 1.0							-1
1.4						CLAY dark brown (FILL)	M	F	no odour no staining	-1.4
1.5		6.7	BH-4/ 1.5							-1.5
1.9						CLAY dark brown mottled green- grey (FILL)	M	F	no odour no staining	-1.9
2		5.4								-2
2.4						CLAY dark brown mottled green- grey, with fine to medium gravel (FILL)	M	F	no odour no staining	-2.4
2.5		1.8								-2.5
2.6						Termination Depth at:2.50 m. Refusal on bedrock.				-2.6

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH05

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 1.00
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	SFA	0.1				GRAVEL poorly graded, angular, grey, with organics (FILL)	D	L	no odour no staining	0
0.05										-0.05
0.1										-0.1
0.15										-0.15
0.2										-0.2
0.25										-0.25
0.3										-0.3
0.35										-0.35
0.4						Sandy GRAVEL fine to coarse, poorly graded, angular to subangular, grey- brown (FILL)	D	L	no odour no staining	-0.4
0.45										-0.45
0.5		1	BH-5/ 0.5							-0.5
0.55										-0.55
0.6										-0.6
0.65										-0.65
0.7										-0.7
0.75										-0.75
0.8										-0.8
0.85										-0.85
0.9						Sandy GRAVEL fine to coarse, poorly graded, angular to subangular, grey- brown (FILL)	D	L	no odour no staining	-0.9
0.95										-0.95
1		0	BH-5/ 1.0							-1
						Termination Depth at:1.00 m. Target depth achieved.				

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH06

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 1.60
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	SFA					CONCRETE				0
0.4						Clayey GRAVEL fine to coarse, poorly graded, angular to subangular, dark brown (FILL)	M	VD	no odour no staining	-0.4
0.5		1.5								-0.5
0.9						CLAY red- brown, some fine to coarse gravel (possible NATURAL - SOIL)	M	F	no odour no staining	-0.9
1		4.5	BH-6.2/ 1.0							-1
1.4						Gravelly CLAY fine to coarse, poorly graded, angular, red- brown (possible NATURAL - SOIL)	M	F	no odour no staining	-1.4
1.5		0.1	BH-6.2/ 1.5							-1.5
1.6						Termination Depth at:1.60 m. Refusal on bedrock.				-1.6

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH07

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 1.30
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
	SFA	0				ASPHALT				
		0.6				Sandy GRAVEL fine to coarse, poorly graded, angular to subangular, brown (FILL)	M	VD	no odour no staining	
0.1										-0.1
0.2										-0.2
0.3										-0.3
0.4						CLAY red- brown, some fine to coarse gravel (possible NATURAL - SOIL)	M	S	no odour no staining	-0.4
0.5		0.4	BH-7/ 0.5 BH-8/ 0.5							-0.5
0.6										-0.6
0.7										-0.7
0.8										-0.8
0.9						CLAY red- brown, some fine to coarse gravel (possible NATURAL - SOIL)	M	F	no odour no staining	-0.9
1		0								-1
1.1										-1.1
1.2						CLAY red- brown, some fine to coarse gravel (NATURAL - SOIL)	M	F	no odour no staining	-1.2
1.3		0	BH-7/ 1.3			Termination Depth at:1.30 m. Refusal on bedrock.				-1.3

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH08

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 0.90
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
	SFA					ASPHALT				
0.05		0				Sandy GRAVEL fine to coarse, poorly graded, angular to subangular, grey- brown (FILL)	M	VD	no odour no staining	-0.05
0.1										-0.1
0.15										-0.15
0.2										-0.2
0.25										-0.25
0.3										-0.3
0.35										-0.35
0.4						Gravelly CLAY brown, and cobbles (NATURAL - SOIL)	M	S	no odour no staining	-0.4
0.45										-0.45
0.5		0.1								-0.5
0.55										-0.55
0.6										-0.6
0.65										-0.65
0.7										-0.7
0.75										-0.75
0.8										-0.8
0.85										-0.85
0.9		0	BH-8/ 0.9			Gravelly CLAY brown, and cobbles (NATURAL - SOIL) Termination Depth at:0.90 m. Refusal on bedrock.	M	S	no odour no staining	-0.9

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH09

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 0.90
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
	SFA	0				ASPHALT				
0.05						Sandy GRAVEL fine to coarse, poorly graded, angular to subangular, grey- brown (FILL)	M	VD	no odour no staining	-0.05
0.1										-0.1
0.15										-0.15
0.2										-0.2
0.25										-0.25
0.3										-0.3
0.35										-0.35
0.4						Gravelly CLAY fine to coarse, angular, brown (FILL)	M	L	no odour no staining	-0.4
0.45										-0.45
0.5		0.3	BH-9/ 0.5							-0.5
0.55										-0.55
0.6										-0.6
0.65										-0.65
0.7										-0.7
0.75										-0.75
0.8										-0.8
0.85										-0.85
0.9						Gravelly CLAY no plasticity, dark brown, trace brick fragments (FILL)	M	F		-0.9
						Termination Depth at 0.90 m, Refusal on bedrock				

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH10

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 0.70
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
	SFA	0				ASPHALT				
0.05						Sandy GRAVEL fine to coarse, poorly graded, angular to subangular, grey- brown (FILL)	M	VD	no odour no staining	-0.05
0.1										-0.1
0.15										-0.15
0.2										-0.2
0.25										-0.25
0.3										-0.3
0.35										-0.35
0.4						Gravelly CLAY no plasticity, dark brown, trace brick fragments (FILL)	M	F		-0.4
0.45										-0.45
0.5		0	BH-10/ 0.5							-0.5
0.55										-0.55
0.6						Gravelly CLAY no plasticity, dark brown, trace brick fragments, and cobbles (FILL)	M	F		-0.6
0.65										-0.65
0.7		0	BH-10/0.7							-0.7
						Termination Depth at:0.70 m. Refusal on bedrock.				

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH11

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 0.50
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
	SFA	6.5				ASPHALT				
0.02						Sandy GRAVEL fine to coarse, poorly graded, angular to subangular, grey (FILL)	M	VD	no odour no staining	-0.02
0.04										-0.04
0.06										-0.06
0.08										-0.08
0.1										-0.1
0.12										-0.12
0.14										-0.14
0.16										-0.16
0.18										-0.18
0.2										-0.2
0.22										-0.22
0.24										-0.24
0.26										-0.26
0.28										-0.28
0.3										-0.3
0.32										-0.32
0.34										-0.34
0.36										-0.36
0.38										-0.38
0.4						Clayey GRAVEL dark brown, with fine to coarse sand (possible NATURAL - SOIL)			no odour no staining	-0.4
0.42										-0.42
0.44										-0.44
0.46										-0.46
0.48										-0.48
0.5		5.6	BH-11/ 0.5			Termination Depth at:0.50 m. Refusal on bedrock.				-0.5
0.52										-0.52

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH12

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 0.80
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
	SFA	6.1				ASPHALT				
0.05						Clayey GRAVEL fine to coarse, poorly graded, angular to subangular, grey (FILL)	M	VD	no odour no staining	-0.05
0.1										-0.1
0.15										-0.15
0.2										-0.2
0.25										-0.25
0.3										-0.3
0.35										-0.35
0.4						Gravelly CLAY dark brown, with brick fragments (FILL)	M	ST	no odour no staining	-0.4
0.45										-0.45
0.5		6.9	BH-12/ 0.5							-0.5
0.55										-0.55
0.6										-0.6
0.65										-0.65
0.7						Gravelly CLAY dark brown mottled red (possible NATURAL - SOIL)	M	ST	no odour no staining	-0.7
0.75										-0.75
0.8		4.6	BH-12/ 0.8							-0.8
						Termination Depth at:0.80 m. Refusal on bedrock.				

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH13

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 0.60
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
	SFA	5.9				ASPHALT				
0.05						Clayey GRAVEL fine to coarse, poorly graded, angular to subangular, grey (FILL)	M	VD	no odour no staining	-0.05
0.1										-0.1
0.15										-0.15
0.2						Gravelly CLAY poorly graded, angular to subangular, red- brown, with fine to coarse sand (NATURAL - SOIL)	SM	ST	no odour no staining	-0.2
0.25										-0.25
0.3		7.1	BH-13/ 0.3							-0.3
0.35										-0.35
0.4										-0.4
0.45										-0.45
0.5						Gravelly CLAY poorly graded, angular to subangular, red- brown, with fine to coarse sand (NATURAL - SOIL)	M	ST	no odour no staining	-0.5
0.55										-0.55
0.6		6.1	BH-13/ 0.6			Termination Depth at:0.60 m. Refusal on bedrock.				-0.6

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH14

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 0.45
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
	SFA	3.9				ASPHALT				
0.02										-0.02
0.04						Clayey GRAVEL fine to coarse, poorly graded, angular to subangular, grey (FILL)	M	VD	no odour no staining	-0.04
0.06										-0.06
0.08										-0.08
0.1										-0.1
0.12										-0.12
0.14										-0.14
0.16						Gravelly CLAY angular to subangular, red- brown, with fine to coarse sand (NATURAL - SOIL)	M	ST	no odour no staining	-0.16
0.18										-0.18
0.2										-0.2
0.22										-0.22
0.24										-0.24
0.26										-0.26
0.28										-0.28
0.3										-0.3
0.32										-0.32
0.34										-0.34
0.36										-0.36
0.38										-0.38
0.4										-0.4
0.42										-0.42
0.44										-0.44
0.46						Termination Depth at:0.45 m. Refusal on bedrock.				-0.46

Notes

This log is not intended for geotechnical purposes.

Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH15

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 0.55
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
	SFA	4	BH-15/ 0.0			ASPHALT				
0.05						Clayey GRAVEL fine to coarse, poorly graded, angular to subangular, grey (FILL)	M	VD	no odour no staining	-0.05
0.1										-0.1
0.15										-0.15
0.2										-0.2
0.25										-0.25
0.3										-0.3
0.35										-0.35
0.4						Gravelly CLAY angular to subangular, red- brown, with fine to coarse sand (NATURAL - SOIL)	M	ST	no odour no staining	-0.4
0.45										-0.45
0.5		5.1	BH-15/ 0.5							-0.5
0.55						Termination Depth at:0.55 m. Refusal on bedrock.				-0.55

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH16

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 1.10
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	SFA	7.8				CONCRETE				0
0.05										-0.05
0.1										-0.1
0.15						SAND fine to medium, well graded, tan, no (FILL)	D	F	no odour no staining	-0.15
0.2										-0.2
0.25										-0.25
0.3										-0.3
0.35										-0.35
0.4						Gravelly CLAY fine to coarse, poorly graded, angular, red- brown (possible NATURAL - SOIL)	M	F	no odour no staining	-0.4
0.45										-0.45
0.5		11.1	BH-16/ 0.5							-0.5
0.55										-0.55
0.6										-0.6
0.65										-0.65
0.7										-0.7
0.75										-0.75
0.8										-0.8
0.85										-0.85
0.9						CLAY dark red- brown (NATURAL - SOIL)	M	ST	no odour no staining	-0.9
0.95										-0.95
1		9.6	BH-16/ 1.0							-1
1.05										-1.05
1.1						Termination Depth at:1.10 m. Refusal on unindentified surface.				-1.1
1.15										-1.15

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

SOIL BORE BH17

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 0.60
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0	SFA	4.8				ASPHALT				0
0.05						Clayey GRAVEL fine to coarse, poorly graded, angular to subangular, grey (FILL)	M	VD	no odour no staining	-0.05
0.1										-0.1
0.15										-0.15
0.2						Gravelly CLAY angular to subangular, brown with white- grey, with fine to coarse sand (NATURAL - SOIL)	M	ST	no odour no staining	-0.2
0.25										-0.25
0.3		6.9	BH-17/ 0.3							-0.3
0.35										-0.35
0.4										-0.4
0.45										-0.45
0.5						Gravelly CLAY angular to subangular, brown with white- grey, with fine to coarse sand (NATURAL - SOIL)	M	ST	no odour no staining	-0.5
0.55										-0.55
0.6		6.3	BH-17/ 0.6			Termination Depth at:0.60 m. Refusal on bedrock.				-0.6

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

BOREHOLE LOG

ENVIRONMENTAL-SOIL BORE

Client University of Tasmania
Project Contamination Assessment Old Forestry Building
Project No. 12574014
Site Old Forestry Building
Location 83 Melville st
Date Drilled 06/03/2022 - 06/03/2022

Drill Co. Hazel Bros Pty Ltd
Driller P. George
Rig Type Excavator with augur attachmen
Total Depth (m) 0.10
Diameter (mm) 200

Easting
Northing
Grid Ref GDA2020_MGA_zone_55
Elevation
Logged By Nicole Reineker
Checked By NKR

Depth (m)	Drilling Method	PID (ppm)	Sample ID	Water	Graphic Log	LITHOLOGICAL DESCRIPTION Soil Type (Classification Group Symbol); Particle Size; Colour; Secondary / Minor Components.	Moisture	Consistency	COMMENTS/ CONTAMINANT INDICATORS Odours, staining, waste materials,separate phase liquids, imported fill, ash.	Elevation (m)
0.00			BH-18/ 0			CONCRETE				-0.005
0.01										-0.01
0.01										-0.015
0.02										-0.02
0.02										-0.025
0.03										-0.03
0.03										-0.035
0.04										-0.04
0.04										-0.045
0.05										-0.05
0.05										-0.055
0.06										-0.06
0.06										-0.065
0.07										-0.07
0.07										-0.075
0.08										-0.08
0.08										-0.085
0.09										-0.09
0.09										-0.095
0.1		0				Clayey GRAVEL fine to coarse, poorly graded, angular to subangular, grey (FILL)	M	VD	no odour no staining	-0.1
0.10						Termination Depth at 0.10 m, grab sample of fill below				-0.105

Notes

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Drilling Abbreviations	Moisture Abbreviations	Consistency Abbreviations	
AH-Air Hammer, AR-Air Rotary, BE-Bucket Excavation, CC-Concrete Coring, DC-Diamond Core, FH-Foam Hammer, HA-Hand Auger, HE-Hand Excavation (shovel), HFA-Hollow Flight Auger, MR-Mud Rotary, NDD-Non Destructive Drilling, PT-Pushtube, SD-Sonic Drilling, SFA-Solid Flight Auger, SS-Split Spoon, WB-Wash Bore, WS-Window Sampler	D-Dry, SM-Slightly Moist, M-Moist, VM-Very Moist, W-Wet, S-Saturated	**Granular Soils** VL-Very Loose, L-Loose, MD-Medium Dense, D-Dense,VD - Very Dense	**Cohesive Soils** VS-Very Soft, S-Soft, F-Firm, ST-Stiff, VST-Very Stiff, H-Hard

Appendix D

Chemistry tables

Appendix D Table 1 RPDs

ESA Old Forestry Building

Date			7/03/2022			7/03/2022			7/03/2022			7/03/2022			16/03/2022			16/03/2022		
Field ID			BH-1/ 0.5	QA4/		BH-1/ 0.5	QA3/		BH-13/ 0.6	QA2/		BH-13/ 0.6	QA1/		GTP-1 2.00	qa5		GTP-1 2.00	QA6	
Lab Report Number			EM2203960-AA	EM2203960-AB		EM2203960-AA	EM2203960-AB		EM2203960-AA	EM2203960-AB		EM2203960-AA	EM2203960-AA		EM2205151	EM2205151		EM2205151	ES2211552	
Matrix Type			Soil	Soil	RPD	Soil	Soil	RPD	Soil	Soil	RPD	Soil	Soil	RPD	Soil	Soil	RPD	Soil	Soil	RPD
	Unit	EQL																		
Inorganics																				
Moisture (%)	%	1	7.5	6.6	13	7.5	7.4	1	11.6	18.4	**45**	11.6	21.9	**61**	10.0	7.6	27	10.0	7.8	25
Metals																				
Arsenic	mg/kg	5	<5	<5	0	<5	<5	0	<5	<5	0	<5	<5	0	<5	<5	0	<5	<5	0
Cadmium	mg/kg	1	<1	<1	0	<1	<1	0	<1	<1	0	<1	<1	0	<1	<1	0	<1	<1	0
Chromium (III+VI)	mg/kg	2	14	16	13	14	13	7	26	27	4	26	32	21	17	16	6	17	13	27
Copper	mg/kg	5	37	26	**35**	37	18	**69**	38	51	29	38	57	**40**	88	80	10	88	84	5
Lead	mg/kg	5	12	16	29	12	11	9	<5	<5	0	<5	<5	0	<5	<5	0	<5	<5	0
Mercury	mg/kg	0.1	<0.1	0.2	**67**	<0.1	0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0	<0.1	<0.1	0
Nickel	mg/kg	2	34	44	26	34	35	3	48	38	23	48	35	**31**	26	23	12	26	24	8
Zinc	mg/kg	5	48	36	29	48	30	**46**	23	14	**49**	23	19	19	26	24	8	26	29	11
BTEXN																				
Benzene	mg/kg	0.2	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.2	0
Toluene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Ethylbenzene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Xylene (o)	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Xylene (m & p)	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Xylene Total	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
BTEX (Sum of Total) - Lab Calc	mg/kg	0.2	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.2	0	<0.2	<0.2	0
Naphthalene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
TRH - NEPM 2013																				
F1 (C6-C10 minus BTEX)	mg/kg	10	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0
C6-C10 Fraction	mg/kg	10	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0
F2 (>C10-C16 minus Naphthalene)	mg/kg	50	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0
>C10-C16 Fraction	mg/kg	50	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0
F3 (>C16-C34 Fraction)	mg/kg	100	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0
F4 (>C34-C40 Fraction)	mg/kg	100	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0
>C10-C40 (Sum of Total)	mg/kg	50	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0
TRH - NEPM 1999																				
C6-C9 Fraction	mg/kg	10	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0	<10	<10	0
C10-C14 Fraction	mg/kg	50	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0
C15-C28 Fraction	mg/kg	100	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0
C29-C36 Fraction	mg/kg	100	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0	<100	<100	0
C10-C36 (Sum of Total)	mg/kg	50	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0	<50	<50	0
PAHs - standard 16																				
Acenaphthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Acenaphthylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Benz(a)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Benzo(a)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Benzo[b+j]fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Benzo(k)fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Benzo(g,h,i)perylene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Chrysene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Dibenz(a,h)anthracene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Fluoranthene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Fluorene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Indeno(1,2,3-c,d)pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Phenanthrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Pyrene	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
PAHs (Sum of total) - Lab calc	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	mg/kg	0.5	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0	<0.5	<0.5	0
Total 8 PAHs (as BaP TEQ) (half LOR) - Lab Calc	mg/kg	0.5	0.6	0.6	0	0.6	0.6	0	0.6	0.6	0	0.6	0.6	0	0.6	0.6	0	0.6	0.6	0
Total 8 PAHs (as BaP TEQ)(full LOR) - Lab Calc	mg/kg	0.5	1.2	1.2	0	1.2	1.2	0	1.2	1.2	0	1.2	1.2	0	1.2	1.2	0	1.2	1.2	0

***RPDs have only been considered where a concentration is greater than 1 times the EQL.**
****Elevated RPDs are highlighted as per QAQC Profile settings (Acceptable RPDs for each EQL multiplier range are: 30 (1 - 10 x EQL); 30 (10 - 30 x EQL); 30 (> 30 x EQL))**
*****Interlab Duplicates are matched on a per compound basis as methods vary between laboratories. Any methods in the row header relate to those used in the primary laboratory**

	Bore hole	depth	PID
Outside Melville	1	0	7.3
		0.5	8
		1	5.7
		1.5	8.3
		2	5.3
		3	4.7
Sewer forestry dome	2	0	0.1
		0.5	0.1
		1	0.1
		1.5	0.1
		2	0.1
		3	0.1
	3	0	0.1
		0.5	0.3
		1	0.2
		1.5	0.2
		2	0.3
		3	0.2
	4	0	5.6
		0.5	8.9
		1	7.8
		1.5	6.7
		2	5.4
		2.5	1.8
Loading Bay car Park	5	0	0.1
		0.5	0
		1	0
Forestry yard	6	0	no sample
		0.5	1.4
		1	4.5
		1.5	0.1
Driveway brisbane	7	0	0
		0.5	0
		1	0
		1.3	0
	8	0	0
		0.5	0.1
		0.9	0
	9	0	0
		0.5	0.3
		0.9	0.5
	10	0	0
		0.5	0
		0.7	0
car park undergrou nd	11	0	6.5
		0.5	5.6
	12	0	6.1
		0.5	6.9
		0.8	4.6
	13	0	5.9
		0.3	7.1
		0.6	6.1
	14	0	3.9
		0.5	5
	15	0	4
		0.5	5.1
	17	0	4.8
		0.3	6.9
		0.6	6.3
Lift shaft	16	0.15	7.8
		0.5	11.1
		1	9.6
Geotest pits	GTP01	0.15	1.5
		0.5	0.8
		1	0.9
		1.5	0
		2	0.2
		3	0.5
		4	0.7
		5	0.4
	GTP2	0.2	0.3
		0.5	0.3
	GTP03	0.05	0.3
		0.5	0.3
		1	0.4
		1.5	0.3
		2	0.3
	GTP04	0.1	1.1
		0.5	0.5

GHD

			Inorganics	Metals								BTEXN							
			Moisture (%)	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Naphthalene
			%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			1	5	1	2	5	5	0.1	2	5	0.2	0.5	0.5	0.5	0.5	0.5	0.2	0.5
CRC CARE 2011 Soil Direct Contact HSL-D Commercial / Industrial												430	99,000	27,000			81,000		11,000
CRC CARE 2011 Soil Direct Contact Intrusive Works												1,100	120,000	85,000			130,000		29,000
CRC CARE 2011 Soil HSL Vap.Int Intrusive Works,0 to <2m,Sand												77	999,999[#1]	999,999[#1]			999,999[#1]		999,999[#1]
CRC CARE 2011 Soil HSL Vap.Int Intrusive Works,2 to <4m,Sand												160	999,999[#1]	999,999[#1]			999,999[#1]		999,999[#1]
NEPM 2013 Table 1A(1) HIL D Comm/Ind				3,000[#2]	900	3,600[#3]	240,000	1,500[#4]	730[#5]	6,000	400,000								
NEPM 2013 Table 1A(3) HSL D Comm/Ind Soil for Vapour Intrusion, Sand												3 | 3 | 3 | 3	999,999 | 999,999 | 999,999 | 999,999[#1]	999,999 | 999,999 | 999,999 | 999,999[#1]			230 | 999,999 | 999,999 | 999,999[#1]		999,999 | 999,999 | 999,999 | 999,999[#1]
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil																			
Location Code	**Date**	**Depth**																	
BH01	7/03/2022	0.5	7.5	<5	<1	14	37	12	<0.1	34	48	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		1.5	20.6	<5	<1	10	28	64	0.2	10	30	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		3	12.7	<5	<1	12	61	32	<0.1	20	60	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1.5 - 1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2 - 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		3 - 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH02	7/03/2022	0.5	7.6	<5	<1	20	32	19	<0.1	61	72	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		1.5	23.7	<5	<1	11	33	328	1.6	11	87	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		2.9	23.3	<5	<1	17	51	912	<0.1	30	192	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1.5 - 1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2 - 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		3 - 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH03	7/03/2022	0.5	17.1	<5	<1	18	41	193	0.4	26	84	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		2	5.0	<5	<1	3	85	8	<0.1	11	45	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2 - 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		3 - 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH04	7/03/2022	0.5	8.6	<5	<1	17	76	71	0.2	39	108	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		1	10.2	<5	<1	16	71	32	<0.1	25	36	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		1.5	16.3	<5	<1	12	19	42	0.2	11	24	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1.5 - 1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2 - 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2.5 - 2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH05	7/03/2022	0.5	12.6	<5	<1	4	11	6	<0.1	6	37	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		1	11.9	<5	2	16	90	11,400	1.8	22	519	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH06	7/03/2022	1	19.9	<5	<1	13	50	20	<0.1	25	26	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		1.5	16.4	<5	<1	12	56	62	0.1	24	48	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	1 - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1.5 - 1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10/04/2022	0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH07	7/03/2022	0.5	23.6	8	<1	12	66	25	0.5	22	33	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		1.3	11.1	<5	<1	5	104	13	0.2	24	40	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		0.5	8.6	<5	<1	10	83	21	<0.1	18	66	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.05 - 0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH08	7/03/2022	0.9	10.6	<5	<1	8	71	8	<0.1	21	35	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH09	7/03/2022	0.5	10.6	<5	<1	15	56	101	0.4	31	68	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		1	8.3	<5	<1	17	40	36	0.2	41	42	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10	7/03/2022	0.5	10.7	<5	<1	9	31	92	0.2	10	72	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		0.7	7.7	<5	<1	9	26	47	0.1	16	46	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11	7/03/2022	0.5	7.6	<5	<1	22	54	48	0.4	61	72	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12	7/03/2022	0.5	18.2	<5	<1	11	68	24	0.3	27	186	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		0.8	9.2	<5	<1	18	48	12	0.2	47	71	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13	7/03/2022	0.3	19.5	<5	<1	32	57	<5	<0.1	33	18	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		0.6	11.6	<5	<1	26	38	<5	<0.1	48	23	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14	7/03/2022	0.5	5.4	<5	<1	24	28	8	<0.1	57	30	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15	7/03/2022	0	3.8	<5	<1	28	19	<5	<0.1	75	28	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		0.5	5.3	<5	<1	29	26	<5	<0.1	75	33	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH16	7/03/2022	0.5	19.3	<5	<1	22	61	34	0.3	39	44	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		1	19.2	<5	<1	18	31	43	0.3	16	82	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17	7/03/2022	0.3	10.1	<5	<1	14	59	<5	<0.1	18	19	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		0.6	12.1	<5	<1	24	60	<5	<0.1	36	27	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18	7/03/2022	0	5.1	<5	<1	32	22	<5	<0.1	86	33	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
	13/03/2022	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GeoTech 1	16/03/2022	1	14.8	<5	<1	16	7	9	<0.1	7	8	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		2	10.0	<5	<1	17	88	<5	<0.1	26	26	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		3	12.3	<5	<1	28	104	34	0.2	31	69	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		4	15.5	<5	<1	34	68	7	<0.1	32	26	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		5	20.4	<5	<1	44	49	<5	<0.1	34	16	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
GeoTech 2	17/03/2022	0.5	18.4	<5	<1	57	77	<5	<0.1	40	23	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
GeoTech 3	17/03/2022	1	12.0	<5	<1	14	361	114	2.6	14	156	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
		2	8.5	<5	<1	21	77	<5	<0.1	28	27	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
GeoTech 4	17/03/2022	0	3.7	<5	<1	23	17	<5	<0.1	62	24	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
Statistics																			
Number of Results			45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Number of Detects			45	1	1	45	45	33	20	45	45	0	0	0	0	0	0	0	0
Minimum Concentration			3.7	<5	<1	3	7	<5	0.1	6	8	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
Minimum Detect			3.7	8	2	3	7	6	0.1	6	8	ND	ND	ND	ND	ND	ND	ND	ND
Maximum Concentration			23.7	8	2	57	361	11,400	2.6	86	519	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5
Maximum Detect			23.7	8	2	57	361	11,400	2.6	86	519	ND	ND	ND	ND	ND	ND	ND	ND
Average Concentration *			13	2.6	0.53	19	59	309	0.26	32	64	0.1	0.25	0.25	0.25	0.25	0.25	0.1	0.25
Geometric Average *			11	2.6	0.52	16	47	19	0.11	26	45	0.1	0.25	0.25	0.25	0.25	0.25	0.1	0.25
Median Concentration *			11.6	2.5	0.5	17	54	20	0.05	27	40	0.1	0.25	0.25	0.25	0.25	0.25	0.1	0.25
Standard Deviation *			5.6	0.82	0.22	10	52	1,697	0.5	19	80	0	0	0	0	0	0	0	0
Geometric Standard Deviation *			1.6	1.2	1.2	1.8	2	6	3	1.9	2.1	1	1	1	1	1	1	1	1
95% UCL (Student's-t) *			14	2.828	0.589	21.12	71.69	734.1	0.384	36.58	83.69	0.1	0.25	0.25	0.25	0.25	0.25	0.1	0.25
% of Detects			100	2	2	100	100	73	44	100	100	0	0	0	0	0	0	0	0
% of Non-Detects			0	98	98	0	0	27	56	0	0	100	100	100	100	100	100	100	100

			TRH - NEPM 2013							TRH - NEPM 1999				
			F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			10	10	50	50	100	100	50	10	50	100	100	50
CRC CARE 2011 Soil Direct Contact HSL-D Commercial / Industrial			26,000		20,000		27,000	38,000						
CRC CARE 2011 Soil Direct Contact Intrusive Works			82,000		62,000		85,000	120,000						
CRC CARE 2011 Soil HSL Vap.Int Intrusive Works,0 to <2m,Sand			999,999[#1]		999,999[#1]									
CRC CARE 2011 Soil HSL Vap.Int Intrusive Works,2 to <4m,Sand			999,999[#1]		999,999[#1]									
NEPM 2013 Table 1A(1) HIL D Comm/Ind														
NEPM 2013 Table 1A(3) HSL D Comm/Ind Soil for Vapour Intrusion, Sand			260 | 370 | 630 | 999,999[#8#1]		999,999 | 999,999 | 999,999 | 999,999[#1]									
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil				700[#9]		1,000[#9]	3,500	10,000						
Location Code	**Date**	**Depth**												
BH01	7/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		1.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		3	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-
		1.5 - 1.5	-	-	-	-	-	-	-	-	-	-	-	-
		2 - 2	-	-	-	-	-	-	-	-	-	-	-	-
		3 - 3	-	-	-	-	-	-	-	-	-	-	-	-
BH02	7/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		1.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		2.9	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-
		1.5 - 1.5	-	-	-	-	-	-	-	-	-	-	-	-
		2 - 2	-	-	-	-	-	-	-	-	-	-	-	-
		3 - 3	-	-	-	-	-	-	-	-	-	-	-	-
BH03	7/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		2	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-
		2 - 2	-	-	-	-	-	-	-	-	-	-	-	-
		3 - 3	-	-	-	-	-	-	-	-	-	-	-	-
BH04	7/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		1	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		1.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-
		1.5 - 1.5	-	-	-	-	-	-	-	-	-	-	-	-
		2 - 2	-	-	-	-	-	-	-	-	-	-	-	-
		2.5 - 2.5	-	-	-	-	-	-	-	-	-	-	-	-
BH05	7/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		1	<10	<10	<50	<50	140	<100	140	<10	<50	<100	100	100
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-
BH06	7/03/2022	1	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		1.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	1 - 1	-	-	-	-	-	-	-	-	-	-	-	-
		1.5 - 1.5	-	-	-	-	-	-	-	-	-	-	-	-
	10/04/2022	0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-
BH07	7/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		1.3	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-
		0.05 - 0.05	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-
		1	-	-	-	-	-	-	-	-	-	-	-	-
		1.3	-	-	-	-	-	-	-	-	-	-	-	-
BH08	7/03/2022	0.9	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0.05	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-
		0.9	-	-	-	-	-	-	-	-	-	-	-	-
BH09	7/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		1	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-
		1	-	-	-	-	-	-	-	-	-	-	-	-
BH10	7/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		0.7	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-
		0.7	-	-	-	-	-	-	-	-	-	-	-	-
BH11	7/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-
BH12	7/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		0.8	<10	<10	<50	<50	<100	120	120	<10	<50	<100	<100	<50
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-
		0.8	-	-	-	-	-	-	-	-	-	-	-	-
BH13	7/03/2022	0.3	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		0.6	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-
		0.3	-	-	-	-	-	-	-	-	-	-	-	-
		0.6	-	-	-	-	-	-	-	-	-	-	-	-
BH14	7/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-
BH15	7/03/2022	0	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-
BH16	7/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		1	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-
		1	-	-	-	-	-	-	-	-	-	-	-	-
BH17	7/03/2022	0.3	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		0.6	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-
		0.3	-	-	-	-	-	-	-	-	-	-	-	-
		0.6	-	-	-	-	-	-	-	-	-	-	-	-
BH18	7/03/2022	0	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
	13/03/2022	0.1	-	-	-	-	-	-	-	-	-	-	-	-
GeoTech 1	16/03/2022	1	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		2	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		3	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		4	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GeoTech 2	17/03/2022	0.5	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GeoTech 3	17/03/2022	1	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
		2	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
GeoTech 4	17/03/2022	0	<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	<100	<50
Statistics														
Number of Results			45	45	45	45	45	45	45	45	45	45	45	45
Number of Detects			0	0	0	0	1	1	2	0	0	0	1	1
Minimum Concentration			<10	<10	<50	<50	<100	<100	<50	<10	<50	<100	100	<50
Minimum Detect			ND	ND	ND	ND	140	120	120	ND	ND	ND	100	100
Maximum Concentration			<10	<10	<50	<50	140	120	140	<10	<50	<100	100	100
Maximum Detect			ND	ND	ND	ND	140	120	140	ND	ND	ND	100	100
Average Concentration *			5	5	25	25	52	52	30	5	25	50	51	27
Geometric Average *			5	5	25	25	51	51	27	5	25	50	51	26
Median Concentration *			5	5	25	25	50	50	25	5	25	50	50	25
Standard Deviation *			0	0	0	0	13	10	22	0	0	0	7.5	11
Geometric Standard Deviation *			1	1	1	1	1.2	1.1	1.4	1	1	1	1.1	1.2
95% UCL (Student's-t) *			5	5	25	25	55.36	54.17	35.17	5	25	50	52.98	29.47
% of Detects			0	0	0	0	2	2	4	0	0	0	2	2
% of Non-Detects			100	100	100	100	98	98	96	100	100	100	98	98

			PAHs - standard 16																		
			Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ) (half LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(full LOR) - Lab Calc
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
CRC CARE 2011 Soil Direct Contact HSL-D Commercial / Industrial																					
CRC CARE 2011 Soil Direct Contact Intrusive Works																					
CRC CARE 2011 Soil HSL Vap.Int Intrusive Works,0 to <2m,Sand																					
CRC CARE 2011 Soil HSL Vap.Int Intrusive Works,2 to <4m,Sand																					
NEPM 2013 Table 1A(1) HIL D Comm/Ind																		4,000[#6]	40[#7]	40[#7]	40[#7]
NEPM 2013 Table 1A(3) HSL D Comm/Ind Soil for Vapour Intrusion, Sand																					
NEPM 2013 Table 1B(7) Management Limits Comm / Ind, Coarse Soil																					
Location Code	**Date**	**Depth**																			
BH01	7/03/2022	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1.5 - 1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2 - 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		3 - 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH02	7/03/2022	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		2.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1.5 - 1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2 - 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		3 - 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH03	7/03/2022	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2 - 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		3 - 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH04	7/03/2022	0.5	<0.5	<0.5	<0.5	0.7	0.6	<0.5	0.6	<0.5	0.7	<0.5	1.2	<0.5	<0.5	0.5	1.3	5.6	0.7	1.0	1.3
		1	<0.5	<0.5	0.6	1.5	1.1	0.8	1.1	0.5	1.3	<0.5	2.5	<0.5	<0.5	1.7	2.6	13.7	1.4	1.7	2.0
		1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1.5 - 1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2 - 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		2.5 - 2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH05	7/03/2022	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1 - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH06	7/03/2022	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		1.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	1 - 1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1.5 - 1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	10/04/2022	0.5 - 0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH07	7/03/2022	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		1.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	1.0	<0.5	<0.5	<0.5	1.1	3.1	<0.5	0.6	1.2
	13/03/2022	0 - 0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.05 - 0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH08	7/03/2022	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH09	7/03/2022	0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.0	0.5	0.8	1.2
		1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH10	7/03/2022	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH11	7/03/2022	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH12	7/03/2022	0.5	<0.5	<0.5	<0.5	0.8	1.2	0.6	0.9	0.9	0.8	<0.5	0.9	<0.5	0.6	<0.5	1.1	7.8	1.5	1.8	2.0
		0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH13	7/03/2022	0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH14	7/03/2022	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH15	7/03/2022	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH16	7/03/2022	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH17	7/03/2022	0.3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BH18	7/03/2022	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	13/03/2022	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GeoTech 1	16/03/2022	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		3	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
GeoTech 2	17/03/2022	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
GeoTech 3	17/03/2022	1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
		2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
GeoTech 4	17/03/2022	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
Statistics																					
Number of Results			45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Number of Detects			0	0	1	4	4	2	3	3	4	0	4	0	1	2	4	5	4	45	45
Minimum Concentration			<0.5	<0.5	<0.5	0.5	0.5	<0.5	<0.5	0.5	0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	0.5	0.6	1.2
Minimum Detect			ND	ND	0.6	0.5	0.5	0.6	0.6	0.5	0.5	ND	0.9	ND	0.6	0.5	1.1	1	0.5	0.6	1.2
Maximum Concentration			<0.5	<0.5	0.6	1.5	1.2	0.8	1.1	0.9	1.3	<0.5	2.5	<0.5	0.6	1.7	2.6	13.7	1.5	1.8	2
Maximum Detect			ND	ND	0.6	1.5	1.2	0.8	1.1	0.9	1.3	ND	2.5	ND	0.6	1.7	2.6	13.7	1.5	1.8	2
Average Concentration *			0.25	0.25	0.26	0.31	0.3	0.27	0.29	0.28	0.3	0.25	0.35	0.25	0.26	0.29	0.36	0.92	0.32	0.66	1.2
Geometric Average *			0.25	0.25	0.25	0.28	0.28	0.26	0.27	0.27	0.28	0.25	0.29	0.25	0.25	0.26	0.29	0.34	0.28	0.64	1.2
Median Concentration *			0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.6	1.2
Standard Deviation *			0	0	0.052	0.21	0.2	0.096	0.16	0.11	0.19	0	0.38	0	0.052	0.22	0.41	2.4	0.26	0.25	0.17
Geometric Standard Deviation *			1	1	1.1	1.4	1.4	1.2	1.4	1.3	1.4	1	1.6	1	1.1	1.4	1.7	2.6	1.5	1.3	1.1
95% UCL (Student's-t) *			0.25	0.25	0.271	0.359	0.352	0.294	0.332	0.303	0.348	0.25	0.448	0.25	0.271	0.343	0.467	1.519	0.384	0.726	1.28
% of Detects			0	0	2	9	9	4	7	7	9	0	9	0	2	4	9	11	9	100	100
% of Non-Detects			100	100	98	91	91	96	93	93	91	100	91	100	98	96	91	89	91	0	0

* A Non Detect Multiplier of 0.5 has been applied.

Comments

#1 Not limiting: Derived soil HSL exceeds soil saturation concentration

#2 Arsenic: HIL assumes 70% oral bioavailability. Site-specific bioavailability maybe important and should be considered where appropriate (refer Schedule B7).

#3 In the absence of a guideline value for total chromium, chromium VI value adopted

#4 Lead: HILs A,B,C based on blood lead models (IEUBK & HIL D on adult lead model for where 50% bioavailability considered. Site-specific bioavailability should be considered where appropriate.

#5 Elemental mercury: HIL does not address elemental mercury. a site specific assessment should be considered if elemental mercury is present, or suspected to be present.

#6 Total PAHs: Based on sum of 16 most common reported (WHO 98). HIL application should consider presence of carcinogenic PAHs (should meet BaP TEQ HIL) & naphthalene (should meet relevant HSL)

#7 Carcinogenic PAHs: HIL based on 8 carc. PAHs & their TEFs (rel to BaP ref Schedule 7) BaP TEQ calc by multiplying the conc of each carc. PAH in sample by its BaP TEF (ref Table 1A(1)) & summing

#8 To obtain F1 subtract the sum of BTEX concentrations from the C6 - C10 fraction.

#9 Separate management limits for BTEX & naphthalene are not available hence should not be subtracted from the relevant fractions to obtain F1 & F2

			Inorganics	Metals							BTEXN								TRH - NEPM 2013							
			Moisture (%)	Arsenic	Cadmium	Chromium (III+VI)	Copper	Lead	Mercury	Nickel	Zinc	Benzene	Toluene	Ethylbenzene	Xylene (o)	Xylene (m & p)	Xylene Total	BTEX (Sum of Total) - Lab Calc	Naphthalene	F1 (C6-C10 minus BTEX)	C6-C10 Fraction	F2 (>C10-C16 minus Naphthalene)	>C10-C16 Fraction	F3 (>C16-C34 Fraction)	F4 (>C34-C40 Fraction)	>C10-C40 (Sum of Total)	C6-C9 Fraction
			%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			1	5	1	2	5	5	0.1	2	5	0.2	0.5	0.5	0.5	0.5	0.5	0.2	0.5	10	10	50	50	100	100	50	10
TAS EPA WCG - Max. Conc. Contaminated Soil - Level 3				750	400	5,000	7,500	3,000	110	3,000	50,000	50	1,000	1,080			1,800										1,000
TAS EPA WCG - Max. Conc. Fill Material - Level 1				20	3	50	100	300	1	60	200	1	1	3			14										65
TAS EPA WCG - Max. Conc. Low Lev. Contam - Level 2				200	40	500	2,000	1,200	30	600	14,000	5	100	100			180										650
Location Code	**Field ID**	**Depth**																									
BH01	BH-1/ 0.5	0.5	7.5	<5	<1	14	37	12	<0.1	34	48	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-1/ 1.5	1.5	20.6	<5	<1	10	28	64	0.2	10	30	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-1/ 3.0	3	12.7	<5	<1	12	61	32	<0.1	20	60	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH02	BH-2/ 0.5	0.5	7.6	<5	<1	20	32	19	<0.1	61	72	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-2/ 1.5	1.5	23.7	<5	<1	11	33	328	1.6	11	87	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-2/ 2.9	2.9	23.3	<5	<1	17	51	912	<0.1	30	192	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH03	BH-3/ 0.5	0.5	17.1	<5	<1	18	41	193	0.4	26	84	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-3/ 2.0	2	5.0	<5	<1	3	85	8	<0.1	11	45	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH04	BH-4/ 0.5	0.5	8.6	<5	<1	17	76	71	0.2	39	108	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-4/ 1.0	1	10.2	<5	<1	16	71	32	<0.1	25	36	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-4/ 1.5	1.5	16.3	<5	<1	12	19	42	0.2	11	24	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH05	BH-5/ 0.5	0.5	12.6	<5	<1	4	11	6	<0.1	6	37	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-5/ 1.0	1	11.9	<5	2	16	90	11,400	1.8	22	519	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	140	<100	140	<10
BH06	BH-6.2/ 1.0	1	19.9	<5	<1	13	50	20	<0.1	25	26	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-6.2/ 1.5	1.5	16.4	<5	<1	12	56	62	0.1	24	48	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH07	BH-7/ 0.5	0.5	23.6	8	<1	12	66	25	0.5	22	33	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-7/ 1.3	1.3	11.1	<5	<1	5	104	13	0.2	24	40	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-8/ 0.5	0.5	8.6	<5	<1	10	83	21	<0.1	18	66	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH08	BH-8/ 0.9	0.9	10.6	<5	<1	8	71	8	<0.1	21	35	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH09	BH-9/ 0.5	0.5	10.6	<5	<1	15	56	101	0.4	31	68	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-9/ 1.0	1	8.3	<5	<1	17	40	36	0.2	41	42	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH10	BH-10/ 0.5	0.5	10.7	<5	<1	9	31	92	0.2	10	72	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-10/0.7	0.7	7.7	<5	<1	9	26	47	0.1	16	46	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH11	BH-11/ 0.5	0.5	7.6	<5	<1	22	54	48	0.4	61	72	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH12	BH-12/ 0.5	0.5	18.2	<5	<1	11	68	24	0.3	27	186	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-12/ 0.8	0.8	9.2	<5	<1	18	48	12	0.2	47	71	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	120	120	<10
BH13	BH-13/ 0.3	0.3	19.5	<5	<1	32	57	<5	<0.1	33	18	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-13/ 0.6	0.6	11.6	<5	<1	26	38	<5	<0.1	48	23	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH14	BH-14/ 0.5	0.5	5.4	<5	<1	24	28	8	<0.1	57	30	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH15	BH-15/ 0.0	0	3.8	<5	<1	28	19	<5	<0.1	75	28	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-15/ 0.5	0.5	5.3	<5	<1	29	26	<5	<0.1	75	33	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH16	BH-16/ 0.5	0.5	19.3	<5	<1	22	61	34	0.3	39	44	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-16/ 1.0	1	19.2	<5	<1	18	31	43	0.3	16	82	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH17	BH-17/ 0.3	0.3	10.1	<5	<1	14	59	<5	<0.1	18	19	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	BH-17/ 0.6	0.6	12.1	<5	<1	24	60	<5	<0.1	36	27	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
BH18	BH-18/ 0	0	5.1	<5	<1	32	22	<5	<0.1	86	33	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
GeoTech 1	GTP-1_1.00	1	14.8	<5	<1	16	7	9	<0.1	7	8	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	GTP-1_2.00	2	10.0	<5	<1	17	88	<5	<0.1	26	26	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	GTP-1_3.00	3	12.3	<5	<1	28	104	34	0.2	31	69	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	GTP-1_4.00	4	15.5	<5	<1	34	68	7	<0.1	32	26	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	GTP-1_5.00	5	20.4	<5	<1	44	49	<5	<0.1	34	16	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
GeoTech 2	GTP-2_0.50	0.5	18.4	<5	<1	57	77	<5	<0.1	40	23	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
GeoTech 3	GTP-03_1.00	1	12.0	<5	<1	14	361	114	2.6	14	156	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
	GTP-03_2.00	2	8.5	<5	<1	21	77	<5	<0.1	28	27	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
GeoTech 4	GTP-4_0.00	0	3.7	<5	<1	23	17	<5	<0.1	62	24	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
Statistics																											
Number of Results			45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Number of Detects			45	1	1	45	45	33	20	45	45	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0
Minimum Concentration			3.7	<5	<1	3	7	<5	0.1	6	8	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	<100	<100	<50	<10
Minimum Detect			3.7	8	2	3	7	6	0.1	6	8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	140	120	120	ND
Maximum Concentration			23.7	8	2	57	361	11,400	2.6	86	519	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.5	<10	<10	<50	<50	140	120	140	<10
Maximum Detect			23.7	8	2	57	361	11,400	2.6	86	519	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	140	120	140	ND
Average Concentration *			13	2.6	0.53	19	59	309	0.26	32	64	0.1	0.25	0.25	0.25	0.25	0.25	0.1	0.25	5	5	25	25	52	52	30	5
Geometric Average *			11	2.6	0.52	16	47	19	0.11	26	45	0.1	0.25	0.25	0.25	0.25	0.25	0.1	0.25	5	5	25	25	51	51	27	5
Median Concentration *			11.6	2.5	0.5	17	54	20	0.05	27	40	0.1	0.25	0.25	0.25	0.25	0.25	0.1	0.25	5	5	25	25	50	50	25	5
Standard Deviation *			5.6	0.82	0.22	10	52	1,697	0.5	19	80	0	0	0	0	0	0	0	0	0	0	0	0	13	10	22	0
Geometric Standard Deviation *			1.6	1.2	1.2	1.8	2	6	3	1.9	2.1	1	1	1	1	1	1	1	1	1	1	1	1	1.2	1.1	1.4	1
95% UCL (Student's-t) *			14	2.828	0.589	21.12	71.69	734.1	0.384	36.58	83.69	0.1	0.25	0.25	0.25	0.25	0.25	0.1	0.25	5	5	25	25	55.36	54.17	35.17	5
% of Detects			100	2	2	100	100	73	44	100	100	0	0	0	0	0	0	0	0	0	0	0	0	2	2	4	0
% of Non-Detects			0	98	98	0	0	27	56	0	0	100	100	100	100	100	100	100	100	100	100	100	100	98	98	96	100

* A Non Detect Multiplier of 0.5 has been applied.

			Inorganics	TRH - NEPM 1999					PAHs - standard 16																		
			Moisture (%)	Arsenic	C10-C14 Fraction	C15-C28 Fraction	C29-C36 Fraction	C10-C36 (Sum of Total)	Acenaphthene	Acenaphthylene	Anthracene	Benz(a)anthracene	Benzo(a)pyrene	Benzo[b+j]fluoranthene	Benzo(k)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-c,d)pyrene	Phenanthrene	Pyrene	PAHs (Sum of total) - Lab calc	Total 8 PAHs (as BaP TEQ)(zero LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ) (half LOR) - Lab Calc	Total 8 PAHs (as BaP TEQ)(full LOR) - Lab Calc
			%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
EQL			1	5	50	100	100	50	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
TAS EPA WCG - Max. Conc. Contaminated Soil - Level 3				750				10,000					20											200			
TAS EPA WCG - Max. Conc. Fill Material - Level 1				20				1,000					0.08											20			
TAS EPA WCG - Max. Conc. Low Lev. Contam - Level 2				200				5,000					2											40			
Location Code	**Field ID**	**Depth**																										
BH01	BH-1/ 0.5	0.5	7.5	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-1/ 1.5	1.5	20.6	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-1/ 3.0	3	12.7	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH02	BH-2/ 0.5	0.5	7.6	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-2/ 1.5	1.5	23.7	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-2/ 2.9	2.9	23.3	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH03	BH-3/ 0.5	0.5	17.1	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-3/ 2.0	2	5.0	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH04	BH-4/ 0.5	0.5	8.6	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	0.7	0.6	<0.5	0.6	<0.5	0.7	<0.5	1.2	<0.5	<0.5	0.5	1.3	5.6	0.7	1.0	1.3
	BH-4/ 1.0	1	10.2	<5	<50	<100	<100	<50	<0.5	<0.5	0.6	1.5	1.1	0.8	1.1	0.5	1.3	<0.5	2.5	<0.5	<0.5	1.7	2.6	13.7	1.4	1.7	2.0
	BH-4/ 1.5	1.5	16.3	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH05	BH-5/ 0.5	0.5	12.6	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-5/ 1.0	1	11.9	<5	<50	<100	100	100	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH06	BH-6.2/ 1.0	1	19.9	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-6.2/ 1.5	1.5	16.4	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH07	BH-7/ 0.5	0.5	23.6	8	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-7/ 1.3	1.3	11.1	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-8/ 0.5	0.5	8.6	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	1.0	<0.5	<0.5	<0.5	1.1	3.1	<0.5	0.6	1.2
BH08	BH-8/ 0.9	0.9	10.6	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH09	BH-9/ 0.5	0.5	10.6	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.0	0.5	0.8	1.2
	BH-9/ 1.0	1	8.3	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH10	BH-10/ 0.5	0.5	10.7	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-10/0.7	0.7	7.7	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH11	BH-11/ 0.5	0.5	7.6	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH12	BH-12/ 0.5	0.5	18.2	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	0.8	1.2	0.6	0.9	0.9	0.8	<0.5	0.9	<0.5	0.6	<0.5	1.1	7.8	1.5	1.8	2.0
	BH-12/ 0.8	0.8	9.2	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH13	BH-13/ 0.3	0.3	19.5	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-13/ 0.6	0.6	11.6	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH14	BH-14/ 0.5	0.5	5.4	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH15	BH-15/ 0.0	0	3.8	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-15/ 0.5	0.5	5.3	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH16	BH-16/ 0.5	0.5	19.3	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-16/ 1.0	1	19.2	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH17	BH-17/ 0.3	0.3	10.1	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	BH-17/ 0.6	0.6	12.1	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
BH18	BH-18/ 0	0	5.1	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
GeoTech 1	GTP-1_1.00	1	14.8	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	GTP-1_2.00	2	10.0	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	GTP-1_3.00	3	12.3	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	GTP-1_4.00	4	15.5	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	GTP-1_5.00	5	20.4	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
GeoTech 2	GTP-2_0.50	0.5	18.4	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
GeoTech 3	GTP-03_1.00	1	12.0	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
	GTP-03_2.00	2	8.5	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
GeoTech 4	GTP-4_0.00	0	3.7	<5	<50	<100	<100	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.2
Statistics																											
Number of Results			45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Number of Detects			45	1	0	0	1	1	0	0	1	4	4	2	3	3	4	0	4	0	1	2	4	5	4	45	45
Minimum Concentration			3.7	<5	<50	<100	100	<50	<0.5	<0.5	<0.5	0.5	0.5	<0.5	<0.5	0.5	0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	0.5	0.6	1.2
Minimum Detect			3.7	8	ND	ND	100	100	ND	ND	0.6	0.5	0.5	0.6	0.6	0.5	0.5	ND	0.9	ND	0.6	0.5	1.1	1	0.5	0.6	1.2
Maximum Concentration			23.7	8	<50	<100	100	100	<0.5	<0.5	0.6	1.5	1.2	0.8	1.1	0.9	1.3	<0.5	2.5	<0.5	0.6	1.7	2.6	13.7	1.5	1.8	2
Maximum Detect			23.7	8	ND	ND	100	100	ND	ND	0.6	1.5	1.2	0.8	1.1	0.9	1.3	ND	2.5	ND	0.6	1.7	2.6	13.7	1.5	1.8	2
Average Concentration *			13	2.6	25	50	51	27	0.25	0.25	0.26	0.31	0.3	0.27	0.29	0.28	0.3	0.25	0.35	0.25	0.26	0.29	0.36	0.92	0.32	0.66	1.2
Geometric Average *			11	2.6	25	50	51	26	0.25	0.25	0.25	0.28	0.28	0.26	0.27	0.27	0.28	0.25	0.29	0.25	0.25	0.26	0.29	0.34	0.28	0.64	1.2
Median Concentration *			11.6	2.5	25	50	50	25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.6	1.2
Standard Deviation *			5.6	0.82	0	0	7.5	11	0	0	0.052	0.21	0.2	0.096	0.16	0.11	0.19	0	0.38	0	0.052	0.22	0.41	2.4	0.26	0.25	0.17
Geometric Standard Deviation *			1.6	1.2	1	1	1.1	1.2	1	1	1.1	1.4	1.4	1.2	1.4	1.3	1.4	1	1.6	1	1.1	1.4	1.7	2.6	1.5	1.3	1.1
95% UCL (Student's-t) *			14	2.828	25	50	52.98	29.47	0.25	0.25	0.271	0.359	0.352	0.294	0.332	0.303	0.348	0.25	0.448	0.25	0.271	0.343	0.467	1.519	0.384	0.726	1.28
% of Detects			100	2	0	0	2	2	0	0	2	9	9	4	7	7	9	0	9	0	2	4	9	11	9	100	100
% of Non-Detects			0	98	100	100	98	98	100	100	98	91	91	96	93	93	91	100	91	100	98	96	91	89	91	0	0

* A Non Detect Multiplier of 0.5 has been applied.

Appendix E

Laboratory documentation

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2203960-AA**	Page	: 1 of 30
Amendment	: **1**		
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS NICOLE REINEKER	Contact	: Shirley LeCornu
Address	: 2 SALAMANCA SQUARE HOBART TAS, AUSTRALIA 7000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9630
Project	: 12574014	Date Samples Received	: 08-Mar-2022 10:45
Order number	: 12574014	Date Analysis Commenced	: 09-Mar-2022
C-O-C number	: 34736	Issue Date	: 07-Apr-2022 12:05
Sampler	: NICOLE REINEKER		
Site	: old forestry building		
Quote number	: ME/589/21 v2		
No. of samples received	: 38		
No. of samples analysed	: 38		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Andrew Lu	VOC Section Supervisor	Melbourne Inorganics, Springvale, VIC
Andrew Lu	VOC Section Supervisor	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EG005-T : EM2203960 #39 Poor duplicate precision for total Lead due to sample matrix. Confirmed by re-digestion and re-analysis.
- Amendment (07/04/2022):This report has been amended following the Nicole Reineker request to split report for sample 65 &66. All analysis results are as per the previous report.
- EG035T: EM2203960 #40 Poor matrix spike recovery for total mercury due to sample matrix. Confirmed by re-extraction and re-analysis.

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)			Sample ID	BH-2/ 0.5	----	----	----	----
			Sampling date / time	07-Mar-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit	EM2203960-008	--------	--------	--------	--------
				Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**7.6**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg	**20**	----	----	----	----
Copper	7440-50-8	5	mg/kg	**32**	----	----	----	----
Lead	7439-92-1	5	mg/kg	**19**	----	----	----	----
Nickel	7440-02-0	2	mg/kg	**61**	----	----	----	----
Zinc	7440-66-6	5	mg/kg	**72**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	BH-2/ 0.5	----	----	----	----
				Sampling date / time	07-Mar-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2203960-008	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**99.6**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**94.3**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**85.7**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**97.7**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**107**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**102**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**101**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**109**	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	BH-2/ 0.5	----	----	----	----
				Sampling date / time	07-Mar-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2203960-008	--------	--------	--------	--------
					Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**114**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH-1/ 0.5	BH-1/ 1.5	BH-1/ 3.0	BH-2/ 1.5	BH-2/ 2.9
			Sampling date / time	07-Mar-2022 10:07	07-Mar-2022 10:08	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit	EM2203960-002	EM2203960-004	EM2203960-006	EM2203960-010	EM2203960-012
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	7.5	20.6	12.7	23.7	23.3
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	14	10	12	11	17
Copper	7440-50-8	5	mg/kg	37	28	61	33	51
Lead	7439-92-1	5	mg/kg	12	64	32	328	912
Nickel	7440-02-0	2	mg/kg	34	10	20	11	30
Zinc	7440-66-6	5	mg/kg	48	30	60	87	192
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	0.2	<0.1	1.6	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-1/ 0.5	BH-1/ 1.5	BH-1/ 3.0	BH-2/ 1.5	BH-2/ 2.9
				Sampling date / time	07-Mar-2022 10:07	07-Mar-2022 10:08	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-002	EM2203960-004	EM2203960-006	EM2203960-010	EM2203960-012
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**102**	**100**	**96.5**	**98.0**	**98.2**
2-Chlorophenol-D4	93951-73-6	0.5	%		**96.8**	**95.5**	**91.7**	**93.9**	**93.6**
2.4.6-Tribromophenol	118-79-6	0.5	%		**92.0**	**87.8**	**85.4**	**84.9**	**85.4**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**99.4**	**97.5**	**94.7**	**96.5**	**97.2**
Anthracene-d10	1719-06-8	0.5	%		**109**	**107**	**104**	**106**	**107**
4-Terphenyl-d14	1718-51-0	0.5	%		**104**	**102**	**99.6**	**101**	**102**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**106**	**94.6**	**92.3**	**74.0**	**88.4**
Toluene-D8	2037-26-5	0.2	%		**112**	**101**	**104**	**73.6**	**95.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-1/ 0.5	BH-1/ 1.5	BH-1/ 3.0	BH-2/ 1.5	BH-2/ 2.9
				Sampling date / time	07-Mar-2022 10:07	07-Mar-2022 10:08	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-002	EM2203960-004	EM2203960-006	EM2203960-010	EM2203960-012
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**121**	**106**	**109**	**77.8**	**108**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH-3/ 0.5	BH-3/ 2.0	BH-4/ 0.5	BH-4/ 1.0	BH-4/ 1.5
			Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit	EM2203960-014	EM2203960-016	EM2203960-019	EM2203960-020	EM2203960-021
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	17.1	5.0	8.6	10.2	16.3
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	18	3	17	16	12
Copper	7440-50-8	5	mg/kg	41	85	76	71	19
Lead	7439-92-1	5	mg/kg	193	8	71	32	42
Nickel	7440-02-0	2	mg/kg	26	11	39	25	11
Zinc	7440-66-6	5	mg/kg	84	45	108	36	24
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.4	<0.1	0.2	<0.1	0.2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.5	1.7	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	0.6	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	1.2	2.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	1.3	2.6	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.7	1.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.7	1.3	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	0.8	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.6	1.1	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.6	1.1	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	5.6	13.7	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.7	1.4	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	1.0	1.7	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.3	2.0	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-3/ 0.5	BH-3/ 2.0	BH-4/ 0.5	BH-4/ 1.0	BH-4/ 1.5
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-014	EM2203960-016	EM2203960-019	EM2203960-020	EM2203960-021
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**97.6**	**96.5**	**96.4**	**97.7**	**96.6**
2-Chlorophenol-D4	93951-73-6	0.5	%		**93.0**	**91.7**	**91.6**	**93.5**	**92.2**
2.4.6-Tribromophenol	118-79-6	0.5	%		**86.2**	**83.2**	**84.1**	**87.8**	**85.3**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**96.9**	**95.8**	**95.9**	**97.1**	**95.3**
Anthracene-d10	1719-06-8	0.5	%		**106**	**105**	**105**	**106**	**105**
4-Terphenyl-d14	1718-51-0	0.5	%		**101**	**101**	**100**	**102**	**100**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**76.9**	**105**	**82.2**	**75.6**	**72.1**
Toluene-D8	2037-26-5	0.2	%		**79.9**	**106**	**90.2**	**85.3**	**78.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-3/ 0.5	BH-3/ 2.0	BH-4/ 0.5	BH-4/ 1.0	BH-4/ 1.5
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-014	EM2203960-016	EM2203960-019	EM2203960-020	EM2203960-021
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**95.5**	**119**	**104**	**90.8**	**85.7**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH-5/ 0.5	BH-5/ 1.0	BH-6.2/ 1.0	BH-6.2/ 1.5	BH-7/ 0.5
			Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit	EM2203960-025	EM2203960-026	EM2203960-029	EM2203960-030	EM2203960-032
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	12.6	11.9	19.9	16.4	23.6
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	8
Cadmium	7440-43-9	1	mg/kg	<1	2	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	4	16	13	12	12
Copper	7440-50-8	5	mg/kg	11	90	50	56	66
Lead	7439-92-1	5	mg/kg	6	11400	20	62	25
Nickel	7440-02-0	2	mg/kg	6	22	25	24	22
Zinc	7440-66-6	5	mg/kg	37	519	26	48	33
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	1.8	<0.1	0.1	0.5
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-5/ 0.5	BH-5/ 1.0	BH-6.2/ 1.0	BH-6.2/ 1.5	BH-7/ 0.5
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-025	EM2203960-026	EM2203960-029	EM2203960-030	EM2203960-032
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	**100**	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	**100**	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	**140**	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	**140**	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		----	**84.9**	**98.3**	**95.8**	**95.7**
2-Chlorophenol-D4	93951-73-6	0.5	%		----	**78.7**	**94.5**	**91.5**	**91.7**
2.4.6-Tribromophenol	118-79-6	0.5	%		----	**65.9**	**87.0**	**84.3**	**83.9**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**97.3**	**96.3**	**97.0**	**94.8**	**95.3**
Anthracene-d10	1719-06-8	0.5	%		**102**	**102**	**107**	**104**	**106**
4-Terphenyl-d14	1718-51-0	0.5	%		**101**	**98.7**	**102**	**99.6**	**101**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**86.9**	**70.5**	**74.7**	**76.7**	**70.4**
Toluene-D8	2037-26-5	0.2	%		**78.9**	**72.3**	**78.4**	**84.1**	**73.3**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-5/ 0.5	BH-5/ 1.0	BH-6.2/ 1.0	BH-6.2/ 1.5	BH-7/ 0.5
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-025	EM2203960-026	EM2203960-029	EM2203960-030	EM2203960-032
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**71.6**	**77.5**	**81.9**	**89.5**	**86.4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH-7/ 1.3	BH-8/ 0.5	BH-8/ 0.9	BH-18/0	BH-9/ 0.5
			Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit	EM2203960-034	EM2203960-036	EM2203960-037	EM2203960-038	EM2203960-039
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	11.1	8.6	10.6	5.1	10.6
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	5	10	8	32	15
Copper	7440-50-8	5	mg/kg	104	83	71	22	56
Lead	7439-92-1	5	mg/kg	13	21	8	<5	101
Nickel	7440-02-0	2	mg/kg	24	18	21	86	31
Zinc	7440-66-6	5	mg/kg	40	66	35	33	68
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.2	<0.1	<0.1	<0.1	0.4
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	1.0	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	1.1	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	3.1	<0.5	<0.5	1.0
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.8
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-7/ 1.3	BH-8/ 0.5	BH-8/ 0.9	BH-18/0	BH-9/ 0.5
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-034	EM2203960-036	EM2203960-037	EM2203960-038	EM2203960-039
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**94.7**	**94.5**	**95.1**	**96.6**	**80.8**
2-Chlorophenol-D4	93951-73-6	0.5	%		**90.5**	**90.2**	**91.3**	**92.4**	**80.0**
2.4.6-Tribromophenol	118-79-6	0.5	%		**81.8**	**84.6**	**83.4**	**85.5**	**57.7**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**93.9**	**94.7**	**94.1**	**97.0**	**87.0**
Anthracene-d10	1719-06-8	0.5	%		**103**	**104**	**105**	**107**	**102**
4-Terphenyl-d14	1718-51-0	0.5	%		**98.4**	**98.7**	**99.7**	**102**	**93.8**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**81.1**	**74.3**	**73.5**	**78.3**	**91.5**
Toluene-D8	2037-26-5	0.2	%		**85.4**	**80.5**	**77.4**	**83.1**	**104**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-7/ 1.3	BH-8/ 0.5	BH-8/ 0.9	BH-18/0	BH-9/ 0.5
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-034	EM2203960-036	EM2203960-037	EM2203960-038	EM2203960-039
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**92.9**	**87.5**	**83.4**	**89.4**	**112**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH-9/ 1.0	BH-10/ 0.5	BH-11/ 0.5	BH-12/ 0.5	BH-12/ 0.8
			Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit	EM2203960-040	EM2203960-042	EM2203960-044	EM2203960-046	EM2203960-047
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	8.3	10.7	7.6	18.2	9.2
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	17	9	22	11	18
Copper	7440-50-8	5	mg/kg	40	31	54	68	48
Lead	7439-92-1	5	mg/kg	36	92	48	24	12
Nickel	7440-02-0	2	mg/kg	41	10	61	27	47
Zinc	7440-66-6	5	mg/kg	42	72	72	186	71
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.2	0.2	0.4	0.3	0.2
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	0.9	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	1.1	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	0.8	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	0.8	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	0.6	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	0.9	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	1.2	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	0.6	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	0.9	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	7.8	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	1.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	1.8	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	2.0	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-9/ 1.0	BH-10/ 0.5	BH-11/ 0.5	BH-12/ 0.5	BH-12/ 0.8
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-040	EM2203960-042	EM2203960-044	EM2203960-046	EM2203960-047
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	120
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	120
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		78.8	81.3	82.7	77.2	79.6
2-Chlorophenol-D4	93951-73-6	0.5	%		78.4	81.2	82.4	77.2	78.8
2.4.6-Tribromophenol	118-79-6	0.5	%		53.4	63.2	61.8	58.6	66.9
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		85.6	88.9	90.3	84.9	87.6
Anthracene-d10	1719-06-8	0.5	%		97.1	106	106	98.8	99.7
4-Terphenyl-d14	1718-51-0	0.5	%		90.4	97.0	96.6	88.7	91.5
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		87.4	95.8	76.8	86.0	85.3
Toluene-D8	2037-26-5	0.2	%		93.7	105	86.6	95.5	97.0

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-9/ 1.0	BH-10/ 0.5	BH-11/ 0.5	BH-12/ 0.5	BH-12/ 0.8
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-040	EM2203960-042	EM2203960-044	EM2203960-046	EM2203960-047
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**104**	**113**	**89.6**	**103**	**103**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH-13/ 0.3	BH-13/ 0.6	BH-14/ 0.5	BH-15/ 0.0	BH-15/ 0.5
			Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit	EM2203960-049	EM2203960-050	EM2203960-051	EM2203960-052	EM2203960-053
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**19.5**	**11.6**	**5.4**	**3.8**	**5.3**
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	**32**	**26**	**24**	**28**	**29**
Copper	7440-50-8	5	mg/kg	**57**	**38**	**28**	**19**	**26**
Lead	7439-92-1	5	mg/kg	<5	<5	**8**	<5	<5
Nickel	7440-02-0	2	mg/kg	**33**	**48**	**57**	**75**	**75**
Zinc	7440-66-6	5	mg/kg	**18**	**23**	**30**	**28**	**33**
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-13/ 0.3	BH-13/ 0.6	BH-14/ 0.5	BH-15/ 0.0	BH-15/ 0.5
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-049	EM2203960-050	EM2203960-051	EM2203960-052	EM2203960-053
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**98.7**	**96.3**	**94.3**	**95.1**	**95.7**
2-Chlorophenol-D4	93951-73-6	0.5	%		**94.8**	**92.7**	**90.4**	**91.9**	**92.2**
2.4.6-Tribromophenol	118-79-6	0.5	%		**84.2**	**82.4**	**81.5**	**82.6**	**80.9**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**97.2**	**95.7**	**94.9**	**94.6**	**95.6**
Anthracene-d10	1719-06-8	0.5	%		**107**	**106**	**104**	**105**	**105**
4-Terphenyl-d14	1718-51-0	0.5	%		**103**	**101**	**97.9**	**100**	**100.0**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**69.4**	**86.3**	**80.0**	**90.5**	**89.9**
Toluene-D8	2037-26-5	0.2	%		**79.0**	**95.0**	**91.8**	**99.3**	**97.0**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-13/ 0.3	BH-13/ 0.6	BH-14/ 0.5	BH-15/ 0.0	BH-15/ 0.5
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-049	EM2203960-050	EM2203960-051	EM2203960-052	EM2203960-053
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**86.0**	**107**	**99.6**	**107**	**105**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	BH-16/ 0.5	BH-16/ 1.0	BH-17/ 0.3	BH-17/ 0.6	BH10/0.7
			Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit	EM2203960-055	EM2203960-056	EM2203960-058	EM2203960-059	EM2203960-061
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	19.3	19.2	10.1	12.1	7.7
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	22	18	14	24	9
Copper	7440-50-8	5	mg/kg	61	31	59	60	26
Lead	7439-92-1	5	mg/kg	34	43	<5	<5	47
Nickel	7440-02-0	2	mg/kg	39	16	18	36	16
Zinc	7440-66-6	5	mg/kg	44	82	19	27	46
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.3	0.3	<0.1	<0.1	0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-16/ 0.5	BH-16/ 1.0	BH-17/ 0.3	BH-17/ 0.6	BH10/0.7
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-055	EM2203960-056	EM2203960-058	EM2203960-059	EM2203960-061
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**95.3**	**92.6**	**94.2**	**96.4**	**95.0**
2-Chlorophenol-D4	93951-73-6	0.5	%		**91.5**	**89.2**	**91.3**	**93.1**	**96.0**
2.4.6-Tribromophenol	118-79-6	0.5	%		**81.4**	**81.0**	**80.6**	**81.4**	**92.6**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**94.6**	**91.6**	**95.2**	**97.4**	**95.5**
Anthracene-d10	1719-06-8	0.5	%		**105**	**106**	**105**	**106**	**110**
4-Terphenyl-d14	1718-51-0	0.5	%		**100**	**100**	**99.7**	**101**	**104**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**74.0**	**90.7**	**80.3**	**90.4**	**93.2**
Toluene-D8	2037-26-5	0.2	%		**83.5**	**99.5**	**88.2**	**90.4**	**86.0**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	BH-16/ 0.5	BH-16/ 1.0	BH-17/ 0.3	BH-17/ 0.6	BH10/0.7
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00	07-Mar-2022 00:00
Compound	CAS Number	LOR	Unit		EM2203960-055	EM2203960-056	EM2203960-058	EM2203960-059	EM2203960-061
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**95.8**	**106**	**98.5**	**105**	**92.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QA1/	QA3/	----	----	----
			Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM2203960-063	EM2203960-064	--------	--------	--------
				Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**21.9**	**7.4**	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	**32**	**13**	----	----	----
Copper	7440-50-8	5	mg/kg	**57**	**18**	----	----	----
Lead	7439-92-1	5	mg/kg	<5	**11**	----	----	----
Nickel	7440-02-0	2	mg/kg	**35**	**35**	----	----	----
Zinc	7440-66-6	5	mg/kg	**19**	**30**	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	**0.1**	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	**0.6**	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	**1.2**	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QA1/	QA3/	----	----	----
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM2203960-063	EM2203960-064	--------	--------	--------
					Result	Result	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	----	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**89.6**	**90.7**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**82.0**	**82.7**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**72.9**	**76.8**	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**91.7**	**88.8**	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**111**	**106**	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**99.2**	**95.4**	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**87.7**	**80.5**	----	----	----
Toluene-D8	2037-26-5	0.2	%		**87.1**	**78.5**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QA1/	QA3/	----	----	----
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM2203960-063	EM2203960-064	--------	--------	--------
					Result	Result	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**92.8**	**85.0**	**----**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2.4.6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2.4.6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2203960-AB**	Page	: 1 of 6
Amendment	: **1**		
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS NICOLE REINEKER	Contact	: Shirley LeCornu
Address	: 2 SALAMANCA SQUARE HOBART TAS, AUSTRALIA 7000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9630
Project	: 12574014	Date Samples Received	: 08-Mar-2022 10:45
Order number	: 12574014	Date Analysis Commenced	: 09-Mar-2022
C-O-C number	: 34736	Issue Date	: 07-Apr-2022 12:06
Sampler	: NICOLE REINEKER		
Site	: old forestry building		
Quote number	: ME/589/21 v2		
No. of samples received	: 2		
No. of samples analysed	: 2		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EG005-T : EM2203960 #39 Poor duplicate precision for total Lead due to sample matrix. Confirmed by re-digestion and re-analysis.
- Amendment (07/04/2022):This report has been amended following the Nicole Reineker request to split report for sample 65 &66. All analysis results are as per the previous report.
- EG035T: EM2203960 #40 Poor matrix spike recovery for total mercury due to sample matrix. Confirmed by re-extraction and re-analysis.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	QA2/	QA4/	----	----	----
			Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM2203960-065	EM2203960-066	--------	--------	--------
				Result	Result	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	**18.4**	**6.6**	----	----	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	**27**	**16**	----	----	----
Copper	7440-50-8	5	mg/kg	**51**	**26**	----	----	----
Lead	7439-92-1	5	mg/kg	<5	**16**	----	----	----
Nickel	7440-02-0	2	mg/kg	**38**	**44**	----	----	----
Zinc	7440-66-6	5	mg/kg	**14**	**36**	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	**0.2**	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	**0.6**	**0.6**	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	**1.2**	**1.2**	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QA2/	QA4/	----	----	----
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM2203960-065	EM2203960-066	--------	--------	--------
					Result	Result	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	----	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**82.0**	**80.2**	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**85.4**	**82.7**	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**74.9**	**70.2**	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**100**	**98.7**	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**103**	**102**	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**97.1**	**96.1**	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**82.1**	**102**	----	----	----
Toluene-D8	2037-26-5	0.2	%		**82.0**	**88.2**	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QA2/	QA4/	----	----	----
				Sampling date / time	07-Mar-2022 00:00	07-Mar-2022 00:00	----	----	----
Compound	CAS Number	LOR	Unit		EM2203960-065	EM2203960-066	--------	--------	--------
					Result	Result	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**81.6**	**94.2**	**----**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: **SOIL**		Recovery Limits (%)	
Compound	*CAS Number*	*Low*	*High*
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(SOIL) EG005(ED093)T: Total Metals by ICP-AES

(SOIL) EG035T: Total Recoverable Mercury by FIMS

(SOIL) EA055: Moisture Content (Dried @ 105-110°C)

(SOIL) EP080/071: Total Petroleum Hydrocarbons

(SOIL) EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions

(SOIL) EP080: BTEXN

(SOIL) EP080S: TPH(V)/BTEX Surrogates

(SOIL) EP075(SIM)B: Polynuclear Aromatic Hydrocarbons

(SOIL) EP075(SIM)S: Phenolic Compound Surrogates

(SOIL) EP075(SIM)T: PAH Surrogates

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2203960-AA**	Page	: 1 of 15
Amendment	: **1**		
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS NICOLE REINEKER	Contact	: Shirley LeCornu
Address	: 2 SALAMANCA SQUARE HOBART TAS, AUSTRALIA 7000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9630
Project	: 12574014	Date Samples Received	: 08-Mar-2022
Order number	: 12574014	Date Analysis Commenced	: 09-Mar-2022
C-O-C number	: 34736	Issue Date	: 07-Apr-2022
Sampler	: NICOLE REINEKER		
Site	: old forestry building		
Quote number	: ME/589/21 v2		
No. of samples received	: 38		
No. of samples analysed	: 38		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Andrew Lu	VOC Section Supervisor	Melbourne Inorganics, Springvale, VIC
Andrew Lu	VOC Section Supervisor	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4215743)									
EM2203960-002	BH-1/ 0.5	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	14	15	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	34	30	9.9	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	37	35	4.2	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	12	12	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	48	53	8.8	0% - 50%
EM2203960-020	BH-4/ 1.0	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	16	15	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	25	32	25.9	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	71	56	24.1	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	32	34	4.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	36	40	11.2	No Limit
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4215745)									
EM2203960-039	BH-9/ 0.5	EG005T: Lead	7439-92-1	5	mg/kg	101	# 60	51.1	0% - 20%
EM2203960-039	BH-9/ 0.5	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	15	15	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	31	28	9.7	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	56	65	14.6	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	68	76	9.9	0% - 50%
EM2203960-052	BH-15/ 0.0	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	28	31	10.7	0% - 50%

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4215745) - continued									
EM2203960-052	BH-15/ 0.0	EG005T: Nickel	7440-02-0	2	mg/kg	75	83	9.5	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	19	20	6.3	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	28	31	10.2	No Limit
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4217340)									
EM2203960-061	BH10/0.7	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	9	9	0.0	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	16	15	7.5	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	26	30	13.9	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	47	51	8.8	0% - 50%
		EG005T: Zinc	7440-66-6	5	mg/kg	46	51	11.3	0% - 50%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4216299)									
EM2203860-001	Anonymous	EA055: Moisture Content	----	0.1	%	6.2	6.0	2.5	No Limit
EM2203960-008	BH-2/ 0.5	EA055: Moisture Content	----	0.1	%	7.6	7.8	2.5	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4216300)									
EM2203960-029	BH-6.2/ 1.0	EA055: Moisture Content	----	0.1	%	19.9	18.6	6.9	0% - 50%
EM2203960-044	BH-11/ 0.5	EA055: Moisture Content	----	0.1	%	7.6	7.4	2.2	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4216301)									
EM2203960-058	BH-17/ 0.3	EA055: Moisture Content	----	0.1	%	10.1	15.2	40.1	0% - 50%
EM2204005-009	Anonymous	EA055: Moisture Content	----	0.1	%	9.3	8.9	3.7	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4217350)									
EM2203960-061	BH10/0.7	EA055: Moisture Content	----	0.1	%	7.7	9.5	21.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4215744)									
EM2203960-002	BH-1/ 0.5	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EM2203960-020	BH-4/ 1.0	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4215746)									
EM2203960-039	BH-9/ 0.5	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.4	0.5	0.0	No Limit
EM2203960-052	BH-15/ 0.0	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4217341)									
EM2203960-061	BH10/0.7	EG035T: Mercury	7439-97-6	0.1	mg/kg	0.1	0.2	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4215716)									
EM2203960-002	BH-1/ 0.5	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4215716) - continued									
EM2203960-002	BH-1/ 0.5	EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EM2203960-021	BH-4/ 1.5	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4215718)									
EM2203960-039	BH-9/ 0.5	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4215718) - continued									
EM2203960-039	BH-9/ 0.5	EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	0.5	0.6	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	0.5	0.6	0.0	No Limit
EM2203960-053	BH-15/ 0.5	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4217304)									
EM2203960-061	BH10/0.7	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4217304) - continued									
EM2203960-061	BH10/0.7	EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4215714)									
EM2203960-002	BH-1/ 0.5	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EM2203960-021	BH-4/ 1.5	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4215715)									
EM2203960-039	BH-9/ 0.5	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EM2203960-053	BH-15/ 0.5	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4215717)									
EM2203960-002	BH-1/ 0.5	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EM2203960-021	BH-4/ 1.5	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4215719)									
EM2203960-039	BH-9/ 0.5	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EM2203960-053	BH-15/ 0.5	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4217299)									
EM2203960-061	BH10/0.7	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4217305)									
EM2203960-061	BH10/0.7	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4215714)									
EM2203960-002	BH-1/ 0.5	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EM2203960-021	BH-4/ 1.5	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4215715)									
EM2203960-039	BH-9/ 0.5	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EM2203960-053	BH-15/ 0.5	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4215717)									
EM2203960-002	BH-1/ 0.5	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EM2203960-021	BH-4/ 1.5	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4215719)									
EM2203960-039	BH-9/ 0.5	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EM2203960-053	BH-15/ 0.5	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4217299)									
EM2203960-061	BH10/0.7	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4217305)									
EM2203960-061	BH10/0.7	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 4215714)									
EM2203960-002	BH-1/ 0.5	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EM2203960-021	BH-4/ 1.5	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080: BTEXN (QC Lot: 4215715)									
EM2203960-039	BH-9/ 0.5	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EM2203960-053	BH-15/ 0.5	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit
EP080: BTEXN (QC Lot: 4217299)									
EM2203960-061	BH10/0.7	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4215743)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	123 mg/kg	101	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.23 mg/kg	72.1	50.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	110	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.9 mg/kg	98.9	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.4 mg/kg	97.2	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	103	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	77.6	70.0	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4215745)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	123 mg/kg	103	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.23 mg/kg	69.3	50.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	112	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.9 mg/kg	99.6	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.4 mg/kg	100	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	107	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	80.0	70.0	130
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4217340)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	123 mg/kg	97.4	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.23 mg/kg	60.8	50.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	104	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.9 mg/kg	94.6	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.4 mg/kg	97.6	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	95.7	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	84.1	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4215744)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.64 mg/kg	95.3	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4215746)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.64 mg/kg	93.0	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4217341)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.64 mg/kg	89.8	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4215716)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	104	85.7	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	103	81.0	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	112	83.6	120

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4215716) - continued								
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	109	81.3	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	107	79.4	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	109	81.7	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	106	78.3	124
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	106	79.9	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	104	76.9	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	107	80.9	130
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	103	70.0	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	100	80.4	130
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	96.6	70.2	123
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	95.8	67.9	122
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	95.3	65.8	123
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	97.9	65.8	127
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4215718)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	93.8	85.7	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	84.2	81.0	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	95.9	83.6	120
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	89.1	81.3	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	92.4	79.4	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	93.4	81.7	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	88.9	78.3	124
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	90.5	79.9	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	85.0	76.9	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	91.8	80.9	130
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	83.2	70.0	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	93.3	80.4	130
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	88.5	70.2	123
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	83.4	67.9	122
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	82.8	65.8	123
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	95.4	65.8	127
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4217304)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	101	85.7	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	101	81.0	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	114	83.6	120
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	111	81.3	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	112	79.4	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	113	81.7	127

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4217304) - continued								
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	109	78.3	124
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	109	79.9	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	106	76.9	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	105	80.9	130
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	98.8	70.0	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	94.4	80.4	130
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	101	70.2	123
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	101	67.9	122
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	102	65.8	123
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	95.2	65.8	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4215714)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	76 mg/kg	70.6	58.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4215715)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	103	58.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4215717)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	760 mg/kg	89.8	75.0	128
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3270 mg/kg	90.5	82.0	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1550 mg/kg	89.8	82.4	121
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	5580 mg/kg	90.1	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4215719)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	760 mg/kg	91.8	75.0	128
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3270 mg/kg	93.3	82.0	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1550 mg/kg	93.8	82.4	121
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	5580 mg/kg	93.2	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4217299)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	94.6	58.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4217305)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	760 mg/kg	95.2	75.0	128
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3270 mg/kg	98.9	82.0	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1550 mg/kg	103	82.4	121
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	5580 mg/kg	99.3	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4215714)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	90 mg/kg	72.8	59.3	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4215715)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	100	59.3	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4215717)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4215717) - continued								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1110 mg/kg	95.4	77.0	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	4180 mg/kg	89.2	81.5	120
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	290 mg/kg	90.3	73.3	137
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	5580 mg/kg	90.5	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4215719)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1110 mg/kg	94.0	77.0	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	4180 mg/kg	93.9	81.5	120
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	290 mg/kg	90.6	73.3	137
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	5580 mg/kg	93.5	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4217299)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	93.0	59.3	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4217305)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1110 mg/kg	100	77.0	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	4180 mg/kg	98.5	81.5	120
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	290 mg/kg	108	73.3	137
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	5580 mg/kg	99.3	70.0	130
EP080: BTEXN (QCLot: 4215714)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	4 mg/kg	67.1	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	4 mg/kg	71.7	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	4 mg/kg	72.5	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	8 mg/kg	76.6	64.8	134
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	4 mg/kg	75.2	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	71.6	61.8	123
EP080: BTEXN (QCLot: 4215715)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	97.2	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	102	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	104	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	106	64.8	134
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	104	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	95.7	61.8	123
EP080: BTEXN (QCLot: 4217299)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	99.9	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	96.9	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	96.0	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	96.3	64.8	134

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	LCS: Spike Recovery (%)	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080: BTEXN (QCLot: 4217299) - continued								
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	100	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	88.2	61.8	123

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4215743)							
EM2203960-004	BH-1/ 1.5	EG005T: Arsenic	7440-38-2	50 mg/kg	99.6	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	98.7	79.7	116
		EG005T: Chromium	7440-47-3	50 mg/kg	98.4	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	98.4	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	100	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	97.0	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	94.3	80.0	120
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4215745)							
EM2203960-040	BH-9/ 1.0	EG005T: Arsenic	7440-38-2	50 mg/kg	105	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	101	79.7	116
		EG005T: Chromium	7440-47-3	50 mg/kg	98.7	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	109	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	102	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	95.6	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	98.8	80.0	120
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4217340)							
EM2203960-063	QA1/	EG005T: Arsenic	7440-38-2	50 mg/kg	92.0	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	86.4	79.7	116
		EG005T: Chromium	7440-47-3	50 mg/kg	88.0	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	96.2	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	90.0	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	95.5	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	90.3	80.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4215744)							
EM2203960-004	BH-1/ 1.5	EG035T: Mercury	7439-97-6	0.5 mg/kg	99.0	76.0	116
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4215746)							
EM2203960-040	BH-9/ 1.0	EG035T: Mercury	7439-97-6	0.5 mg/kg	# 117	76.0	116

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4217341)							
EM2203960-063	QA1/	EG035T: Mercury	7439-97-6	0.5 mg/kg	97.0	76.0	116
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4215716)							
EM2203960-004	BH-1/ 1.5	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	106	77.2	116
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	107	65.5	136
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4215718)							
EM2203960-040	BH-9/ 1.0	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	92.3	77.2	116
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	97.6	65.5	136
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4217304)							
EM2203960-063	QA1/	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	86.6	77.2	116
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	91.6	65.5	136
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4215714)							
EM2203960-004	BH-1/ 1.5	EP080: C6 - C9 Fraction	----	28 mg/kg	75.5	33.4	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4215715)							
EM2203960-040	BH-9/ 1.0	EP080: C6 - C9 Fraction	----	28 mg/kg	76.1	33.4	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4215717)							
EM2203960-006	BH-1/ 3.0	EP071: C10 - C14 Fraction	----	760 mg/kg	92.2	71.2	125
		EP071: C15 - C28 Fraction	----	3270 mg/kg	92.6	75.6	122
		EP071: C29 - C36 Fraction	----	1550 mg/kg	91.8	78.0	120
		EP071: C10 - C36 Fraction (sum)	----	5580 mg/kg	91.8	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4215719)							
EM2203960-042	BH-10/ 0.5	EP071: C10 - C14 Fraction	----	760 mg/kg	84.8	71.2	125
		EP071: C15 - C28 Fraction	----	3270 mg/kg	90.1	75.6	122
		EP071: C29 - C36 Fraction	----	1550 mg/kg	91.3	78.0	120
		EP071: C10 - C36 Fraction (sum)	----	5580 mg/kg	89.5	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4217299)							
EM2203960-063	QA1/	EP080: C6 - C9 Fraction	----	28 mg/kg	71.4	33.4	124
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4217305)							
EM2203960-064	QA3/	EP071: C10 - C14 Fraction	----	760 mg/kg	91.0	71.2	125
		EP071: C15 - C28 Fraction	----	3270 mg/kg	90.3	75.6	122
		EP071: C29 - C36 Fraction	----	1550 mg/kg	91.4	78.0	120
		EP071: C10 - C36 Fraction (sum)	----	5580 mg/kg	90.9	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4215714)							
EM2203960-004	BH-1/ 1.5	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	73.5	30.8	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4215715)							
EM2203960-040	BH-9/ 1.0	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	73.0	30.8	120

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4215717)							
EM2203960-006	BH-1/ 3.0	EP071: >C10 - C16 Fraction	----	1110 mg/kg	97.8	72.2	128
		EP071: >C16 - C34 Fraction	----	4180 mg/kg	91.2	76.5	119
		EP071: >C34 - C40 Fraction	----	290 mg/kg	94.0	66.8	138
		EP071: >C10 - C40 Fraction (sum)	----	5580 mg/kg	92.2	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4215719)							
EM2203960-042	BH-10/ 0.5	EP071: >C10 - C16 Fraction	----	1110 mg/kg	88.8	72.2	128
		EP071: >C16 - C34 Fraction	----	4180 mg/kg	91.1	76.5	119
		EP071: >C34 - C40 Fraction	----	290 mg/kg	84.8	66.8	138
		EP071: >C10 - C40 Fraction (sum)	----	5580 mg/kg	90.5	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4217299)							
EM2203960-063	QA1/	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	66.0	30.8	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4217305)							
EM2203960-064	QA3/	EP071: >C10 - C16 Fraction	----	1110 mg/kg	88.2	72.2	128
		EP071: >C16 - C34 Fraction	----	4180 mg/kg	91.2	76.5	119
		EP071: >C34 - C40 Fraction	----	290 mg/kg	92.5	66.8	138
		EP071: >C10 - C40 Fraction (sum)	----	5580 mg/kg	91.1	70.0	130
EP080: BTEXN (QCLot: 4215714)							
EM2203960-004	BH-1/ 1.5	EP080: Benzene	71-43-2	2 mg/kg	73.7	54.4	127
		EP080: Toluene	108-88-3	2 mg/kg	83.3	57.1	131
EP080: BTEXN (QCLot: 4215715)							
EM2203960-040	BH-9/ 1.0	EP080: Benzene	71-43-2	2 mg/kg	80.6	54.4	127
		EP080: Toluene	108-88-3	2 mg/kg	85.7	57.1	131
EP080: BTEXN (QCLot: 4217299)							
EM2203960-063	QA1/	EP080: Benzene	71-43-2	2 mg/kg	90.2	54.4	127
		EP080: Toluene	108-88-3	2 mg/kg	88.6	57.1	131

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2203960-AB**	Page	: 1 of 6
Amendment	: **1**		
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS NICOLE REINEKER	Contact	: Shirley LeCornu
Address	: 2 SALAMANCA SQUARE HOBART TAS, AUSTRALIA 7000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9630
Project	: 12574014	Date Samples Received	: 08-Mar-2022
Order number	: 12574014	Date Analysis Commenced	: 09-Mar-2022
C-O-C number	: 34736	Issue Date	: 07-Apr-2022
Sampler	: NICOLE REINEKER		
Site	: old forestry building		
Quote number	: ME/589/21 v2		
No. of samples received	: 2		
No. of samples analysed	: 2		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4217895)									
EM2203960-065	QA2/	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	27	34	21.9	0% - 50%
		EG005T: Nickel	7440-02-0	2	mg/kg	38	40	5.6	0% - 20%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	51	64	22.8	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	14	17	24.2	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4217899)									
ES2207837-001	Anonymous	EA055: Moisture Content	----	0.1	%	45.0	53.3	16.8	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4217896)									
EM2203960-065	QA2/	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4218475)									
EM2203960-065	QA2/	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4218475) - continued									
EM2203960-065	QA2/	EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4218474)									
EM2203960-065	QA2/	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4218916)									
EM2203960-065	QA2/	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4218474)									
EM2203960-065	QA2/	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4218916)									
EM2203960-065	QA2/	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080: BTEXN (QC Lot: 4218916)									
EM2203960-065	QA2/	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4217895)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	92.4	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	101	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	97.7	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	99.4	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	95.3	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	92.0	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	80.6	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4217896)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	122	70.0	125
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4218475)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	93.0	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	86.2	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	90.6	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	95.1	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	95.4	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	87.3	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	94.4	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	95.4	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	88.9	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	92.7	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	85.1	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	96.2	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	75.8	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	87.5	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	85.1	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	87.4	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4218474)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	88.0	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	89.0	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	88.7	71.0	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4218916)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	98.1	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4218474)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4218474) - continued								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	90.5	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	88.1	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	78.3	63.0	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4218916)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	98.6	68.4	128
EP080: BTEXN (QCLot: 4218916)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	98.5	62.0	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	93.5	67.0	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	95.6	65.0	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	97.0	66.0	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	98.0	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	87.4	63.0	119

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4217895)							
EM2203960-065	QA2/	EG005T: Arsenic	7440-38-2	50 mg/kg	84.8	70.0	130
		EG005T: Cadmium	7440-43-9	50 mg/kg	83.0	70.0	130
		EG005T: Chromium	7440-47-3	50 mg/kg	68.2	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	92.1	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	83.0	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	95.4	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	76.5	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4217896)							
EM2203960-065	QA2/	EG035T: Mercury	7439-97-6	5 mg/kg	93.8	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4218475)							
EM2203960-065	QA2/	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	76.8	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	84.1	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4218474)							
EM2203960-065	QA2/	EP071: C10 - C14 Fraction	----	480 mg/kg	92.8	73.0	137
		EP071: C15 - C28 Fraction	----	3100 mg/kg	94.7	53.0	131

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4218474) - continued							
EM2203960-065	QA2/	EP071: C29 - C36 Fraction	----	2060 mg/kg	102	52.0	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4218916)							
EM2203960-065	QA2/	EP080: C6 - C9 Fraction	----	32.5 mg/kg	96.6	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4218474)							
EM2203960-065	QA2/	EP071: >C10 - C16 Fraction	----	860 mg/kg	88.0	73.0	137
		EP071: >C16 - C34 Fraction	----	4320 mg/kg	100	53.0	131
		EP071: >C34 - C40 Fraction	----	890 mg/kg	88.2	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4218916)							
EM2203960-065	QA2/	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	96.3	70.0	130
EP080: BTEXN (QCLot: 4218916)							
EM2203960-065	QA2/	EP080: Benzene	71-43-2	2.5 mg/kg	86.9	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	81.6	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	89.5	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	90.4	70.0	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	90.8	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	86.2	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EM2203960**	Page	: 1 of 10
Amendment	: **1**		
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS NICOLE REINEKER	Telephone	: +6138549 9630
Project	: 12574014	Date Samples Received	: 08-Mar-2022
Site	: old forestry building	Issue Date	: 07-Apr-2022
Sampler	: NICOLE REINEKER	No. of samples received	: 66
Order number	: 12574014	No. of samples analysed	: 40

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Duplicate outliers exist - please see following pages for full details.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG005(ED093)T: Total Metals by ICP-AES	EM2203960--039	BH-9/ 0.5	**Lead**	7439-92-1	51.1 %	0% - 20%	**RPD exceeds LOR based limits**
Matrix Spike (MS) Recoveries							
EG035T: Total Recoverable Mercury by FIMS	EM2203960--040	BH-9/ 1.0	**Mercury**	7439-97-6	117 %	76.0-116%	**Recovery greater than upper data quality objective**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
BH-1/ 0.5, BH-1/ 1.5, BH-1/ 3.0, BH-2/ 0.5, BH-2/ 1.5, BH-2/ 2.9, BH-3/ 0.5, BH-3/ 2.0, BH-4/ 0.5, BH-4/ 1.0, BH-4/ 1.5, BH-5/ 0.5, BH-5/ 1.0, BH-6.2/ 1.0, BH-6.2/ 1.5, BH-7/ 0.5, BH-7/ 1.3, BH-8/ 0.5, BH-8/ 0.9, BH-18/0, BH-9/ 0.5, BH-9/ 1.0, QA1/, BH-10/ 0.5, BH-11/ 0.5, BH-12/ 0.5, BH-12/ 0.8, BH-13/ 0.3, BH-13/ 0.6, BH-14/ 0.5, BH-15/ 0.0, BH-15/ 0.5, BH-16/ 0.5, BH-16/ 1.0, BH-17/ 0.3, BH-17/ 0.6, BH10/0.7, QA3/, QA2/, QA4/	**07-Mar-2022**	**----**	----	----	**09-Mar-2022**	21-Mar-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
BH-1/ 0.5, BH-1/ 1.5, BH-1/ 3.0, BH-2/ 0.5, BH-2/ 1.5, BH-2/ 2.9, BH-3/ 0.5, BH-3/ 2.0, BH-4/ 0.5, BH-4/ 1.0, BH-4/ 1.5, BH-5/ 0.5, BH-5/ 1.0, BH-6.2/ 1.0, BH-6.2/ 1.5, BH-7/ 0.5, BH-7/ 1.3, BH-8/ 0.5, BH-8/ 0.9, BH-18/0, BH-9/ 0.5, BH-9/ 1.0, QA1/, BH-10/ 0.5, BH-11/ 0.5, BH-12/ 0.5, BH-12/ 0.8, BH-13/ 0.3, BH-13/ 0.6, BH-14/ 0.5, BH-15/ 0.0, BH-15/ 0.5, BH-16/ 0.5, BH-16/ 1.0, BH-17/ 0.3, BH-17/ 0.6, BH10/0.7, QA3/	**07-Mar-2022**	**09-Mar-2022**	03-Sep-2022	✓	**09-Mar-2022**	03-Sep-2022	✓
Soil Glass Jar - Unpreserved (EG005T)							
QA2/, QA4/	**07-Mar-2022**	**09-Mar-2022**	03-Sep-2022	✓	**10-Mar-2022**	03-Sep-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
BH-1/ 0.5, BH-1/ 1.5, BH-1/ 3.0, BH-2/ 0.5, BH-2/ 1.5, BH-2/ 2.9, BH-3/ 0.5, BH-3/ 2.0, BH-4/ 0.5, BH-4/ 1.0, BH-4/ 1.5, BH-5/ 0.5, BH-5/ 1.0, BH-6.2/ 1.0, BH-6.2/ 1.5, BH-7/ 0.5, BH-7/ 1.3, BH-8/ 0.5, BH-8/ 0.9, BH-18/0, BH-9/ 0.5, BH-9/ 1.0, BH-10/ 0.5, BH-11/ 0.5, BH-12/ 0.5, BH-12/ 0.8, BH-13/ 0.3, BH-13/ 0.6, BH-14/ 0.5, BH-15/ 0.0, BH-15/ 0.5, BH-16/ 0.5, BH-16/ 1.0, BH-17/ 0.3, BH-17/ 0.6	**07-Mar-2022**	**09-Mar-2022**	04-Apr-2022	✓	**09-Mar-2022**	04-Apr-2022	✓
Soil Glass Jar - Unpreserved (EG035T)							
BH10/0.7, QA1/, QA3/, QA2/, QA4/	**07-Mar-2022**	**09-Mar-2022**	04-Apr-2022	✓	**10-Mar-2022**	04-Apr-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
BH-1/ 0.5, BH-1/ 1.5, BH-1/ 3.0, BH-2/ 0.5, BH-2/ 1.5, BH-2/ 2.9, BH-3/ 0.5, BH-3/ 2.0, BH-4/ 0.5, BH-4/ 1.0, BH-4/ 1.5, BH-5/ 0.5, BH-5/ 1.0, BH-6.2/ 1.0, BH-6.2/ 1.5, BH-7/ 0.5, BH-7/ 1.3, BH-8/ 0.5, BH-8/ 0.9, BH-18/0, BH-9/ 0.5, BH-9/ 1.0, QA1/, BH-10/ 0.5, BH-11/ 0.5, BH-12/ 0.5, BH-12/ 0.8, BH-13/ 0.3, BH-13/ 0.6, BH-14/ 0.5, BH-15/ 0.0, BH-15/ 0.5, BH-16/ 0.5, BH-16/ 1.0, BH-17/ 0.3, BH-17/ 0.6, BH10/0.7, QA3/	**07-Mar-2022**	**09-Mar-2022**	21-Mar-2022	✓	**09-Mar-2022**	18-Apr-2022	✓
Soil Glass Jar - Unpreserved (EP075(SIM))							
QA2/, QA4/	**07-Mar-2022**	**10-Mar-2022**	21-Mar-2022	✓	**10-Mar-2022**	19-Apr-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP080)							
BH-1/ 0.5, BH-1/ 1.5, BH-1/ 3.0, BH-2/ 0.5, BH-2/ 1.5, BH-2/ 2.9, BH-3/ 0.5, BH-3/ 2.0, BH-4/ 0.5, BH-4/ 1.0, BH-4/ 1.5, BH-5/ 0.5, BH-5/ 1.0, BH-6.2/ 1.0, BH-6.2/ 1.5, BH-7/ 0.5, BH-7/ 1.3, BH-8/ 0.5, BH-8/ 0.9, BH-18/0, BH-9/ 0.5, BH-9/ 1.0, QA1/, BH-10/ 0.5, BH-11/ 0.5, BH-12/ 0.5, BH-12/ 0.8, BH-13/ 0.3, BH-13/ 0.6, BH-14/ 0.5, BH-15/ 0.0, BH-15/ 0.5, BH-16/ 0.5, BH-16/ 1.0, BH-17/ 0.3, BH-17/ 0.6, BH10/0.7, QA3/	**07-Mar-2022**	**09-Mar-2022**	21-Mar-2022	✓	**09-Mar-2022**	21-Mar-2022	✓
Soil Glass Jar - Unpreserved (EP080)							
QA2/, QA4/	**07-Mar-2022**	**10-Mar-2022**	21-Mar-2022	✓	**10-Mar-2022**	21-Mar-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP080)							
BH-1/ 0.5, BH-1/ 1.5, BH-1/ 3.0, BH-2/ 0.5, BH-2/ 1.5, BH-2/ 2.9, BH-3/ 0.5, BH-3/ 2.0, BH-4/ 0.5, BH-4/ 1.0, BH-4/ 1.5, BH-5/ 0.5, BH-5/ 1.0, BH-6.2/ 1.0, BH-6.2/ 1.5, BH-7/ 0.5, BH-7/ 1.3, BH-8/ 0.5, BH-8/ 0.9, BH-18/0, BH-9/ 0.5, BH-9/ 1.0, QA1/, BH-10/ 0.5, BH-11/ 0.5, BH-12/ 0.5, BH-12/ 0.8, BH-13/ 0.3, BH-13/ 0.6, BH-14/ 0.5, BH-15/ 0.0, BH-15/ 0.5, BH-16/ 0.5, BH-16/ 1.0, BH-17/ 0.3, BH-17/ 0.6, BH10/0.7, QA3/	**07-Mar-2022**	**09-Mar-2022**	21-Mar-2022	✓	**09-Mar-2022**	21-Mar-2022	✓
Soil Glass Jar - Unpreserved (EP080)							
QA2/, QA4/	**07-Mar-2022**	**10-Mar-2022**	21-Mar-2022	✓	**10-Mar-2022**	21-Mar-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
BH-1/ 0.5, BH-1/ 1.5, BH-1/ 3.0, BH-2/ 0.5, BH-2/ 1.5, BH-2/ 2.9, BH-3/ 0.5, BH-3/ 2.0, BH-4/ 0.5, BH-4/ 1.0, BH-4/ 1.5, BH-5/ 0.5, BH-5/ 1.0, BH-6.2/ 1.0, BH-6.2/ 1.5, BH-7/ 0.5, BH-7/ 1.3, BH-8/ 0.5, BH-8/ 0.9, BH-18/0, BH-9/ 0.5, BH-9/ 1.0, QA1/, BH-10/ 0.5, BH-11/ 0.5, BH-12/ 0.5, BH-12/ 0.8, BH-13/ 0.3, BH-13/ 0.6, BH-14/ 0.5, BH-15/ 0.0, BH-15/ 0.5, BH-16/ 0.5, BH-16/ 1.0, BH-17/ 0.3, BH-17/ 0.6, BH10/0.7, QA3/	**07-Mar-2022**	**09-Mar-2022**	21-Mar-2022	✓	**09-Mar-2022**	21-Mar-2022	✓
Soil Glass Jar - Unpreserved (EP080)							
QA2/, QA4/	**07-Mar-2022**	**10-Mar-2022**	21-Mar-2022	✓	**10-Mar-2022**	21-Mar-2022	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	7	63	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	5	38	**13.16**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	5	38	**13.16**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	6	38	**15.79**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	5	38	**13.16**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	5	38	**13.16**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	38	**7.89**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

CHAIN OF CUSTODY

ALS COC#: 34736 ALS Laboratory: EM Melbourne

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

CLIENT: GHDSER - GHD PTY LTD

PROJECT: 12574014

SITE: old forestry building

ORDER NO: 12574014

PROJECT MANAGER: Nicole Reineker

PRIMARY SAMPLER: Nicole Reineker

CONTACT PH:

QUOTE NO: ME/589/21 v2

SAMPLER MOBILE: / EM2021GHDSER0036

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 2 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

FREIGHT

URGENT

SAMPLE DETAILS							ANALYSIS REQUIRED			
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	ALTERNATIVE ANALYSIS		ADDITIONAL INFORMATION
001	BH-1		07/03/2022 10:07 AM	Soil	ALS: 1 Non ALS: 0	No	-			
002	BH-2		07/03/2022 10:07 AM	Soil	ALS: 1 Non ALS: 0	No	-			
003	BH-3		07/03/2022 10:08 AM	Soil	ALS: 1 Non ALS: 0	No	-			
004	BH-4		07/03/2022 10:08 AM	Soil	ALS: 1 Non ALS: 0	No	-			

Environmental Division
Melbourne
Work Order Reference
EM2203960

Telephone : +61-3-8549 9600

Received: 8/3, 10:45 Carrier: TNT Post

C/note: 906362

Temp: 6 °C Seal: ON

Ice / Icebricks: Mix

ALS

CHAIN OF CUSTODY

(ALS) *COC#:* **34736** *ALS Laboratory:* EM Melbourne

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

CLIENT: GHDSER - GHD PTY LTD

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EMAIL REPORTS TO:

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TURNAROUND REQUIREMENTS : 2 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	BH-1	Soil Glass Jar - Unpreserved	250 mL	00260220078217	Orange	No	
002	BH-2	Soil Glass Jar - Unpreserved	250 mL	00260220078163	Orange	No	
003	BH-3	Soil Glass Jar - Unpreserved	250 mL	00260220078205	Orange	No	
004	BH-4	Soil Glass Jar - Unpreserved	250 mL	00260220078241	Orange	No	

Total Bottle Count: ALS: 4, Non ALS: 0

Ranil Weerakkody

From: Peter Ravlic
Sent: Tuesday, 8 March 2022 11:42 AM
To: COC Melbourne
Subject: FW: [EXTERNAL] - 3 eskies arriving today. all samples on 2 day turnaround or hold. COC 34736 and 34741
Attachments: field old forestry.xlsx

Kind Regards

Peter Ravlic
Client Services
ALS Limited

Ph: +61 3 8549 9600
peter.ravlic@alsglobal.com

2-4 Westall Road, Springvale VIC 3171

alsglobal.com

From: Nicole Reineker <Nicole.Reineker@ghd.com>
Sent: Tuesday, 8 March 2022 9:17 AM
To: Peter Ravlic <peter.ravlic@alsglobal.com>
Subject: [EXTERNAL] - 3 eskies arriving today. all samples on 2 day turnaround or hold. COC 34736 and 34741

Hi Peter
These are the samples that I mentioned last week for the 2 day turnaround. WE also need a few eskies and freezer packs sent to the office as we're down to one esky and Im sampling Friday and Tuesday. Can you please also fill these with soil jars as we are starting to get a little low on these.

COC via app 34741
TCLP leach on 7 metals suite.
Analysis on the following samples:
Bulk Upper 0%
Bulk Upper 5%
Bulk Upper 10%
Bulk Upper 15%
Bulk Upper 20%
QA
Upper 0
Lower 0
Hold the Upper 5, 10, 15 and 20%; and Lower 5, 10,15,20

There are also sandwich bags with some additional volume of sample for each sample in the esky.

COC 34736

Please analyse these for the TRH,BTEXN,PAH 8 metals suite. (in sheet 2 of attached- if an excel format is easier for lab)

ALS 1:D.

BH	depth	
1	0.5	(2)
1	1.5	(4)
1	3	(6)
2	0.5	(8)
2	1.5	(10)
2	3	(12) – Received 2.9
3	0.5	(14)
3	2	(16)
4	0.5	(19)
4	1	(20)
4	1.5	(21)
5	0.5	(25
5	1	(26)
6	1	(29) → Received "BH 6.2"
6	1.5	(30)
7	0.5	(32)
7	1.3	(34)
8	0.5	(36)
8	0.9	(37)
9	0	(38)
9	0.5	(39)
9	0.9	(40) → Received 1.0
10	0.5	(42)
10	0.7	→ NOT RECEIVED
11	0.5	(44)
12	0.5	(46)
12	0.8	(47)
13	0.3	(49)
13	0.6	(50)
14	0.5	(51)
15	0	(52)
15	0.5	(53)
17	0.3	(58)
17	0.6	(59)
16	0.5	(55)
16	1	(56)

Please send QA2 + QA4 to ALS Sydney.

QA1 + QA3 on 2 day TAT as well

Please give me call if there are questions

Cheers

Nicole K Reineker

Environmental Scientist

Please note my working days are Monday to Thursday

GHD

Proudly employee-owned | ghd.com

2 Salamanca Square Hobart TAsmania 7000 Australia

D +61 3 6210 0626 **M** +61 403 857 681 **E** nicole.reineker@ghd.com

GREEN H. RECEIVED (8/3)

	(ALS ID)	
BH1	1	0
	2	0.5
	3	1.0
	4	1.5
	5	2
	6	3
BH2	7	0.0 - 0.1
	8	0.5
	9	1.0
	10	1.5
	11	2.0
	12	2.9
BH3	13	0.1
	14	0.5
	15	1.5
	16	2.0
	17	3.0
BH4	18	0.0
	19	0.5
	20	1.0
	21	1.5
	22	2.0
	23	2.5
BH5	24	0.0
	25	0.5
	26	1.0
BH6.2	27	0.5
	28	0.8
	29	1.0
	30	1.5
BH7	31	0.0
BH7	32	0.5
BH7	33	1.0
	34	1.3
BH8	35	0.0
	36	~~0.9~~ 0.5
	37	0.9
BH9	38	~~1.5~~ 0.0
	39	0.5
	40	1.0
BH10	41	0.0
	42	0.5
BH11	43	0.0
	44	0.5
BH12	45	0.0
	46	0.5
	47	0.8
BH13	48	0.0
	49	0.3
	50	0.6
BH14	51	~~0~~ 0.5
^15	52	0.0
	53	0.5
16	54	0.15
	55	0.5
	56	1.0
17	57	0.0
	58	0.3
	59	0.6
18	60	0.0
(EXTRAS)		
BH?	61	1.7/0.7? } email CSCI
BH?	62	1.0
QA1	63	
QA3	64	
QA2	65	} ES.
QA4	66	

CHAIN OF CUSTODY

COC#: 34736 ALS Laboratory: EM Melbourne

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

CLIENT: GHDSER - GHD PTY LTD

PROJECT: 12574014

SITE: old forestry building

ORDER NO: 12574014

PROJECT MANAGER: Nicole Reineker

PRIMARY SAMPLER: Nicole Reineker

CONTACT PH:

QUOTE NO: ME/589/21 v2

SAMPLER MOBILE:

/ EM2021GHDSER0036

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 2 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	

Other comments:

FREIGHT

URGENT

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	BH-1		07/03/2022 10:07 AM	Soil	ALS: 1 Non ALS: 0	No	-		
002	BH-2		07/03/2022 10:07 AM	Soil	ALS: 1 Non ALS: 0	No	-		
003	BH-3		07/03/2022 10:08 AM	Soil	ALS: 1 Non ALS: 0	No	-		
004	BH-4		07/03/2022 10:08 AM	Soil	ALS: 1 Non ALS: 0	No	-		

Environmental Division
Melbourne
Work Order Reference
EM2203960

Telephone : +61-3-8549 9600

SCANNED

Received: 8/3, 10:45 Carrier: TASPOST
C/note: 906362
Temp: 10.5 °C Seal: Y N
Ice / Icebricks / N/A

CHAIN OF CUSTODY

COC#: **34736** *ALS Laboratory:* EM Melbourne

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

CLIENT: GHDSER - GHD PTY LTD

PROJECT: 12574014

SITE: old forestry building

ORDER NO: 12574014

PROJECT MANAGER: Nicole Reineker

PRIMARY SAMPLER: Nicole Reineker

CONTACT PH:

QUOTE NO: ME/589/21 v2

SAMPLER MOBILE: / EM2021GHDSER0036

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 2 Days

Biohazard info:

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Custody Seal intact? Yes No N/A

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Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
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003	BH-3	Soil Glass Jar - Unpreserved	250 mL	00260220078205	Orange	No	
004	BH-4	Soil Glass Jar - Unpreserved	250 mL	00260220078241	Orange	No	

Total Bottle Count: ALS: 4, Non ALS: 0

Ranil Weerakkody

From: Peter Ravlic
Sent: Tuesday, 8 March 2022 11:42 AM
To: COC Melbourne
Subject: FW: [EXTERNAL] - 3 eskies arriving today. all samples on 2 day turnaround or hold. COC 34736 and 34741
Attachments: field old forestry.xlsx

Kind Regards

Peter Ravlic
Client Services
ALS Limited

Ph: +61 3 8549 9600
peter.ravlic@alsglobal.com

2-4 Westall Road, Springvale VIC 3171

alsglobal.com

From: Nicole Reineker <Nicole.Reineker@ghd.com>
Sent: Tuesday, 8 March 2022 9:17 AM
To: Peter Ravlic <peter.ravlic@alsglobal.com>
Subject: [EXTERNAL] - 3 eskies arriving today. all samples on 2 day turnaround or hold. COC 34736 and 34741

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COC via app 34741
TCLP leach on 7 metals suite.
Analysis on the following samples:
Bulk Upper 0%
Bulk Upper 5%
Bulk Upper 10%
Bulk Upper 15%
Bulk Upper 20%
QA
Upper 0
Lower 0
Hold the Upper 5, 10, 15 and 20%; and Lower 5, 10,15,20

There are also sandwich bags with some additional volume of sample for each sample in the esky.

COC 34736

Please analyse these for the TRH,BTEXN,PAH 8 metals suite. (in sheet 2 of attached- if an excel format is easier for lab)

ALS 1:D.

BH	depth	
1	0.5	(2)
1	1.5	(4)
1	3	(6)
2	0.5	(8)
2	1.5	(10)
2	3	(12) – Received 2.9
3	0.5	(14)
3	2	(16)
4	0.5	(19)
4	1	(20)
4	1.5	(21)
5	0.5	(25
5	1	(26)
6	1	(29) → Received "BM6.2"
6	1.5	(30) → Received "BM6.2"
7	0.5	(32)
7	1.3	(34)
8	0.5	(36)
8	0.9	(37)
9	0	(38)
9	0.5	(39)
9	0.9	(40) → Received 1.0
10	0.5	(42)
10	0.7	→ NOT RECEIVED
11	0.5	(44)
12	0.5	(46)
12	0.8	(47)
13	0.3	(49)
13	0.6	(50)
14	0.5	(51)
15	0	(52)
15	0.5	(53)
17	0.3	(58)
17	0.6	(59)
16	0.5	(55)
16	1	(56)

Please send QA2 + QA4 to ALS Sydney

QA1 + QA3 on 2 day TAT as well

Please give me call if there are questions

Cheers

Nicole K Reineker

Environmental Scientist

Please note my working days are Monday to Thursday

GHD

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2 Salamanca Square Hobart TAsmania 7000 Australia

D +61 3 6210 0626 **M** +61 403 857 681 **E** nicole.reineker@ghd.com

GREEN H. RECEIVED (8/3)

(ALS ID)

BH1	1	0	BH7	33	1.0	QA2 65	} ES.
	2	0.5		34	1.3	QA4 66	
	3	1.0	BH8	35	0.0		
	4	1.5		36	~~0.9~~ 0.5		
	5	2		37	0.9		
	6	3	BH9	38	~~1.5~~ 0.0		
BH2	7	0.0-0.1		39	0.5		
	8	0.5		40	1.0		
	9	1.0	BH10	41	0.0		
	10	1.5		42	0.5		
	11	2.0	BH11	43	0.0		
	12	2.9		44	0.5		
BH3	13	0.1	BH12	45	0.0		
	14	0.5		46	0.5		
	15	1.5		47	0.8		
	16	2.0	BH13	48	0.0		
	17	3.0		49	0.3		
BH4	18	0.0		50	0.6		
	19	0.5	BH14	51	~~0~~ 0.5		
	20	1.0	" 15	52	0.0		
	21	1.5		53	0.5		
	22	2.0	16	54	0.15		
	23	2.5		55	0.5		
BH5	24	0.0		56	1.0		
	25	0.5	17	57	0.0		
	26	1.0		58	0.3		
BH6.2	27	0.5		59	0.6		
	28	0.8	18	60	0.0		
	29	1.0	(EXTRAS)				
	30	1.5	BH?	61	1.7/0.7?	} email CSCI	
BH7	31	0.0	BH?	62	1.0		
BH7	32	0.5	QA1	63			
			QA3	64			

CHAIN OF CUSTODY

COC#: 34736 ALS Laboratory: EM Melbourne

CLIENT: GHDSER - GHD PTY LTD

PROJECT: 12574014

SITE: old forestry building

ORDER NO: 12574014

PROJECT MANAGER: Nicole Reineker
PRIMARY SAMPLER: Nicole Reineker

CONTACT PH:
QUOTE NO: ME/589/21 v2
SAMPLER MOBILE: / EM2021GHDSER0036

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

TURNAROUND REQUIREMENTS : 2 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

FREIGHT

URGENT

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
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002	BH-2		07/03/2022 10:07 AM	Soil	ALS: 1 Non ALS: 0	No	-		
003	BH-3		07/03/2022 10:08 AM	Soil	ALS: 1 Non ALS: 0	No	-		
004	BH-4		07/03/2022 10:08 AM	Soil	ALS: 1 Non ALS: 0	No	-		

Environmental Division
Melbourne
Work Order Reference
EP EM2203960
8/3

Telephone : +61-3-8549 9600

SCANNED

Received: 8/3, 10:45 Carrier: TASPOST
C/note: 206382
Temp: 6.1 °C Seal: ON
Ice / Icebricks: Y N/A

ALS

CHAIN OF CUSTODY

ALS COC#: **34736** *ALS Laboratory:* EM Melbourne

CLIENT: GHDSER - GHD PTY LTD

PROJECT: 12574014

SITE: old forestry building

ORDER NO: 12574014

PROJECT MANAGER: Nicole Reineker
PRIMARY SAMPLER: Nicole Reineker

CONTACT PH:
QUOTE NO: ME/589/21 v2

SAMPLER MOBILE:
/ EM2021GHDSER0036

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

TURNAROUND REQUIREMENTS : 2 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	BH-1	Soil Glass Jar - Unpreserved	250 mL	00260220078217	Orange	No	
002	BH-2	Soil Glass Jar - Unpreserved	250 mL	00260220078163	Orange	No	
003	BH-3	Soil Glass Jar - Unpreserved	250 mL	00260220078205	Orange	No	
004	BH-4	Soil Glass Jar - Unpreserved	250 mL	00260220078241	Orange	No	

Total Bottle Count: ALS: 4, Non ALS: 0

Erin Price

From: Peter Ravlic
Sent: Wednesday, 9 March 2022 9:20 AM
To: Erin Price
Cc: Samples Melbourne
Subject: RE: COC required: EM2203960, Client GHDSER, Project 12574014

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Erin

Further to the below

Please allocate the following ID's

#62 - BH7/1.0
#33 - BH3/10.0
#61 - BH10/0.7
#66 – QA4

I will email through a COC this morning

Thanks

Kind Regards

right solutions. right partner.

Peter Ravlic
Client Services
ALS Limited

Ph: +61 3 8549 9600
peter.ravlic@alsglobal.com

2-4 Westall Road, Springvale VIC 3171

alsglobal.com

From: Peter Ravlic
Sent: Wednesday, 9 March 2022 9:00 AM
To: Erin Price <erin.price@alsglobal.com>
Cc: Samples Melbourne <Samples.Melbourne@alsglobal.com>
Subject: RE: COC required: EM2203960, Client GHDSER, Project 12574014

Hi Erin

Please allocate same analysis on the QA samples

I will chase up the other issues

Thanks

Kind Regards

Peter Ravlic
Client Services
ALS Limited

Ph: +61 3 8549 9600
peter.ravlic@alsglobal.com

2-4 Westall Road, Springvale VIC 3171

alsglobal.com

From: Erin Price <erin.price@ALSGlobal.com>
Sent: Tuesday, 8 March 2022 5:28 PM
To: ALS Enviro Melbourne <ALSEnviroMelbourne@ALSGlobal.com>
Cc: Samples Melbourne <Samples.Melbourne@alsglobal.com>
Subject: COC required: EM2203960, Client GHDSER, Project 12574014

Hi All,

We've had a few issues with EM2203960 and I was hoping for some clarification.

The WO was created in Compass however only 4 of the 66 samples received were scanned in.
The follow up email listing analysis does not cover all of the samples received.
I have scanned in a list of samples received, but if the client could send a correct COC with all samples and analysis that would be great.

Could the client confirm;

- What analysis is requested for samples QA1 and QA3
- And analysis for samples sent to Sydney (QA2 and QA4)

Analysis has not been logged for these samples.

In addition the following sample was not received

- BH10_0.7

the following client ID could not be deciphered;

- 061 (BH?_1.7) (picture attached)
- Sample 066 was also difficult to decipher but it was assumed to be QA4

We also received X2 jars that appeared to be labelled BH7_1.0 (sample 033 and sample 062)
I have attached pictures of the samples in question, are they the same sample or is one intended to be different?

I have logged analysis for all other samples listed on client email.

Kind Regards,

Erin Price
Sample Receipt Officer
ALS Limited

2-4 Westall Road, Springvale VIC 3171

alsglobal.com

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ **Sydney** 277 Woodpark Rd, Smithfield NSW 2164 Ph 02 8784 8555 E samples.sydney@alsenviro.com

☐ **Brisbane** 32 Shand St, Stafford QLD 4053 Ph 07 3243 7222 E samples.brisbane@alsenviro.com

☐ **Melbourne** 2-4 Westall Rd, Springvale VIC 3171 Ph 03 8549 9600 E samples.melbourne@alsenviro.com

☐ **Newcastle**: 5 Rosegum Rd, Warabrook NSW 2304 Ph 02 4968 9433 E samples.newcastle@alsenviro.com

☐ **Townsville**: 14-15 Desma Ct, Bohle QLD 4818 Ph 07 4796 0600 E townsville.environmental@alsenviro.com

☐ **Adelaide**: 2-1 Burma Rd, Pooraka SA 5095 Ph 08 8359 0890 E adelaide@alsenviro.com

CLIENT:	GHD	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	☐ Standard TAT **(List due date):** Non Standard or urgent TAT **(List due date):** **2 day turnaround if possible**
OFFICE:	Hobart		
PROJECT:	12574014	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)** COC: 1 2 3 4 5 6 7
ORDER NUMBER:	12574014		OF: 1 2 3 4 5 6 7
PROJECT MANAGER:	Nicole Reineker	403857681	
SAMPLER: Nicole Reineker	N/A	**SAMPLER MOBILE:** 0403857681	
COC emailed to ALS?		**EDD FORMAT (or default):**	
Email Reports to (will default to PM if no other addresses are listed): don.rockliff@ghd.com			
Email Invoice to :	ap-fss@ghd.com		

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Nicoel Reineker			
DATE/TIME: 7/03/21	DATE/TIME:	DATE/TIME:	DATE/TIME:

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where **Metals** are required, specify **Total** (unfiltered bottle required) or **Dissolved** (field filtered bottle required).							Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES		Analysis as per email						Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
	BH1 0	6/3/22	S	SOIL JAR	1								
	BH1 0.5	6/3/22	S	SOIL JAR	1								
	BH1-1	6/3/22	S	SOIL JAR	1								
	BH1-1.5	6/3/22	S	SOIL JAR	1								
	BH1-2	6/3/22	S	SOIL JAR	1								
	BH1-2	6/3/22	S	SOIL JAR	1								
	BH1-3	6/3/22	S	SOIL JAR	1								
	BH2-0	6/3/22	S	SOIL JAR	1								
	BH2-0.5	6/3/22	S	SOIL JAR	1								
	BH2-1	6/3/22	S	SOIL JAR	1								
	BH2-1.5	6/3/22	S	SOIL JAR	1								
	BH2-2	6/3/22	S	SOIL JAR	1								
	BH2-3	6/3/22	S	SOIL JAR	1								
	BH3-0	6/3/22	S	SOIL JAR	1								
	BH3-0.5	6/3/22	S	SOIL JAR	1								
	BH3-1	6/3/22	S	SOIL JAR	1								
	BH3-1.5	6/3/22	S	SOIL JAR	1								
	BH3-2	6/3/22	S	SOIL JAR	1								
	BH3-3	6/3/22	S	SOIL JAR	1								
	BH4-0	6/3/22	S	SOIL JAR	1								
	BH4-0.5	6/3/22	S	SOIL JAR	1								
	BH4-1	6/3/22	S	SOIL JAR	1								
	BH4-1.5	6/3/22	S	SOIL JAR	1								
	BH4-2	6/3/22	S	SOIL JAR	1								
	BH4-2.5	6/3/22	S	SOIL JAR	1								
	BH5-0	6/3/22	S	SOIL JAR	1								
	BH5-0.5	6/3/22	S	SOIL JAR	1								
	BH5-1	6/3/22	S	SOIL JAR	1								
	BH6.1-0.5	6/3/22	S	SOIL JAR	1								
	BH6.2-0.5	6/3/22	S	SOIL JAR	1								
	BH6-1	6/3/22	S	SOIL JAR	1								
	BH6-1.5	6/3/22	S	SOIL JAR	1								
	BH7-0	6/3/22	S	SOIL JAR	1								
	BH7-0.5	6/3/22	S	SOIL JAR	1								
	BH7-1	6/3/22	S	SOIL JAR	1								
	BH7-1.5	6/3/22	S	SOIL JAR	1								
	BH8-0	6/3/22	S	SOIL JAR	1								
	BH8-0.5	6/3/22	S	SOIL JAR	1								
	BH8-1	6/3/22	S	SOIL JAR	1								

	BH8-0.9	6/3/22	S	SOIL JAR				1		Analysis as per email	
	BH9-0	6/3/22	S	SOIL JAR				1			
	BH9-0.5	6/3/22	S	SOIL JAR				1			
	BH9-0.9	6/3/22	S	SOIL JAR				1			
	BH10-0	6/3/22	S	SOIL JAR				1			
	BH10-0.5	6/3/22	S	SOIL JAR				1			
	BH10-0.7	6/3/22	S	SOIL JAR				1			
	BH11-0	6/3/22	S	SOIL JAR				1			
	BH11-0.5	6/3/22	S	SOIL JAR				1			
	BH12-0	6/3/22	S	SOIL JAR				1			
	BH12-0.5	6/3/22	S	SOIL JAR				1			
	BH12-0.8	6/3/22	S	SOIL JAR				1			
	BH13-0	6/3/22	S	SOIL JAR				1			
	BH13-0.3	6/3/22	S	SOIL JAR				1			
	BH13-0.6	6/3/22	S	SOIL JAR				1			
	BH14-0	6/3/22	S	SOIL JAR				1			
	BH14-0.5	6/3/22	S	SOIL JAR				1			
	BH15-0	6/3/22	S	SOIL JAR				1			
	BH15-0.5	6/3/22	S	SOIL JAR				1			
	BH16-0.15	6/3/22	S	SOIL JAR				1			
	BH16-0.5	6/3/22	S	SOIL JAR				1			
	BH16-1	6/3/22	S	SOIL JAR				1			
	BH17-0	6/3/22	S	SOIL JAR				1			
	BH17-0.5	6/3/22	S	SOIL JAR				1			
	BH17-1	6/3/22	S	SOIL JAR				1			
	qa1	6/3/22	S	SOIL JAR				1			
	QA2	6/3/22	S	SOIL JAR				1			
	QA4	6/3/22	S	SOIL JAR				1			
	QA3	6-Mar	S	SOIL JAR				1			
							TOTAL				

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

COC 34736

Please analyse these for the TRH,BTEXN,PAH 8 metals suite. (in sheet 2 of attached- if an excel format is easier for lab)

ALS 1:D.

BH	depth	
1	0.5	(2)
1	1.5	(4)
1	3	(6)
2	0.5	(8)
2	1.5	(10)
2	3	(12) – Received 2.9
3	0.5	(14)
3	2	(16)
4	0.5	(19)
4	1	(20)
4	1.5	(21)
5	0.5	(25
5	1	(26)
6	1	(29) → Received "BH 6.2"
6	1.5	(30)
7	0.5	(32)
7	1.3	(34)
8	0.5	(36)
8	0.9	(37)
9	0	(38)
9	0.5	(39)
9	0.9	(40) → Received 1.0
10	0.5	(42)
10	0.7	→ ~~NOT RECEIVED~~
11	0.5	(44)
12	0.5	(46)
12	0.8	(47)
13	0.3	(49)
13	0.6	(50)
14	0.5	(51)
15	0	(52)
15	0.5	(53)
17	0.3	(58)
17	0.6	(59)
16	0.5	(55)
16	1	(56)

Please give me call if there are questions

Cheers

Nicole K Reineker

Environmental Scientist

Forwarded to Secondary Lab
Initials EP Date 8/3

Please note my working days are Monday to Thursday

GHD

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GREEN H. RECEIVED (8/3)

(ALS ID)

BH1	1	0
	2	0.5
	3	1.0
	4	1.5
	5	2
	6	3
BH2	7	0.0 - 0.1
	8	0.5
	9	1.0
	10	1.5
	11	2.0
	12	2.9
BH3	13	0.1
	14	0.5
	15	1.5
	16	2.0
	17	3.0
BH4	18	0.0
	19	0.5
	20	1.0
	21	1.5
	22	2.0
	23	2.5
BH5	24	0.0
	25	0.5
	26	1.0
BH6.2	27	0.5
	28	0.8
	29	1.0
	30	1.5
BH7	31	0.0
BH7	32	0.5
BH7	33	1.0
	34	1.3
BH8	35	0.0
	36	~~0.9~~ 0.5
	37	0.9
BH9	38	~~1.5~~ 0.0
	39	0.5
	40	1.0
BH10	41	0.0
	42	0.5
BH11	43	0.0
	44	0.5
BH12	45	0.0
	46	0.5
	47	0.8
BH13	48	0.0
	49	0.3
	50	0.6
BH14	51	~~0.~~ 0.5
" 15	52	0.0
	53	0.5
16	54	0.15
	55	0.5
	56	1.0
17	57	0.0
	58	0.3
	59	0.6
18	60	0.0
(EXTRAS)		
BH?	61	1.7/0.7? } email CSCI
BH?	62	1.0
QA1	63	
QA3	64	
QA2	65	} ES.
QA4	66	

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EM2205151**	Page	: 1 of 12
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS NICOLE REINEKER	Contact	: Shirley LeCornu
Address	: LEVEL 8, 180 LONSDALE ST MELBOURNE VIC, AUSTRALIA 3001	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9630
Project	: 12574014	Date Samples Received	: 24-Mar-2022 10:00
Order number	: 12574014	Date Analysis Commenced	: 31-Mar-2022
C-O-C number	: 35132	Issue Date	: 01-Apr-2022 14:06
Sampler	: NICOLE REINEKER		
Site	: geo tech test pits		
Quote number	: ME/589/21 v2		
No. of samples received	: 21		
No. of samples analysed	: 10		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	GTP-1_1.00	----	----	----	----
				Sampling date / time	16-Mar-2022 09:45	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2205151-003	--------	--------	--------	--------
					Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		**14.8**	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg		**16**	----	----	----	----
Copper	7440-50-8	5	mg/kg		**7**	----	----	----	----
Lead	7439-92-1	5	mg/kg		**9**	----	----	----	----
Nickel	7440-02-0	2	mg/kg		**7**	----	----	----	----
Zinc	7440-66-6	5	mg/kg		**8**	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		**0.6**	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		**1.2**	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	GTP-1_1.00	----	----	----	----
				Sampling date / time	16-Mar-2022 09:45	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2205151-003	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	----	----	----	----
^ Total Xylenes	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**103**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**92.6**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**83.8**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**102**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**107**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**110**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**90.9**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**97.0**	----	----	----	----

Analytical Results

Sub-Matrix: SEDIMENT (Matrix: SOIL)				Sample ID	GTP-1_1.00	----	----	----	----
				Sampling date / time	16-Mar-2022 09:45	----	----	----	----
Compound	CAS Number	LOR	Unit		EM2205151-003	--------	--------	--------	--------
					Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**95.8**	**----**	**----**	**----**	**----**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	GTP-1_2.00	GTP-1_3.00	GTP-1_4.00	GTP-1_5.00	qa5
			Sampling date / time	16-Mar-2022 09:48	16-Mar-2022 09:49	16-Mar-2022 09:49	16-Mar-2022 09:50	16-Mar-2022 09:50
Compound	CAS Number	LOR	Unit	EM2205151-005	EM2205151-006	EM2205151-007	EM2205151-008	EM2205151-009
				Result	Result	Result	Result	Result
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	10.0	12.3	15.5	20.4	7.6
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	<5
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	17	28	34	44	16
Copper	7440-50-8	5	mg/kg	88	104	68	49	80
Lead	7439-92-1	5	mg/kg	<5	34	7	<5	<5
Nickel	7440-02-0	2	mg/kg	26	31	32	34	23
Zinc	7440-66-6	5	mg/kg	26	69	26	16	24
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	0.2	<0.1	<0.1	<0.1
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	0.6
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	1.2
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	<10

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	GTP-1_2.00	GTP-1_3.00	GTP-1_4.00	GTP-1_5.00	qa5
				Sampling date / time	16-Mar-2022 09:48	16-Mar-2022 09:49	16-Mar-2022 09:49	16-Mar-2022 09:50	16-Mar-2022 09:50
Compound	CAS Number	LOR	Unit		EM2205151-005	EM2205151-006	EM2205151-007	EM2205151-008	EM2205151-009
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	<10	<10
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	<10	<10
>C10 - C16 Fraction	----	50	mg/kg		<50	<50	<50	<50	<50
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	<50	<50
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	<50	<50
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	<0.2	<0.2
^ Total Xylenes	----	0.5	mg/kg		<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	<1	<1
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**105**	**105**	**104**	**101**	**104**
2-Chlorophenol-D4	93951-73-6	0.5	%		**94.1**	**95.4**	**94.9**	**91.6**	**93.4**
2.4.6-Tribromophenol	118-79-6	0.5	%		**86.3**	**87.7**	**85.9**	**85.9**	**86.7**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**102**	**104**	**104**	**101**	**104**
Anthracene-d10	1719-06-8	0.5	%		**110**	**102**	**110**	**107**	**103**
4-Terphenyl-d14	1718-51-0	0.5	%		**110**	**106**	**112**	**107**	**111**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**97.2**	**83.8**	**87.3**	**94.9**	**91.6**
Toluene-D8	2037-26-5	0.2	%		**103**	**91.5**	**94.0**	**103**	**97.8**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	GTP-1_2.00	GTP-1_3.00	GTP-1_4.00	GTP-1_5.00	qa5
			Sampling date / time	16-Mar-2022 09:48	16-Mar-2022 09:49	16-Mar-2022 09:49	16-Mar-2022 09:50	16-Mar-2022 09:50
Compound	CAS Number	LOR	Unit	EM2205151-005	EM2205151-006	EM2205151-007	EM2205151-008	EM2205151-009
				Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued								
4-Bromofluorobenzene	460-00-4	0.2	%	**98.7**	**90.2**	**93.5**	**101**	**94.4**

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	GTP-03_1.00	GTP-03_2.00	GTP-4_0.00	GTP-2_0.50	----
			Sampling date / time	17-Mar-2022 07:29	17-Mar-2022 07:30	17-Mar-2022 09:11	17-Mar-2022 11:11	----
Compound	CAS Number	LOR	Unit	EM2205151-013	EM2205151-015	EM2205151-016	EM2205151-021	--------
				Result	Result	Result	Result	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	12.0	8.5	3.7	18.4	----
EG005(ED093)T: Total Metals by ICP-AES								
Arsenic	7440-38-2	5	mg/kg	<5	<5	<5	<5	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	14	21	23	57	----
Copper	7440-50-8	5	mg/kg	361	77	17	77	----
Lead	7439-92-1	5	mg/kg	114	<5	<5	<5	----
Nickel	7440-02-0	2	mg/kg	14	28	62	40	----
Zinc	7440-66-6	5	mg/kg	156	27	24	23	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	2.6	<0.1	<0.1	<0.1	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons								
Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg	0.6	0.6	0.6	0.6	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg	1.2	1.2	1.2	1.2	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	10	mg/kg	<10	<10	<10	<10	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	GTP-03_1.00	GTP-03_2.00	GTP-4_0.00	GTP-2_0.50	----
			Sampling date / time	17-Mar-2022 07:29	17-Mar-2022 07:30	17-Mar-2022 09:11	17-Mar-2022 11:11	----
Compound	CAS Number	LOR	Unit	EM2205151-013	EM2205151-015	EM2205151-016	EM2205151-021	--------
				Result	Result	Result	Result	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
C10 - C14 Fraction	----	50	mg/kg	<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	mg/kg	<100	<100	<100	<100	----
C29 - C36 Fraction	----	100	mg/kg	<100	<100	<100	<100	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	<10	<10	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg	<10	<10	<10	<10	----
>C10 - C16 Fraction	----	50	mg/kg	<50	<50	<50	<50	----
>C16 - C34 Fraction	----	100	mg/kg	<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	mg/kg	<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	<50	<50	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg	<50	<50	<50	<50	----
EP080: BTEXN								
Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	----
Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
^ Sum of BTEX	----	0.2	mg/kg	<0.2	<0.2	<0.2	<0.2	----
^ Total Xylenes	----	0.5	mg/kg	<0.5	<0.5	<0.5	<0.5	----
Naphthalene	91-20-3	1	mg/kg	<1	<1	<1	<1	----
EP075(SIM)S: Phenolic Compound Surrogates								
Phenol-d6	13127-88-3	0.5	%	**101**	**102**	**103**	**99.0**	----
2-Chlorophenol-D4	93951-73-6	0.5	%	**91.1**	**92.6**	**93.9**	**88.0**	----
2.4.6-Tribromophenol	118-79-6	0.5	%	**86.0**	**84.8**	**81.6**	**82.6**	----
EP075(SIM)T: PAH Surrogates								
2-Fluorobiphenyl	321-60-8	0.5	%	**99.0**	**101**	**103**	**99.9**	----
Anthracene-d10	1719-06-8	0.5	%	**107**	**108**	**105**	**107**	----
4-Terphenyl-d14	1718-51-0	0.5	%	**108**	**108**	**119**	**106**	----
EP080S: TPH(V)/BTEX Surrogates								
1.2-Dichloroethane-D4	17060-07-0	0.2	%	**90.4**	**89.0**	**93.4**	**75.9**	----
Toluene-D8	2037-26-5	0.2	%	**99.0**	**96.9**	**97.9**	**79.7**	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	GTP-03_1.00	GTP-03_2.00	GTP-4_0.00	GTP-2_0.50	----
				Sampling date / time	17-Mar-2022 07:29	17-Mar-2022 07:30	17-Mar-2022 09:11	17-Mar-2022 11:11	----
Compound	CAS Number	LOR	Unit		EM2205151-013	EM2205151-015	EM2205151-016	EM2205151-021	--------
					Result	Result	Result	Result	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**94.2**	**93.7**	**95.0**	**85.1**	**----**

Surrogate Control Limits

Sub-Matrix: SEDIMENT		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2.4.6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

Sub-Matrix: SOIL		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	54	125
2-Chlorophenol-D4	93951-73-6	65	123
2.4.6-Tribromophenol	118-79-6	34	122
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	61	125
Anthracene-d10	1719-06-8	62	130
4-Terphenyl-d14	1718-51-0	67	133
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	51	125
Toluene-D8	2037-26-5	55	125
4-Bromofluorobenzene	460-00-4	56	124

QUALITY CONTROL REPORT

Work Order	: **EM2205151**	Page	: 1 of 6
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Melbourne
Contact	: MS NICOLE REINEKER	Contact	: Shirley LeCornu
Address	: LEVEL 8, 180 LONSDALE ST MELBOURNE VIC, AUSTRALIA 3001	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: +6138549 9630
Project	: 12574014	Date Samples Received	: 24-Mar-2022
Order number	: 12574014	Date Analysis Commenced	: 31-Mar-2022
C-O-C number	: 35132	Issue Date	: 01-Apr-2022
Sampler	: NICOLE REINEKER		
Site	: geo tech test pits		
Quote number	: ME/589/21 v2		
No. of samples received	: 21		
No. of samples analysed	: 10		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument Chemist	Melbourne Inorganics, Springvale, VIC

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4260093)									
EM2205151-003	GTP-1_1.00	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	16	18	12.6	No Limit
		EG005T: Nickel	7440-02-0	2	mg/kg	7	6	0.0	No Limit
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	7	7	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	9	7	26.2	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	8	8	0.0	No Limit
EM2205151-021	GTP-2_0.50	EG005T: Cadmium	7440-43-9	1	mg/kg	<1	<1	0.0	No Limit
		EG005T: Chromium	7440-47-3	2	mg/kg	57	55	3.5	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	40	38	5.4	0% - 50%
		EG005T: Arsenic	7440-38-2	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Copper	7440-50-8	5	mg/kg	77	67	13.0	0% - 50%
		EG005T: Lead	7439-92-1	5	mg/kg	<5	7	37.1	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	23	21	10.7	No Limit
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4260095)									
EM2205151-003	GTP-1_1.00	EA055: Moisture Content	----	0.1	%	14.8	15.4	4.0	0% - 50%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4260094)									
EM2205151-003	GTP-1_1.00	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EM2205151-021	GTP-2_0.50	EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4260091)									
EM2205151-003	GTP-1_1.00	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4260091) - continued									
EM2205151-003	GTP-1_1.00	EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4260090)									
EM2205151-003	GTP-1_1.00	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4260092)									
EM2205151-003	GTP-1_1.00	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4260090)									
EM2205151-003	GTP-1_1.00	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4260092)									
EM2205151-003	GTP-1_1.00	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
		EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	<50	0.0	No Limit
EP080: BTEXN (QC Lot: 4260090)									
EM2205151-003	GTP-1_1.00	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4260093)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	123 mg/kg	102	70.0	130
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	1.23 mg/kg	56.0	50.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	20.2 mg/kg	106	70.0	130
EG005T: Copper	7440-50-8	5	mg/kg	<5	55.9 mg/kg	94.4	70.0	130
EG005T: Lead	7439-92-1	5	mg/kg	<5	62.4 mg/kg	92.7	70.0	130
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.4 mg/kg	98.9	70.0	130
EG005T: Zinc	7440-66-6	5	mg/kg	<5	162 mg/kg	74.3	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4260094)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.64 mg/kg	89.8	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4260091)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	3 mg/kg	104	85.7	123
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	3 mg/kg	111	81.0	123
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	3 mg/kg	109	83.6	120
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	3 mg/kg	107	81.3	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	3 mg/kg	110	79.4	123
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	3 mg/kg	106	81.7	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	3 mg/kg	110	78.3	124
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	3 mg/kg	109	79.9	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	3 mg/kg	117	76.9	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	3 mg/kg	119	80.9	130
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	3 mg/kg	120	70.0	121
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	3 mg/kg	109	80.4	130
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	3 mg/kg	113	70.2	123
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	3 mg/kg	108	67.9	122
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	3 mg/kg	104	65.8	123
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	3 mg/kg	111	65.8	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4260090)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	36 mg/kg	93.7	58.6	131
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4260092)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	760 mg/kg	86.7	75.0	128
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	3270 mg/kg	90.6	82.0	123
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	1550 mg/kg	88.8	82.4	121
EP071: C10 - C36 Fraction (sum)	----	50	mg/kg	<50	5580 mg/kg	89.6	70.0	130

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4260090)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	45 mg/kg	97.0	59.3	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4260092)								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	1110 mg/kg	103	77.0	130
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	4180 mg/kg	85.8	81.5	120
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	290 mg/kg	89.8	73.3	137
EP071: >C10 - C40 Fraction (sum)	----	50	mg/kg	<50	5580 mg/kg	89.2	70.0	130
EP080: BTEXN (QCLot: 4260090)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	2 mg/kg	102	61.6	117
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	2 mg/kg	97.8	65.8	125
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	2 mg/kg	98.5	65.8	124
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	4 mg/kg	97.1	64.8	134
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	2 mg/kg	97.6	68.7	132
EP080: Naphthalene	91-20-3	1	mg/kg	<1	0.5 mg/kg	86.6	61.8	123

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4260093)							
EM2205151-005	GTP-1_2.00	EG005T: Arsenic	7440-38-2	50 mg/kg	103	78.0	124
		EG005T: Cadmium	7440-43-9	50 mg/kg	94.9	79.7	116
		EG005T: Chromium	7440-47-3	50 mg/kg	94.8	79.0	121
		EG005T: Copper	7440-50-8	250 mg/kg	105	80.0	120
		EG005T: Lead	7439-92-1	250 mg/kg	94.8	80.0	120
		EG005T: Nickel	7440-02-0	50 mg/kg	94.1	78.0	120
		EG005T: Zinc	7440-66-6	250 mg/kg	90.0	80.0	120
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4260094)							
EM2205151-005	GTP-1_2.00	EG035T: Mercury	7439-97-6	0.5 mg/kg	103	76.0	116
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4260091)							
EM2205151-005	GTP-1_2.00	EP075(SIM): Acenaphthene	83-32-9	3 mg/kg	97.2	77.2	116
		EP075(SIM): Pyrene	129-00-0	3 mg/kg	101	65.5	136
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4260090)							
EM2205151-005	GTP-1_2.00	EP080: C6 - C9 Fraction	----	28 mg/kg	85.9	33.4	124

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4260092)							
EM2205151-006	GTP-1_3.00	EP071: C10 - C14 Fraction	----	760 mg/kg	86.2	71.2	125
		EP071: C15 - C28 Fraction	----	3270 mg/kg	90.2	75.6	122
		EP071: C29 - C36 Fraction	----	1550 mg/kg	88.1	78.0	120
		EP071: C10 - C36 Fraction (sum)	----	5580 mg/kg	89.1	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4260090)							
EM2205151-005	GTP-1_2.00	EP080: C6 - C10 Fraction	C6_C10	33 mg/kg	82.3	30.8	120
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4260092)							
EM2205151-006	GTP-1_3.00	EP071: >C10 - C16 Fraction	----	1110 mg/kg	102	72.2	128
		EP071: >C16 - C34 Fraction	----	4180 mg/kg	85.2	76.5	119
		EP071: >C34 - C40 Fraction	----	290 mg/kg	89.3	66.8	138
		EP071: >C10 - C40 Fraction (sum)	----	5580 mg/kg	88.8	70.0	130
EP080: BTEXN (QCLot: 4260090)							
EM2205151-005	GTP-1_2.00	EP080: Benzene	71-43-2	2 mg/kg	103	54.4	127
		EP080: Toluene	108-88-3	2 mg/kg	106	57.1	131

CHAIN OF CUSTODY

(ALS) COC#: 35132 *ALS Laboratory:* EM Melbourne

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

CLIENT: GHDSER - GHD PTY LTD

PROJECT: 12574014

SITE: geo tech test pits

ORDER NO: 12574014

PROJECT MANAGER: Nicole Reineker

PRIMARY SAMPLER: Nicole Reineker

CONTACT PH:

QUOTE NO: ME/589/21 v2

SAMPLER MOBILE:

/ EM2021GHDSER0036

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	

Other comments: URGENT FREIGHT

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	GTP-01_0.00		16/03/2022 09:44 AM	Soil	ALS: 1 Non ALS: 0	No	-		
002	GTP-1_0.50		16/03/2022 09:45 AM	Soil	ALS: 1 Non ALS: 0	No	-		
003	GTP-1_1.00		16/03/2022 09:45 AM	Soil	ALS: 1 Non ALS: 0	No	-		
004	GTP-1_1.50		16/03/2022 09:46 AM	Soil	ALS: 1 Non ALS: 0	No	-		
005	GTP-1_2.00		16/03/2022 09:48 AM	Soil	ALS: 1 Non ALS: 0	No	-		
006	GTP-1_3.00		16/03/2022 09:49 AM	Soil	ALS: 1 Non ALS: 0	No	-		
007	GTP-1_4.00		16/03/2022 09:49 AM	Soil	ALS: 1 Non ALS: 0	No	-		
008	GTP-1_5.00		16/03/2022 09:50 AM	Soil	ALS: 1 Non ALS: 0	No	-		
009	qa5		16/03/2022 09:50 AM	Soil	ALS: 1 Non ALS: 0	No	-		

Environmental Division
Melbourne
Work Order Reference
EM2205151

Telephone : +61-3-8549 9600

Received: 24/3 10:00 Carrier: TNT

C/note: 906361

Temp: 9.8°C Seal: Y / N

Ice / Ice bricks NA

CHAIN OF CUSTODY

ALS COC#: 35132 *ALS Laboratory:* EM Melbourne

CLIENT: GHDSER - GHD PTY LTD

PROJECT: 12574014

SITE: geo tech test pits

ORDER NO: 12574014

PROJECT MANAGER: Nicole Reineker

PRIMARY SAMPLER: Nicole Reineker

CONTACT PH:

QUOTE NO: ME/589/21 v2

SAMPLER MOBILE: / EM2021GHDSER0036

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
010	qa6		16/03/2022 09:51 AM	Soil	ALS: 1 Non ALS: 0	No	-		
011	LP_0.03		17/03/2022 07:28 AM	Soil	ALS: 1 Non ALS: 0	No	-		
012	GTP-03_0.50		17/03/2022 07:29 AM	Soil	ALS: 1 Non ALS: 0	No	-		
013	GTP-03_1.00		17/03/2022 07:29 AM	Soil	ALS: 1 Non ALS: 0	No	-		
014	GTP-03_1.50		17/03/2022 07:30 AM	Soil	ALS: 1 Non ALS: 0	No	-		
015	GTP-03_2.00		17/03/2022 07:30 AM	Soil	ALS: 1 Non ALS: 0	No	-		
016	GTP-4_0.00		17/03/2022 09:11 AM	Soil	ALS: 1 Non ALS: 0	No	-		
017	GTP-4_0.50		17/03/2022 09:12 AM	Soil	ALS: 1 Non ALS: 0	No	-		
018	qa7		17/03/2022 09:25 AM	Soil	ALS: 1 Non ALS: 0	No	-		

CHAIN OF CUSTODY

ALS COC#: 35132 ALS Laboratory: EM Melbourne

CLIENT: GHDSER - GHD PTY LTD

PROJECT: 12574014

SITE: geo tech test pits

ORDER NO: 12574014

PROJECT MANAGER: Nicole Reineker

PRIMARY SAMPLER: Nicole Reineker

CONTACT PH:

QUOTE NO: ME/589/21 v2

SAMPLER MOBILE: / EM2021GHDSER0036

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
019	qa8		17/03/2022 09:26 AM	Soil	ALS: 1 Non ALS: 0	No	-		
020	GTP-2_0.00		17/03/2022 11:07 AM	Soil	ALS: 1 Non ALS: 0	No	-		
021	GTP-2_0.50		17/03/2022 11:11 AM	Soil	ALS: 1 Non ALS: 0	No	-		
022	GTP-2_1.00		17/03/2022 11:12 AM	Soil	ALS: 1 Non ALS: 0	No	-		
023	GTP-2_1.50		17/03/2022 11:12 AM	Soil	ALS: 1 Non ALS: 0	No	-		
024	GTP-2_2.00		17/03/2022 11:13 AM	Soil	ALS: 1 Non ALS: 0	No	-		
025	GTP-2_3.00		17/03/2022 11:13 AM	Soil	ALS: 1 Non ALS: 0	No	-		
026	GTP-2_4.00		17/03/2022 11:14 AM	Soil	ALS: 1 Non ALS: 0	No	-		
027	GTP-2_5.00		17/03/2022 11:14 AM	Soil	ALS: 1 Non ALS: 0	No	-		

Wednesday, March 23, 2022 4:39:15 AM

* Not received NP (ALS) 31/03

CHAIN OF CUSTODY

ALS COC#: 35132 *ALS Laboratory:* EM Melbourne

CLIENT: GHDSER - GHD PTY LTD

PROJECT: 12574014

SITE: geo tech test pits

ORDER NO: 12574014

PROJECT MANAGER: Nicole Reineker

PRIMARY SAMPLER: Nicole Reineker

CONTACT PH:

SAMPLER MOBILE:

QUOTE NO: ME/589/21 v2 / EM2021GHDSER0036

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

SAMPLE	SAMPLE NAME	BOTTLE NAME	VOLUME	BARCODE	TYPE	FILTERED	REASON
001	GTP-01_0.00	Soil Glass Jar - Unpreserved	250 mL	00260220078206	Orange	No	
002	GTP-1_0.50	Soil Glass Jar - Unpreserved	250 mL	00260220078198	Orange	No	
003	GTP-1_1.00	Soil Glass Jar - Unpreserved	250 mL	00261020021204	Orange	No	
004	GTP-1_1.50	Soil Glass Jar - Unpreserved	250 mL	00260220078243	Orange	No	
005	GTP-1_2.00	Soil Glass Jar - Unpreserved	250 mL	00260220078040	Orange	No	
006	GTP-1_3.00	Soil Glass Jar - Unpreserved	250 mL	00260220077265	Orange	No	
007	GTP-1_4.00	Soil Glass Jar - Unpreserved	250 mL	00260220078216	Orange	No	
008	GTP-1_5.00	Soil Glass Jar - Unpreserved	250 mL	00261020021060	Orange	No	
009	qa5	Soil Glass Jar - Unpreserved	250 mL	00260220078067	Orange	No	
010	qa6	Soil Glass Jar - Unpreserved	250 mL	00260220078239	Orange	No	
011	LP_0.03	Soil Glass Jar - Unpreserved	250 mL	00261020020975	Orange	No	
012	GTP-03_0.50	Soil Glass Jar - Unpreserved	250 mL	00261020020911	Orange	No	
013	GTP-03_1.00	Soil Glass Jar - Unpreserved	250 mL	00261020020918	Orange	No	
014	GTP-03_1.50	Soil Glass Jar - Unpreserved	250 mL	00261020020928	Orange	No	
015	GTP-03_2.00	Soil Glass Jar - Unpreserved	250 mL	00261020021035	Orange	No	
016	GTP-4_0.00	Soil Glass Jar - Unpreserved	250 mL	00261020021033	Orange	No	
017	GTP-4_0.50	Soil Glass Jar - Unpreserved	250 mL	00261020020889	Orange	No	
018	qa7	Soil Glass Jar - Unpreserved	250 mL	00261020020896	Orange	No	
019	qa8	Soil Glass Jar - Unpreserved	250 mL	00261020020803	Orange	No	
020	GTP-2_0.00	Soil Glass Jar - Unpreserved	250 mL	00261020021038	Orange	No	
021	GTP-2_0.50	Soil Glass Jar - Unpreserved	250 mL	00261020021071	Orange	No	
022	GTP-2_1.00	Soil Glass Jar - Unpreserved	250 mL	00261020021070	Orange	No	
023	GTP-2_1.50	Soil Glass Jar - Unpreserved	250 mL	00261020020868	Orange	No	
024	GTP-2_2.00	Soil Glass Jar - Unpreserved	250 mL	00261020020865	Orange	No	
025	GTP-2_3.00	Soil Glass Jar - Unpreserved	250 mL	00261020020821	Orange	No	
026	GTP-2_4.00	Soil Glass Jar - Unpreserved	250 mL	00261020020796	Orange	No	

CHAIN OF CUSTODY

ALS COC#: 35132 *ALS Laboratory:* EM Melbourne

CLIENT: GHDSER - GHD PTY LTD

PROJECT: 12574014

SITE: geo tech test pits

ORDER NO: 12574014

PROJECT MANAGER: Nicole Reineker

PRIMARY SAMPLER: Nicole Reineker

CONTACT PH:

QUOTE NO: ME/589/21 v2

SAMPLER MOBILE: / EM2021GHDSER0036

EMAIL REPORTS TO:

EMAIL INVOICES TO:

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments:

027	GTP-2_5.00	Soil Glass Jar - Unpreserved	250 mL	00261020020894	Orange	No	

Total Bottle Count: ALS: 27, Non ALS: 0

Ranil Weerakkody

From: Peter Ravlic
Sent: Thursday, 24 March 2022 8:49 AM
To: COC Melbourne
Cc: Dilani Fernando
Subject: GHDSER - COC 35132 - Incoming 24/3 - URGENT 2 DAY TAT

Hi Team

Below analysis confirmation for 2 day TAT

Thanks

Kind Regards

right solutions. right partner.

Peter Ravlic
Client Services
ALS Limited

Ph: +61 3 8549 9600
peter.ravlic@alsglobal.com

2-4 Westall Road, Springvale VIC 3171

alsglobal.com

From: Nicole Reineker <Nicole.Reineker@ghd.com>
Sent: Wednesday, 23 March 2022 3:43 PM
To: Peter Ravlic <peter.ravlic@alsglobal.com>
Subject: [EXTERNAL] - esky arriving tomorrow- analysis in email for COC 35132

Hi Peter,
Could these please be done under a 2 day turnaround please.
The samples to be analysed for TRH/BTEXN/PAH/8 metals and the rest put on hold.

GTP1_1 #3
GTP1_2 #5
GTP1_3 #6
GTP1_4 #7
GTP1_5 #8
GTP2_0.5 #21
GTP3_1 #13
GTP3_2 #15
GTP4_0.1 #16 ?
QA5 #9
→ QA6 (please send to Sydney) ALS. ✓

Kind Regards
Nicole

Nicole K Reineker

Environmental Scientist

Please note my working days are Monday to Thursday

GHD

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ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2211552**	Page	: 1 of 6
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE REINEKER	Contact	: Shirley LeCornu
Address	: LEVEL 8, 180 LONSDALE ST MELBOURNE VIC, AUSTRALIA 3001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	: 12544866	Date Samples Received	: 01-Apr-2022 15:00
Order number	: 12574014	Date Analysis Commenced	: 04-Apr-2022
C-O-C number	: ----	Issue Date	: 05-Apr-2022 17:13
Sampler	: ----		
Site	: geo tech test pits		
Quote number	: ME/589/21 v2		
No. of samples received	: 1		
No. of samples analysed	: 1		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero, for 'TEQ 1/2LOR' are treated as half the reported LOR, and for 'TEQ LOR' are treated as being equal to the reported LOR. Note: TEQ 1/2LOR and TEQ LOR will calculate as 0.6mg/Kg and 1.2mg/Kg respectively for samples with non-detects for all of the eight TEQ PAHs.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- EP075(SIM): Surrogate recovery bias low due to sample matrix interferences.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QA6	----	----	----	----
				Sampling date / time	16-Mar-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2211552-001	--------	--------	--------	--------
					Result	----	----	----	----
EA055: Moisture Content (Dried @ 105-110°C)									
Moisture Content	----	1.0	%		7.8	----	----	----	----
EG005(ED093)T: Total Metals by ICP-AES									
Arsenic	7440-38-2	5	mg/kg		<5	----	----	----	----
Cadmium	7440-43-9	1	mg/kg		<1	----	----	----	----
Chromium	7440-47-3	2	mg/kg		13	----	----	----	----
Copper	7440-50-8	5	mg/kg		84	----	----	----	----
Lead	7439-92-1	5	mg/kg		<5	----	----	----	----
Nickel	7440-02-0	2	mg/kg		24	----	----	----	----
Zinc	7440-66-6	5	mg/kg		29	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthylene	208-96-8	0.5	mg/kg		<0.5	----	----	----	----
Acenaphthene	83-32-9	0.5	mg/kg		<0.5	----	----	----	----
Fluorene	86-73-7	0.5	mg/kg		<0.5	----	----	----	----
Phenanthrene	85-01-8	0.5	mg/kg		<0.5	----	----	----	----
Anthracene	120-12-7	0.5	mg/kg		<0.5	----	----	----	----
Fluoranthene	206-44-0	0.5	mg/kg		<0.5	----	----	----	----
Pyrene	129-00-0	0.5	mg/kg		<0.5	----	----	----	----
Benz(a)anthracene	56-55-3	0.5	mg/kg		<0.5	----	----	----	----
Chrysene	218-01-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg		<0.5	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	mg/kg		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg		<0.5	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg		<0.5	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg		<0.5	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (half LOR)	----	0.5	mg/kg		0.6	----	----	----	----
^ Benzo(a)pyrene TEQ (LOR)	----	0.5	mg/kg		1.2	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QA6	----	----	----	----
				Sampling date / time	16-Mar-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2211552-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C10 - C14 Fraction	----	50	mg/kg		<50	----	----	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	----	----	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	10	mg/kg		<10	----	----	----	----
>C10 - C16 Fraction	----	50	mg/kg		<50	----	----	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	----	----	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	50	mg/kg		<50	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	50	mg/kg		<50	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	----	----	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	----	----	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	----	----	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	----	----	----	----
^ **Sum of BTEX**	----	0.2	mg/kg		<0.2	----	----	----	----
^ **Total Xylenes**	----	0.5	mg/kg		<0.5	----	----	----	----
Naphthalene	91-20-3	1	mg/kg		<1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	0.5	%		**90.8**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	0.5	%		**96.3**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	0.5	%		**87.4**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	0.5	%		**108**	----	----	----	----
Anthracene-d10	1719-06-8	0.5	%		**101**	----	----	----	----
4-Terphenyl-d14	1718-51-0	0.5	%		**103**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.2	%		**97.4**	----	----	----	----
Toluene-D8	2037-26-5	0.2	%		**93.2**	----	----	----	----

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)				Sample ID	QA6	----	----	----	----
				Sampling date / time	16-Mar-2022 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2211552-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	0.2	%		**97.2**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **SOIL**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	63	123
2-Chlorophenol-D4	93951-73-6	66	122
2.4.6-Tribromophenol	118-79-6	40	138
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	70	122
Anthracene-d10	1719-06-8	66	128
4-Terphenyl-d14	1718-51-0	65	129
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	73	133
Toluene-D8	2037-26-5	74	132
4-Bromofluorobenzene	460-00-4	72	130

QUALITY CONTROL REPORT

Work Order	: **ES2211552**	Page	: 1 of 6
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE REINEKER	Contact	: Shirley LeCornu
Address	: LEVEL 8, 180 LONSDALE ST MELBOURNE VIC, AUSTRALIA 3001	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +6138549 9630
Project	: 12544866	Date Samples Received	: 01-Apr-2022
Order number	: 12574014	Date Analysis Commenced	: 04-Apr-2022
C-O-C number	: ----	Issue Date	: 05-Apr-2022
Sampler	: ----		
Site	: geo tech test pits		
Quote number	: ME/589/21 v2		
No. of samples received	: 1		
No. of samples analysed	: 1		

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This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EG005(ED093)T: Total Metals by ICP-AES (QC Lot: 4266915)									
ES2211616-003	Anonymous	EG005T: Chromium	7440-47-3	2	mg/kg	73	71	2.8	0% - 20%
		EG005T: Nickel	7440-02-0	2	mg/kg	84	86	2.7	0% - 20%
		EG005T: Copper	7440-50-8	5	mg/kg	5	<5	0.0	No Limit
		EG005T: Lead	7439-92-1	5	mg/kg	<5	<5	0.0	No Limit
		EG005T: Zinc	7440-66-6	5	mg/kg	1190	1120	5.4	0% - 20%
EA055: Moisture Content (Dried @ 105-110°C) (QC Lot: 4266917)									
ES2211616-001	Anonymous	EA055: Moisture Content	----	0.1	%	44.2	46.0	3.8	0% - 20%
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4266916)									
--------		EG035T: Mercury	7439-97-6	0.1	mg/kg	----	<0.1	0.0	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4266562)									
ES2211616-001	Anonymous	EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	<0.5	0.0	No Limit

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 4266562) - continued									
ES2211616-001	Anonymous	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Sum of polycyclic aromatic hydrocarbons	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP075(SIM): Benzo(a)pyrene TEQ (zero)	----	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4266563)									
ES2211616-001	Anonymous	EP071: C15 - C28 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C29 - C36 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: C10 - C14 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4266937)									
ES2211616-001	Anonymous	EP080: C6 - C9 Fraction	----	10	mg/kg	<10	<10	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4266563)									
ES2211616-001	Anonymous	EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	<100	0.0	No Limit
		EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	<50	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4266937)									
ES2211616-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	<10	0.0	No Limit
EP080: BTEXN (QC Lot: 4266937)									
ES2211616-001	Anonymous	EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	<0.2	0.0	No Limit
		EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	<0.5	0.0	No Limit
		EP080: Naphthalene	91-20-3	1	mg/kg	<1	<1	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4266915)								
EG005T: Arsenic	7440-38-2	5	mg/kg	<5	121.1 mg/kg	100	88.0	113
EG005T: Cadmium	7440-43-9	1	mg/kg	<1	0.74 mg/kg	95.2	70.0	130
EG005T: Chromium	7440-47-3	2	mg/kg	<2	19.6 mg/kg	111	68.0	132
EG005T: Copper	7440-50-8	5	mg/kg	<5	52.9 mg/kg	106	89.0	111
EG005T: Lead	7439-92-1	5	mg/kg	<5	60.8 mg/kg	100.0	82.0	119
EG005T: Nickel	7440-02-0	2	mg/kg	<2	15.3 mg/kg	102	80.0	120
EG005T: Zinc	7440-66-6	5	mg/kg	<5	139.3 mg/kg	92.2	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4266916)								
EG035T: Mercury	7439-97-6	0.1	mg/kg	<0.1	0.087 mg/kg	114	70.0	125
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4266562)								
EP075(SIM): Naphthalene	91-20-3	0.5	mg/kg	<0.5	6 mg/kg	105	77.0	125
EP075(SIM): Acenaphthylene	208-96-8	0.5	mg/kg	<0.5	6 mg/kg	104	72.0	124
EP075(SIM): Acenaphthene	83-32-9	0.5	mg/kg	<0.5	6 mg/kg	94.2	73.0	127
EP075(SIM): Fluorene	86-73-7	0.5	mg/kg	<0.5	6 mg/kg	111	72.0	126
EP075(SIM): Phenanthrene	85-01-8	0.5	mg/kg	<0.5	6 mg/kg	103	75.0	127
EP075(SIM): Anthracene	120-12-7	0.5	mg/kg	<0.5	6 mg/kg	92.6	77.0	127
EP075(SIM): Fluoranthene	206-44-0	0.5	mg/kg	<0.5	6 mg/kg	109	73.0	127
EP075(SIM): Pyrene	129-00-0	0.5	mg/kg	<0.5	6 mg/kg	107	74.0	128
EP075(SIM): Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5	6 mg/kg	104	69.0	123
EP075(SIM): Chrysene	218-01-9	0.5	mg/kg	<0.5	6 mg/kg	101	75.0	127
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.5	mg/kg	<0.5	6 mg/kg	102	68.0	116
EP075(SIM): Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5	6 mg/kg	103	74.0	126
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5	6 mg/kg	89.9	70.0	126
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5	6 mg/kg	96.0	61.0	121
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5	6 mg/kg	92.3	62.0	118
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5	6 mg/kg	96.8	63.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4266563)								
EP071: C10 - C14 Fraction	----	50	mg/kg	<50	300 mg/kg	100	75.0	129
EP071: C15 - C28 Fraction	----	100	mg/kg	<100	450 mg/kg	110	77.0	131
EP071: C29 - C36 Fraction	----	100	mg/kg	<100	300 mg/kg	105	71.0	129
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4266937)								
EP080: C6 - C9 Fraction	----	10	mg/kg	<10	26 mg/kg	70.2	68.4	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4266563)								

Sub-Matrix: **SOIL**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4266563) - continued								
EP071: >C10 - C16 Fraction	----	50	mg/kg	<50	375 mg/kg	95.8	77.0	125
EP071: >C16 - C34 Fraction	----	100	mg/kg	<100	525 mg/kg	108	74.0	138
EP071: >C34 - C40 Fraction	----	100	mg/kg	<100	225 mg/kg	99.6	63.0	131
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4266937)								
EP080: C6 - C10 Fraction	C6_C10	10	mg/kg	<10	31 mg/kg	71.2	68.4	128
EP080: BTEXN (QCLot: 4266937)								
EP080: Benzene	71-43-2	0.2	mg/kg	<0.2	1 mg/kg	82.6	62.0	116
EP080: Toluene	108-88-3	0.5	mg/kg	<0.5	1 mg/kg	82.2	67.0	121
EP080: Ethylbenzene	100-41-4	0.5	mg/kg	<0.5	1 mg/kg	78.3	65.0	117
EP080: meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5	2 mg/kg	81.1	66.0	118
EP080: ortho-Xylene	95-47-6	0.5	mg/kg	<0.5	1 mg/kg	81.8	68.0	120
EP080: Naphthalene	91-20-3	1	mg/kg	<1	1 mg/kg	81.4	63.0	119

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **SOIL**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG005(ED093)T: Total Metals by ICP-AES (QCLot: 4266915)							
ES2211616-003	Anonymous	EG005T: Chromium	7440-47-3	50 mg/kg	98.7	68.0	132
		EG005T: Copper	7440-50-8	250 mg/kg	98.6	70.0	130
		EG005T: Lead	7439-92-1	250 mg/kg	97.2	70.0	130
		EG005T: Nickel	7440-02-0	50 mg/kg	91.2	70.0	130
		EG005T: Zinc	7440-66-6	250 mg/kg	70.4	66.0	133
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4266916)							
ES2211616-003	Anonymous	EG035T: Mercury	7439-97-6	5 mg/kg	97.8	70.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 4266562)							
ES2211616-001	Anonymous	EP075(SIM): Acenaphthene	83-32-9	10 mg/kg	86.7	70.0	130
		EP075(SIM): Pyrene	129-00-0	10 mg/kg	99.0	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4266563)							
ES2211616-001	Anonymous	EP071: C10 - C14 Fraction	----	480 mg/kg	111	73.0	137
		EP071: C15 - C28 Fraction	----	3100 mg/kg	117	53.0	131
		EP071: C29 - C36 Fraction	----	2060 mg/kg	122	52.0	132
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4266937)							

Sub-Matrix: **SOIL**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4266937) - continued							
ES2211616-001	Anonymous	EP080: C6 - C9 Fraction	----	32.5 mg/kg	77.6	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4266563)							
ES2211616-001	Anonymous	EP071: >C10 - C16 Fraction	----	860 mg/kg	101	73.0	137
		EP071: >C16 - C34 Fraction	----	4320 mg/kg	121	53.0	131
		EP071: >C34 - C40 Fraction	----	890 mg/kg	128	52.0	132
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4266937)							
ES2211616-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	37.5 mg/kg	104	70.0	130
EP080: BTEXN (QCLot: 4266937)							
ES2211616-001	Anonymous	EP080: Benzene	71-43-2	2.5 mg/kg	79.0	70.0	130
		EP080: Toluene	108-88-3	2.5 mg/kg	79.0	70.0	130
		EP080: Ethylbenzene	100-41-4	2.5 mg/kg	84.6	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2.5 mg/kg	81.2	70.0	130
		EP080: ortho-Xylene	95-47-6	2.5 mg/kg	83.7	70.0	130
		EP080: Naphthalene	91-20-3	2.5 mg/kg	95.6	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2211552**	Page	: 1 of 5
Client	: **GHD PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NICOLE REINEKER	Telephone	: +6138549 9630
Project	: 12544866	Date Samples Received	: 01-Apr-2022
Site	: geo tech test pits	Issue Date	: 05-Apr-2022
Sampler	: ----	No. of samples received	: 1
Order number	: 12574014	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Analysis Holding Time Compliance

Matrix: **SOIL**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA055: Moisture Content (Dried @ 105-110°C)						
Soil Glass Jar - Unpreserved						
QA6	----	----	----	04-Apr-2022	30-Mar-2022	**5**
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons						
Soil Glass Jar - Unpreserved						
QA6	04-Apr-2022	30-Mar-2022	**5**	----	----	----
EP080/071: Total Petroleum Hydrocarbons						
Soil Glass Jar - Unpreserved						
QA6	04-Apr-2022	30-Mar-2022	**5**	04-Apr-2022	30-Mar-2022	**5**
Soil Glass Jar - Unpreserved						
QA6	04-Apr-2022	30-Mar-2022	**5**	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions						
Soil Glass Jar - Unpreserved						
QA6	04-Apr-2022	30-Mar-2022	**5**	04-Apr-2022	30-Mar-2022	**5**
Soil Glass Jar - Unpreserved						
QA6	04-Apr-2022	30-Mar-2022	**5**	----	----	----
EP080: BTEXN						
Soil Glass Jar - Unpreserved						
QA6	04-Apr-2022	30-Mar-2022	**5**	04-Apr-2022	30-Mar-2022	**5**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content (Dried @ 105-110°C)							
Soil Glass Jar - Unpreserved (EA055)							
QA6	**16-Mar-2022**	**----**	----	----	**04-Apr-2022**	30-Mar-2022	✗
EG005(ED093)T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T)							
QA6	**16-Mar-2022**	**04-Apr-2022**	12-Sep-2022	✓	**05-Apr-2022**	12-Sep-2022	✓

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved (EG035T)							
QA6	**16-Mar-2022**	**04-Apr-2022**	13-Apr-2022	✓	**05-Apr-2022**	13-Apr-2022	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Soil Glass Jar - Unpreserved (EP075(SIM))							
QA6	**16-Mar-2022**	**04-Apr-2022**	30-Mar-2022	×	**05-Apr-2022**	14-May-2022	✓
EP080/071: Total Petroleum Hydrocarbons							
Soil Glass Jar - Unpreserved (EP071)							
QA6	**16-Mar-2022**	**04-Apr-2022**	30-Mar-2022	×	**05-Apr-2022**	14-May-2022	✓
Soil Glass Jar - Unpreserved (EP080)							
QA6	**16-Mar-2022**	**04-Apr-2022**	30-Mar-2022	×	**04-Apr-2022**	30-Mar-2022	×
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Soil Glass Jar - Unpreserved (EP071)							
QA6	**16-Mar-2022**	**04-Apr-2022**	30-Mar-2022	×	**05-Apr-2022**	14-May-2022	✓
Soil Glass Jar - Unpreserved (EP080)							
QA6	**16-Mar-2022**	**04-Apr-2022**	30-Mar-2022	×	**04-Apr-2022**	30-Mar-2022	×
EP080: BTEXN							
Soil Glass Jar - Unpreserved (EP080)							
QA6	**16-Mar-2022**	**04-Apr-2022**	30-Mar-2022	×	**04-Apr-2022**	30-Mar-2022	×

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Moisture Content	EA055	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (SIM)	EP075(SIM)	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	7	**14.29**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (SIM)	EP075(SIM)	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (SIM)	EP075(SIM)	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (SIM)	EP075(SIM)	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-AES	EG005T	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	7	**14.29**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055	SOIL	In house: A gravimetric procedure based on weight loss over a 12 hour drying period at 105-110 degrees C. This method is compliant with NEPM Schedule B(3).
Total Metals by ICP-AES	EG005T	SOIL	In house: Referenced to APHA 3120; USEPA SW 846 - 6010. Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl2) (Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	SOIL	In house: Referenced to USEPA SW 846 - 8015 Sample extracts are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C40. Compliant with NEPM Schedule B(3).
PAH/Phenols (SIM)	EP075(SIM)	SOIL	In house: Referenced to USEPA SW 846 - 8270. Extracts are analysed by Capillary GC/MS in Selective Ion Mode (SIM) and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	SOIL	In house: Referenced to USEPA SW 846 - 8260. Extracts are analysed by Purge and Trap, Capillary GC/MS. Quantification is by comparison against an established 5 point calibration curve. Compliant with NEPM Schedule B(3) amended.

Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	In house: Referenced to USEPA 200.2. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM Schedule B(3).
Methanolic Extraction of Soils for Purge and Trap	ORG16	SOIL	In house: Referenced to USEPA SW 846 - 5030A. 5g of solid is shaken with surrogate and 10mL methanol prior to analysis by Purge and Trap - GC/MS.
Tumbler Extraction of Solids	ORG17	SOIL	In house: Mechanical agitation (tumbler). 10g of sample, Na2SO4 and surrogate are extracted with 30mL 1:1 DCM/Acetone by end over end tumble. The solvent is decanted, dehydrated and concentrated (by KD) to the desired volume for analysis.

Batch as ES 514.

CHAIN OF CUSTODY COC#: 35132 ALS Laboratory: EM Melbourne	RELINQUISHED BY: JW DATE TIME: 31/3	RECEIVED BY: DATE TIME:	RELINQUISHED BY: DATE TIME:	RECEIVED BY: [signature] DATE TIME:

CLIENT: GHDSER - GHD PTY LTD

PROJECT: 12574014

SITE: geo tech test pits

ORDER NO: 12574014

PROJECT MANAGER: Nicole Reineker CONTACT PH: SAMPLER MOBILE:

PRIMARY SAMPLER: Nicole Reineker QUOTE NO: ME/589/21 v2 / EM2021GHDSER0036

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS : 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact? Yes No N/A

Free ice / frozen ice bricks present upon receipt? Yes No N/A

Random Sample Temperature on Receipt: °C

Other comments: URGENT FREIGHT

SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
001	GTP-01_0.00		16/03/2022 09:44 AM	Soil	ALS: 1 Non ALS: 0	No	-		
002	GTP-1_0.50		16/03/2022 09:45 AM	Soil	ALS: 1 Non ALS: 0	No	-		
003	GTP-1_1.00		16/03/2022 09:45 AM	Soil	ALS: 1 Non ALS: 0	No	-		
004	GTP-1_1.50		16/03/2022 09:46 AM	Soil	ALS: 1 Non ALS: 0	No	-		
005	GTP-1_2.00		16/03/2022 09:48 AM	Soil	ALS: 1 Non ALS: 0	No	-		
006	GTP-1_3.00		16/03/2022 09:49 AM	Soil	ALS: 1 Non ALS: 0	No	-		
007	GTP-1_4.00		16/03/2022 09:49 AM	Soil	ALS: 1 Non ALS: 0	No	-		
008	GTP-1_5.00		16/03/2022 09:50 AM	Soil	ALS: 1 Non ALS: 0	No	-		
009	qa5		16/03/2022 09:50 AM	Soil	ALS: 1 Non ALS: 0	No	-		

Received Justin 1/4/22 3pm

Environmental Division
Sydney
Work Order Reference
ES2211552

Telephone : + 61-2-8784 8555

Received: 24/3 10:00 Carrier: [illegible]
Cnote: 906361
Temp: 9.0°
Ice: Icebricks Seal: On N/A

Batch as ES

CHAIN OF CUSTODY

ALS COC#: 35132 ALS Laboratory: EM Melbourne

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE TIME:	DATE TIME:	DATE TIME:	DATE TIME:

CLIENT: GHDSER - GHD PTY LTD

PROJECT: 12574014

SITE: geo tech test pits

ORDER NO: 12574014

PROJECT MANAGER: Nicole Reineker
PRIMARY SAMPLER: Nicole Reineker

CONTACT PH:
QUOTE NO: ME/589/21 v2

SAMPLER MOBILE:
/ EM2021GHDSER0036

EMAIL REPORTS TO:

EMAIL INVOICES TO:

TURNAROUND REQUIREMENTS: 5 Days

Biohazard info:

LABORATORY USE ONLY (Circle)

Custody Seal intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comments:			

SAMPLE DETAILS							ANALYSIS REQUIRED		
SAMPLE	NAME	DESCRIPTION	DATE / TIME	MATRIX	TOTAL BOTTLES	ON HOLD	Analysis NOT REQUIRED	ALTERNATIVE ANALYSIS	ADDITIONAL INFORMATION
(1) 010	qa6		16/03/2022 09:51 AM	Soil	ALS: 1 Non ALS: 0	No	-		
011	LP_0.03		17/03/2022 07:28 AM	Soil	ALS: 1 Non ALS: 0	No	-		
012	GTP-03_0.50		17/03/2022 07:29 AM	Soil	ALS: 1 Non ALS: 0	No	-		
013	GTP-03_1.00		17/03/2022 07:29 AM	Soil	ALS: 1 Non ALS: 0	No	-		
014	GTP-03_1.50		17/03/2022 07:30 AM	Soil	ALS: 1 Non ALS: 0	No	-		
015	GTP-03_2.00		17/03/2022 07:30 AM	Soil	ALS: 1 Non ALS: 0	No	-		
016	GTP-4_0.00		17/03/2022 09:11 AM	Soil	ALS: 1 Non ALS: 0	No	-		
017	GTP-4_0.50		17/03/2022 09:12 AM	Soil	ALS: 1 Non ALS: 0	No	-		
018	qa7		17/03/2022 09:25 AM	Soil	ALS: 1 Non ALS: 0	No	-		

Ranil Weerakkody

From: Peter Ravlic
Sent: Thursday, 24 March 2022 8:49 AM
To: COC Melbourne
Cc: Dilani Fernando
Subject: GHDSER - COC 35132 - Incoming 24/3 - URGENT 2 DAY TAT

Hi Team

Below analysis confirmation for 2 day TAT

Thanks

Kind Regards

Peter Ravlic
Client Services
ALS Limited

Ph: +61 3 8549 9600
peter.ravlic@alsglobal.com

2-4 Westall Road, Springvale VIC 3171

alsglobal.com

Batch as ES.

From: Nicole Reineker <Nicole.Reineker@ghd.com>
Sent: Wednesday, 23 March 2022 3:43 PM
To: Peter Ravlic <peter.ravlic@alsglobal.com>
Subject: [EXTERNAL] - esky arriving tomorrow- analysis in email for COC 35132

Hi Peter,
Could these please be done under a 2 day turnaround please.
The samples to be analysed for TRH/BTEXN/PAH/8 metals and the rest put on hold.
GTP1_1
GTP1_2
GTP1_3
GTP1_4
GTP1_5
GTP2_0.5
GTP3_1
GTP3_2
GTP4_0.1
QA5
QA6 (please send to Sydney)

Kind Regards
Nicole

Nicole K Reineker

Environmental Scientist

Please note my working days are Monday to Thursday

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Connect

Both as ES

From: Peter Ravlic
To: Nicole Reineker
Subject: RE: [EXTERNAL] - esky arriving tomorrow- analysis in email for COC 35132
Date: Thursday, 31 March 2022 10:16:24 AM
Attachments: image006.png
image008.png
image009.png
image010.png
image011.png
image012.png

Hi Nicole

As discussed, the analysis was passed on to sample receipt at the time but unfortunately the email was overlooked and so the samples were not processed. As some samples were sampled on the 16/3, the analysis for TPH/BTEX/PAH will be done 1 day out of holding time. We don't believe results will be impacted undertaking analysis a few hours outside of holding time and also the fact that samples have been kept chilled overnight from receipt.

Again, apologies for the oversight

Thanks

Kind Regards

right solutions. right partner.

Peter Ravlic
Client Services
ALS Limited

Ph: +61 3 8549 9600
peter.ravlic@alsglobal.com

2-4 Westall Road, Springvale VIC 3171

alsglobal.com

From: Nicole Reineker <Nicole.Reineker@ghd.com>
Sent: Wednesday, 23 March 2022 3:43 PM
To: Peter Ravlic <peter.ravlic@alsglobal.com>
Subject: [EXTERNAL] - esky arriving tomorrow- analysis in email for COC 35132

Hi Peter,
Could these please be done under a 2 day turnaround please.
The samples to be analysed for TRH/BTEXN/PAH/8 metals and the rest put on hold.
GTP1_1
GTP1_2
GTP1_3
GTP1_4
GTP1_5
GTP2_0.5
GTP3_1
GTP3_2
GTP4_0.1
QA5
QA6 (please send to Sydney)

Kind Regards
Nicole

Nicole K Reineker

Environmental Scientist

Please note my working days are Monday to Thursday

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Appendix F

Contamination Assessment Report (GHD, 2022)

GHD
Hobart, TAS 7000
Australia
www.ghd.com

Your ref: [0000]
Our ref: 12574014

15 February 2022

University of Tasmania
C/- Frazer Read (All Urban Planning Pty Ltd)
19 Mawhera Avenue
SANDY BAY TAS 7005

Application No. PLN-21-869 83 - Assessment against the Potentially Contaminated Land Code

Melville Street & 80 Brisbane Street, Hobart & Adjacent Road Reserve - Partial Demolition, Alterations, Extension and Change of Use

Dear Frazer

University of Tasmania (GHD) has engaged GHD Pty Ltd (GHD) to update the existing Contamination Report for development site (83 Melville Street & 80 Brisbane Street), and to include consideration of proposed work in the adjacent road reserve.

This letter is a review of the updated Contamination Assessment report (attached) against the requirements of the Potentially Contaminated Land Code - E2.6.2. of the Hobart Interim Planning Scheme 2015. It considers the proposed UTAS redevelopment activities in the context of existing and proposed contamination assessment works.

This letter and the attached Contamination Assessment report have been developed and reviewed by Peter Topliss (EIANZ Certified Site Contaminated Specialist [CEnvP No.SC41076]), and the associated work conducted in general accordance with the NEPM (2013)[1].

The extent/boundary of the Site and the associated redevelopment activities are modified from the previous submissions in 2018 in the following key areas:

- The site extent has been expanded to include 80 Brisbane Street and associated work in adjacent road reserves;
- Excavation works required to accommodate the redevelopment program include areas of ground levelling, lift pits, and new utility trenches (stormwater and sewer) as shown in Figure 1

[1] National Environment Protection (Assessment of Site Contamination) Measure, as amended 2013.

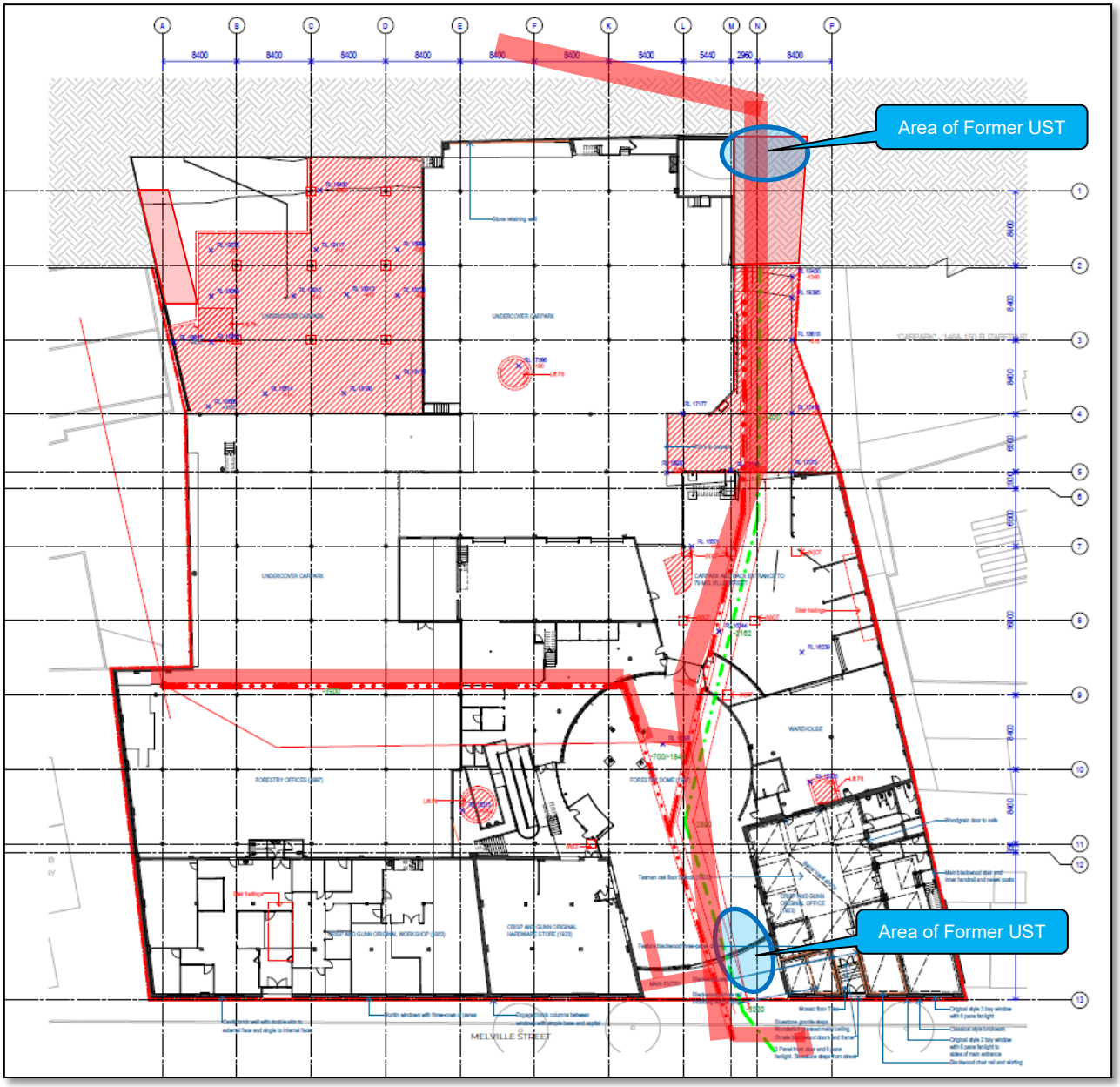

Figure 1 *Site development footprint (red shaded areas = proposed excavation areas and utility trenches)*

Site has been subject to various phases of prior contamination assessment including:

- Richard Stoklosa Engineering Practice Pty Ltd (1994) *Screening level Environmental Site Assessment of 79-83 Melville Street, Hobart*. Report prepared for James Douglas & Associates on behalf of Tasmania State Property Services, dated 2 December 1994.
- Stoklosa Engineering Pty Ltd (1996) *Forestry Tasmania Redevelopment Project, 79-83 Melville Street, Hobart*. Letter to Forestry Tasmania, dated 18 September 1996.
- Stoklosa Engineering Pty Ltd (1996) *Environmental Remediation and Validation, December 1996* (report not available for this review).
- GHD (2018) *78-83 Melville St, Limited Preliminary Site Investigation.* Report prepared for the University of Tasmania.
- GHD (2022) Contamination Assessment 79-83 Melville Street Hobart and 80 Brisbane Street Hobart.

The latter assessment report combines all previous assessment work and expands the area of consideration to include the entire development footprint and provides broad consideration for the proposed work in the adjacent road reserve.

In summary, the development site has been subject to extensive background investigation and targeted assessment and remediation (i.e. removal of underground petroleum storage systems [UPSS]). This provides increased confidence that key potential aspects of concern have subsequently been identified and addressed to varying degrees. The site history and potential contamination risk is typical of most urban sites in Hobart and based on available information, has not shown any higher risk issues.

For areas of proposed excavation for redevelopment (where potential exposure risk is higher) the following key aspects are to be considered:

- Former UPSS near Brisbane Street - While unconfirmed, available evidence suggests it was likely removed and possibly remediated (circa 1996).
- Former UPSS near Melville Street - Removed and residual contaminated soil identified as “localised” and “unlikely that the contamination has migrated off site” (Stoklosa 1996).
- Imported fill used across the site generally (and historical use of hydrocarbons on site), and likely representing a low risk, consistent with other urban sites in Hobart (i.e. a mixture of fill material and typically low level contaminated soil)
- A residual risk remains for many streets in central Hobart associated with the potential for buried old town gas infrastructure (pipework), including both Brisbane Street and Melville Street. There is no information to suggest the associated risk is any higher at this location than in any other areas of the city.
- Potential localised contamination aspects were identified on-site including the capped oil sump, triple interceptor trap and electrical substation. However, as they are not located in proximity to the proposed areas of excavation, and represents relatively low risk profiles, there is no material increased risk to construction workers, futures site users or the environment associated with the proposed development works.
- The residual risk to site from potential off-site contamination risk (i.e. surrounding automotive and fuel storage activities) migrating on-site is primarily relating to scenarios where excavation works are conducted into, or in close proximity to the underlying groundwater.

In summary the site history and potential contamination risk is typical of most urban sites in Hobart and based on the prior contamination assessment programs, has not shown any higher risk aspects. While further quantitative assessment work is recommended to confirm potential contamination risks at specific target areas prior to commencement of work on site (and off-site), it is reasonable to conclude that the overarching risk profile for the site can be effectively managed to avoid adverse impact on human health or the environment.

Informed by previous investigations on the site as outline above and in the attached assessment, it is considered that the following specific actions prior to commencement of excavation on site will appropriately manage the risk to human health and the environment:

- Define the characteristics and extend of residual contamination (if present);
- Determine whether contamination represents a potential unacceptable risk to human health or the environment (including risk to construction workers);
- Specify any associated remediation and/or specify site controls required to protect risk to human health or the environment (acknowledging that in some cases full assessment and remediation may not be practical until site develop has commenced, due to access constraints); and
- Ultimately identify that the site is suitable for its intended future use (subject to any remediation or controls required).

More specifically, the ESA is to address the following target aspects representing potential site contamination that require further assessment:

- Area of proposed utility trenching next to the former UPSS near Brisbane Street;
- Area of proposed utility trenching next to the former UPSS near Melville Street;
- Areas of prosed utility trenching in road reservations on both Brisbane and Melville Streets, and accounting for associated potential risks from old town gas (including safe work protocol during drilling);
- General assessment (grid and/or judgemental sampling patterns) for soil characterisation of proposed excavation areas required for the redevelopment including areas of ground levelling, lift pits, and remaining utility trenches not addressed above.

In context of the broader site footprint outside of proposed areas of excavation, it represents a low risk profile. As the exposure setting and land use do not materially change (commercial setting to commercial setting) there is no material increased risk to construction workers, futures site users or the environment associated with the broader site footprint.

UTAS has already committed to conduct further contamination investigation works to meet the aforementioned identified gaps, and sampling programs have been developed. However, due to difficulties is securing availability of civil contractors due to high demand and access to leased car park areas requiring 24hr access, the work cannot be conducted as part of this submission. The work will be carried out prior to construction related excavation works commencing. UTAS will also commission development of a Construction Environmental Management Plan and Soil & Water Management Plan (including groundwater) to guide site construction activities. The findings of further contamination investigations will be used to build the basis of those plans.

It is important to recognise that UTAS (with GHD) has a proven track record of addressing potential site contamination aspects at very similar development scenarios in central Hobart (i.e. NRAS Melville Street and The Hedberg). These recent programs have been successful in identifying site contamination aspects, remediation and conducting risk assessments to determine suitability for site workers and future users.

Potentially Contaminated Land Code

E2.6 Development Standards
E2.6.2 Excavation

Objective: To ensure that works involving excavation of potentially contaminated land does not adversely impact on human health or the environment.

Performance criteria	***Assessment***
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.*	The proposal is considered to satisfy P1 (b) in that the site history and potential contamination risk is typical of most urban sites in Hobart and based on the prior contamination assessment programs, has not shown any higher risk aspects. Further quantitative assessment work is recommended in the following areas: • the proposed utility trenching next to the former UPSS near Brisbane Street; • the proposed utility trenching next to the former UPSS near Melville Street; • the proposed utility trenching in road reservations on both Brisbane and Melville Streets, and accounting for associated potential risks from old town gas (including safe work protocol during drilling); and • a general assessment (grid and/or judgemental sampling patterns) for soil characterisation of proposed excavation areas

required for the redevelopment including areas of ground levelling, lift pits, and remaining utility trenches not addressed above.

These investigations will confirm any specific remediation measures prior to commencement of any excavation work on site and are an appropriate plan to managed potential contamination and associated risk to human health and the environment and

Subject to this approach it is considered the excavation will be effectively managed to ensure no adverse impact on human health or the environment.

Regards

Peter Topliss
Technical Director - Contamination and Remediation

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Peter.topliss@ghd.com

Contamination Assessment

79-83 Melville Street and 80 Brisbane Street, Hobart

University of Tasmania

10 February 2022

The Power of Commitment

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Author	Nicole Reineker
Project manager	Nicole Reineker
Client name	University of Tasmania
Project name	UTAS Old Forestry Building Contamination Assessment
Document title	Contamination Assessment | 79-83 Melville Street and 80 Brisbane Street, Hobart
Revision version	Rev 0
Project number	12574014

Document status

Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
	0	Nicole Reineker	Peter Topliss		Peter Topliss		11/2/2022

Contents

Table index

Appendices

1. Introduction

1.1 Purpose of this report

The objective of this study was to identify any current or legacy activities that have potential to impact the soil or groundwater below the site based on a desktop review, and site visit and any associated recommendation to address those risks.

1.2 Scope of works

This contamination assessment has been undertaken in general accordance with the National Environment Protection Council (NEPC) (2013) Schedule B2 Guideline on Site Characterisation of the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended April 2013) (the NEPM).

The scope of work completed to inform this report comprised the following tasks:

- Review and interpretation of the following information sources
- Local government planning information indicating current and proposed land use zoning and permissible uses
- Historical aerial photography depicting the site and surrounds
- Geological, soil and topographical maps depicting the site
- WorkSafe Tasmania dangerous goods records review (information outstanding)
- EPA Tasmania Contaminated Site database search (information outstanding)
- Local government (Hobart City Council) records
- Preparation of this report describing the investigation and presenting the findings

1.3 Limitations

This report has been prepared by GHD for University of Tasmania and may only be used and relied on by University of Tasmania for the purpose agreed between GHD and University of Tasmania as set out in section 1 of this report.

GHD otherwise disclaims responsibility to any person other than University of Tasmania arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.4 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

GHD has prepared this report on the basis of information provided by University of Tasmania and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

2. Site setting

2.1 Site identification

Table 1 Site details

Item	Details
Site Address	79 – 83 Melville Street, Hobart, Tasmania, 7000 and 80 Brisbane Street, Hobart, Tasmania, 7000.
Property Identifiers (Melville St)	Title Reference Number/s: 149231/2 Property ID Number (PID): 2911798
Property Identifiers (Brisbane St)	Title Reference Number/s: 149231/1 Property ID Number (PID): 2811771
Site Area	Approximately 7000 m^2
Site Owner/ Operator	University of Tasmania
Current Zoning	22.0 Central Business (Hobart Interim Planning Scheme 2015)
Current Land Use Melville St: Brisbane St	 Not currently in use- previously Forestry Tasmania Freedom Furniture- Home wears retail outlet
Surrounding Land Uses	The site is located approximately 550 m west northwest of the Hobart GPO. Current land uses surrounding the site comprise: North: Brisbane Street -Retail businesses East: Murray Street- Retail, business offices and a mechanics West: Elizabeth Street- retail and lifestyle businesses South: Melville Street- Wesley Centre (Chapel, Hall and Museum), multistorey car parking and retail business.

2.2 Site layout

The site is located on the periphery of Hobart's Central Business District with frontage to Melville Street and vehicle access from Brisbane Street. The layout of the site is shown on Figure 1 in Appendix A. It is essentially an irregular rectangular shape with very little open space, apart from a drive-way located on the north-eastern boundary leading to the service yard. Buildings cover the rest of the extent of the site, with two converted redbrick warehouses joined by a large glass atrium along Melville Street. This building extends back to Brisbane Street with car parking on the lower ground floor, a service yard, workshops and laboratory leading to the offices along Melville Street. All ground is covered with buildings or asphalt.

2.3 Site environmental setting

2.3.1 Elevation and topography

The site slopes gently from the north east to the south west and has an approximate elevation ranging from 15 – 20 m AHD. It is considered likely that the rear of the site (northern end) has been excavated into natural ground to facilitate development of the car parking.

2.3.2 Geology

Geology has been mapped as comprising four units as follows and is shown on Figure 2 Appendix A .

– Northern section of the site mapped as alluvial gravel, sand and clay (Qa).
– South eastern section is mapped as undifferentiated quaternary deposits (Q).

– South western portion of the site is mapped as comprising poorly sorted boulder to pebble grade deposits with boulders up to 3 m length, clasts generally dominantly of dolerite with traces to rarely dominant amounts of Upper Parmeener mudstone and other rocks and less commonly Lower Parmeener rocks, clayey material (Tcbd).
– A small area around the service yard is mapped as dolerite and related rocks (Jd).

2.3.3 Surface water and groundwater

The site is located approximately 900 m north east of the Sullivans Cove, River Derwent. Information on depth to groundwater beneath the site has been obtained from bore logs contained in Screening Level Environmental Site Assessment of 79-83 Melville Street, Hobart (Stoklosa 1994), and was observed at between 1 and 4 metres below ground level (mbgl).

On the basis of topography in the vicinity of the site and proximity to the Derwent Estuary, it is anticipated that the groundwater flow direction at the site is towards the Derwent Estuary to the south east.

2.3.4 Acid sulphate soils

The majority of the site is mapped as being at low risk of having acid sulphate soils (ASS), with a small section along the western boundary mapped as not being at risk.

2.4 Site history search

2.4.1 Site history

Originally a land grant acquired by the Crisp family, the site, which extends through to Brisbane Street, operated as a sawmill and timber and hardware outlet until 1968. Following a fire at the site in 1922 the two redbrick warehouses on Melville Street were constructed, the eastern one was used as a warehouse store for dry and finished timber products and smaller western one housed the hardware emporium business.

The site was sold to the Tasmanian State Government in the late 1960s and was used as stores and offices including the State Emergency Service, and The State Fire Commission. In 1997 the site was redeveloped to be Forestry Tasmania Office and showroom. This redevelopment retained the two redbrick warehouses and incorporated into the design a glazed, domed foyer joining them together. This development comprised the refurbishment of the two warehouse buildings; construction of new office and amenities areas; a retail showroom and the foyer dome.

2.4.2 WorkSafe Tasmania Dangerous Goods records

A search of the WorkSafe Tasmania dangerous goods records was ordered to confirm what dangerous goods the site has historically been licenced to hold. On 28th September, WorkSafe advised that their database searches had identified

The search revealed documentation that:

– On 4 July 1955, Crisp and Gunn Co-op Ltd applied to renew registration of storage of 500 gallons of mineral spirit
– On 5 December 1962, The Shell Company of Australia applied to replace the single manual pump with a single electric pump on an existing 500 gallon tank (not to scale diagram included)
– On 4 January 1963, Crisp and Gunn was inspected by Inspector of Explosives to inspect pump outfit owned by The Shell Company of Australia that was approved on 5 December 1962
– An application by Crisp and Gunn, to keep one 1,000 gallon petrol tank at 79 Melville Street, was submitted to Department of Mine on 5 June 1967
– On 17 April 1967, approval of 1,000 gallon tank situated at Crisp and Gunn Co-op Ltd
– On 20 July 1967, Crisp and Gunn was inspected by Inspector of Explosives to inspect the 1,000 gallon tank owned by Shell Co of Australia that was approved on 17 April 1967

A copy of the WorkSafe Dangerous Goods Documentation and correspondence is presented as Appendix C.A copy of the correspondence is provided in Appendix C

2.4.3 Environmental Protection Authority (EPA) Tasmania records

The Environmental Protection Agency was contacted for any information they may hold regarding the Site. The EPA confirmed that they held several records/reports regarding an Environmental Site Assessments and the letter states:

"*Of particular interest was the decommissioning of an underground storage tank (UST) located on the Brisbane Street side of the Site and another UST located on the Melville Street side of the Site"*

In addition they mention:

– Stoklosa 1996 report and the EPA response that the localised hydrocarbon presence (around Melville street former UST) should be disclosed to future occupants of the Site
– WorkSafe records for the site and neighbouring site (same records provided by WorkSafe)

A copy of the correspondence is provided in Appendix D

2.4.4 City of Hobart Council records

The City of Hobart (CoH) Council was contacted for any information they may hold regarding current or historic pollution at the site, including old reports and applications for fuel storage or chemical storage, remediation notices, pollution incidents, and permits. The CoH confirmed that they had records that the site had been historically used for potentially contaminating land-use activities (refer to Appendix E). The only potential sources of contamination at or adjacent to the site that CoH noted, were hydrocarbons. The main use of the site from 1886 until 1967 was classified as wood treatment/sawmill, with various business occupying the site. These businesses comprised:

– From 1886 -1915, Central Saw and Planing Mills
– From 1916-1932, Absolom brothers
– From 1955 -1967, Crisp and Gunn Co-op Ltd
– Dates unknown, Absolom Garage
– Dates unknown, Bert Self
– Dates unknown, Shell

The property also lies adjacent three sites that have been identified as potentially contaminated with hydrocarbons. These comprise:

– 131-133 Murray Street, which operated as a fuel supplier in 1916
– 141-143 Murray Street, which operated as a motor car dealers, engineers and garage between 1966 and 1979 by:
    - J.T. Graves & Son Pty. Ltd
    - H.C. Sleigh/ Golden Fleece
    - John Tasman Graves
– 132- 146 Elizabeth Street, which operated in 1940 as a body works, motor car dealers, engineers and garages by Trade Motor Body Works

These three adjacent properties are mapped as being located either side of the site.

The phrase "motor car dealer, engineer and garage" is a category name used to categorise similar businesses which was used when the contaminated sites register was created. These operations are generally considered to fall under the current classification of "commercial engine and machinery workshops or petroleum product or oil storage for service stations

A copy of the correspondence is provided in Appendix E

2.4.5 Dial before you dig records

A Dial Before You Dig (DBYD) request was submitted on Monday 1st October. The following information was received about the infrastructure on site from:

– TasNetworks
– TasGas
– nbn Co.
– Optus
– DPIWE (Aboriginal Heritage)
– TasWater
– HCC

The City of Hobart (CoH) response letter highlighted the possibility of “abandoned old town gas (coal gas) pipes potentially emitting harmful gases and Volatile Organic Compounds (VOCs) may be found in many areas of the City” within the vicinity of the site. There is no information available on exactly where these pipes may be located within Hobart CBD. While these pipes are usually located within road reserves, feeder lines may be present on the site.

TasWater’s responses show that sewage lines run through the site.

Appendix F contains all the responses received from the DBYD search.

2.5 Historic aerial photography

A review of historical aerial photography was undertaken as part of this assessment, and the findings of the review are presented in Table 2 below.

Historic aerial photographs of the site were ordered at approximately 10-year intervals commencing from the earliest available (1946) to 2000. Figures for this report have been prepared using the most current image of the site available from Google Earth which is from 2022 and the same image has been used to describe the current site layout. The historic aerials are presented in Appendix G.

Table 2 Aerial photograph summary

Photo ID	Date taken	The site	Melville Street	Brisbane Street	Murray Street	Elizabeth Street
10917	1946	The two redbrick warehouse buildings (now joined by atrium). Western building has three roof sections (looking like 3 adjoined warehouses). Eastern building roofline similar. Where atrium is now is a fenced yard. Very large warehouse/structure joins redbrick buildings behind fenced yard - this takes up approximately 1/4 of the current site.	Looks similar to now	Houses/small buildings, some with back yards all along street - no empty blocks.	All cadastral blocks have at least one building on them. Appears to be more commercial than Brisbane St (storage yards at multiple properties - unable to determine what is being stored) storage yard at 131-133 Murray looks like shipping containers.	Street looks similar to now (shop fronts and terraces) but with back yards rather than an office block at back of buildings.
326-123	1957	Looks very similar to 1946 photo- storage yards behind buildings on Melville Street more obvious. Chimney stack visible (where Freedom is now). Piles of timber being stored in a yard. Possible location of petrol bowser visible in fenced yard on Melville St.	Same	Same	Same	Same
442-248	1965	Best historical image of site (all aspects clear). Houses removed from Brisbane St making a large driveway/access to storage yards at back of Melville St warehouses. Storage yards appear to have sealed surface. Two raised tanks near chimney stack (probably water due to shape and height). A new, small structure in fenced yard - surface appears to be sealed (possibly new petrol bowser installed in 1962)on Melville St.	Same	House/building (apart of site) removed to allow access to storage yards at site. 94-98 Brisbane -Building on corner of Murray removed and new building constructed at back of block – there are multiple cars in yard - surface is sealed.	131-133 Murray St has shipping containers stored. 141-143 Murray St multiple vehicles in yard at back, the surface appears to be sealed.- some debris on ground around fences and staining of ground surface (probably operating as garage).	Same- but storage yard at back of 132-146 Elizabeth is clearer and possible oil/ hydrocarbon drums/above ground tanks. Surface is sealed.
801-053	26/10/1979	Back of site cleared - all houses removed, chimney stack removed, raised tanks removed, storage areas/yards removed. Driveway installed from Brisbane St to centre of block (where it is now). At end of driveway new building attached to shed/warehouse. Possible location of petrol bowser and 1000 gallon tank (installed 1967) near driveway. Surface has been sealed and some areas have marked car parks, rest used for unmarked car parking.	Same	All buildings from corner of Murray to 74 Brisbane (now Wagner's Framing) demolished and turned into car parking. Appears to be below street level in sections.	141-143 Murray St- surface resealed and parking bays painted in. Roof replaced on one building. 131-133 Murray St building has been extended – no longer being used as storage yard, surface has been sealed and now being used as car parking.	Backyard at 146a-150 Elizabeth contains multiple cars - not as a car park. Some staining on ground (or could be vegetation).

Photo ID	Date taken	The site	Melville Street	Brisbane Street	Murray Street	Elizabeth Street
		Fence/wall between redbrick warehouses on Melville removed. Small structure seen in 1965 photo removed. Car parking spaces marked in lot.				
1118-026	2/12/1988	New roof on front third of eastern red brick warehouse. New roof on building extended above at end of driveway and small lean-to attached on eastern side. No other changes.	Same	Same	131-133 Murray - car parking marked.	Same
1239-074	16/2/1996	The rest of the roof replaced on eastern redbrick warehouse. No other changes.	Same	Same	141-143 Murray - roof replaced on warehouse/shed.	Same
1332-092	19/11/2000	Forestry Tasmania development of site has occurred. Glass dome constructed between the two redbrick warehouses. Large warehouse in centre of block removed. Along Brisbane St, Freedom Furniture shop and car park built. Driveway off Brisbane St extended and new service yard created (where large warehouse was removed from). New roof on western redbrick warehouse and extended.	Same	Same	Same	Same
theList, Base map State Aerial Photo	2022	Same	Same	Same	Same	132-146 Elizabeth Street – warehouses and back of buildings removed (leaving street facing terrace houses) and large office block developed.

3. Previous reports

The Site has been subject to a number of investigations that are able to inform the potential for site contamination and its associated risk. The following reports were made available for use in this investigation and are included in Appendix H:

- Richard Stoklosa Engineering Practice Pty Ltd (1994). *Screening level Environmental Site Assessment of 79-83 Melville Street, Hobart.* Report prepared for James Douglas & Associates on behalf of Tasmania State Property Services, dated 2 December 1994.
- Stoklosa Engineering Pty Ltd (1996). *Forestry Tasmania Redevelopment Project, 79-83 Melville Street, Hobart.* Letter to Forestry Tasmania, dated 18 September 1996.
- *Department of Environment and Land Management (DELM) (1996). Forestry Tasmania Redevelopment Project 79-83 Melville Street,* Environment Tasmania letter to Forestry Tasmania, dated 23 September 1996.
- Department of Environment and Land Management (DELM) (1997). *Forestry Tasmania Redevelopment Project 79-83 Melville Street,* Environment Tasmania letter to Forestry Tasmania, dated 20 January 1997.
- WSP Parsons Brinckerhoff (2017). *Site Location Plan – 79 Melville Street, Hobart*. Email chain with attachment from WSP Parson Brinckerhoff to Abacus Property dated 7th April 2017.
- Nekon (2018). *Oil Sump Removal/Treatment*. Email with attachments from Nekon Pty Ltd to UTAS dated 27th September 2018.
- Collex Waste Management (1996), *Certificate of Disposal*, dates 28th August 1996

3.1 Stoklosa (1994)

Stoklosa (1996) included a detailed site history review and identified early Site use as timber/joinery business, changing to office and stores from the mid 1960s. A tall smokestack was identified in the northwest section of the site (now within the footprint of the Freedom Furniture store), likely associated with burning of wood waste. While the 1996 site inspection identified various small quantities of hazardous materials on site (i.e. small outdoor flammable liquid store on concrete), the primary aspect identified was a single petrol tank and bowser, abandoned prior to 1965. Its location is identified on the northern corner of the site, adjacent to Brisbane Street (refer Figure 3 in Appendix A). Council records suggested a triple interceptor trap located 'in the storage area'. The exact location is not provided but inferred to be in the northern section of the site (i.e. within the current fenced in car parking area/open area).

Historical geological investigation logs (1979) were included in the appendix. These engineering logs in locations near proposed future soil disturbance areas identified that fill had been used in places across the site to a depth of approximately 1.0 mbgl. The fill was varied with a variety of material recorded including rubble, brick fragments, rocks, clay, and boulders.

No contaminant testing was undertaken as part of this investigation.

3.2 Stoklosa (1996)

This report included assessment of soils after removal of a single underground storage tank (UST) from the main entrance area near Melville Street (Figure 4 in Appendix A). Residual petroleum hydrocarbons were detected in soils in the base of the excavation at concentrations that exceed current commercial/industrial land use criteria (NEPM 2013 Table 1A(3) Soils HSLs for vapour intrusion) for TRH (FT2 and FT9 only), but not xylene. However, they did not exceed either the CRC Care direct contact for intrusive works or HSL for vapour intrusion for intrusive works criteria (CRC Care 2011[1]). Samples from the same area (presumed upgradient, however sample depth not specified [FT-1, FT-3, FT-8]) did not contain concentrations of hydrocarbons or BTEX significantly above the laboratory limit of reporting. The letter concludes the lateral and vertical extent of contamination is not known, however:

"*There appears to be no significant risk of exposure to workers or visitors to the site."*

[1] CARE, CRC. "Health Screening Levels for Petroleum Hydrocarbons in Soil and Groundwater." (2011).

No metals concentrations were detected above the commercial/industrial land use criteria at the UST, or in other areas of the Site that were investigated.

There was evidence of planning the removal and assessment of the UST near Brisbane Street, and a note that Stoklosa Engineering must be on site to witness the removal of the UST and to take samples, and correspondence from EPA indicating that the tank has been removed.

Table 3 Hydrocarbon and BTEX concentrations detected in Stoklosa 1996 (Melville St UST)

	TPH (mg/kg)	C6-C9 (mg/kg)	C10-C14 (mg/kg)	C15-C28 (mg/kg)	C29+ (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylene (mg/kg)
FT-1	ND	ND	ND	ND	ND	ND	ND	ND	ND
FT-2	660	530	130	ND	ND	ND	4	7	66
FT-3	8	ND	ND	ND	ND	ND	ND	ND	ND
FT-8	7	ND	ND	ND	ND	ND	ND	ND	ND
FT-9	1790	1330	440	ND	ND	2	8	14	176

ND = non detect above laboratory limit of reporting

3.3 DELM (1996)

This letter is in response to Stoklosa Engineering letters dated 8th and 18th of September 1996 and a meeting on site on 10 September. It mentions that UST evacuations and that the results were provided to Environment Tasmania under due diligence. That additional testing is required around the “unanticipated UST” to determine extent of lateral contamination and that bore logs need to be provided with results to determine depth of each sample.

3.4 Collex (1996)

This is a one page document confirming that 2,500 litres of hydrocarbon contaminated (slurry?) was removed from 79 Melville Street on 28 August 1996 (no mention of whether this is from one or both of the USTs).

3.5 DELM (1997)

This letter makes reference to a subsequent body of work “Environmental Remediation and Validation, December 1996” prepared by Stoklosa Engineering. While the report was not available for this investigation, Environment Tasmania concur with Stoklosa that “…contaminated soil under the UST represents a localised hot spot…” and that “it is unlikely that the contamination has migrated off site, or will do so in the future”. Environment Tasmania considered that the site was suitable for its use as Forestry Tasmania, however if the site use was to change/or be developed for a more sensitive use in future, in-situ soil testing may be required.

3.6 Parsons Brinckerhoff (2017)

This is an email chain with attachment that outlines the results of an site inspection undertaken on 7 April 2017 by an Senior Environmental Scientist.

The following observations were made during the inspection:

– Two metal gatic covers were observed located on a square of reinstated bitumen approximately 1x1 m in size.
– Plastic covers were removed which reviewed two vertical pipes of approximately 3-4 inches in diameter.
– No hydrocarbon odours were noted when the covers were removed.
– The periodic horizontal flow of water was observed at the base of the standpipes approximately 2.9 m below surface.
– The covers aligned with the services indicated on the plan and observed onsite, which are believed to relate to sewer and surface water.

– No ‘petrol tanks’ were able to be located at the site.

Parson Brinckerhoff believed that the vertical pipes were most likely installed to inspect or allow access to the existing services. The periodic flow of water and their location in relation to existing services suggests it may be associated with the sewer or stormwater water drainage services.

3.7 Nekon (2018)

This email confirms that the oil sump that was located in the Workshop with the three roller doors (refer Figure 3 in Appendix A), that opens to the undercover car park was cleaned out and capped. This email contained photographs of the sump prior to cleaning and after capping. The invoice for these works was also attached.

4. Site inspections

Two site inspections were undertaken by GHD, on Monday 24 October and Wednesday 26 October 2018, with a further inspection being undertaken on 28 January 2022. While the entire building was inspected (during the 2018 inspections), only the ground floor level including car parking area will be discussed in this section, as the second and third floors are unlikely to have contributed to any soil or groundwater contamination on site. The inspection in January 2022 was targeted towards the excavations proposed as part of the redevelopment of the Site.

The plates from the three site inspections are included in Appendix B and these comprise part of the description of the Site.

Entrance and Atrium

This area is unsealed and has a dirt/soil ground. This area was previously the planted out as a simulated Tasmanian Forest.

Square steel coved manhole located in front of atrium along Melville Street - this is in the vicinity where the former UST that was removed for the Forestry Development was located (Plate 1).

There was evidence of geo-fabric used in the development of the forest in the atrium coming to the surface (Plate 2). This was observed throughout the right side of the atrium.

There were a few concrete manhole covers observed in the Atrium (Plate 3), these gatics are located above the sewage line. The gatics throughout the site that relate to sewage infrastructure look identical.

Workshops- Fabrication and Operations

There are two workshops on the ground floor, one on each side of the building. The Fabrication workshop is the one that has a roller door to the Service Yard. The Operations Workshop is located with three roller door access to the undercover garage.

Both of these workshops contained exterior signage saying that they contained flammable gas, non-flammable nontoxic gas and oxidizing gas (Plate 4 and Plate 5).

Within the Operations workshop there is a circle of fresh concrete (Plate 6). This is from where the oil sump was cleaned and then capped.

Laboratories

There was HAZCHEM signage on the Laboratory door to the Service Yard. It is likely that agricultural chemicals were used and stored within this area (see plate 7). It is unlikely that these would have contributed to any contamination on site as the floor of the laboratory is sealed with concrete. There is a drain in the corner of the room. There was no evidence of chemical use laboratory (i.e. signage) but this room had been gutted with partitions between sections removed (Plate 8).

Service Yard

The service yard is connected to the atrium, Fabrication workshop and the driveway from Brisbane Street. There is a three bay garage down the northern edge (one with a roller door and the other two open), a sink near the gate to the atrium; the remainder of the area is open to the sky and the surface is sealed.

Within the garage area there are three bays, the bay closest to the workshop has a drain with standing water (Plate 11) and a gatic covered sump (Plate 10) and a large metal manhole cover. The adjacent bay contains what was assumed to be the triple interceptor trap (Plate 12) and was likely used as a wash down area. The second bay also contains a steel pipe down the eastern corner (Plate 12) – it is unknown what this was used for. The third bay has a sealed surface without any drains.

There is evidence that an area of the concrete adjacent to the garage area was replaced recently (Plate 10), it is unknown why this occurred.

There are multiple drains (Plate 10 and Plate 14) in this area with visible water under the grate (Plate 11). A spill mat was stored in the service yard (Plate 15).

Eastern Redbrick warehouse

This building was being used as a meeting room and offices and is in good condition (Plate 16). Prior to our site visit, sections of the floorboards had been cut to allow access to the underfloor surface. The floor of this building comprises floorboards raised over a dirt floor (Plate 18 and Plate 21). There appears to be no slab in place in this section of the site.

Western redbrick warehouse (GLA 3)

This building was used as mainly offices during Forestry's tenancy. The ground floor of this building is at or below street level. Most of this area has been gutted but some sections still contain some partitions (Plate 19).

Prior to the site visit sections of the floorboards were removed to allow access to the subsurface (Plate 19). The floorboards within the building are raised above a concrete slab (Plate 21).

Underground car parking area

The underground car park is at the back of the buildings facing Melville Street and underneath Freedom Furniture Store. All surfaces are sealed. There are numerous concrete manholes that are aligned over the TasWater sewage network and HCC stormwater drains. An example of the stormwater drains can be seen in Plate 23. There were two gatic covers located adjacent to each other observed in this area (Plate 22). These are in line with the sewage line and manholes in the area.

There is a electricity substation in the corner of the car park area adjacent to the driveway (Plate 25).

Driveway from Brisbane Street to Service yard and underground Car park

Plate 24 shows where a section of the asphalt has been cut and replaced with three rectangular gatic covers. This is within the vicinity of where the Brisbane Street UST was/is located. There are also numerous cut lines in the asphalt surrounding this gatic.

Sewage, water and stormwater

Concrete manhole covers located throughout the site - these are consistent with where sewage/wastewater lines (TasWater) and stormwater drainage (HCC) are located. An example of the drains in the underground car parking area is shown in Plate 23. An example of the TasWater's sewage manhole covers can be seen in Plate 1.

Surrounding land use

Currently there is a Beaurepaires retail outlet adjacent to the Freedom Furniture shop on Brisbane Street.

5. Site history of potential contamination

The following have been identified as potential sources of historical contamination at the site:

– Underground Storage Tanks and associated infrastructure including bowers and piping
– Chemical storage
– Triple interceptor trap
– Historical uncontrolled fill beneath the site
– General commercial/industrial land with potential for incidental leaks and spills to ground

Potentially contaminating activities undertaken historically on neighbouring land are generally associated with the automotive industry or fuel storage. Specifically, there has been:

– Rowe, a fuel supplier present on the adjacent site to the southeast (131- 133 Murray Street)
– Trade Motor Body Works, an automotive business to the west/northwest of the site (132-146 Elizabeth Street)
– J.T Graves & Son Pty Ltd, an automotive business to the east of the site

Figure 3 in Appendix A shows the locations of historic and current potentially contaminating activities undertaken in the vicinity of the site, relative to the site layout.

6. Summary of potential contamination and risk assessment

6.1 Former UST (1000 gallon) and metered pump- Brisbane Street

Mentioned in: WorkSafe Dangerous Goods (1967 records), Hobart City Council records (Shell), Stoklosa (1994), Stoklosa (1996), Site visit (gatics covers on driveway where tank was assumed to be).

Overview

We were unable to confirm that the UST that was located in the northern corn of the site adjacent to Brisbane Street was removed and remediated. The exact location of the tank was unable to de determined, as the diagrams in WorkSafe records have no scale nor is the surrounding land use labelled. It is likely that this occurred due to evidence of the planning of this removal and that Stoklosa Engineering noted in their letter (dated 18 September 1996) that they need to be onsite to witness the removal of this UST, and the correspondence from the EPA (12/10/2018) indicated that they had records of its removal.

The site visit noted that there was a large rectangular gatic cover (Plate 24) in the vicinity of where the UST was believed to be and the substation located in the car park, however when the location was compared with the DBYD response (Appendix F) from TasNetworks, no cabling went into the driveway area.

Relative risk

The likelihood of residual contamination (in soil and groundwater) in the area is low to moderate. If the gatic covered could be removed and inspected, this would add some confirmation of the residual risk.

6.2 Former UST (500 gallon) and Bowser – Melville Street

Mentioned in: WorkSafe Dangerous Goods (1962/3 records), Hobart City Council records (Shell), Stoklosa (1996), DELM (1996)

Overview

The UST that was referred to in Stoklosa's reports as the unanticipated UST, was removed in 1996 and there is evidence of soil testing being undertaken. While elevated concentrations of short chair hydrocarbon and xylene were detected in some samples, Environment Tasmania concur with Stoklosa that "…contaminated soil under the UST represents a localised hot spot…" and that "it is unlikely that the contamination has migrated off site or will do so in the future".

Relative risk

The likelihood of residual contamination (in soil and groundwater) in the area is low to moderate. As the source (UST) was removed, and residual impact at that time appeared localised, any residual risk will likely have degraded over time (20 years since assessment). Additionally, the unsealed ground and the large scale of the overlaying building (vented glass atrium) would limit accumulation of any residual vapour risk, which also would likely decrease quickly over time.

6.3 Uncontrolled fill

Mentioned in Stoklosa (1994).

Overview and relative risk

There is evidence from bore logs contained in the above report that fill was used across the site. There are no details of where the fill originated from or if it contained any contaminants. While uncontrolled imported fill retains a level of site contamination risk, this is considered no different to most other urban sites in Tasmania. The risk is likely relatively low as prior investigations did not identify any specific aspects of concern during works (i.e. potential asbestos containing material or stained and odorous material).

6.4 Chemical stores

Mention in Stoklosa (1994) and observed during site visit.

Overview and relative risk

Stoklosa noted that there was a flammable chemical store that was being removed as part of the redevelopment for Forestry. This store was on a sealed surface and soil testing was undertaken once removed. No contaminants of concern were found.

Both workshops and the laboratory were used to store chemicals within the Forestry Tasmania Building. The floor of both workshops are sealed with concrete, making it unlikely that this storage would have any impact on soil or groundwater. The risk is therefore considered relatively low.

6.5 Oil sump

Mentioned in Nekon (2018) and observed during site inspection.

Overview and relative risk

There is an oil sump located within the Operations Workshop. This sump was cleaned and capped in April 2018. While it is acknowledged that any in-ground containment has potential to leak, it is uncommon for such sources to contribute to notable ground contamination, and more likely represent a risk of localised residual impact immediately around the infrastructure. The risk is therefore considered relatively low.

6.6 Triple interceptor trap

Mentioned in Stoklosa (1994) and observed during site inspection.

Overview and relative risk

There is a triple interception pit located in the middle bay of the open garages. There are also multiple drains within this area, however there was signage for a spill control mat located nearby within the service yard. This would have reduced risks to waterways and groundwater from activities in this area. While it is acknowledged that any in-ground containment has potential to leak, it is uncommon for such sources to contribute to notable ground contamination, and more likely represent a risk of localised residual impact immediately around the infrastructure. The risk is therefore considered relatively low.

6.7 General hydrocarbon presence

Mentioned in Hobart City Council records.

Overview and relative risk

The site has been utilised in the past by Bert Self (likely to sell motorcycles and sidecars - from advertisement in Huon Times, dated 26/6/1926) and Absolom Garage and Absolom Brothers, while there are no dates or locations within the site. It is likely that these businesses were related to motor vehicles and the resultant hydrocarbon risk. However, these businesses were likely at the site during the early 20th Century.

It is considered that key potential sources of contamination associated with such land use relate to fuel storage and handling which likely been addressed (USTs). While it is acknowledged that such land uses have potential to generate leaks and spills to ground, it is uncommon for such sources to contribute to notable ground

contamination, and more likely represent a risk of localised residual impact. The risk is therefore considered relatively low.

6.8 Old town gas

Mentioned in Hobart City Council records.

Overview and relative risk

There is no information available on exactly where these pipes may be located within Hobart CBD. While these pipes are usually located within road reserves, feeder lines may be present on the site. The residual risk would primarily relate to works in adjacent roads, and more specifically vapour risk to workers exposing such infrastructure. The associated risk to the site is considered low.

6.9 Electricity sub-station

Observed during site visits.

Overview and relative risk

The substation is located adjacent to the driveway in the underground car park and appears to be relatively new. While it acknowledged that electricity equipment has potential to generate leaks and spills to ground (from oil filled infrastructure), it is uncommon for such sources to contribute to notable ground contamination when located on sealed concrete surfaces. The risk is therefore considered relatively low.

6.10 Surrounding land use (historical and current)

Mentioned in Hobart City Council records and observed during site inspection.

Overview

Potentially contaminating activities undertaken historically on neighbouring land are generally associated with the automotive industry or fuel storage. Specifically, there has been:

– Rowe, a fuel supplier present on the adjacent site to the south east(131- 133 Murray Street)
– Trade Motor Body Works, an automotive business to the west/north west of the site (132-146 Elizabeth Street)
– J.T Graves & Son Pty Ltd, an automotive business to the east of the site

Currently there is a Beaurepaires retail outlet adjacent to the Freedom Furniture shop on Brisbane Street.

Relative risk

The residual risk to site from potential off-site contamination risk migrating on-site is primarily relating to scenarios where excavation works are conducted into, or in close proximity to the underlying groundwater. No site infrastructure (other than stormwater and sewer systems) are considered to approach the groundwater and therefore the risk is considered low at this time.

7. Conclusion

The Site has been subject to extensive background investigation and targeted assessment and remediation (i.e. removal of underground petroleum storage systems [UPSS]). This provides increased confidence that key potential aspects of concern have subsequently been identified and addressed to varying degrees.

The site history and potential contamination risk is typical of most urban sites in Hobart and based on the prior contamination assessment programs, has not shown any higher risk aspects. While there remain lower risk potential contamination aspects, based on continued commercial use (i.e. with limited requirement for ground disturbance), these are unlikely to represent issues requiring notable management controls.

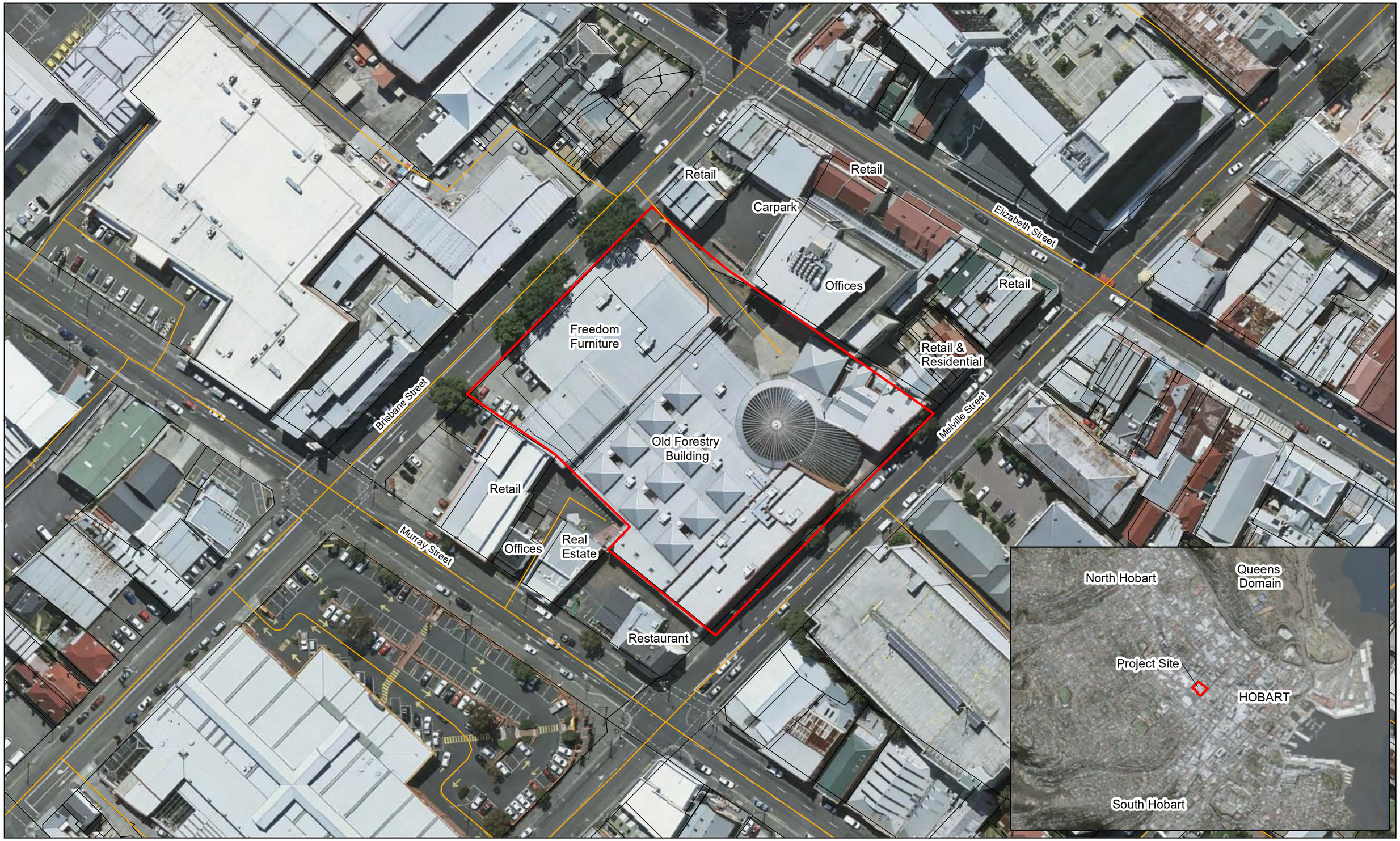
Where there were future development requirements for notable subsurface disturbance (i.e. utility trenching, basement construction), then there would be an increased risk of requirements to manage residual contamination (if present). However the results of the limited soil sampling undertaken by Stoklosa 1996 indicates that there is minimal risk to construction workers in this area from either vapours or direct contact with soils.

While further quantitative assessment work is recommended to confirm potential contamination risks at specific target areas (around both former USTs) prior to commencement of any notable subsurface disturbance work on site (and off-site), the overarching risk profile of the site is relatively low.

Appendices

Appendix A

Figures



1:1,000 @ A3

0 10 20 30 40

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Project Site
- Cadastral parcels
- Transport segments

University of Tasmania
UTAS Old Forestry Building Contamination Assessment

Job Number	12574014
Revision	A
Date	11 Feb 2022

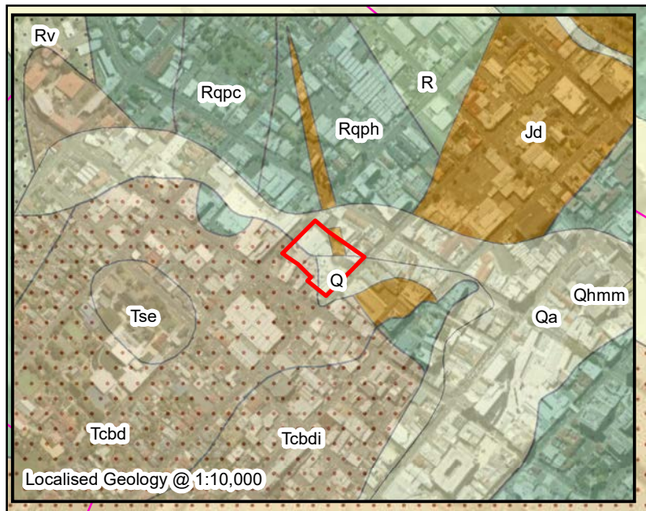
Site Location and Surrounding Land Use

Figure 1

G:\32\12574014\GIS\Maps\Deliverables\12574014_01_SiteLocation_RevB.mxd

Data source: TheList, Transport segments, cadastre, 2021. Created by:tdcoates

2 Salamanca Square, Hobart Tasmania 7000 Australia **T** 61 3 6210 0600 **E** hbamail@ghd.com **W** www.ghd.com



Rqph
Jd
Rqph
Jd
Elizabeth Street
Qa
Jd
Brisbane Street
Melville Street
Q
Tcbd
Murray Street

Geology 25K

Quaternary

Q — *Undifferentiated Quaternary sediments of alluival sand, gravel and clay.*

Tertiary

Tc — *Poorly sorted boulder to pebble grade deposits with boulders up to 3 m length, clasts generally dominantly of dolerite with traces to rarely dominant amounts of Upper Parmeener mudstone and other rocks and less commonly Lower Parmeener rocks, clayey material, conglomerate, gravel and grit.*

Jurassic

Jd — *Dolerite (tholeiitic) with locally developed granophyre*

Triassic

Rq — *Dominantly quartz sandstone - Freshwater predominantly cross-bedded quartzose to feldspathic sandstone commonly with overturned cross-bedding, subordinate siltstone with sparse plant and vertebrate fossils (Knocklofty Formation).*

1:800 @ A3

0 10 20 30

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

Project Site

Transport segments

University of Tasmania
UTAS Old Forestry Building Contamination Assessment

Job Number 12574014
Revision A
Date 11 Feb 2022

Site Geology

Figure 2

G:\32\12574014\GIS\Maps\Deliverables\12574014_03_SiteGeology_RevA.mxd

Data source: TheList, Transport segments, cadastre, 2022; GHD, Potentially contaminating land uses, 2018; Created by:tdcoates

2 Salamanca Square, Hobart Tasmania 7000 Australia T 61 3 6210 0600 E hbamail@ghd.com W www.ghd.com

1:800 @ A3

0 10 20 30

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Site Outline (all levels)
- Automative Industry (Historic)
- Fuel Supplier (Historic)
- Automative Industry (Currently Operating)
- Cadastral parcels
- Transport segments

University of Tasmania
UTAS Old Forestry Building Contamination Assessment

Job Number 12574014
Revision A
Date 10 Feb 2022

Potentially Contaminating Activites Undertaken in Vicinity of the Site

Figure 3

G:\32\12574014\GIS\Maps\Deliverables\12574014_02_PotentialContaminants_RevA.mxd

Data source: TheList, Transport segments, cadastre, 2022; GHD, Potentially contaminating land uses, 2018; Created by:tdcoates

2 Salamanca Square, Hobart Tasmania 7000 Australia **T** 61 3 6210 0600 **E** hbamail@ghd.com **W** www.ghd.com

1:500 @ A3

0 10 20 30

Meters

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

LEGEND

- Project Site
- Transport segments

Infrastructure of Interest

- Operation Workshop/ Fabrication Workshop
- Operational Substation
- Capped Oil Sump
- Former UST Area
- Triple Interceptor Drain
- Former Flammable Goods Store

Hydrocarbon Soil Bores (Skolsa, 1996 Contamination Assessment)

- Below limit of reporting
- Hydrocarbons detected

University of Tasmania
UTAS Old Forestry Building Contamination Assessment

Job Number	12574014
Revision	A
Date	11 Feb 2022

Potential Sources of Contamination Originating On-site

Figure 4

G:\32\12574014\GIS\Maps\Deliverables\12574014_03_DetailedSitePlan_RevA.mxd

Data source: TheList, Transport segments, cadastre, 2021. Created by:tdcoates

2 Salamanca Square, Hobart Tasmania 7000 Australia **T** 61 3 6210 0600 **E** hbamail@ghd.com **W** www.ghd.com

Appendix B

Plates from site inspections

Plate Number	Image from Site Visit	Description
1		Manhole cover in vicinity of removed UST in front of Atrium
2		Geo-fabric coming to surface in Atrium
3		An example of the sewage line gatic covers throughout the site

Plate Number		Description
4		Gas signage outside the Fabrication Workshop
5		Gas and HAZCHEM signage outside of the Operations Workshop
6		Capped Oil Sump in Operations Workshop
7		HAZCHEM signage on Laboratory door

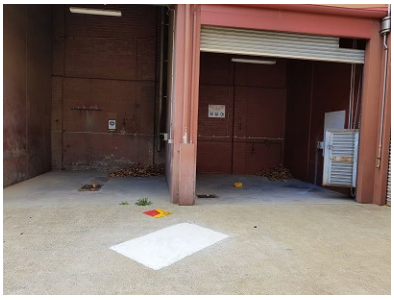
Plate Number		Description
8		Laboratory has been gutted
9		Open garages/wash down area in Service Yard (there are three bays)
10		Garage in Service yard showing drain and gatic covered sump
11		Close up of drain in Garage in Service Yard

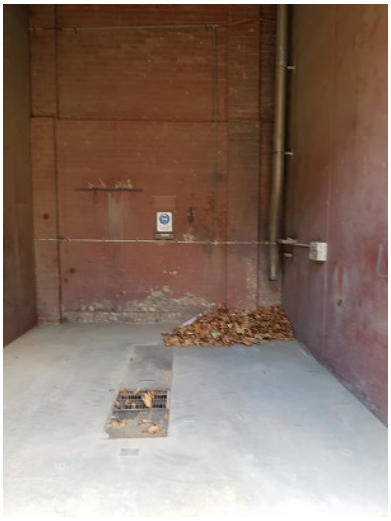
Plate Number		Description
12		Triple interceptor trap in vehicle wash down bay
13		Section of concrete surface in Service Yard replaced
14		Drain in centre of Service Yard

Plate Number		Description
15		On outside of Operations Workshop within the Service Yard
16		An example of the condition of the ground floor of the eastern redbrick warehouse
17		View through the floorboards in the western redbrick warehouse
18		View through the floorboards in the western redbrick warehouse (different hole in floor)
19		Office partitions and section of floor removed in western redbrick warehouse.

Plate Number	Image from Site Visit	Description
20		Section of western redbrick warehouse with wall removed
21		Slab beneath the floorboard in eastern redbrick warehouse.
22		Gatic covers in underground car park
23		Stormwater drain to the Derwent

Plate Number	Image from Site Visit	Description
24		Coverings of Ground in middle of driveway
25		Electricity substation in underground carpark

Appendix C

WorkSafe correspondence and records

3693

File No. C2

DEPARTMENT OF MINES, TASMANIA

NAME OR SUBJECT: Crisp & Gunn Co-op Ltd.,

ADDRESS: 19 Melville St.,

Hobart.

Cancelled

17-7-17

FORM 6

Inflammable Liquids Act 1929

APPLICATION FOR LICENCE IN RESPECT OF PREMISES FOR MANUFACTURE OF OR KEEPING INFLAMMABLE LIQUIDS OR DANGEROUS COMMODITIES

1. Applicant's Full Name ..... CRISP & GUNN CO-OP. LTD.
2. Applicant's Occupation ..... Timber Merchants.
3. Applicant's Postal Address ..... 79 Melville St
4. Situation of Premises to be Licensed ..... 79 Melville St
5. Name of Municipality and Town or Township within which, or within five miles of which, the Premises is situated ..... Hobart.
6. Name and quantity to be ~~manufactured~~ kept under this Application:—
   Inflammable Liquid Class A (Petrol, &c.) ..... 1000 Gallons, Petrol
   Inflammable Liquid Class B (Kerosene, &c.) .....
   Dangerous Commodity .....
7. Number of Tanks and Package Storage Areas under this Application ..... One.
8. Name and Total Quantity to be kept:—
   Inflammable Liquid Class A (Petrol, &c.) .....
   Inflammable Liquid Class B (Kerosene, &c) .....
   Dangerous Commodity .....
9. Total Number of Tanks and Package Storage Areas installed ..... One.

I declare that the above statements and answers are true to the best of my knowledge and belief.

CRISP & GUNN CO-OP. LTD.

(*Signed*) ..... A. K. Gunn

Dated this Fifth day of June, 1967

(*This Application, with Licence Fee of £ $4-00, to be forwarded to—*

Director of Mines, Hobart)

(*Scale of fees is shown on reverse hereof*)

70894

No. 1292
$4.00
16/6/67

Department of Mines,

Tasmania.

Date 20 / 7 /19 67

For the Director of Mines, Hobart
From the Inspector of Explosives ..... HOBART .....

RECORD OF INSPECTION OF INSTALLATION

Premises of: CRISP & GUNN.

Known as:

Premises at: BRISBANE ST.

Oil Company:

[redacted]

Date of Approval: 17 APRIL 67

Date of Inspection: 20 JULY 67

Finding: ~~Unsuitable~~ / Suitable) for Licensing

Pump Outfit package Storage Area: P/O

Variation from Approval: NIL.

Application Form: Left with occupier/~~Forwarded herewith~~.

Amount of Fee advised Yes/~~No~~

..... J Goodrick .....

FORM 5 (Regulation 78)

1174

TASMANIA

Inflammable Liquids Act 1929 **No 145**

Granted to.....

.....

.....

[redacted]

Personal Information Redacted

Fee, $2

Approval of Site and Construction of Premises for Keeping Inflammable Liquids or Dangerous Commodities or the Alteration thereof.

Approval for the *site and construction/*~~alteration of the site and construction~~ as shown on the approved plans and specifications of a *~~package/storage area~~/*tank for the undermentioned inflammable liquids and dangerous commodities, subject to the provisions of the *Inflammable Liquids Act* 1929, and regulations being observed and subject to the undermentioned special conditions, situate at Crisp and Gunn Co-op Ltd.,

HOBART.

This approval is valid only for one year from the date of issue

Date of issue 17th April, 1967.

Chief Inspector of Explosives

J. L. Clark.

Inspector of Explosives

Inflammable liquid: Class A 1000 Gallons

Class B ..... Gallons

Dangerous commodities: .....

SPECIAL CONDITIONS

.....

.....

.....

.....

** Strike out if inapplicable*

[redacted]

14/4/67

PROPOSED REPOSITIONING OF PUMP & TANK.

CRISP & GUNN CO-OP LTD.

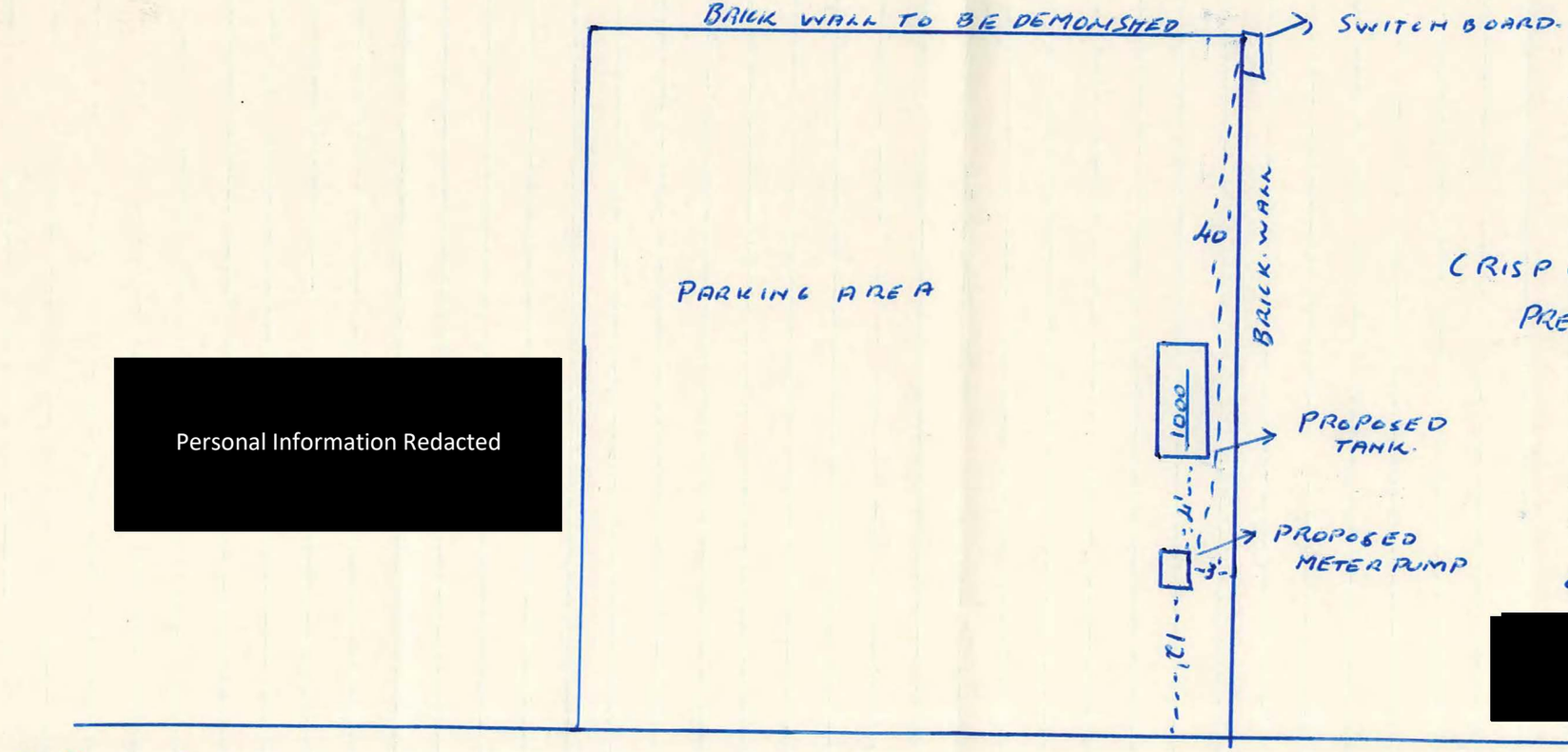
D of M	S & A	CG	CC & M	ACIMS

RECEIVED 14 APR 1967

ANSWERED

DEPT. OF MINES

REF. NO. 2131/67



APPROVED
G. Jobson.
Senior Inspector of Explosives
17 APR 1967

Rec 1179
$2.00
14.4.67

[redacted]

CONTACT IF REQUIRED
CRISP & GUNN

[redacted]

Department of Mines

Tasmania

Date 4 / 1 /1963

MEMORNANDUM

For the Director of Mines, Hobart.
From the Inspector of Explosives,.....Holland.....

Record of Inspection of Installation

Premises of: Crisp & Gunn Co. of P/L.

Known as: 79 Melville St.

Oil Company: [redacted]

Personal Information Redacted

Date of Approval: 5/12/62.

Date of inspection: 3/1/63

Finding: ~~Unsuitable~~) Suitable) for licensing

Pump Outfit ~~Package Storage Area~~:

Variation from Approval: nil

Application Form: ~~Left with occupier/Forwarded herewith.~~

~~Amount of Fee advised~~: ~~Yes/No~~

A.R. Powell .....

C/

(Regulation 78)

FORM 5

TASMANIA

Inflammable Liquids Act 1929 No. 809

Fee, £1

Granted to Personal Information Redacted

Approval of Site and Construction of Premises for Keeping Inflammable Liquids or Dangerous Commodities or the Alteration thereof.

Approval for the ~~* site and construction~~/* alteration of the site and construction as shown on the approved plans and specifications of a * ~~package storage area~~/* tank for the undermentioned inflammable liquids and dangerous commodities, subject to the provisions of the *Inflammable Liquids Act* 1929, and regulations being observed and subject to the undermentioned special conditions, situate at Crisp & Gunn Co - Op Pty Ltd., 79 Melville Street, Hobart.

This approval is valid only for one year from the date of issue.

Date of issue 5th December, 19 62.

Chief Inspector of Explosives.

Inspector of Explosives.

Inflammable liquid: Class A 500 existing Gallons.

Class B ..... Gallons.

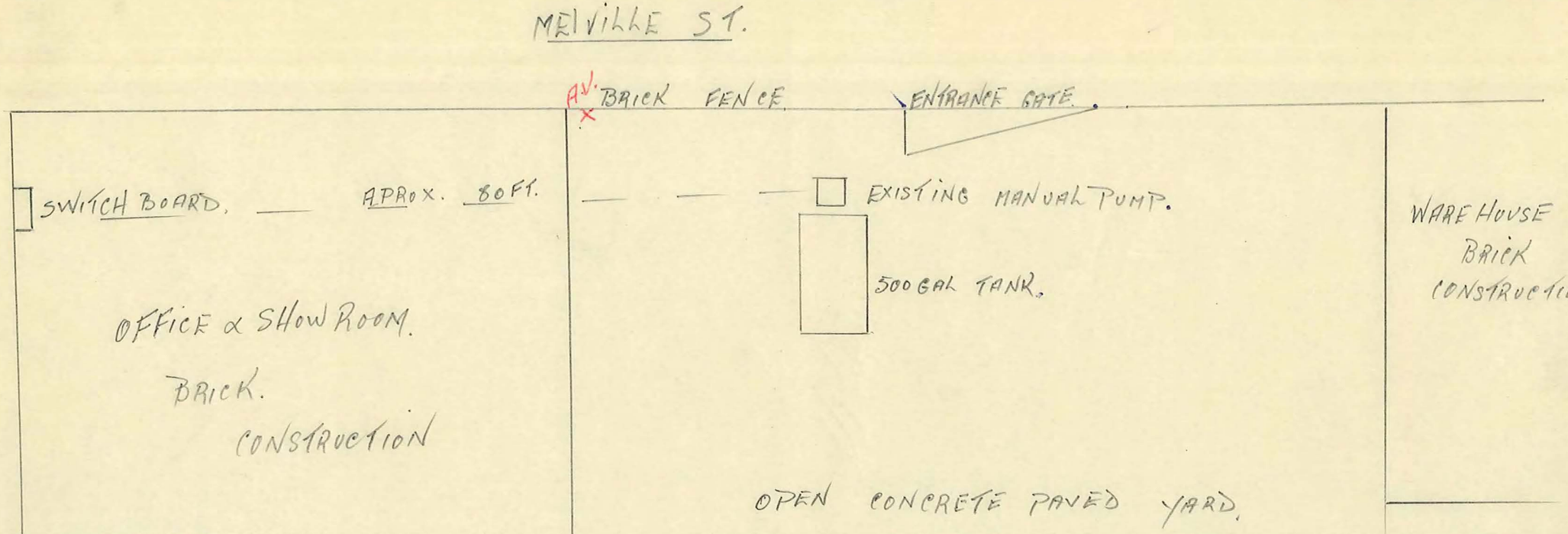
Dangerous commodities: .....

SPECIAL CONDITIONS.

Replace single manual with single electric pump.

* Strike out if inapplicable.

65252



CRISP & GUNN CO.OP.P/L.
79 MELVILLE ST.
HOBART

Proposed Meterization of existing manual Pump

No alteration of existing Pipeline

Switchboard approx 80 ft. from Pump

Wiring to be encased in Conduit

APPROVED
Inspector of Explosives
5 DEC 1962.

Personal Information Redacted

S & A | C G | CC & M | ACIM

RECEIVED 3 - DEC 1962
REFERENCED
DEPT. OF MINES
REF. NO. 5781/62

20873
3/12/62

Form H.

FOR OFFICE USE ONLY

			Initials
Correspondence: 62	Licence No.	625 ~~11/57~~	
	Certificate of Registration		
	Receipt No.	5186	
	Amount of Cash Received	£1-5-0	
	Date Received	5/7/55	

MEMORANDUM

Department of Mines,

Hobart, 1st July, 1955

Please note that your Licence / Certificate of Registration, under the provisions of the Inflammable Liquids Act 1929 in respect of the storage of Petrol, Kerosene, or Carbide of Calcium, expired on the 30th June last.

If you desire the registration renewed, please fill in the form of application hereunder, and return it to me with the prescribed fee.

Any person keeping Inflammable Liquid, except in Licensed or Registered Premises, is liable to a penalty of Fifty Pounds (£50).

J. G. SYMONS
~~W. H. WILLIAMS~~,
Director of Mines.

Crisp & Gunn Co-op Ltd.,
79 Melville St.,
Hobart.

D.M. | S&A | C G | CC&M | ACIM & E | REGISTRAR | E & IL
RECEIVED 5 JUL 1955
ANSWERED
DEPT. OF MINES
REF. NO.

THE INFLAMMABLE LIQUIDS ACT 1929

APPLICATION FOR RENEWAL

I, CRISP & GUNN CO-OP LTD. of 79 MELVILLE ST. HOBART
hereby apply to have the registration of my premises, situate at 79 Melville St
renewed under the provisions of the Inflammable Liquids Act 1929 in respect to the storage of MINERAL SPIRIT and forward herewith the fee.

REGISTERED QUANTITIES

Fee Paid £1-5-0
Mineral Spirit 500 gallons
Mineral Oil — gallons
Carbide of Calcium — lbs.

* Strike out which does not apply.

QUANTITIES TO BE REGISTERED
(To be filled in)

Mineral Spirit 500 gallons
Mineral Oil — gallons
Carbide of Calcium — lbs.

For CRISP & GUNN CO-OP. LTD.
Signature: *~~Mr.~~ *~~Mrs.~~ *~~Miss~~ E. J. Franks SECRETARY

Date of Application 4th July 1955

Mineral Spirit relates to Petrols, &c., with a flash point of 73°F. or less.
Mineral Oil relates to Kerosene, &c., with a flash point of above 73°F. and less than 150°F.
In the case of Petrol Pumps, please furnish particulars of tanks installed and in use.

Total number of underground tanks on premises	Capacity of each tank	Number of tanks in use

District Inspector's recommendation:

Note.—Cheques, postal notes, or money-orders should be made payable to the Director of Mines. If bank notes are forwarded by post, the letter should be registered. Stamps will not be accepted in payment.

96819—M1157—95 (14)

Authority to Release Information to a Third Party
Dangerous Substances Location

I, (full Name)
Calbourne Nominees Pty Ltd

authorise WorkSafe Tasmania to release information relating to Facility Number: Not Known

Location of Facility (full address) 78-83 Melville Street, Hobart (strata title reference 149231/2 (includes carpark and ground floor of 80 Brisbane St)

to (full Name)
Nicole Kaye Reineker

of (company Name)
GHD Pty Ltd

Signature

Date 27/9/18

Address
GPO Box 1406 Hobart Tas

Phone	Mobile Phone	Email
03 62 24 65 11	0408 141 316	leigh@nekon.com.au

- [x] Current manifest
- [x] Current site plan
- [x] All historical information
- [x] Contamination issues
- [x] Decommissioning details
- [ ] Other (please give details below)

Other Information required

For further assistance please contact:

Department of Justice
WorkSafe Tasmania
PO Box 56, Rosny Park, TAS 7018
Phone: (in Tasmania) 1300 366 322; (outside Tasmania) - 03 6166 4600; Fax 03 6173 0206
Email: wstinfo@justice.tas.gov.au Website www.worksafe.tas.gov.au

Tasmanian Government

Appendix D

EPA correspondence

Level 7, 134 Macquarie Street, Hobart TAS
GPO Box 1550, Hobart, TAS 7001 Australia

Enquiries: Contaminated Sites Unit
Phone: (03) 6165 4599
Email: contaminatedsites@epa.tas.gov.au
Web: www.epa.tas.gov.au
Our Ref: (EN-EM-AV-100706_38: H968275) sma

ENVIRONMENT PROTECTION AUTHORITY

12 October 2018

Ms Nicole Reineker
GHD
2 Salamanca Square
HOBART TAS 7000

Dear Ms Reineker

PROPERTY INFORMATION REQUEST
80 Brisbane Street, Hobart, PID: 2811771
79-83 Melville Street, Hobart, PID: 2811798

On 18 September 2018, the Contaminated Sites Unit received your Property Information Request relating to the land referred to above ('the Site'). A search of relevant databases and records has been undertaken.

During the mid-1990's several properties were redeveloped into a building complex that included Forestry Tasmania's head office and Freedom Furniture retail space. One of the original properties was the State Emergency Service and Tasmanian Fire Service Melville Street station.

During the redevelopment, EPA Tasmania received several reports regarding an Environmental Site Assessment. Of particular interest was the decommissioning of an underground storage tank (UST) located on the Brisbane Street side of the Site and another UST located on the Melville Street side of the Site.

The last report received was, *Forestry Tasmania Redevelopment Site: 79-83 Melville Street: Hobart Environmental Remediation and Validation*, prepared for Civil & Civic and Laver, dated December 1996, and prepared by Stoklosa Engineering Pty Ltd.

In response to this report, EPA Tasmania advised the proponent in a letter dated 20 January 1997:

> "*...Environment Tasmania considers the site suitable for its intended use. However, if the site is to be developed for a more sensitive use in the future, further remediation of contaminated soil left in situ may be required. As recommended by the consultant, the presence of localised hydrocarbon contamination should be disclosed to future occupants of the site.*"

WorkSafe Tasmania (WST) file C2 refers to dangerous goods being stored in underground storage tanks (UST) on the Melville St side of the Site during the period 1955-1967.

While no further records relating to contamination or potentially contaminating activities at the Site were located, several records regarding neighbouring properties were found -

161-177 Murray St (50m North West of the Site) was redeveloped in 1999 from an automotive workshop to a Harvey Norman Retail outlet:

- WST file P74 refers to the historical storage of dangerous goods in UST.(1949-1965)

- In June 1999, EPA Tasmania received the report - *Land Contamination investigation and remediation Harvey Norman Construction Site Murray Street Hobart*, dated May 1999, prepared by Environmental & Technical Services Pty Ltd (ETS). This report outlines the investigation and remediation associated with the removal of eight USTs from the building site. After several discussions with the consultant, The Director, EPA, advised the Hobart City Council in a letter dated 5 April 2000:

> *"I agree with ETS that the site was remediated to a level appropriate for the current use. However, if the use of the site is changed to a more sensitive use, further soil and groundwater analyse will be required to ensure that no risk is posed to the proposed occupiers."*

Neighbouring properties that also have historical WST records regarding the storage of dangerous goods in USTs include:

- 79-81 Brisbane Street, WST File W435 (1966-1989)
- 141 Murray Street, WST File G227 (1966-1979)
- 198-202 Murray Street, WST File F188 (1955-1967), now an animal hospital
- 103 Melville Street WST File K8 (1938-1984), now Mitre 10 Hardware
- 144-160 Murray Street WST File W329 (1969-1985) and IS67155-15 (1936)

No other records relating to contamination or potentially contaminating activities at the Site or adjacent properties were found.

The search of records is restricted to those held by EPA Tasmania and includes records relating to: The *Environmental Management and Pollution Control (Underground Petroleum Storage Systems) Regulations 2010;* Industrial Sites (which are or have been regulated by EPA Tasmania); historical landfills; and contamination issues reported to the Contaminated Sites Unit. In addition, the Incidents and Complaints database and records relating to the historical storage of dangerous goods (as detailed below) are searched.

WorkSafe Tasmania (1300 366 322 or wstinfo@justice.tas.gov.au) may have issued dangerous goods licences and/or may hold relevant records for the Site and adjoining properties. As the storage of dangerous goods/fuels is an environmentally relevant activity, you may wish to contact them for further information.

Please note that the dangerous goods licensing records referred to by EPA Tasmania are for sites with underground storage tanks that ceased holding Dangerous Goods Licences prior to 1993. WorkSafe Tasmania hold the records for these Licences after 1993.

EPA Tasmania does not hold records on all sites that are or may be contaminated. You should consider obtaining a site history to determine the likelihood of contamination. If contamination on the Site or an adjacent property is considered likely, further assessment by a competent environmental assessment practitioner is recommended. Site assessments should be conducted in accordance with the *National Environment Protection (Assessment of Site Contamination) Measure 1999*, National Environment Protection Council (or as varied). http://epa.tas.gov.au/regulation/contaminated-sites/identification-and-assessment-of-contaminated-land/contaminated-site-assessment

Please note since 1 July 2015, the Director has required all environmental site assessments and reports submitted to the Contaminated Sites Unit for consideration to be prepared by a person certified as a specialist contaminated sites consultant under a scheme approved by the Director. Effective 30 June 2018, the endorsed scheme is operated by Certified Environmental Practitioners (CEnvP): Consultants certified under this scheme are approved to use the seal **CEnvP Site Contamination**. https://www.cenvp.org.

Further details are available at: http://epa.tas.gov.au/regulation/contaminated-sites/identification-and-assessment-of-contaminated-land/engaging-a-contaminated-site-assessment-consultant.

As local councils are able to issue Environment Protection Notices, Environmental Infringement Notices and record complaints, you may wish to contact them for additional information that may be relevant to the site. Further, if the Site has historically been subject to a permit under the *Land Use Planning and Approvals Act 1993*, the Council would have issued the permit.

Under the *Right to Information Act 2009* (RTI Act), you are entitled to apply for any records mentioned within this letter such as reports, letters, or other relevant documents. For further information on how the RTI process works and how to request information under the RTI Act please visit the Department of Primary Industries, Parks, Water and Environment website.

If you are purchasing a property, you should consider Part 5A of the *Environmental Management and Pollution Control Act 1994* (EMPCA) which defines and specifies requirements for managing contaminated sites. If there is reason to believe the site is, or is likely to be, contaminated there are certain requirements that you must meet (e.g. notification of a likely contaminated site to the Director, EPA as outlined in section 74B of the EMPCA).

Although all due care has been taken in the preparation of this letter, the Crown gives no warranty, express or implied, as to the accuracy or completeness of the information provided. The Crown and its servants or agents accept no responsibility for any loss or damage arising from reliance upon this letter, and any person relying on the letter does so at their own risk absolutely.

As you are aware, property searches incur a charge of $237.00. An invoice is enclosed.

If you have any queries in relation to the matters above, please contact the Contaminated Sites Unit using the details at the head of this correspondence or refer to the EPA website at www.epa.tas.gov.au and click on 'Regulation to locate information on Underground Fuel Tanks and Contaminated Sites.

Yours sincerely

Bruce Napier
ENVIRONMENTAL OFFICER - CONTAMINATED SITES

Email: nicole.reineker@ghd.com

Attachment: Invoice

Appendix E

Hobart City Council records

From: Salter, Simone
To: Nicole Reineker
Subject: RE: database search request - follow up
Date: Monday, 1 October 2018 12:22:29 PM
Attachments: image001.png
image002.png
image003.png
image004.png

Hi Nicole

I tried to call and have left a message.

Please find consolidated information below for you.

To consolidate everything for you at 79-83 Melville Street is:

Type	Business	Date	Potential Source of Contamination
Wood Treatment/Sawmill	Absolom brothers	1916 - 1932	
	Absolom Garage	Dates unkown	
	Bert Self	Dates unknown	
	Central Saw and Planing Mills	1886 – 1915	Hydrocarbons
	Shell	Dates unknown	
	Crisp & Gunn Co-op Ltd	1955-1967	

The following are adjacent sites listed as potentially contaminated:

Address	Type	Business	Date	Potential Source of Contamination
132 – 146 Elizabeth Street	Body Works Motor Car Dealers, Engineers & Garages	Trade Motor Body Works	1940	Hydrocarbons
131 – 133 Murray Street	Fuel Supplier	Rowe	1916	Hydrocarbons
141 – 143 Murray Street	Motor Car Dealers, Engineers & Garages	J.T. Graves & Son Pty. Ltd. H.C. Sleigh/Golden Fleece John Tasman Graves	1966 – 1679	Hydrocarbons

Thanks
Simone

Simone Salter | Senior Environmental Health Officer | Environmental Health
6238 2738

From: Nicole Reineker [mailto:Nicole.Reineker@ghd.com]
Sent: Monday, 1 October 2018 11:34 AM
To: Salter, Simone <salters@hobartcity.com.au>
Subject: RE: database search request - follow up

Hi Simone,
No worries at all- this potential sale is very hush hush at present.

Can you please give me a call- I have filled out the right to information form- request #5.

Previously we have received information about site use just in an email- I have attached an email from Jessica Dwyer that we received back on another project.

I need the information as soon as possible as I need to submit my desktop review by the middle of this week.

Kind Regards
Nicole

From: Salter, Simone <salters@hobartcity.com.au>
Sent: Monday, 1 October 2018 11:01 AM
To: Nicole Reineker <Nicole.Reineker@ghd.com>
Subject: RE: database search request - follow up

Hi Nicole

Sorry I wasn't aware of the building selling again or going through a different process. I thought it was to do with the initial dealings with the property I had a few months ago.

We have a few letters/reports etc on file for this property that I can provide upon receipt of a request to information - https://www.hobartcity.com.au/Council/Legislation-and-by-laws/Right-to-Information-Act-2009

Kind Regards
Simone

Simone Salter | Senior Environmental Health Officer | Environmental Health
6238 2738

From: Nicole Reineker [mailto:Nicole.Reineker@ghd.com]
Sent: Monday, 1 October 2018 10:58 AM
To: Salter, Simone <salters@hobartcity.com.au>
Subject: RE: database search request - follow up

Hi Simone,
Can you please explain what you mean by Frazer Reed is project planner for coordinating all

these reports? He is not included on any of the group emails from the potential purchaser of this property. How recently was he undertaking this role?

Kind Regards
Nicole

From: Salter, Simone <salters@hobartcity.com.au>
Sent: Monday, 1 October 2018 10:22 AM
To: Nicole Reineker <Nicole.Reineker@ghd.com>
Subject: RE: database search request - follow up

Hi Nicole

Our database shows the only information as hydrocarbons and the names as listed by Felicity below. Information shows that there were previous underground petrol storage tanks on the site.

I have previously provided reports to Frazer Reed from All Urban Planning through a request to information request. He would be able to forward you anything as he is the project planner coordinating all of these reports etc.

Kind Regards
Simone

Simone Salter | Senior Environmental Health Officer | Environmental Health
6238 2738

From: Nicole Reineker [mailto:Nicole.Reineker@ghd.com]
Sent: Monday, 1 October 2018 9:02 AM
To: Salter, Simone <salters@hobartcity.com.au>
Subject: RE: database search request - follow up

Hi Simone,
Yes it is, I expect you may have a a run on requests- Probably one from each of the consultants doing the due diligence reports.
Thanks for your help.

Kind Regards
Nicole

From: Salter, Simone <salters@hobartcity.com.au>
Sent: Monday, 1 October 2018 8:58 AM
To: Nicole Reineker <Nicole.Reineker@ghd.com>
Subject: RE: database search request - follow up

Hi Nicole

Is this for the old Forestry building?

Kind Regards
Simone

Simone Salter | Senior Environmental Health Officer | Environmental Health
6238 2738

From: Nicole Reineker [mailto:Nicole.Reineker@ghd.com]
Sent: Monday, 1 October 2018 8:52 AM
To: Salter, Simone <salters@hobartcity.com.au>
Subject: database search request - follow up

Good Morning Simone,
I emailed Felicity Edwards last Monday morning requesting a search of the Council databases regarding potential contamination at the site 79-83 Melville St (Strat Title 149231/2). I was wondering how this search was going, would it be possible to receive this information this morning, as I am on a very tight timeframe.

Kind Regards
Nicole

From: Edwards, Felicity <edwardsf@hobartcity.com.au>
Sent: Monday, 24 September 2018 9:56 AM
To: Nicole Reineker <Nicole.Reineker@ghd.com>
Cc: Salter, Simone <salters@hobartcity.com.au>
Subject: RE: contamination database search for a site in CBD

Hi Nicole
We should be able to get some info back to you by the end of the week. There is no charge.
At a quick look on the main database, the site does show as potentially contaminated, the associated historical names are;

- Absolom brothers
- Bert Self
- Central Saw and Planing Mills
- Crisp and Gunn Coop
- Shell

I have cc'd Councils Senior EHO Simone Salter who will allocate the request to one of the team to do a detailed file review. Please contact Simone with any further queries.
Kind regards
Felicity

Felicity Edwards | Manager Environmental Health | City Planning
6238 2842

From: Nicole Reineker [mailto:Nicole.Reineker@ghd.com]
Sent: Monday, 24 September 2018 9:31 AM
To: Edwards, Felicity <edwardsf@hobartcity.com.au>

Subject: contamination database search for a site in CBD

Good Morning Felicity,
Rohan Probert suggested that you may be the person I need to contact to get a database base search for a property in the CBD undertaken.
I am undertaking a contamination site investigation on 79-83 Melville St (the site also includes 80 Brisbane St). I submitted the EPA database search request earlier this week and they are very busy and unlikely to be able to ruin the search within the project timeframe.
Deborah at the EPA suggested that I contact the council as they have access to the some of the same databases.
I am particularly interested in finding out if there is any known contamination at this site, including any records of any underground or above ground storage tanks for petroleum products or other chemicals.

Is this something you can help me with? If not can you please point me in the direction of who would be the best person to contact. Also can you please let me know how long a search would take and if there is any charge?

Kind Regards

Nicole K Reineker
Graduate Environmental Scientist

T: 61 3 6210 0626 | V: 320626
GHD
Proudly employee owned
T: +61 6210 0626| M: +61 403 857 681| E: Nicole.reineker@ghd.com
2 Salamanca Square, Hobart Tasmania, Australia | www.ghd.com
Connect

From: Alex Brownlie
Sent: Friday, 21 September 2018 10:57 AM
To: Nicole Reineker <Nicole.Reineker@ghd.com>
Subject: FW: contamination database search for HCC

FYI

Alex Brownlie | A GHD Principal
B.Sc. Dip.UP RPIA (Fellow)
Technical Director Planning

GHD
Proudly employee owned
T: +61 3 6210 0600 | M: 0418 133 152 | E: alex.brownlie@ghd.com
2 Salamanca Square Hobart TAS 7000 Australia | www.ghd.com

Connect

WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY& BUILDINGS | TRANSPORTATION

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From: Probert, Rohan <probertr@hobartcity.com.au>
Sent: Friday, 21 September 2018 10:21 AM
To: Alex Brownlie <Alex.Brownlie@ghd.com>
Subject: RE: contamination database search for HCC

Hi Alex,

As a starting point, Felicity Edwards – Manager Environmental Health. She's on 6238 2842 or at edwardsf@hobartcity.com.au.

Regards

Rohan Probert | Manager Development Appraisal | City Planning
6238 2179

From: Alex Brownlie [mailto:Alex.Brownlie@ghd.com]
Sent: Friday, 21 September 2018 9:30 AM
To: Probert, Rohan <probertr@hobartcity.com.au>
Subject: FW: contamination database search for HCC

Hi Rohan,
Who is my best contact within Council for contam land information?

Regards

Alex Brownlie | A GHD Principal
B.Sc. Dip.UP RPIA (Fellow)
Technical Director Planning

GHD
Proudly employee owned
T: +61 3 6210 0600 | M: 0418 133 152 | E: alex.brownlie@ghd.com
2 Salamanca Square Hobart TAS 7000 Australia | www.ghd.com
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WATER | ENERGY & RESOURCES | ENVIRONMENT | PROPERTY& BUILDINGS | TRANSPORTATION

Please consider our environment before printing this email

From: Nicole Reineker
Sent: Friday, 21 September 2018 9:17 AM
To: Alex Brownlie <Alex.Brownlie@ghd.com>
Subject: contamination database search for HCC

Hello Alex,
I am undertaking a contamination site investigation on 79-83 Melville St (the site also includes 80

Brisbane St). I submitted the EPA database search request earlier this week and they are very busy and unlikely to be able to ruin the search within the project timeframe.
Deborah at the EPA suggested that I contact the council as they have access to the some of the same databases.
I am particularly interested in finding out if there is any known contamination at this site, including any records of any underground or above ground storage tanks for petroleum products or other chemicals.

Thanks for your help in this matter.

Kind Regards
Nicole K Reineker
Graduate Environmental Scientist

T: 61 3 6210 0626 | V: 320626
GHD
Proudly employee owned
T: +61 6210 0626| M: +61 403 857 681| E: Nicole.reineker@ghd.com
2 Salamanca Square, Hobart Tasmania, Australia | www.ghd.com
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If you receive this communication in error, please advise us by reply email or telephone on +61 3 6238 2711, then delete the communication. You will be reimbursed for reasonable costs incurred in notifying us.

Please consider the environment - Do you really need to print this email?

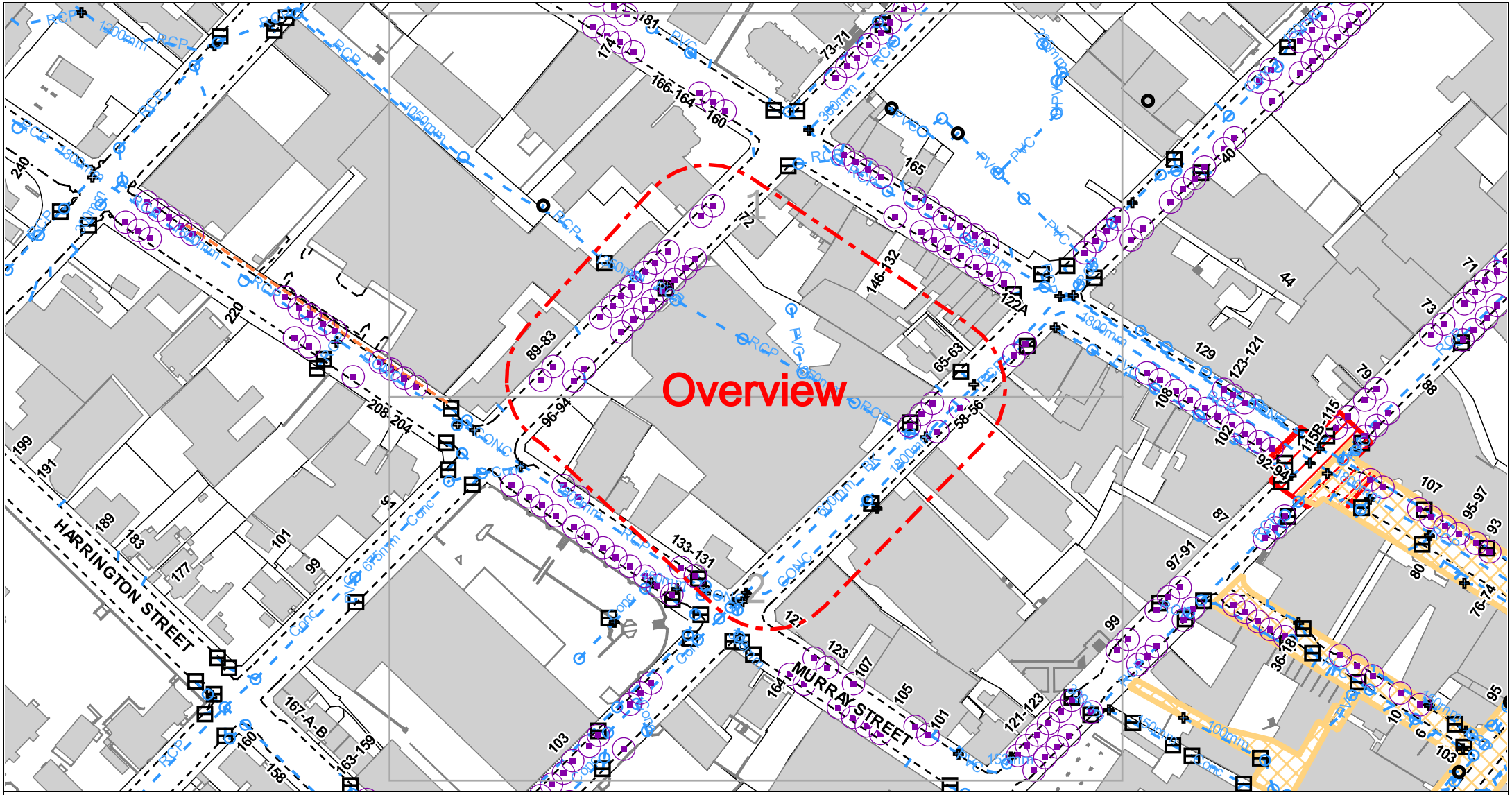
This e-mail has been scanned for viruses

Appendix F

Dial before you dig records

City of HOBART

Sequence No: 76013864
Job No: 15023440
Location of Works: 83 Melville Street, Hobart, TAS 7000



DISCLAIMER:

While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither City of Hobart or PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of these terms.

A field survey is to be conducted before information contained in this plan is relied upon.

WARNINGS AND REQUIREMENTS:

Refer to the cover letter and information sheet for all warnings, requirements and contact details.

Abandoned old town gas (coal gas) pipes potentially emitting harmful gases and Volatile Organic Compounds (VOCs) may be found in many areas of the City. Refer to the cover letter and information sheet for more detail.

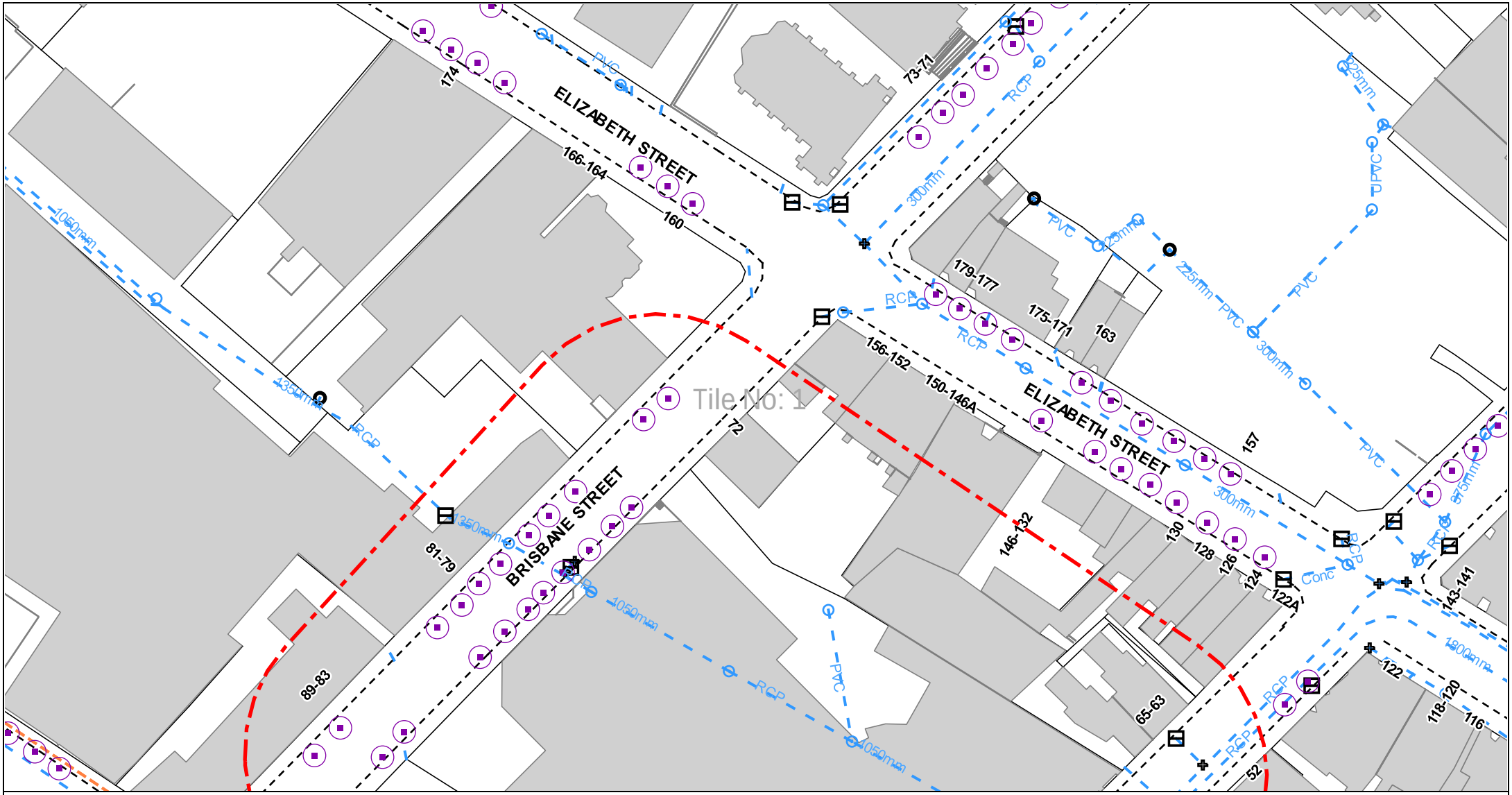
If in-ground parking sensors are located in the enquiry area please call City of Hobart Parking Operations at least 7 days prior to any works on telephone (03) 6238 2439.

- Stormwater Pit
- Intake Point, Junction, Outlet Point
- Maintenance Shaft, Man Hole
- Pollution Control Unit
- Inspection Opening
- Stormwater Pipe
- Electrical and Other
- In-ground Parking Sensor
- Construction Risk Area
- Potential Electrical Underground Assets
- DBYD Enquiry Area

N

City of HOBART

Sequence No: 76013864
Job No: 15023440
Location of Works: 83 Melville Street, Hobart, TAS 7000



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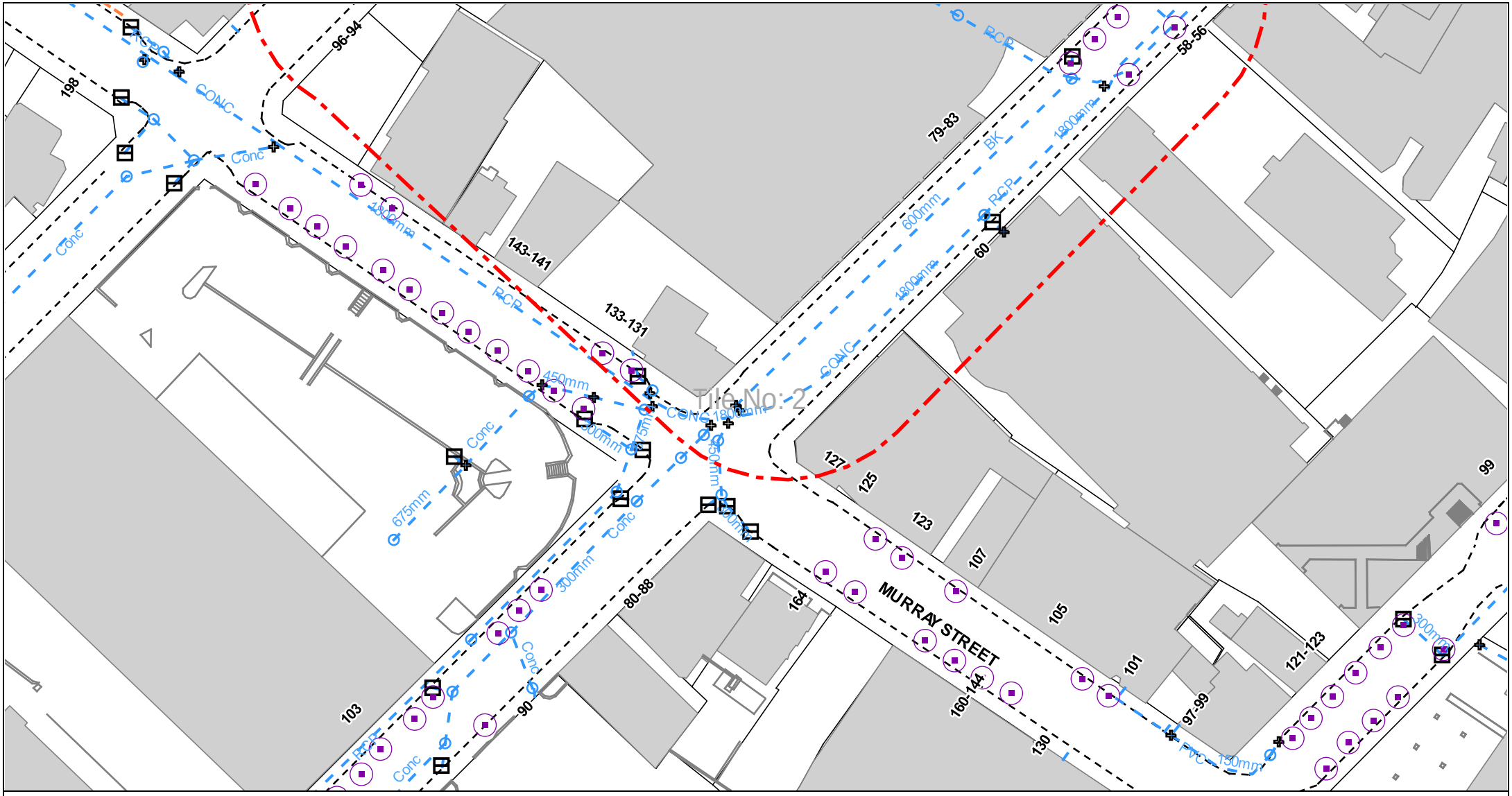
City of HOBART

Sequence No: 76013864
Job No: 15023440
Location of Works: 83 Melville Street, Hobart, TAS 7000



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- Electrical and Other
- In-ground Parking Sensor
- Construction Risk Area
- Potential Electrical Underground Assets
- DBYD Enquiry Area

N

Enquiries to:
Road & Environmental Engineering Unit

Phone:
(03) 6238 2900

Email:
coh@hobartcity.com.au

01/10/2018

Ms Nicole Reineker
2 Salamanca Square
Battery Point TAS 7004

Dear Ms Nicole Reineker

DIAL BEFORE YOU DIG ENQUIRY
HOBART CITY COUNCIL

I refer to your request through the 1100 Dial Before You Dig service requesting information about City of Hobart (the City) underground assets as per the following details:

Date of Enquiry:	01/10/2018
Sequence Number:	76013864
DBYD Job No:	15023440
Enquiry Location:	83 Melville Street Hobart TAS 7000

Please note
All information is provided as a courtesy. It is indicative only and subject to field verification. The information is not to be copied or distributed in any way without prior approval of the City.

WARNING – Old Town Gas

Abandoned old town gas (coal gas) pipes potentially emitting harmful gases and Volatile Organic Compounds (VOCs) may be found in many areas of the City. Refer to the information sheet for more detail.

Works in Road Reservation
Prior to works in the road reservation a Permit to Open Up and Temporarily Occupy a Highway must be granted. Application forms can be found via the City's website:
www.hobartcity.com.au/City-services/Road-and-footpath-assets/Roads-and-footpaths

In-Ground Parking Sensors
The City must be advised at least 7 business days in advance when works are planned in areas with in-ground parking sensors. More information is available at the City's website:
www.hobartcity.com.au/dialbeforeyoudig/parkingsensors

Works in near Waterways and Rivulets
Approval is required for any works within a waterway or 10 metres from the top of the bank of a waterway. Application forms are available via the City's website:
www.hobartcity.com.au/City-services/Environment/Stormwater-and-waterways/Local-waterways

Please contact the City's Road and Environmental Engineering Unit on telephone (03) 6238 2900 or via coh@hobartcity.com.au should you require any further information.

Yours sincerely

(John Holmes)
MANAGER ROAD AND ENVIRONMENTAL ENGINEERING

Attachment(s) Information Sheet, Plan(s)

INFORMATION SHEET

DUTY OF CARE

- No mechanical plant can be used within 1 metre of indication of an underground City asset unless sighted first by hand digging/potholing. A spotter must be used when using mechanical plant.
- No works to be undertaken within 1 metre of indication of foundations associated with a City asset unless prior approval is obtained from the City.
- Any differences between the locations marked on the City's plan and actual location of assets should immediately be reported to the City's Road and Environmental Engineering Unit on telephone (03) 6238 2900.

ANY DAMAGE TO A COUNCIL ASSET MUST BE REPORTED IMMEDIATELY ON TELEPHONE (03) 6278 0200

The City reserves the right to recover compensation for loss or damage and repair costs to any of its assets irrespective of provision of drawings or undertaking locations on site.

Information and requirements for use in conjunction with the plan

WARNING – Old Town Gas

- Abandoned old town gas (coal gas) pipes potentially emitting harmful gases and Volatile Organic Compounds (VOCs) may be found in many areas of the City.
- The Tasmanian Government lists the following suburbs as having been reticulated with old town gas mains:
    - Central Business District (CBD)
    - Battery Point
    - Dynnyrne
    - Glebe
    - Lenah Valley
    - Mount Stuart
    - New Town
    - North Hobart
    - Ridgeway
    - Sandy Bay including Lower Sandy Bay
    - South Hobart Cascades
    - West Hobart
- For more information please refer to the website provided by the Tasmanian Government at https://www.cbos.tas.gov.au/topics/technical-regulation/gas-standards-safety/practitioners/old-town-gas

Drainage Assets

- City owned stormwater assets must be located before excavation.
- City owned stormwater assets must not be modified, removed or tampered with in any way without express permission from the City.
- Contact the City's Road and Environmental Engineering Unit on telephone (03) 6238 2900 if further information is required.

Electrical and Other Assets

- City owned or approved electrical and other cables or pipes may be present in indicated areas.
- Some private infrastructure (for example a pressurised oxygen line and computer cabling) is also shown.
- Locate conduits before excavation and dig with care, as conduits may not be to standard, such as the depth.
- Contact the City's Road and Environmental Engineering Unit on telephone (03) 6238 2900 if further information is required.

In-Ground Parking Sensors

- Advise the City not less than 7 business days in advance when works are planned so that sensors can be removed and scheduled for subsequent replacement, please telephone (03) 6238 2439 or via email parkingsensors@hobartcity.com.au
- Upon completion of an application form Council will arrange removal and advise you when the sensors have been removed.
- Please be aware that a fee will be levied for the removal and reinstatement of parking meter sensors.

Construction Risk Areas

- These locations include where the City has been notified of or become aware of hazards such as ground contamination, abandoned underground assets (such as old town gas pipes and fuel tanks) and old landfill sites.
- For more information contact the City's Road and Environmental Engineering Unit on telephone (03) 6238 2900 or via coh@hobartcity.com.au

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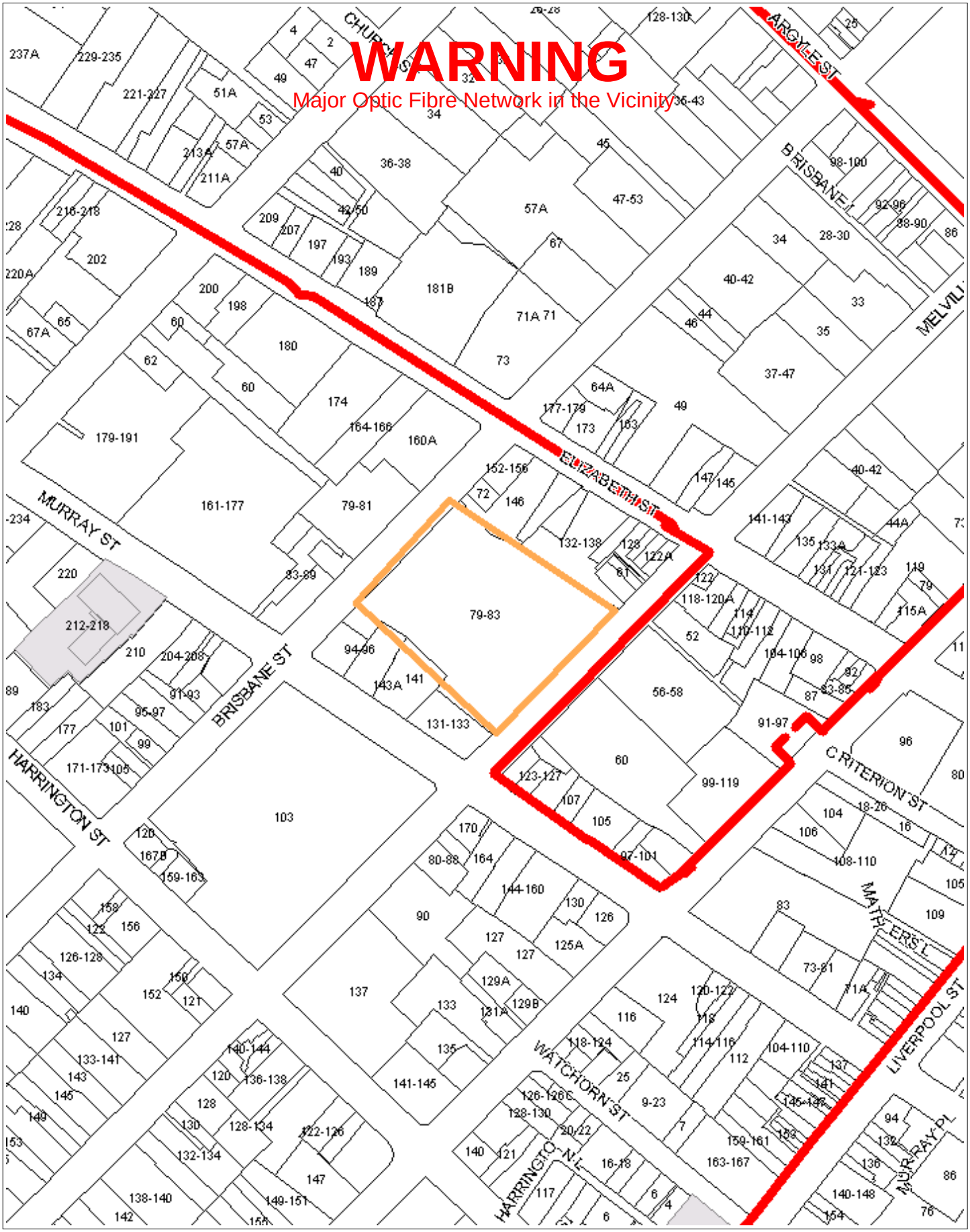


Sequence Number: 76013865

Date Generated: 01/10/2018

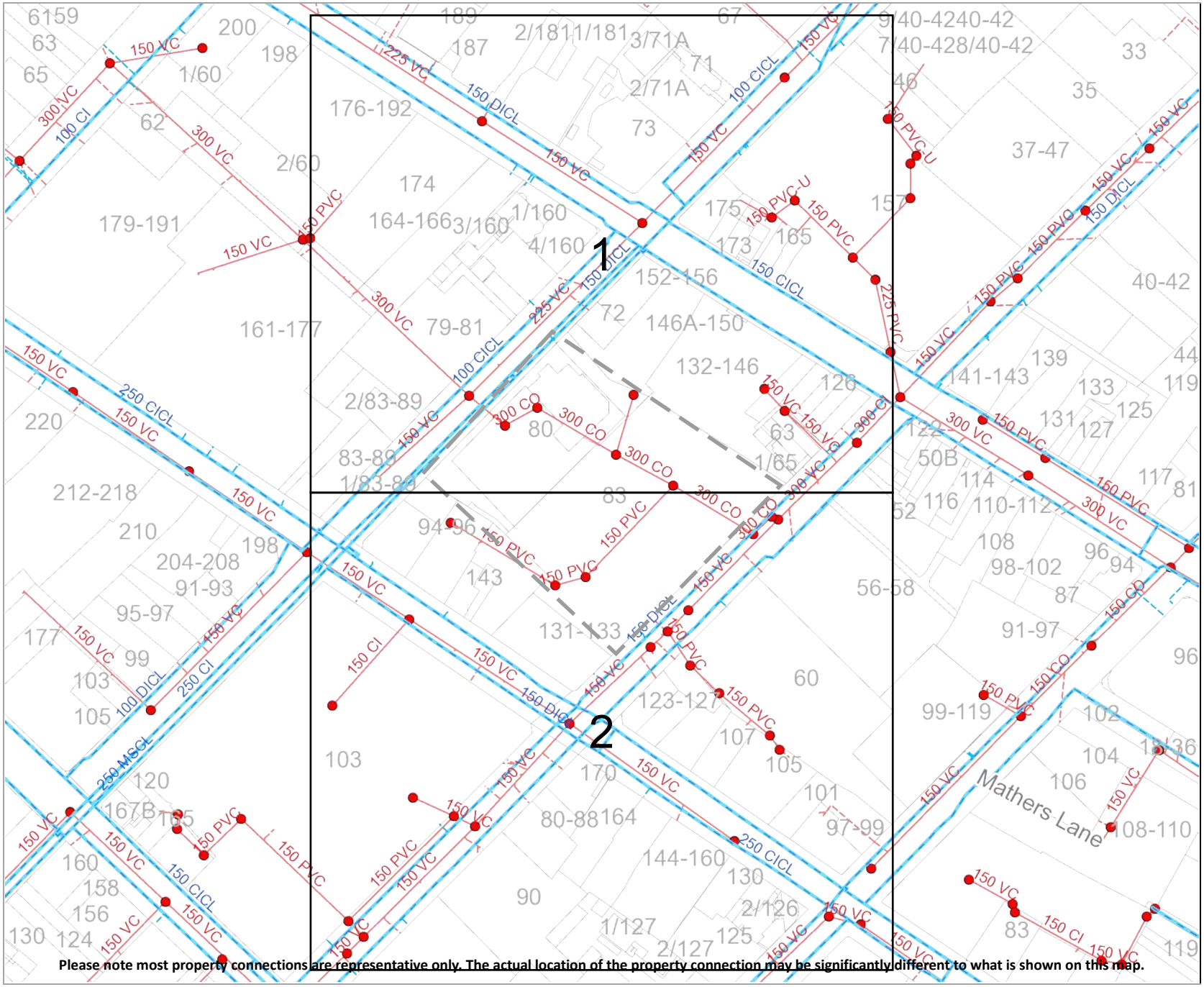
For all Optus DBYD plan enquiries –
Email: Fibre.Locations@optus.net.au
For urgent onsite assistance contact 1800 505 777
Optus Limited ACN 052 833 208

Sequence Number: **76013866**

Location: 83 Melville Street, Hobart, TAS 7000

Date Generated: **01/10/2018 (valid for 30 days)**

DIAL BEFORE YOU DIG www.1100.com.au
The Essential First Step.



Legend

- DBYD Enquiry
- Fire Hydrant
- Water Property Connection
- Water Main
- Water Main (Critical)
- Sewer Maintenance Hole
- Sewer Property Connection
- Sewer Pressurised Main (Critical)
- Sewer Gravity Main (Critical)
- Sewer Gravity Main
- Stormwater Maintenance Hole
- Stormwater Property Connection
- Stormwater Gravity Main
- Recycled Water Property Connection
- Recycled Water Main
- A Abandoned Line Sewer

In an emergency contact TasWater
Phone: 13 6992

N

Scale: 1:2050

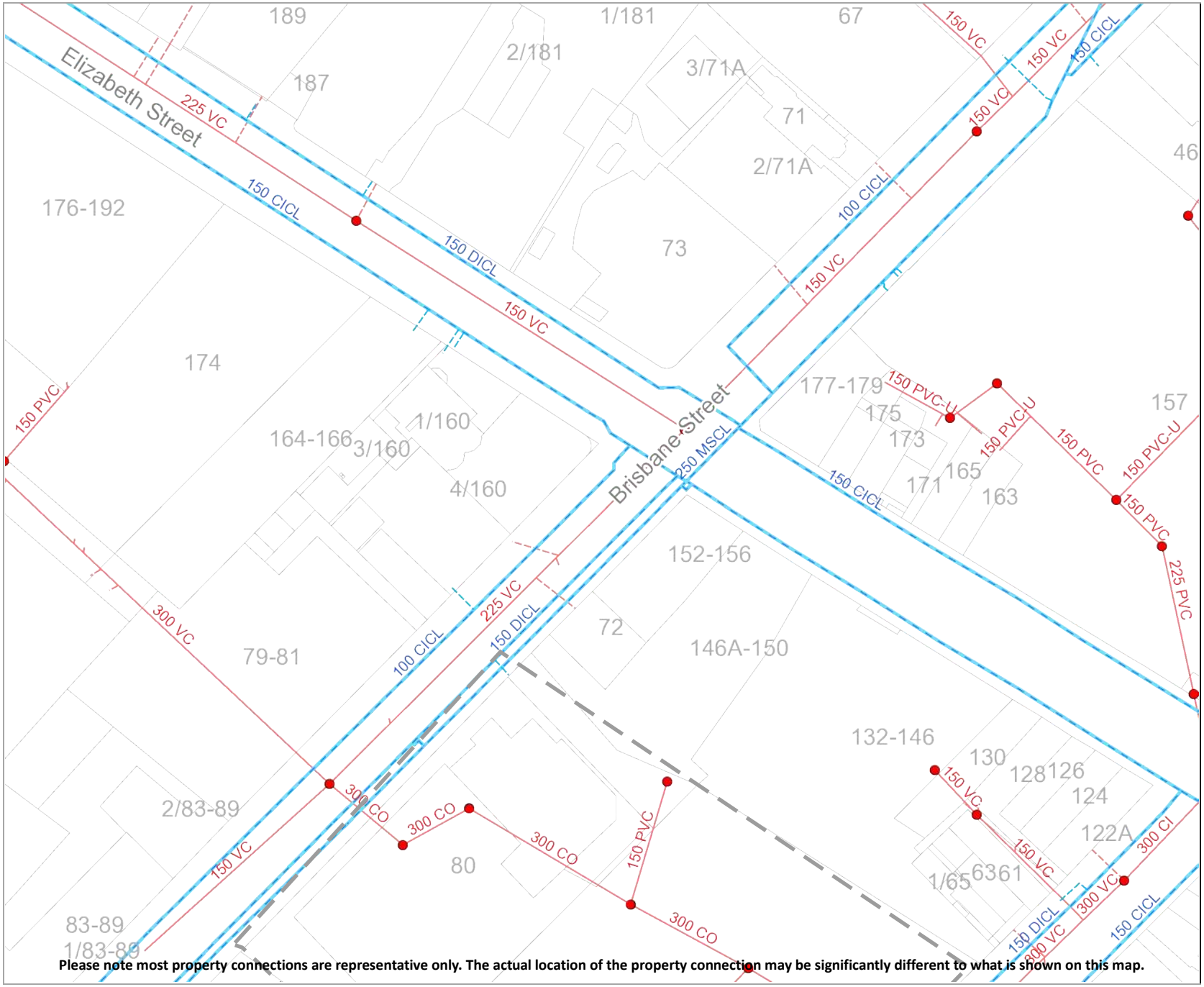
Disclaimer: The plan is provided in response to a Dial Before You Dig request. While all reasonable care has been taken to ensure the accuracy of the information on this plan, its purpose is to provide a general indication of the location of TasWater infrastructure. The information provided may contain errors or omissions and the accuracy may not suit all users. A site inspection and investigation is recommended before commencement of any project based on this data.

Please note most property connections are representative only. The actual location of the property connection may be significantly different to what is shown on this map.

Sequence Number: **76013866**

Location: 83 Melville Street, Hobart, TAS 7000

Date Generated: **01/10/2018 (valid for 30 days)**



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Scale: **1:1000**

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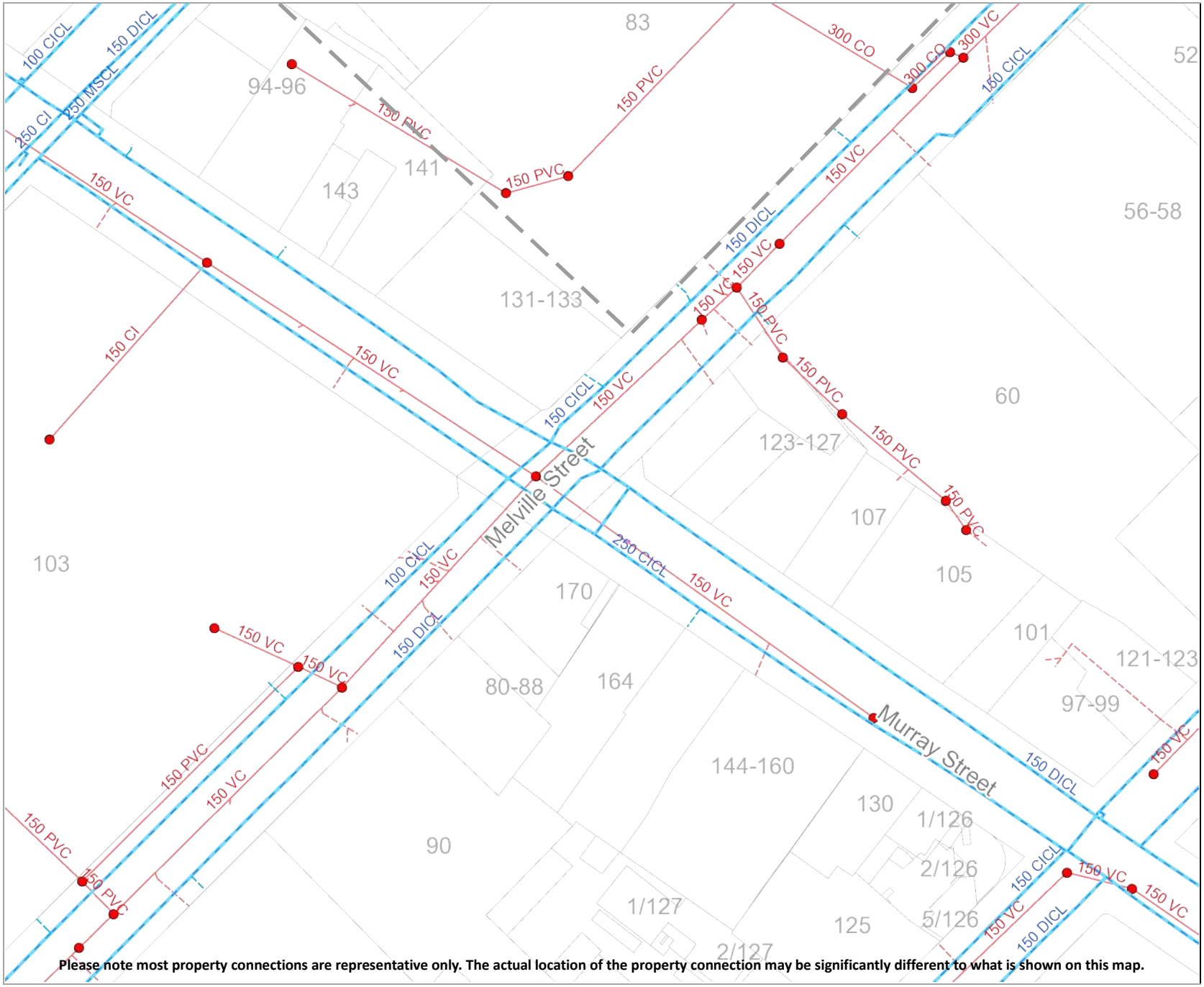
Date Generated: **01/10/2018 (valid for 30 days)**



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Aboriginal Heritage SEARCH RECORD

This search in response to your DBYD request

Job Number: 15023440 (Sequence Number: 76013871)

has not identified any registered Aboriginal relics or apparent risk of impacting Aboriginal relics.

This Search Record has been requested for Ms Nicole Reineker at 8:40AM on 01 October 2018 and delivered to nicole.reineker@ghd.com.
This Search Record expires on 01 April 2019.
Your personal Search Identification Number is PS0038375.

Please be aware that the absence of records on the Aboriginal Heritage Register for the nominated area of land does not necessarily mean that the area is devoid of Aboriginal relics. If at any time during works you suspect the existence of Aboriginal relics, cease works immediately and contact Aboriginal Heritage Tasmania for advice.

It is also recommended that you have on hand during any ground disturbance or excavation activities the Unanticipated Discovery Plan, to aid you in meeting requirements under the *Aboriginal Heritage Act 1975* should Aboriginal relics be uncovered. There are requirements that apply under the *Aboriginal Heritage Act 1975*. It is an offence to destroy, damage, deface, conceal or otherwise interfere with relics without a permit granted by the Minister. There is an obligation to report findings of relics as soon as practicable.

This Search Record is confirmation that you have checked the Aboriginal Heritage Property Search website or the Dial Before You Dig referral service for this search area. This Search Record will expire in six months from the search date.

If you have any queries please do not hesitate to contact Aboriginal Heritage Tasmania on **1300 487 045** or at **aboriginal@heritage.tas.gov.au**.

N

Murray Street
Patrick St
Elizabeth Street
Brisbane Street
Harrington Street
Melville Street
concrete blocks
Abandoned Pipe

9.2/B/1000
9.2/B/800
63/SDR11
10/B/750
2.6/B/750
3.2/B/750
6.8/B/750
6.7/B/800
6.3/B/800
12.5/B/750
6.1/B/750
4.6/B/750
9.1/B/800
1.9/B/750
3.7/B/800
3.8/B/750
5.5/B/750
2/B/750
5.6/B/750
4.3/B/1500
90/SDR11
3.8/reducer/750
5.3/B/750
5.1/B/750
12.8/EM/750
4/B/800
4.4/B/800
125/SDR11
9.8/B/800
9.7/B/800
9.7/K/800
200/SDR9
200/SDR11
5.43/LB/800
6.6/B/750
6.6/B/750

0 25 90 metres

Offset Detail V1.2/B/650

V = Pipe in Verge
1.2 = Offset dist. in metres
K = Offset to back of kerb
650 = Depth of cover in mm
(V = Verge, R = Road, P = Property, Blank = Unknown, E= Easement)

Offset Abbreviations

K = Back of kerb
B = Boundary line
b = Building
eb = Edge of bitumen
EM = End of main
F = Fence Line
PP = Power pole
rw = Railway Line
45/B = 45 Bend
v = Valve

Pipe Protection
Cadastral Parcel
Customer Property
Building (approx.)
High Risk Work Area
Risk Assessment Required

5,100kPa and 10,200kPa
STEEL

Valves
001 Steel
023 PE 1000kPa
024 PE 500kPa

SDR9 MAOP 1000kPa
63mm PE
90mm PE
125mm PE
160mm PE
200mm PE
250mm PE
1000kPa Present

SDR11 MAOP 500kPa
32mm PE
63mm PE
90mm PE
125mm PE
160mm PE
Abandoned Pipe
Service Pipe

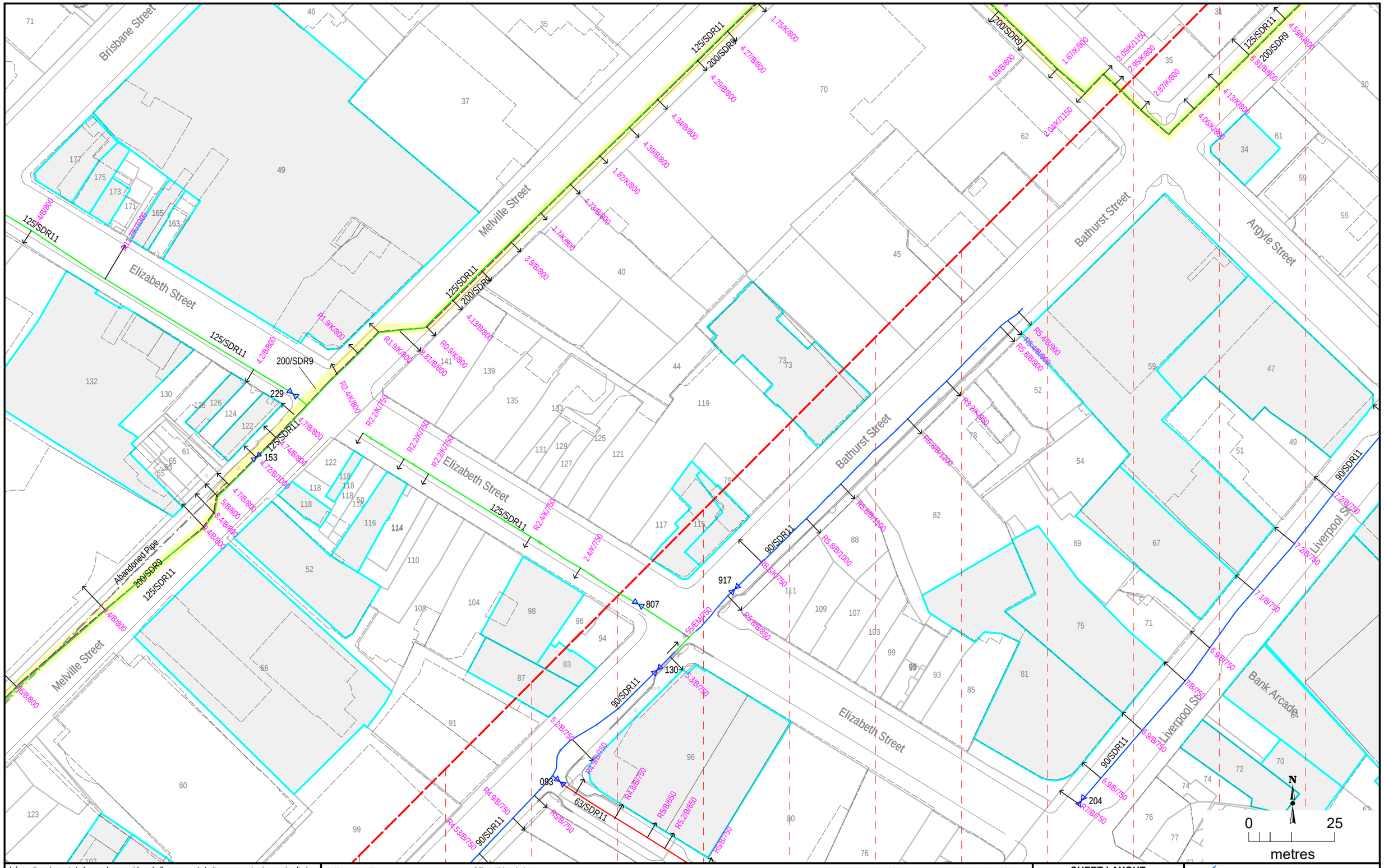
SHEET LAYOUT

453 454 455
459 460 461
113 466 467

TAS GAS NETWORKS
LOCATION PLAN
645 - HOBART

Issued Date: 15/03/2016 | Rev No. 0

TGN-645-NW-AL-460



Information shown is to be used as a guide only & no warranty to its accuracy is given or implied.
A SITE INSPECTION AND MARK UP IS RECOMMENDED BEFORE COMMENCEMENT OF ANY WORKS CLOSE TO TAS GAS ASSETS.
Any third party features shown on this drawing are for "information only". The respective owners should be contacted to confirm location of those assets.
This map to be read in conjunction with Service As Builts and Steel As-Builts (where required).
Base data from theLIST © State of Tasmania
Additional third party data © LGA's, by "Creative Commons Australia" or LGAs
Check issue date of this plan, data may have been changed since this plan was produced.

Offset Detail V1.2/B/650

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Pipe Protection
Cadastral Parcel
Customer Property
Building (approx.)
High Risk Work Area
Risk Assessment Required

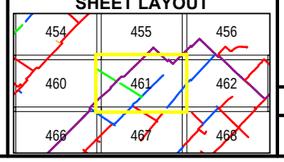
5,100kPa and 10,200kPa
STEEL

Valves
001 Steel
023 PE 1000kPa
024 PE 500kPa

SDR9 MAOP 1000kPa
63mm PE
90mm PE
125mm PE
160mm PE
200mm PE
250mm PE
1000kPa Present

SDR11 MAOP 500kPa
32mm PE
63mm PE
90mm PE
125mm PE
160mm PE
Abandoned Pipe
Service Pipe

SHEET LAYOUT



TAS GAS NETWORKS
LOCATION PLAN
645 - HOBART

Issued Date: 26/06/2017 | Rev No. 02

TGN-645-NW-AL-461

Comments / Observations					
Type of Service (circle relevant type)					
Long	Intermediate	Short	Tail (mains sketch)	Ryder (mains sketch)	Other (specify)

Please record As-Built Sketch below

Include North arrow in circle	**Name of Contractor**	Address of Installation Street Number ……52 ……..
	Name of Service Layer	Street Name ……Melville Street …… Suburb ……Hobart……Postcode…7000……

PLEASE NOTE:

There is a Service Connection at the following address in the area or vicinity of your DBYD inquiry:
52 Melville Street Hobart

DESCRIPTION:

No accurate details are available for this Service.

Please consult your As-Built drawing and contact Tas Gas if you need further information,

Tas Gas GIS Team

Depth of Main……..……..mm Gas Main Diameter…….. mm

Comments (e.g. boundary unknown etc.):……..……..……

……

Offset measurements are to be taken from the property boundaries (front & side) not only from the tee but also at the front boundary and at least once within the property. It is essential to show the depth of the service line at the tie in to the mains, across the footpath
and once or twice within the property. Please indicate on the drawing where Polymeric strip and or concrete slab is installed. Show isolation valve detail if installed. Tas Gas reserves the right to request, amend or revise this drawing and any additional drawings for the installation. All drawings are to be completed to the entire satisfaction of Tas Gas.

For Tas Gas use: As-built Approved		Documents Scanned / Electronically Filed	
By :	Date : / /	By :	Date : / /
		By :	

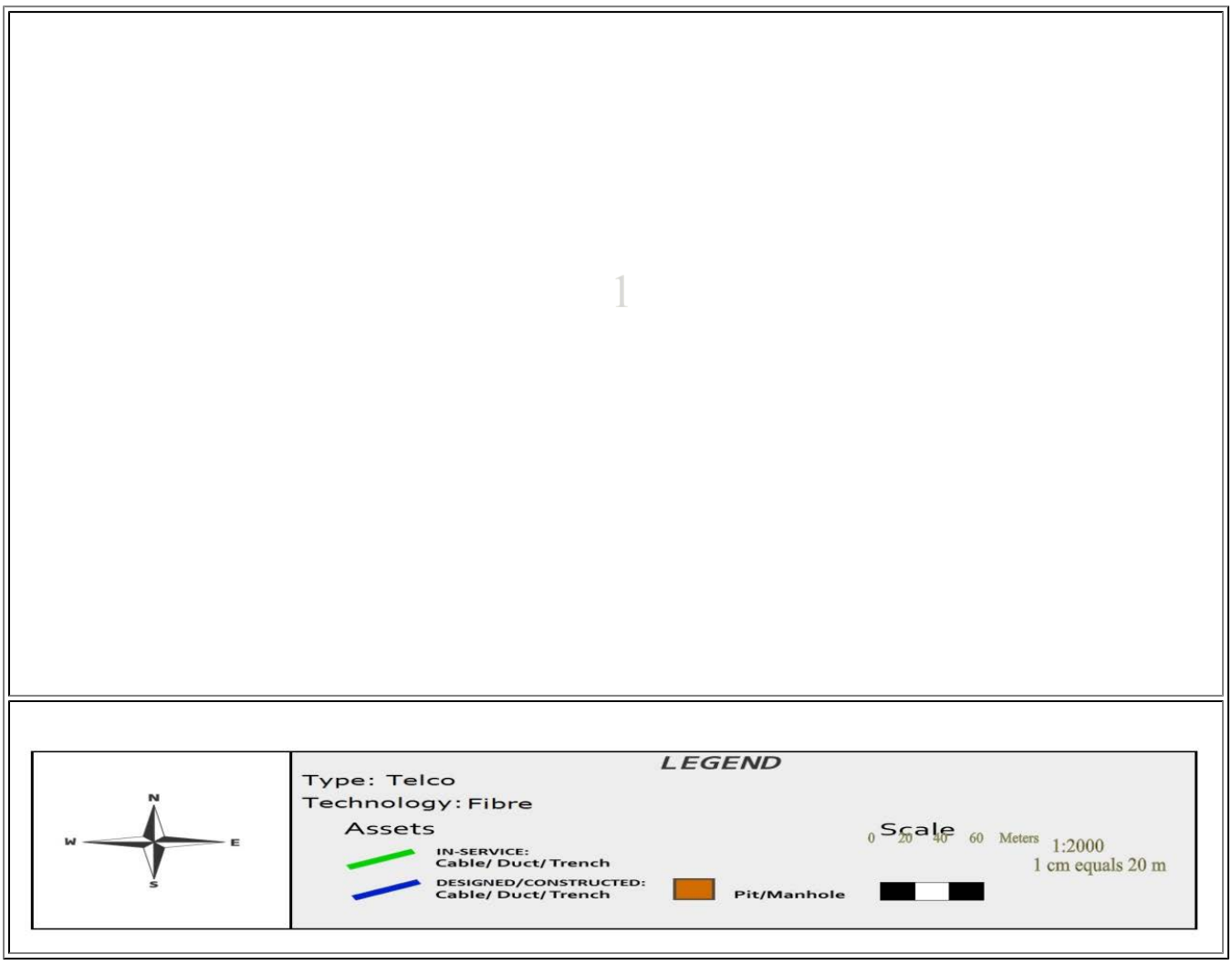
RECORDS : As-Built – Original HC to Meter Installation File ; Scan a copy to e-Connections File ; Scanned Copy to GIS Records for As-Builts

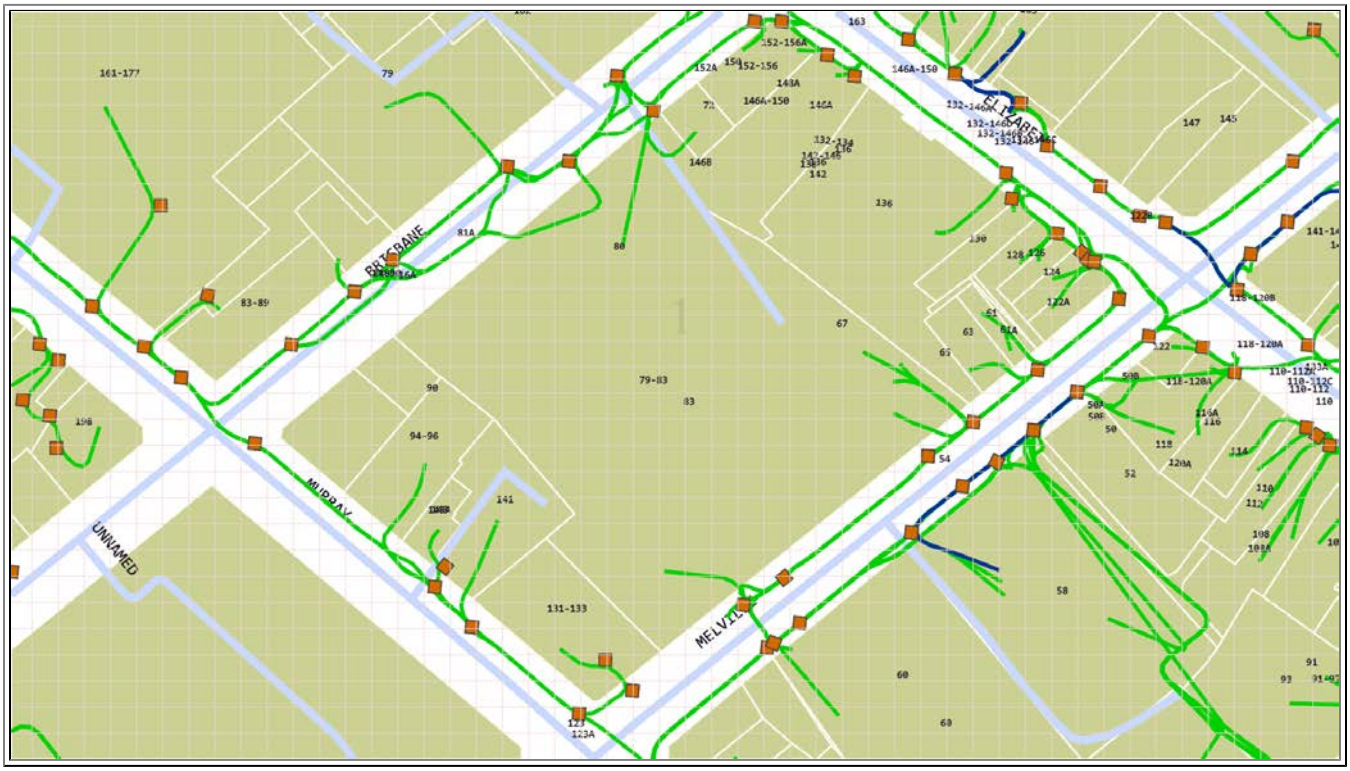
"Safety by choice - not by chance"

Indicative Plans

Issue Date:	01/10/2018
Location:	83 Melville Street,Hobart,TAS-7000

DIAL BEFORE YOU DIG www.1100.com.au





Emergency Contacts

You must immediately report any damage to **nbn™** network that you are/become aware of. Notification may be by telephone - 1800 626 329.

01/10/2018

GHD - Ms Nicole Reineker

GHD

2 Salamanca Square

Battery Point TAS 7004

Job No: 15023440

Sequence No: 76013862

Location Specified in Request (Site):

83 Melville Street ,Hobart

TASNETWORKS HAS RECORDS OF UNDERGROUND ELECTRICAL AND/OR TELECOMMUNICATIONS ASSETS IN OR AROUND THE SITE. DO NOT PROCEED WITHOUT READING AND UNDERSTANDING THE FOLLOWING REQUIREMENTS

To make your experience easier TasNetworks now has a new look, single response that covers TasNetworks' Electrical (Transmission and Distribution) and Telecommunication underground assets. Note that the text of this response has also changed so please take the time to read our response carefully.

Thank you for your recent Dial Before You Dig (**DBYD**) enquiry. TasNetworks works with DBYD to provide you with:

a) Information regarding our records relating to the general location of any underground assets owned by TasNetworks located in the vicinity of the Site;

b) Information regarding how to arrange on-site location services to assist you with identifying the exact location of TasNetworks' underground assets;

c) General information on how to work safely near TasNetworks' underground and overhead assets; and

d) Your legal obligations:

i. not to unlawfully interfere with TasNetworks' assets (both underground and overhead); and

ii. to notify TasNetworks of work that may affect our assets (both underground and overhead). Note that submission of a DBYD request is not sufficient notice for this purpose.

Our assets

TasNetworks owns and maintains both electrical and telecommunications assets. Our Electrical assets cover Transmission Extra High Voltage (EHV) and Distribution High Voltage (HV) and Low Voltage (LV) Networks. Our telecommunications assets may form part of the electrical infrastructure and includes fibre optic cables. Our assets may be located underground or overhead.

Our records

TasNetworks has records that there are underground assets owned by TasNetworks located in or around the Site. The approximate locations of these underground assets are set out in the plans enclosed. Where relevant, detailed plans may also be attached as image files. Please note that the plans and information provided with this letter are a guide only and may not provide an exact location of TasNetworks' underground assets. To ensure that the exact location of TasNetworks' assets has been marked out before you start works please arrange an on-site location by an accredited services locator.

Your obligations

It is important that you understand what your obligations are when it comes to working in the vicinity of TasNetworks' underground assets.

You must:

- Undertake your own searches, investigations, and enquiries to ensure that the information provided in this letter is accurate, reliable and complete and provide this information to anyone engaged to carry out cable location or underground works;
- Obtain updated plans from TasNetworks if you undertake work more than 30 days from the date of this letter by a new DBYD enquiry;
- It is a requirement under s110 of the *Electricity Supply Industry Act 1995* that you notify us in writing if you plan to undertake work that may affect our electrical assets (for example, excavation in the vicinity of our assets). Submission of a DBYD request is not the requisite notice under the Act. You must notify us by email to customer.enquiries@tasnetworks.com.au; please include the Job Number, Sequence Number, Street and Suburb in the subject title. Some more specific guidance around circumstances in which you must provide us with notice are set out below;
- For any work that involves excavation or boring with penetration below **100 mm and within 5 metres** of TasNetworks' underground assets, as well as following the Dial Before You Dig (DBYD) Best Practice Guide for Locating Underground Services the additional minimum requirements must be met:
    - Engage a cable locator to locate and mark the location of the relevant assets showing both alignment and depth.
    - Pothole by hand or use other non-destructive methods to expose the cable and verify location and depth of the assets.
    - If excavations are outside of the table below then excavations may proceed with no further involvement from TasNetworks.
    - If excavations are within the vicinities outlined in the table below then you must give TasNetworks at least **7 days' notice** prior to commencing work and provide detail of the proposed works. TasNetworks may require a copy of your safety management plan, which could be in the form of a Safe Work Method Statement (**SWMS**), which outlines how the risks associated with cables will be managed. **No work shall proceed in this vicinity without prior approval from TasNetworks.**
    - If excavations are within the vicinities outlined in the table below no mechanical excavation is allowed (only hand digging or vacuum truck excavation is permitted), unless specifically approved by TasNetworks.

Cable Type	Depth of Excavation	Proximity to Cable (Horizontal)
Communications or LV	500 mm	2 m
HV	500 mm	2 m
EHV	100 mm	5 m

    - Following any excavation works, the installation (including cable markers, bedding materials and mechanical protection) must be reinstated to TasNetworks' standard. Contact TasNetworks for further information.
- Work safely, exercising reasonable skill, care and diligence so that you do not interfere with any of TasNetworks' assets. We note that it is an offence under section 109 of the *Electricity Supply Industry Act* 1995 (Tas) to interfere with TasNetworks' electrical infrastructure or an electrical installation without TasNetworks' consent; and
- Ensure an emergency plan for contact with energised electric lines is developed and maintained so it is effective for each workplace or site. **IMMEDIATELY REPORT ANY DAMAGE to TasNetworks' infrastructure by telephoning 132 004.**

Working near TasNetworks infrastructure
Electricity infrastructure is inherently dangerous and if damaged or interfered with can cause serious injury (including death) and also disrupt essential supply to customers. As such, it is important that you treat electricity with respect. Our fibre optic assets are fragile; contact with a fibre optic cable may cause internal damage, even when no external damage is present. Any contact with our electricity infrastructure or telecommunications assets must be reported to TasNetworks immediately by telephoning **132 004**.

On-site Location Services
As the location of TasNetworks' assets on the enclosed plans are approximate only, TasNetworks recommends you engage the services of an accredited cable location service provider to ascertain the exact location of such assets. The cable locator must assume that all communications cables are non-conducting. Contact information for cable location and underground service location services can be found in the Yellow Pages at www.yellowpages.com.au under "cable location" or through the National Utility Locating Contractors Association at www.nulca.com.au.

Private assets
TasNetworks does not maintain records for privately owned infrastructure. You will need to make enquiries about the location of any privately owned assets at the Site with the relevant property owner. On occasion, some privately owned infrastructure may show up in our records and in our DBYD response to you. If the TasNetworks DBYD response that you receive contains information on privately owned infrastructure, you will still need to make further enquiries about the location of privately owned assets with the relevant property owner, as TasNetworks' records of privately owned infrastructure are not maintained or updated.

TasNetworks will not be liable to you or any person for any loss or damage (whether direct, indirect, special, consequential or otherwise) suffered or incurred if you (or any other person) act, or fail to act, on any information set out in this letter.

If any doubt exists as to your requirements or obligations when excavating around TasNetworks assets, then contact the Customer Service Centre prior to any work commencing.

Regards,

Customer Service Centre Officer,
TasNetworks Pty Ltd
Phone: 1300 137 008

Enquiry Details

Enquiry Details	
Utility ID	50300
Job Number	15023440
Sequence Number	76013862
Enquiry Date	01/10/2018 08:31
Address	83 Melville Street Hobart
Location in Road	Not Supplied
Activity	Tendering

Enquirer Details			
Customer ID	1895125		
Contact	Ms Nicole Reineker		
Company	GHD		
Email	nicole.reineker@ghd.com		
Phone	0362100626	**Mobile**	Not Supplied

Assets	
Affected Assets	Conduit, Fiber Optic Cable, HV Cable, LV Cable

Plan description

If underground assets owned by TasNetworks exist within our records in the vicinity of the Site, a colour overview map and index map(s) are included. Key to symbols are included on these plans. All maps on the following pages highlight the Site in a **bold red** colour.

Where relevant, detailed underground asset plans for TasNetworks owned assets may also be attached as image files.

Key to symbols used on any attached TasNetworks Underground asset plan image files.

EHV	Extra High Voltage
HV	High Voltage
LV	Low Voltage
UG	Underground
OH	Overhead
STD	Standard

Underground Cable (Black/White plans)

▬▬	EHV/HV/LV Cable
- - - - - -	Fibre Optic Cable

-·-·-	Streetlight cable	▬◥	Potend Or Joint	◯	Manhole	○◉	HV,LV Pole HV/LV Pole
- - - -	Service Duct	◥	Cabinet	□	Service Pit	▭	Steel/concrete Pole
●▬	Sealed end on UG Cable	S%	Turret with Switch	●	Service Post	●H	Std Fuse Base with lamp
		▭	Feeder Pillar	T	Telephone Cabinet	▭	Road Crossing Duct

▨	Zone Substation	▨	Substation	H L 2-125 PVC	Typical section through crossing

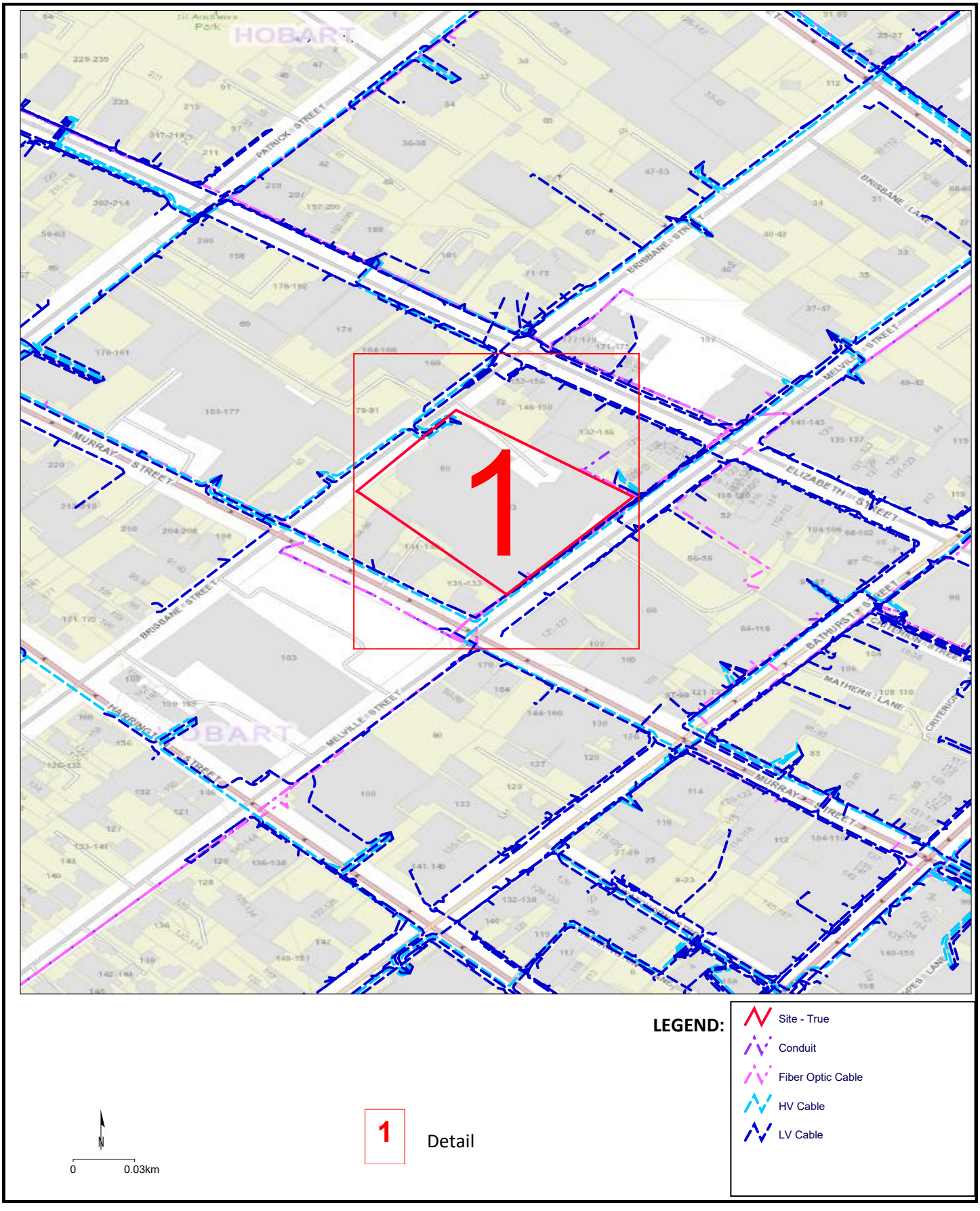
Overview Map

Job No: 15023440

Sequence No: 76013862

83 Melville Street Hobart

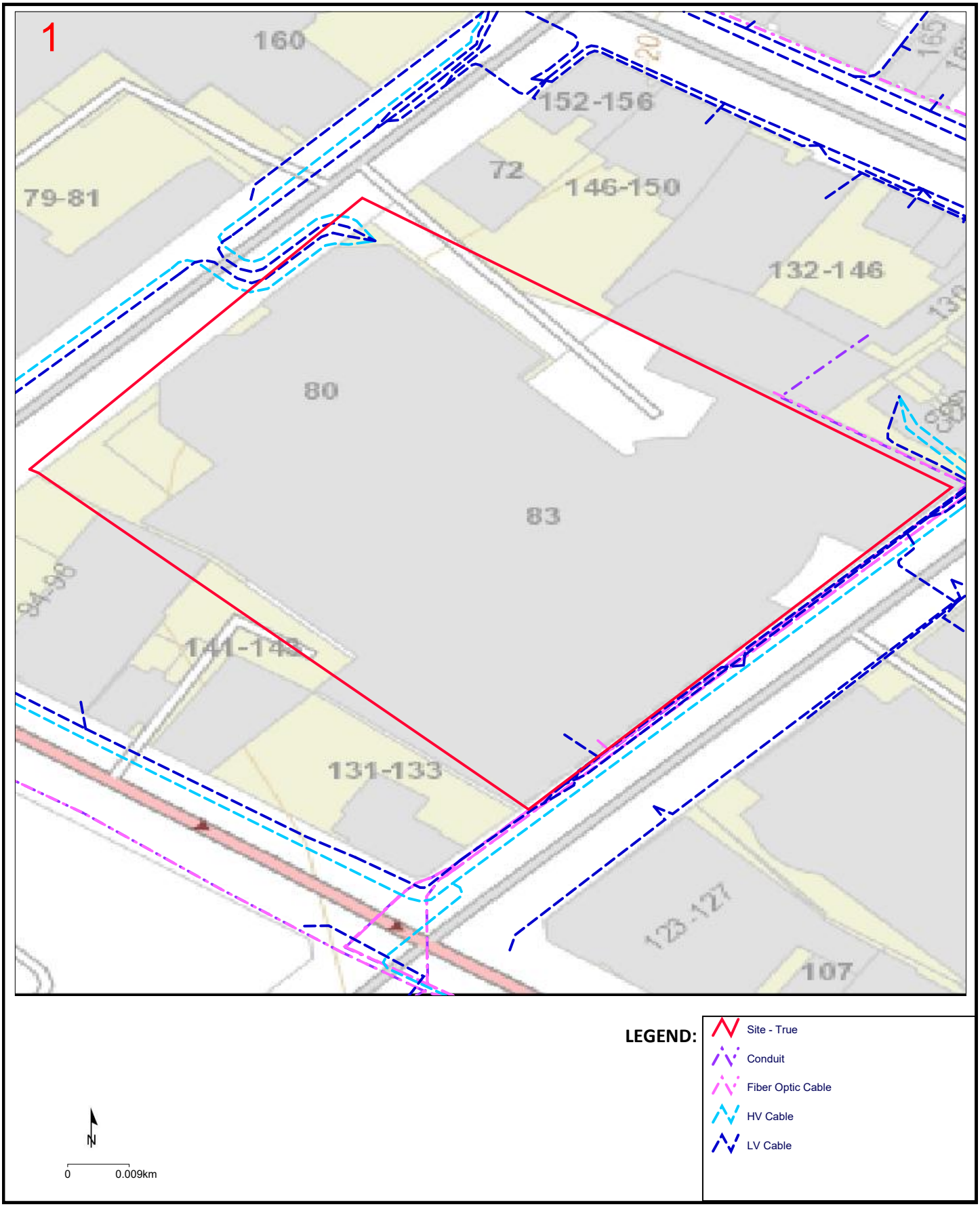
TasNetworks contact details: 1300 137 008 (enquiries) or 132 004 (emergency only), email customer.enquiries@tasnetworks.com.au



Detail Map 1 **Job No:** 15023440 **Sequence No:** 76013862

83 Melville Street Hobart

TasNetworks contact details: 1300 137 008 (enquiries) or 132 004 (emergency only), email customer.enquiries@tasnetworks.com.au



Job No 15023440

Phone: 1100
www.1100.com.au

Caller Details

Contact:	Ms Nicole Reineker	**Caller Id:**	1895125	**Phone:**	0362100626
Company:	GHD	**Mobile:**	Not Supplied	**Fax:**	Not Supplied
Address:	2 Salamanca Square Battery Point TAS 7004	**Email:**	nicole.reineker@ghd.com		

Dig Site and Enquiry Details

WARNING: The map below only displays the location of the proposed dig site and does not display any asset owners' pipe or cables. The area highlighted has been used only to identify the participating asset owners, who will send information to you directly.

User Reference: 79 melville
Working on Behalf of: Private

Enquiry Date:	Start Date:	End Date:
01/10/2018	03/10/2018	03/10/2018

Address:
83 Melville Street
Hobart TAS 7000

Job Purpose:	Onsite Activity:
Design	Tendering
Location of Workplace:	**Location in Road:**
Private Property	Not Supplied

- Check the location of the dig site is correct. If not submit a new enquiry.
- If the scope of works change, or plan validity dates expire, resubmit your enquiry.
- Do NOT dig without plans. Safe excavation is your responsibility. If you do not understand the plans or how to proceed safely, please contact the relevant asset owners.

Notes/Description of Works:
Not Supplied

Your Responsibilities and Duty of Care

- If plans are not received within 2 working days, contact the asset owners directly & quote their Sequence No.
- ALWAYS perform an onsite inspection for the presence of assets. Should you require an onsite location, contact the asset owners directly. Please remember, plans do not detail the exact location of assets.
- Pothole to establish the exact location of all underground assets using a hand shovel, before using heavy machinery.
- Ensure you adhere to any State legislative requirements regarding Duty of Care and safe digging requirements.
- If you damage an underground asset you MUST advise the asset owner immediately.
- By using this service, you agree to Privacy Policy and the terms and disclaimers set out at **www.1100.com.au**
- **For more information on safe excavation practices, visit www.1100.com.au**

Asset Owner Details

The assets owners listed below have been requested to contact you with information about their asset locations within 2 working days.
Additional time should be allowed for information issued by post. It is **your responsibility** to identify the presence of any underground assets in and around your proposed dig site. Please be aware, that not all asset owners are registered with the Dial Before You Dig service, so it is **your responsibility** to identify and contact any asset owners not listed here directly.
** Asset owners highlighted by asterisks ** require that you visit their offices to collect plans.
# Asset owners highlighted with a hash require that you call them to discuss your enquiry or to obtain plans.

Seq. No.	Authority Name	Phone	Status
76013871	Department of Primary Industries, Parks, Water and Environment (DPIPWE)	1300487045	NOTIFIED
76013864	Hobart City Council	0362382482	NOTIFIED
76013869	NBN Co, VicTas	1800626762	NOTIFIED
76013865	Optus and/or Uecomm, Tas	1800505777	NOTIFIED
76013868	PIPE Networks, Tas	1800201100	NOTIFIED
76013867	Tas Gas Networks	0363369350	NOTIFIED
76013870	TasmaNet	0404684955	NOTIFIED
76013862	TasNetworks Pty Ltd	1300137008	NOTIFIED
76013866	TasWater	136992	NOTIFIED
76013863	Telstra VICTAS	1800653935	NOTIFIED

END OF UTILITIES LIST

Appendix G

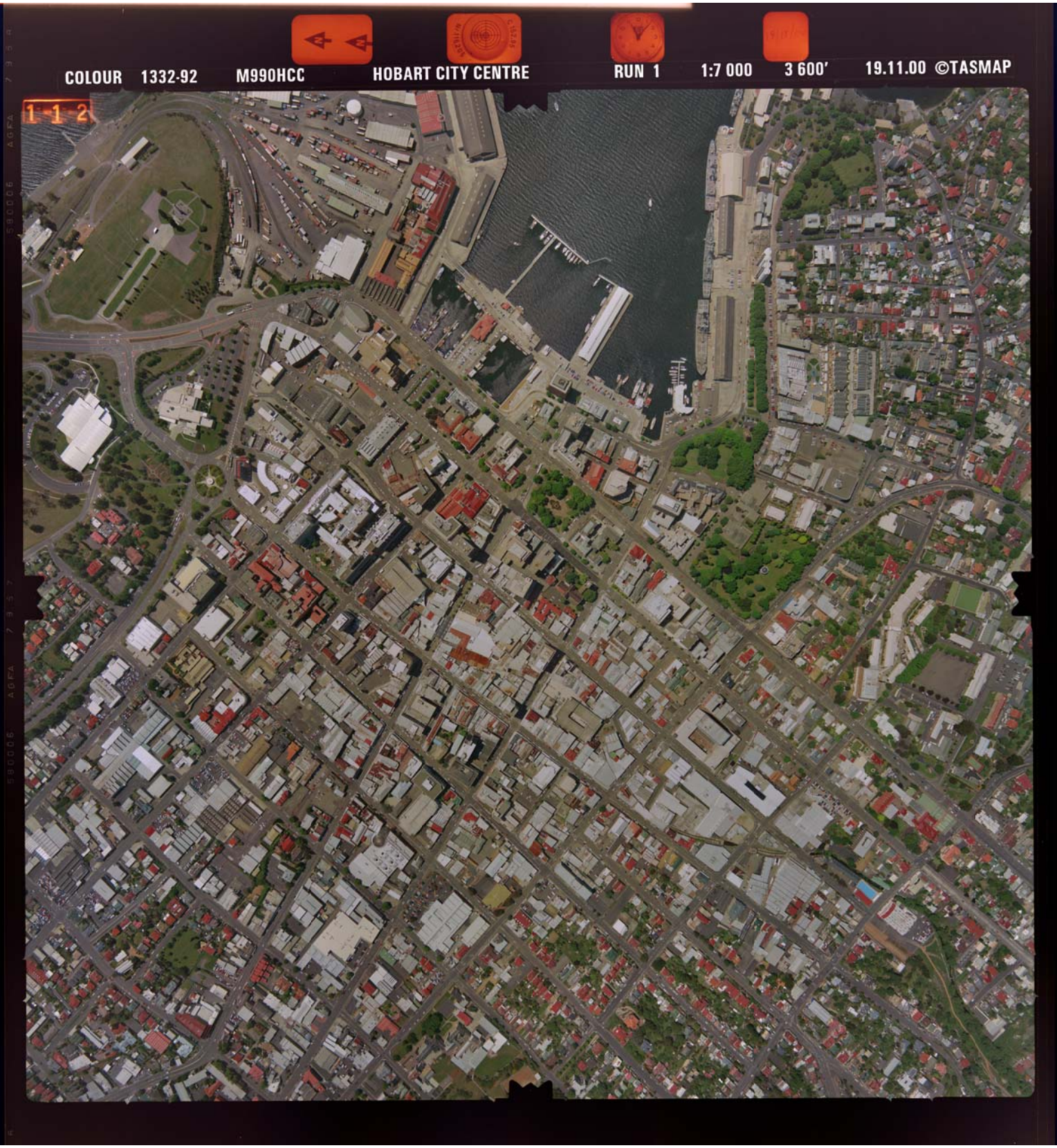
Aerial photographs


T 326 - 123
OBART RUN 9 12-2-57 LENS 9667 152·50 M/M 7 036'


801 -053
0-0 3


1118- 26 M55 HOBART CITY CENTRE RUN 2 1:4 600 2 300′ 2.12.88 ©TASMAP
0-0 8


1239-74 A102 HOBART CBD. OPM. RUN 1 1:14 000 14 000' 16.2.96 © TASMAP
AGFA 1850 031462 AGFA 1851


COLOUR 1332-92 M990HCC HOBART CITY CENTRE RUN 1 1:7 000 3 600' 19.11.00 ©TASMAP
1 1 2


RUN 2
HOBART
Crown Copyright
LANDS PHOTO

Appendix H

Historic reports

Screening Level Environmental Site Assessment of 79-83 Melville Street, Hobart

2 December 1994

Prepared for James Douglas & Associates
on behalf of Tasmania State Property Services

Richard Stoklosa Engineering Practice Pty Ltd
14 Sunvale Avenue
Sandy Bay, Tasmania 7005
(002) 25 4933

Table of Contents

1. Executive Summary

Purpose and Scope

This screening level environmental site assessment was undertaken by Richard Stoklosa, of:

Richard Stoklosa Engineering Practice Pty Ltd
14 Sunvale Avenue
Sandy Bay, Tasmania 7005

The work was performed at the request of James Douglas and Associates, on behalf of Tasmania State Property Services, for the property known as:

Crisp and Gunn Buildings
79-83 Melville Street
Hobart, Tasmania

This screening level environmental site assessment involves a review of the site history and land use including examination of aerial photographs and historical review documents), review of available tate and local records, and site reconnaissance. The purpose of the assessment is to investigate the ossibility of site contamination from previous land use.

bservations

site contains brick buildings currently used as offices, and large store areas constructed of brick timber, with concrete floors. At the rear of the buildings are outdoor car parking areas on bitumen graded gravel and soils. Some vehicles also park inside the store area immediately off Melville . The buildings are under consideration for their conservation value, and it is contemplated that operty will be put up for sale in the near term by the State of Tasmania.

and later Crisp and Gunn) owned and operated the premises as a timber milling, joinery, and re merchandising business since 1886. After a fire destroyed the buildings in 1922, the current gs were constructed and the timber business continued until about 1965. The State of a acquired the property in 1967, and it has since been used for offices and stores. The current are the State Emergency Service and the State Fire Commission. Other state government nts also use portions of the stores area for equipment and materials.

ll quantities of hazardous materials are stored and handled at the site. This includes a 1,000 ol underground storage tank and bowser on the premises, licensed to Shell Company of d in 1973 (under the Inflammable Liquids Act 1929) by the State Department of Mines Goods Directorate). The license indicates that the petrol tank and bowser was to be the State Supply and Tender Department. Notes attached to the license further indicate ol tank was previously used by Crisp and Gunn and abandoned prior to the license date ca 1965 when operations ceased). It is not known how old the tank is, or what other have been stored in it.

he underground petrol tank, there is a small outdoor flammable liquid store (enclosed ain link fence) reported to contain 44 gallon drums of chain saw fuel and kerosene. It hat other materials may have been stored at this site, but it is unlikely that the site was ure from large quantities of other hazardous materials, given the present tenancy and milling and hardware merchandising activities. Small quantities of chemicals etc.) were probably part of the historical merchandising activities.

Insulation was noted above ceiling panels in some of the upstairs office spaces at 79 Melville Street. The type of insulation used at the property is not known.

Some large portions of the store behind the office building at 79 Melville Street was inaccessible during the site reconnaissance visits. Large ground-level access covers were observed in at least two locations, but could not be investigated.

Conclusions and Recommendations

A summary of potential sources of contamination is shown on the following page for reference. No testing of soils or building materials (insulation) for potential contamination and/or identification of hazardous materials has been conducted.

Access to fenced and locked portions of the store area is also necessary to fully investigate the nature and condition of the facility, particularly the ground-level access covers that were observed.

Due to the presence of the underground petrol storage tank and other materials at the site, a sampling programme is indicated to adequately assess the environmental condition of the site.

Characterization Data

...ions, based upon review of available records, site reconnaissance and testing.

Existence / Information	Test Data Available: Yes	Test Data Available: No	Test Type(F)/Results	Evidence of Oil/Haz Mat'l: REC	OBS	TEST	NONE	Comments
	☐	■		☐	☐	☐	■	
e incidental e of oils/fuel	☐	■		☐	■	☐	☐	Oil film on standing water in parking area drain
	☐	■		☐	☐	☐	■	
	☐	■		☐	☐	☐	■	
	☐	■		☐	☐	☐	■	
	☐	■		☐	☐	☐	■	
gallon petrol tank ed) and bowser	☐	■		☐	☐	☐	■	Soil test required to confirm subsurface conditions
on-OHM AST or pressure testing	☐	■		☐	■	☐	■	
lon drums of ne, chainsaw fuel	☐	■		☐	☐	☐	■	Drums on concrete floor, generator fuel in curbed area
	☐	■		☐	☐	☐	■	

ABBREVIATIONS:

REC – Records
OBS – Observations
OHM – Oil/Haz. Materials

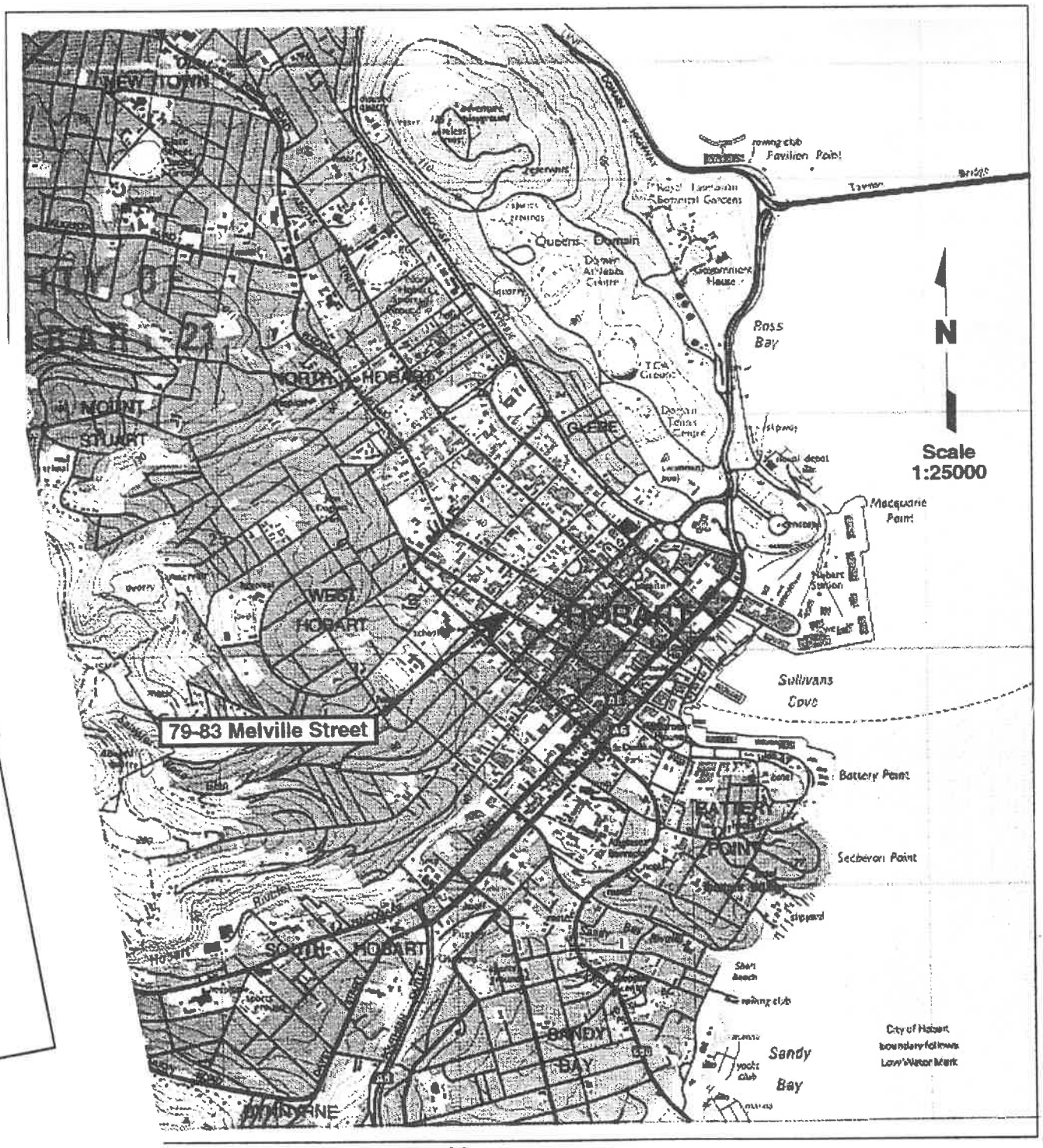
stes

(D) Includes domestic or industrial sewage leach fields/pits
(E) Note: Waste oil is considered a hazardous material
(F) Tested for hydrocarbons, BETX, lead, zinc, cadmium, and mercury

nd the State Fire Comm offices. Concrete access covers observed on floor, but no information on use available to date.
ken to investigate the possibility of contamination (re: the area of the underground storage tank on the premises).
d excavations conducted on the site in 1979. No remaining evidence of site work discovered during reconnaissance.

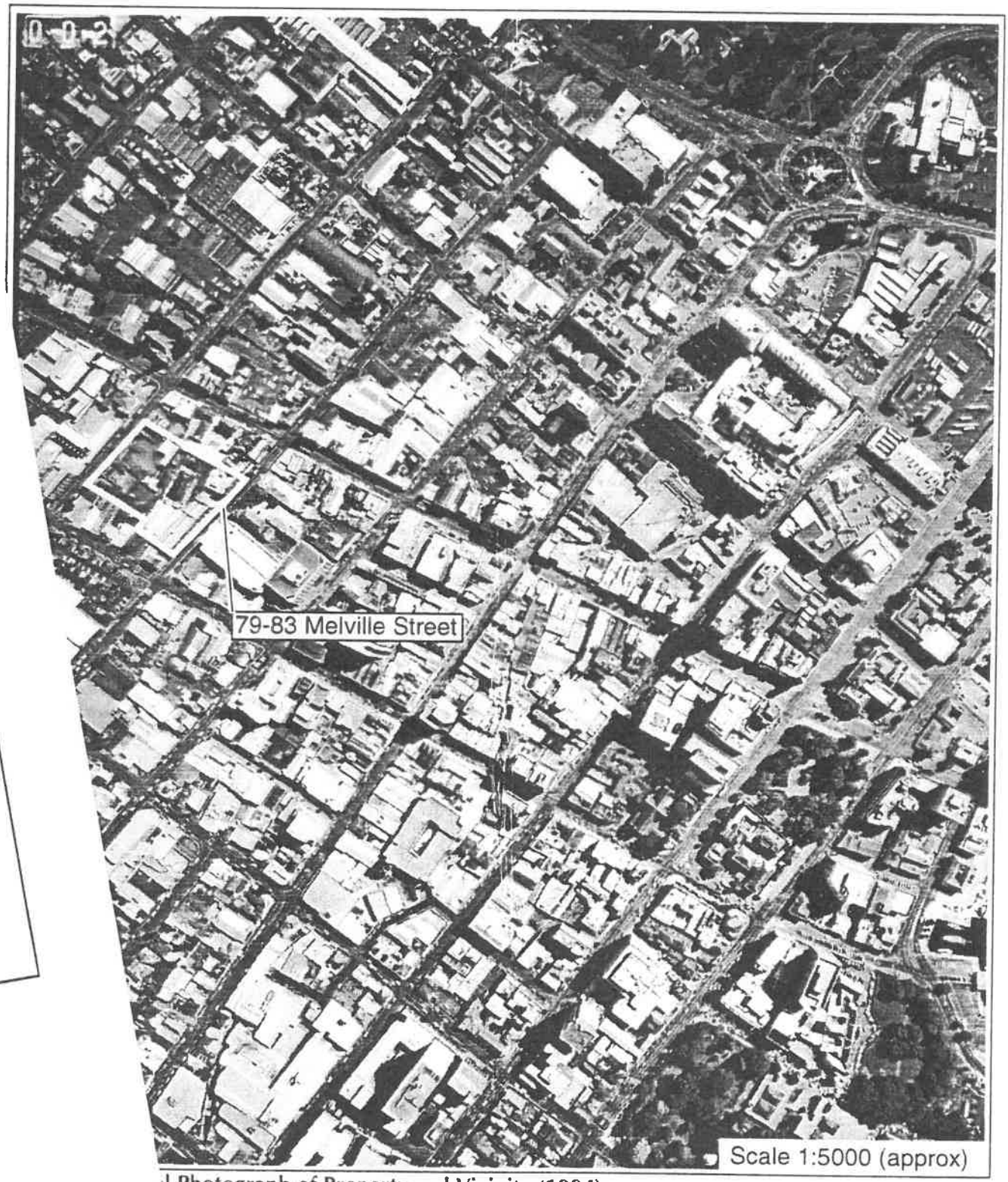
2. Site Description

The property is located at 79-83 Melville Street, Hobart, Tasmania. The location of the property on a regional scale is shown on the topographic map reproduced below.



Property Location on Topographic Map

The property is located in an area of commercial and light industrial development in the Hobart "central business district" area. The site contains brick buildings currently used as offices, and large store areas constructed of brick and timber, with concrete floors. At the rear of the buildings are outdoor car parking areas on bitumen and graded gravel and soils. Some vehicles also park inside the store area immediately off Melville Street. Figure 2-2 is an aerial photograph of the site, showing existing development.



l Photograph of Property and Vicinity (1994)

The current use of the property is for state government offices and stores. The current office tenants are the State Emergency Service and the State Fire Commission. Other government departments use portions of the large store areas. A diagram of the site is shown in Figure 2-3 for reference.

Diagram

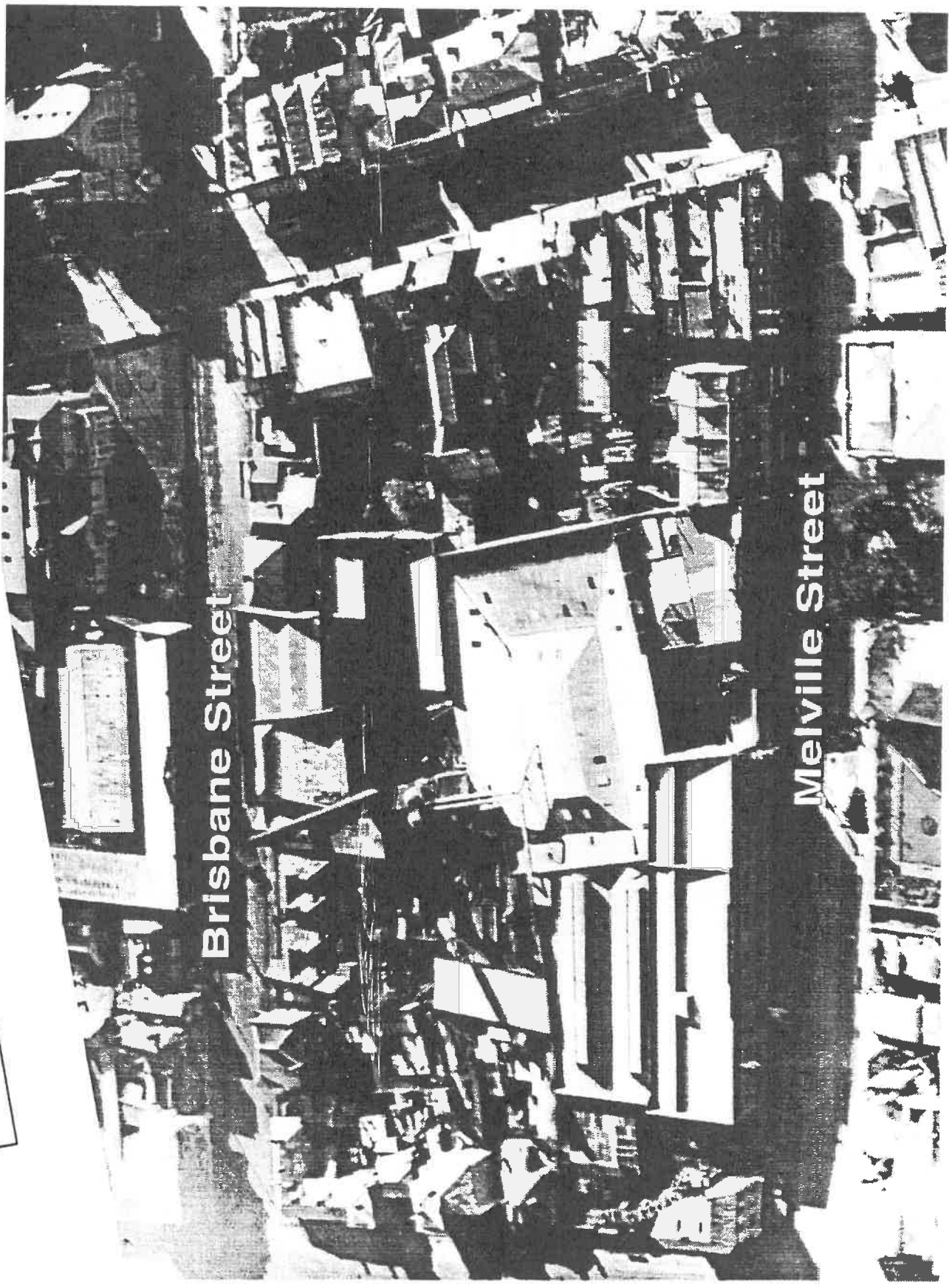
3. Site History

The buildings are under consideration for their conservation value. A thorough description of site history is available separately.[1]

Crisp (and later Crisp and Gunn) owned and operated the premises as a timber milling, joinery, and hardware merchandising business since 1886. After a fire destroyed the buildings in 1922, the current buildings were constructed and the timber business continued until about 1965. The State of Tasmania acquired the property in 1967, and it has since been used for offices and stores. The current tenants are the State Emergency Service and the State Fire Commission. Other state government departments also use portions of the stores area for equipment and materials.

A 1913 oblique photograph of the property is shown in Figure 3-1. The timber milling operation is thought to have been conducted in the buildings nearest Brisbane Street. The large store area was for the milling inventory. The structure at what is now 79 Melville Street was probably the business office, and the larger structure at 83 Melville Street was the joinery shop and hardware merchandising business. A tall smoke stack is evident in the photograph, possibly for burning wood chips and shavings collected in the ductwork seen on the buildings in the photograph.

'incent, Cultural Resource Management, Conservation Assessment, 83 Melville Street (including 79
4.



ɪtograph of the Former Crisp and Gunn Business Facilities

4. Proposed Land Use

The property is to be marketed for sale by the state government in the near term. Some of the existing structures are currently being assessed for their conservation value.

The site is currently a commercial and light industrial property, and it is unknown whether this type of land use will continue in the future.

5. Site Reconnaissance

Site reconnaissance included examination of records and field verification of the location of stormwater services. The property contains buildings and large store areas with concrete floors. At the rear of the property are car parking areas with bitumen and gravel/soil surfaces (refer to site diagram in Figure 2-3).

A search of post-1977 records by the Hobart City Council did not reveal any council orders, licenses, or other information of significance to the environmental condition of the property.[2]

Site reconnaissance was performed on 4 November 1994 and 1 December 1994. Observations are recorded using an Environmental Site Assessment Checklist which is included in Appendix A for reference.

Some small quantities of hazardous materials are stored and handled at the site. This includes a 1,000 gallon petrol underground storage tank and bowser on the premises, licensed to Shell Company of Australia Ltd in 1973 (under the Inflammable Liquids Act 1929) by the State Department of Mines (Dangerous Goods Directorate). The license indicates that the petrol tank and bowser was to be operated by the State Supply and Tender Department. Notes attached to the license further indicate that the petrol tank was previously used by Crisp and Gunn and abandoned prior to the license date 'probably circa 1965 when operations ceased). It is not known how old the tank is, or what other naterials may have been stored in it.

addition to the underground petrol tank, there is a small outdoor flammable liquid store (enclosed a locked, chain link fence) reported to contain 44 gallon drums of chain saw fuel and kerosene. It ocated at the rear of the State Emergency Service (SES) building and store at 83 Melville Street.

not known what other materials may have been stored at this site, but it is unlikely that the site subject to exposure from large quantities of other hazardous materials, given the present tenancy previous timber milling and hardware merchandising activities. Small quantities of chemicals nts, paints, etc.) were probably part of the historical merchandising activities.

ion was noted above ceiling panels in some of the upstairs office spaces at 79 Melville Street. pe of insulation used at the property is not known.

was available to the space beneath the building at 79 Melville Street. Examination of this area reveal evidence of past storage of materials, and the soils appeared to be dry. There was no of the soils, or odors indicative of potential contamination.

e portions of the store behind the office building at 79 Melville Street were inaccessible site reconnaissance visits. Large ground-level access covers were observed in at least two but could not be investigated.

dence of a large stormwater conduit beneath the site. A large diameter pipe (in excess of s shown on Hobart City Council drainage plans, which appears to be the same size pipe countered in one of the boreholes drilled in 1979 (refer to Section 6 and Appendix A, mber 4). It has been speculated that the large stormwater pipe drains the area from ege to the northwest of the property.

bart City Council, Records Section, personal communication.

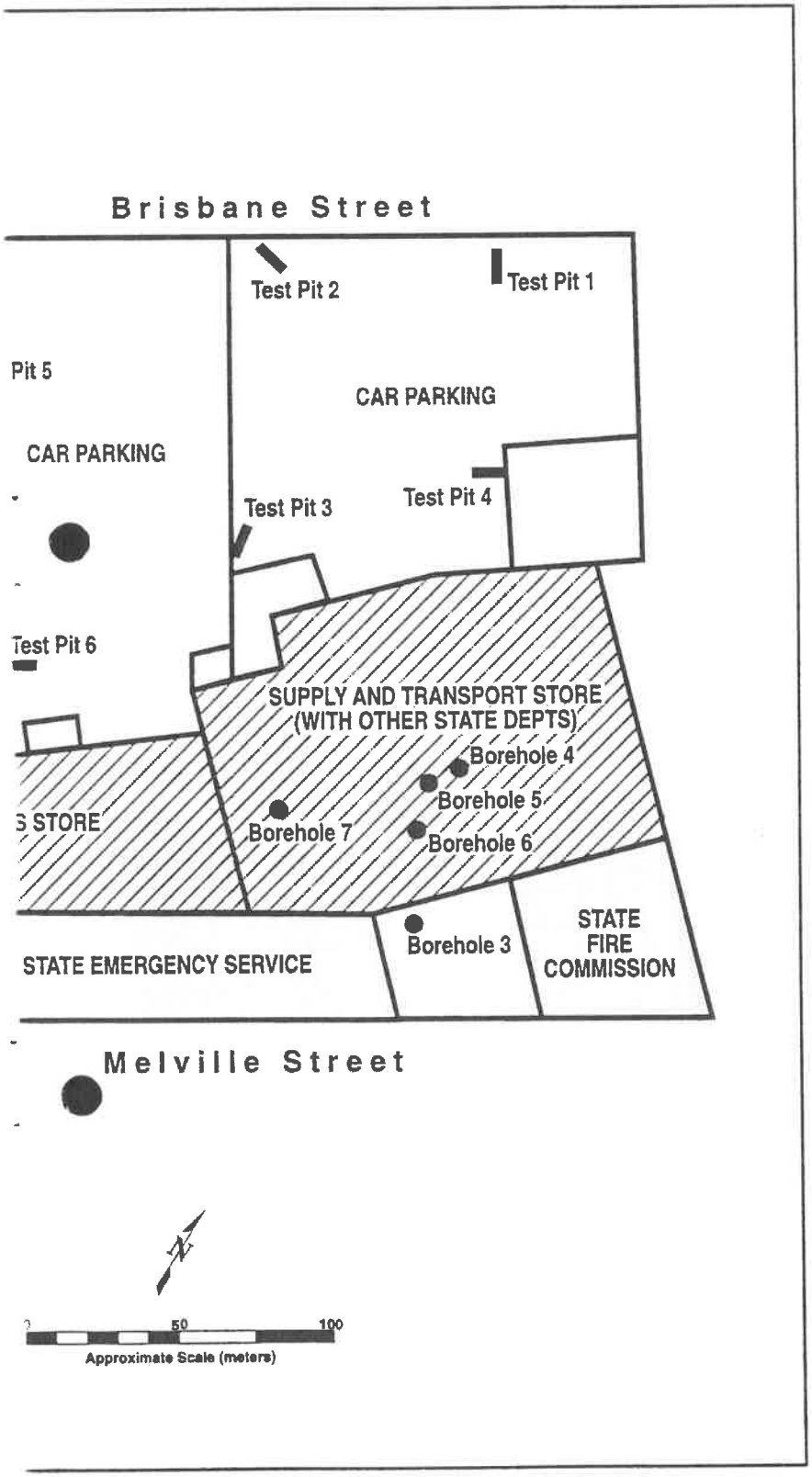
There is a cylindrical brick access structure rising above the embankment at the rear of 79 Melville Street, which is probably associated with the sewer piping at the site. Water was heard flowing through the pipe during the site visits.

One of the floor drains contained an oily film on standing water, observed through the steel cover grate. Discussion with the Hobart City Council also reveals records of a triple interceptor trap in the store area, designed to intercept oil and sediment, which is normally associated with auto mechanic work or car washing activity.[3]

A small shed at the rear of the SES Store contains a skid-mounted 45 kVA (approximate) diesel powered generator. It is on standby for emergency power generation for SES operations. A small diesel tank is attached to the bottom of the skid, and the unit is resting on a curbed concrete bund. No evidence of leakage was noted.

One above ground storage tank is situated in the store area behind 79 Melville Street. It is reportedly used only for pressure testing, using water,[4] and has a pressure gauge and drain fitted for this purpose.

Hobart City Council, personal communication.
osz, State Fire Commission, personal communication.



cavations and Boreholes (1979)

6. Geological Conditions

Mineral Resources, regarding geologic
cription was available on the property,
dolerite and clayey soils.

erformed in 1979 by the Department of
s of the investigation are included in
follows.[7]

indicates that the block bounded by
by Triassic age sediments. The more
ater Hobart Area (Provisional, Map 1,
to the east of the north-south diagonal

1979, on behalf of the Department of
orth-south diagonal noted above. These
oles (refer to locations in Figure 6-1 for
been levelled for car parking. The test
lluvial materials occur above dolerite.
which sub-vertical to vertical joints
itu dolerite occurs at between 0.3 and

Streets were made using auger screws.
ents occur above extremely weathered
to stiff, high plasticity clay, sometimes
as moist, hard, high plasticity clay. A
trance to the (then) Supply and Tender
nts above extremely weathered in-situ

area. With the exception of one hole
r pipe, these holes were completed as
meters of fill materials over moderately

ite has been filled over to provide level

a depth of about ten meters.

Works, Materials and Research Laboratory
es.

Appendix B

Geologic Description of Excavations and Boreholes

Environmental Site Assessment Checklist

General Circumstances

Project: SITE RECONNAISSANCE OF 79-83 MELVILLE STREET, HOBART

Client: JAMES DOUGLAS & ASSOCIATES Phone: 31 4020 Fax: 31 4020

Owner: Tasmanian Property Services Group (Ross Kile) Phone: 33 3088 Fax: 33 6655

Site Contact: Arranged by James Douglas Phone: 31 4020 Fax: 31 4020

Site Name: "Crisp & Gunn Buildings" -

Current Site Use: 79 Melville St: State Fire Commission ; 83 Melville St: SES (State Emergency Service) Land Area: _____

Location / Address: 79-83 Melville St., Hobart, TASMANIA

Site Access Condition: Off Street Access to Buildings, some areas of warehouse fenced & locked - no access

Type of Facility (circle): Industrial Commercial Residential (Other) State Agency Offices / Stores

Data Collection Prior to Site Investigations

Topographic Map: TASMAP - Hobart Sheet Scale: 1:25 000 Date: 1988

Site Map: Included with Geologic Report of Boreholes and Excavations (197 Scale: 1:500 approx? Date: 1979

Prepared By: Dept. Main Roads - Mat'l & Research Dv.

Geologic Map: (Provisional - Map 1) TASMAP Engineering Geology Map - Hobart Scale: 1:25000 Date: 1990

Soil Map: " High Plasticity Clays, Gravel, Cobbles Scale: (from subsurface exploration - see below) Date: _____

Aerial Photo: TASMAP 1218-204, M990, HOBART CITY Scale: 1:5000 Date: 12.2.94

Well Data: (NOT AVAILABLE - NONE OBSERVED) Driller / Logger: _____

Details Available? (circle): Yes No Depth: _____ Date: _____

Type of Lithology (circle): Bedrock Weathered Unconsolidated Mineralised

Ground Water Occurrence and Depth: _____

Subsurface Exploration: 6 Test Pit Excavations & 7 Boreholes Performed By: Dept. Main Roads - Mat'l & Research Dv.

Details Available? (circle): (Yes) No Depth: Excavations up to 1.5 meters; Boreholes: 2.5 to 10 meters Date: 1979 (Nov)

Type of Lithology (circle): Bedrock (Weathered - Decomposed Dolerite) Unconsolidated Mineralised

Ground Water Occurrence and Depth: estimated to be at least 6 meters below surface. (opinion of Dept. Mines) (not encountered in Boreholes up to 10 meters)

Adjacent Properties

Property Name: Commercial Properties — Type of Business: Print Shop, Retail Shops

Property Name: Residential Use — Type of Business: (evidence of possible incidental use)

Property Name: City Properties — Type of Business: Parking Garage (Melville St.)

Property Name: _____ — Type of Business: _____

Use of Contiguous Properties

Wetlands: None, although some evidence points to piping of the Warwick Rivulet beneath the site.

Landfill / Waste Treatment Facility: None.

Storage Facilities: Large warehouse stores on premises, ~~storage assoc. with smaller~~

Petrol Stations: Shell Bowser on premises (petrol), with 1,000 gallon licensed UST

Agriculture / Grazing Lands: None.

Commercial: ~~Commercially-intensive land use - retail shops/services~~ None.

Industrial: Light industrial – welding (gas), equipment maintenance workshops

Other?: Professional offices in brick buildings on premises; car parking/washing

Use of Surrounding Properties

Wetlands: None.

Landfill / Waste Treatment Facility: None.

Storage Facilities: Storage associated with smaller businesses in area (print shop next door).

Petrol Stations: None, possible fuel/oil at auto mechanic shop (incidental quant.?).

Agriculture / Grazing Lands: None.

Commercial: Commercially-intensive land use in surrounding area.

Industrial: Light industrial (auto mechanics, etc.)

Other?: Parking garage (multi-storey) on opposite side of Melville St.

Environmental Concerns due to Adjacent Properties

Print shop and auto mechanic businesses adjacent to subject property may involve storage of hazardous materials — however, no apparent discharges are evident and environmental concern to subject property is probably insignificant.

7. Conclusions and Recommendations

Testing of soils and possibly some of the building materials (insulation) for potential contamination and/or identification of hazardous materials should be conducted to adequately investigate the possibility of site contamination from previous land use.

Access to fenced and locked portions of the store area is also necessary to fully investigate the nature and condition of the facility. Of interest are the ground-level access covers that were observed, and the reported triple interceptor oil and sediment trap. A more thorough examination of council drainage plans and other site drawings, with field confirmation, is necessary in the inaccessible areas of the property.

Due to the presence of the underground petrol storage tank and other materials at the site, a sampling programme is indicated to adequately assess the environmental condition of the site.

Upon completion of these further investigations, recommendations can be made on the short term and long term environmental management of the property.

8. Limitations of Investigation

It is presumed that the information provided by various sources, both published and by way of personal communication, is substantially accurate and has disclosed all relevant information.

Certain limitations on this assessment should be recognized to keep the conclusions and recommendations in perspective:

- No records were available to describe historical land use at the property (prior to 1977) from the Hobart City Council. No records are available to describe the storage, handling, or discharge of chemicals or hazardous materials that may have been used on the premises.

- Municipal sewer and storm water piping traverse the property. These pipelines were not examined in the field, and no opinion is rendered on their condition. However, there is no apparent evidence of sewer or storm water problems on the soils above these pipelines.

Environmental conditions are dynamic, and the present assessment is only a "snap shot" of the condition of the property at the time of the site investigation.

9. References

South Australian Health Commission, ***Identification and Assessment of Contaminated Land***, 1994.

TASMAP, Aerial Photograph, 1218-204, M990, Hobart City, 1:5000, 2560', 12 February 1994.

TASMAP, Engineering Geology Map – Greater Hobart Area, Map1, Provisional, 1990.

TASMAP, Topographic Map – Hobart Sheet, 1988.

Vincent, Robert, Cultural Resource Management, ***Conservation Assessment, 83 Melville Street (including 79 Melville Street)***, 1994.

Appendix A

Environmental Site Assessment Checklist

Appendix 4

Land Titles

Department of Main Roads, Tas
Materials and Research Division

Engineering log — excavation

pit no: 1
sheet 1 of 1

file: 04.053

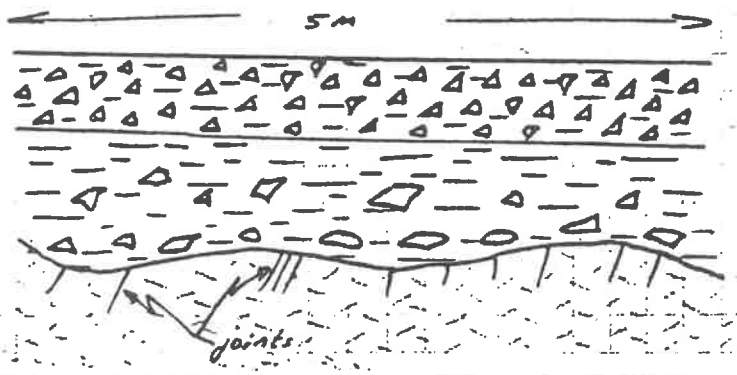
project: POLICE HEADQUARTERS, HOBART
pit location: NE. CORNER MET. ARCHITECTS CAR PARK

pit commenced: 17-9-79
pit completed: 17-9-79
supervised by: W. DOE
log checked by:

equipment type and model: FORD 420
excavation dimensions: 5 m long, 0.5 m wide

R.L. surface: -2.693 m
datum: BRISBANE ST operator: SMITH

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. depth in metres	graphic log	classification symbol	material (soil type: plasticity or particle characteristics, colour, secondary and minor components.)	moisture condition	consistency, rel. density	hand penetrometer 100 kPa 200 300 400	structure and additional observations
BH					0.3			GRAVEL, fine grained, decomposed dolerite	M	L		
								CLAY and ROCK FILL	M	MD		
					0.5			DOLERITE, coarse grained, contains clay pockets				
					1.0			DOLERITE, decomposed, in situ				



N.B. DATUM is SW CORNER OF WATSONS WIRELESS BRISBANE ST FOOTPATH.

key

method
- natural exposure
- E existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper

support
- T timbering

penetration
- 1 2 3 no resistance ranging to refusal

water
- 10 Oct, 73 water level on date shown
- water inflow
- water outflow

notes — samples and tests
- U50 — undisturbed sample 50 mm diameter
- D — disturbed sample
- N — standard penetration test:figure = result
- N* — SPT + sample
- Nc — cone penetrometer

classification symbols and soil description
based on unified classification system

moisture
- D — dry
- M — moist
- W — wet

consistency/relative density
- VS — very soft
- S — soft
- F — firm
- St — stiff
- VSt — very stiff
- H — hard
- Fb — friable
- VL — very loose
- L — loose
- MD — moderately dense
- D — dense
- VD — very dense

Department of Main Roads (Tas)
Materials and Research Division

Engineering log — excavation

pit no. 3
sheet 1 of 1

file: 04.053

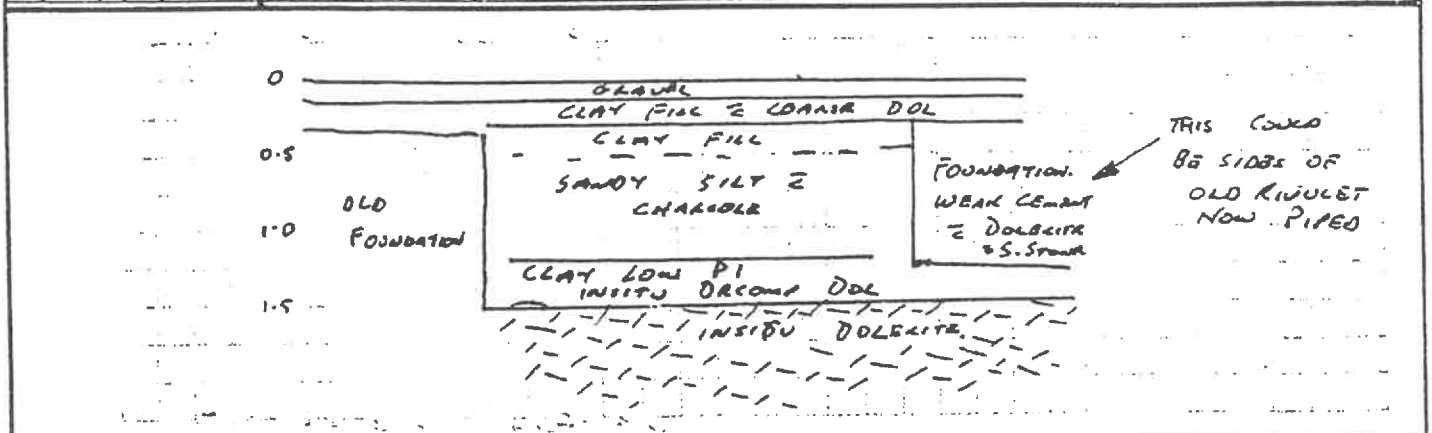
project: POLICE HEADQUARTERS HOBART
pit location: S.W. CORNER MET. ARCH. CAR PARK

pit commenced: 17-9-79
pit completed: 17-9-79
supervised by: W DOE
log checked by:

equipment type and model: FORD 420
excavation dimensions: 2.5 m long, 0.5 m wide

R.L. surface: -4.025 m
datum: BALSMANE ST operator: SMITH

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. depth metres	graphic log	classification symbol	material (soil type: plasticity or particle characteristics, colour, secondary and minor components.)	moisture condition	consistency, rel. density	100 kPa hand penetrometer 200 300 400	structure and additional observations
							GP	GRAVEL FINE BROWN DOLERITE	M	L		
							CL	CLAY FILL + COARSE DOLERITE	M	L		
					0.5		CH	CLAY FILL. HIGH PLASTICITY	M	L		
BH					1		SM	SANDY SILT FINE TOPSOIL WITH CHARCOAL PARTICLES	M	L		
							CL	CLAY LOW PLASTICITY DECOMP DOLERITE	M	S-Fb		
					1.5			INSITU DECOMP DOL				



key

method
- A natural exposure
- E existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper

support
- T timbering

penetration
- 1 2 3 — no resistance ranging to refusal

water
- 10 Oct, 73 water level on date shown
- water inflow
- water outflow

notes — samples and tests
- U50 — undisturbed sample 50 mm diameter
- D — disturbed sample
- N — standard penetration test: figure = result
- N* — SPT + sample
- Nc — cone penetrometer

classification symbols and soil description
based on unified classification system

moisture
- D — dry
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- W — wet

consistency/relative density
- VS — very soft
- S — soft
- F — firm
- St — stiff
- VSt — very stiff
- H — hard
- Fb — friable
- VL — very loose
- L — loose
- MD — moderately dense
- D — dense
- VD — very dense

Department of Main Roads (Tas)
Materials and Research Division

Engineering log — excavation

pit no. 5
sheet 1 of 1

file: 04·053

project: POLICE HEADQUARTERS HOBART
pit location: DLI. CAR PARK ADJACENT DUNLOP WALL

pit commenced: 17-9-79
pit completed: 17-9-79
supervised by: W DOE
log checked by:

equipment type and model: FORD 420
excavation dimensions: 2 m long, 0·5 m wide

R.L. surface: −0·245 m
datum: BRISBANE operator: SMITH

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. depth metres	graphic log	classification symbol	material (soil type: plasticity or particle characteristics, colour, secondary and minor components.)	moisture condition	consistency, rel. density	hand penetrometer 100 kPa 200 300 400	structure and additional observations
							GP/C	RUBBLE FILL + CLAY		D		
BH					0·5			OLD BUILDING FOUNDATIONS BRICKS + CEMENT		MD		
					1·3			INSITU DOLERITE		VD		VERTICAL JOINTING 25mm JOINT SPACING
								HOLE DISCONTINUED				

key

method
- natural exposure
- E existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper

support
- T timbering

penetration
1 2 3 — no resistance ranging to refusal

water
- 10 Oct, 73 water level on date shown
- water inflow
- water outflow

notes — samples and tests
- U50 — undisturbed sample 50 mm diameter
- D — disturbed sample
- N — standard penetration test: figure = result
- N* — SPT + sample
- Nc — cone penetrometer

classification symbols and soil description
based on unified classification system

moisture
- D — dry
- M — moist
- W — wet

consistency/relative density
- VS — very soft
- S — soft
- F — firm
- St — stiff
- VSt — very stiff
- H — hard
- Fb — friable
- VL — very loose
- L — loose
- MD — moderately dense
- D — dense
- VD — very dense

Department of Main Roads (Tas)
Materials and Research Division

engineering log – borehole

borehole no: 1
sheet 1 of 2

file:

project: POLICE HEADQUARTERS, HOBART
borehole location: refer site plan

hole commenced: 7-11-79
hole completed: 8-11-79
supervised by: N.D. JOHNSON
log checked by: B.D. WELDON

drill model and mounting: GEMCO (trailer)
hole diameter: 110 mm
slope: Vert deg.
bearing: — deg.
R.L. surface: m
datum:
operator: J. Hammersley

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. / depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency, rel. density	hand penetrometer 100 200 300 400 kPa	structure and additional observations
S					0		GP	GRAVEL, decomposed dolerite				FILL OR TERTIARY SEDIMENTS
							CH	CLAY & BOULDERS (FILL)				
				N*=4 (2,2,2)	1.0		CH	CLAY; high plasticity; moisture content (M.C.) greater than plastic limit (P.L.); brown; minor (<1%) fine grained sand size particles.	M	F		
				N*=4 (1,2,2)	2.0		CH		M	F		
				N*=6 (7,3,3)	3.0		GM	SILT & GRAVEL, coarse grained sandstone (slightly indurated) gravel in yellow silt matrix, sub angular gravel fragments	M	H to Fb		
			▽ 9/11/79	N*=36 (9,16,20)	4.0		CH	CLAY; high-medium plasticity M.C. < P.L.; speckled and mottled colouring of white, grey, red, brown showing remnant dolerite fabric. Some earthy or powdery lenses and seams of white calcite. (extremely weathered dolerite). Some fine to coarse sand sized grains of fresh to slightly weathered mineral grains.				EXTREMELY WEATHERED IN SITU DOLERITE
				N*=37 11,12,25	5.0		CH					
				N*=40 (12,16,24)	6.0		CH					
				N*=54 (16,24,30)	7.0		CH					

key

method
- S auger screwing*
- AD auger drilling*
- R roller/tricone
- W washbore
- CT cable tool

* bit shown by suffix:
- B – blank bit
- V – "V" bit
- T – TC bit

e.g. ADT

support
- C casing
- M mud

penetration
1 2 3 — no resistance ranging to refusal

water
10 Oct, 73 water level on date shown
water inflow
water outflow

notes
- U50 – undisturbed sample 50 mm diameter
- D – disturbed sample
- N – standard penetration test: figure = result
- N* – SPT + sample
- Nc – cone penetrometer

classification symbols and soil description
based on unified classification system

moisture
- D – dry
- M – moist
- W – wet

consistency/relative density
- VS – very soft
- S – soft
- F – firm
- St – stiff
- VSt – very stiff
- H – hard
- Fb – friable
- VL – very loose
- L – loose
- MD – moderately dense
- D – dense
- VD – very dense

Department of Main Roads (Tas)
Materials and Research Division

Engineering log – borehole

borehole no. 2
sheet 1 of 1

file:

project: POLICE HEADQUARTERS, HOBART
borehole location: refer site plan

hole commenced: 8-11-79
hole completed: 8-11-79
supervised by: N.D. JOHNSON
log checked by: B.D. WELDON

drill model and mounting: GEMCO (trailer)
hole diameter: 110 mm

slope: Vert deg.
bearing: — deg.

R.L. surface: m
datum:

operator: T. Hammersley

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency, rel. density	hand penetrometer 100 200 300 400 kPa	structure and additional observations
A.S.					0.0			GRAVEL, decomposed dolerite				
				N* = 4 (1,2,2)	1.0		CH	CLAY; high plasticity, moisture content (M.C.) greater than plastic limit (P.L.); brown	M	F		FILL OR TERMARY SEDIMENTS
				N* = 8 (2,2,6)	2.0		CH		M	St		
			▽	9-11-79	3.0			CLAY, high plasticity; M.C. < P.L., speckled and mottled colouring of red-brown-white-grey showing remnant dolerite fabric. Some white powdery calcite lenses. Minor (<1%) fine to coarse sand sized mineral grains				EXTREMELY WEATHERED IN SITU DOLERITE
				N* = 31 (7,13,18)	4.0		CH		M	H		
				N* = 45 (11,21,24)	5.0		CH		M	H		
					6.0			END OF BOREHOLE at 5.95 m depth				

key

method
- AS auger screwing*
- AD auger drilling*
- R roller/tricone
- W washbore
- CT cable tool

* bit shown by suffix:
- B — blank bit
- V — "V" bit
- T — TC bit

e.g. ADT

support
- C casing
- M mud

penetration
1 2 3 — no resistance ranging to refusal

water
10 Oct, 73 water level on date shown
water inflow
water outflow

notes — samples and tests
- U50 — undisturbed sample 50 mm diameter
- D — disturbed sample
- N — standard penetration test: figure = result
- N* — SPT + sample
- Nc — cone penetrometer

classification symbols and soil description
based on unified classification system

moisture
- D — dry
- M — moist
- W — wet

consistency/relative density
- VS — very soft
- S — soft
- F — firm
- St — stiff
- VSt — very stiff
- H — hard
- Fb — friable
- VL — very loose
- L — loose
- MD — moderately dense
- D — dense
- VD — very dense

Department of Main Roads (Tas)
Materials and Research Division

engineering log – borehole

borehole no. 5
sheet 1 of 2

file:

project: POLICE HEADQUARTERS, HOBART
borehole location: refer site plan

hole commenced: 14-11-79
hole completed: 14-11-79
supervised by: N. D. JOHNSON
log checked by: B.D. WELDON

drill model and mounting: GEMCO (trailer)
hole diameter: 110 mm
slope: Vert deg.
bearing: deg.
R.L. surface: m
datum:
operator: J. Hammersley

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency, rel. density	hand penetrometer kPa 100 200 300 400	structure and additional observations
A.S.								CONCRETE				
			▼	15-11-79			CH	CLAY, high plasticity, moisture content greater than plastic limit; black to brown colour, contains red-brick fragments (coarse gravel size).	M	F		FILL
				N* = 2 (1,1,1)	1.0							
				N* > 60	2.0				M	F		7 blows for 150 mm penetration, 18 blows for no further penetration
				N* > 60				Continued on cored borehole sheet				20 blows for zero penetration

key

method
AS auger screwing*
AD auger drilling*
R roller/tricone
W washbore
CT cable tool
* bit shown by suffix:
B – blank bit
V – "V" bit
T – TC bit
e.g. ADT

support
C casing
M mud

penetration
1 2 3
no resistance
ranging to
refusal

water
10 Oct, 73 water level on date shown
water inflow
water outflow

notes – samples and tests
U50 – undisturbed sample 50 mm diameter
D – disturbed sample
N – standard penetration test: figure = result
N* – SPT + sample
Nc – cone penetrometer

classification symbols and soil description
based on unified classification system

moisture
D – dry
M – moist
W – wet

consistency/relative density
VS – very soft
S – soft
F – firm
St – stiff
VSt – very stiff
H – hard
Fb – friable
VL – very loose
L – loose
MD – moderately dense
D – dense
VD – very dense

Department of Main Roads (Tas)
Materials and Research Division

borehole no: 6
sheet 1 of 2

engineering log – borehole

file:

project: POLICE HEADQUARTERS, HOBART
borehole location: refer site plan

hole commenced: 14-11-79
hole completed: 15-11-79
supervised by: N. D. JOHNSON
log checked by: B. D. WELDON

drill model and mounting: GEMCO (Hauler)
hole diameter: 110 mm
slope: VERT deg.
bearing: – deg.
R.L. surface: m
datum:
operator: J. Hammersley

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency, rel. density	hand penetrometer kPa 100 200 300 400	structure and additional observations
A.S.								CONCRETE				
								BRICK FRAGMENTS	M	L		
								COBBLES + CLAY	M	L		FILL
				N°6 (1,3,3)	10			CLAY, high plasticity, moisture content greater than plastic limit, black-brown, gravelly in places (fine to medium gravel).	M	F-St		
					20			GRAVEL (possibly weathered in situ dolerite	M	D		?
				N° >60								20 blows for zero penetration.
					30			Continued on engineering log – cored borehole sheet.				

key

method
AS auger screwing*
AD auger drilling*
R roller/tricone
W washbore
CT cable tool
* bit shown by suffix:
B – blank bit
V – "V" bit
T – TC bit
e.g. ADT

support
C casing
M mud

penetration
1 2 3 — no resistance ranging to refusal

water
10 Oct, 73 water level on date shown
water inflow
water outflow

notes – samples and tests
U50 – undisturbed sample 50 mm diameter
D – disturbed sample
N – standard penetration test: figure = result
N* – SPT + sample
Nc – cone penetrometer

classification symbols and soil description
based on unified classification system

moisture
D – dry
M – moist
W – wet

consistency/relative density
VS – very soft
S – soft
F – firm
St – stiff
VSt – very stiff
H – hard
Fb – friable
VL – very loose
L – loose
MD – moderately dense
D – dense
VD – very dense

DEPARTMENT OF PUBLIC WORKS (TAS.)
MATERIALS AND RESEARCH DIVISION

M2/R/F8

borehole no. 7

sheet 1 of 1

engineering log — cored borehole

File No.

project: POLICE HEADQUARTERS, HOBART

borehole location: refer site plan

hole commenced: 16-11-79

hole completed: 16-11-79

supervised by: N.D. JOHNSON

log checked by: B.D. WELDON

drill model and mounting: GEMCO (Hydrau) slope: Vert deg.

barrel type and length: NMLC 220 fluid H_2O bearing: - deg.

R.L. surface: m

datum: Driller J. Hammersley

drilling information				rock substance				rock mass defects	
method	case-lift / water		R.L. / depth metres	graphic log / core loss	substance description rock type: grain characteristics, colour, structure, minor components.	weathering	strength Is (50) EL VL L M H VH EH	defect spacing mm 30 100 300 1000 >3000	defect description thickness, type, inclination, planarity, roughness, coating. particular / general
					CONCRETE				
					CLAY, high plasticity, yellow				FILL
		N° > 60 (220mm)	1.0		DOLERITE, medium to coarse grained, grey-blue some iron staining near joints (brown)	SW -MW Fr			N.B. lost 20 blows for only 50 mm penetration.
			2.0						45°, 60° and subvertical joints, some iron stained. Minor amounts of calcite and/or zeolite
			3.0			Fr SW Fr MW			
			4.0		END OF BOREHOLE at - 3.45m depth				
			5.0						

key

method

AS	auger screwing
AD	auger drilling
R	roller/tricone
W	washbore
NMLC	NMLC core drilling

case-lift

- casing used
- barrel withdrawn

water

- 10 Oct, 73 — water level date shown
- water inflow
- partial drilling water loss
- complete drilling water loss

graphic log/core loss

- core recovered (hatching indicates material)
- no core recovered

weathering

Fr	fresh
SW	slightly weathered
MW	moderately weathered
HW	highly weathered
EW	extremely weathered

strength (Ind irect tensile strength)

EL	extremely low
VL	very low
L	low
M	medium
H	high
VH	very high
EH	extremely high

DEPARTMENT OF PUBLIC WORKS (TAS.)
MATERIALS AND RESEARCH DIVISION

M.R.D. 58

borehole no. 5
sheet 2 of 2

engineering log — cored borehole

File No.

project: POLICE HEADQUARTERS, HOBART
borehole location: refer site plan

hole commenced: 14-11-79
hole completed: 14-11-79
supervised by: N.D. JOHNSON
log checked by: B.D. WELDON

drill model and mounting: GEMCO (Hydraulic) slope: Vert deg.
barrel type and length: NMLC 2.10m fluid H_2O bearing: — deg.

R. L. surface: m
datum:
Driller J. Hammersley

drilling information				rock substance				rock mass defects	
method	case-lift	water	R.L. / depth metres	graphic log / core loss	substance description: rock type, grain characteristics, colour, structure, minor components.	weathering	strength Is (50) EL VL L M H VH	defect spacing mm 30 100 300 1000 >3000	defect description: thickness, type, inclination, planarity, roughness, coating. particular / general
		15-11-79	1.0		Continued from engineering log — borehole sheet				
			2.0						
			2.70						
NMLC			2.83		CORE LOSS				
			3.0		DOLERITE, medium to coarse grained, blue-grey, some iron staining (brown)	W Fr			Iron stained subvertical and subhorizontal joints
			4.0		END of BOREHOLE at −3.90m depth				

method: AS auger screwing; AD auger drilling; R roller/tricone; W washbore

case-lift: casing used; barrel withdrawn

water: 10 Oct, 73 water level

graphic log/core loss: core recovered

weathering: Fr — fresh; SW — slightly weathered; MW — moderately weathered

strength (Indirect tensile strength): EL — extremely low; VL — very low; L — low; M — medium

Department of Main Roads (Tas)
Materials and Research Division

engineering log – borehole

borehole no. 4
sheet 1 of 1

file:

project: POLICE HEADQUARTERS, HOBART
borehole location: refer site plan

hole commenced: 13-11-79
hole completed: 13-11-79
supervised by: N. D. JOHNSON
log checked by: B. D. WELDON

drill model and mounting: GEMCO (trailer)
hole diameter: 110 mm
slope: Vert deg.
bearing: — deg.
R.L. surface: m
datum:
operator: J. Hammersley

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency, rel. density	hand penetrometer kPa 100 200 300 400	structure and additional observations
								CONCRETE				
A.S.				$N^* > 60$ (1, 3, 20)	1.0		CH	CLAY, high plasticity, moisture content greater than plastic limit, black to brown-green colour (FILL)	M	F		N.B. last 20 blows for zero penetration
								CONCRETE				
								STORMWATER PIPE				
				$N^* > 60$ (1, 2, 10)	2.0			CONCRETE				N.B. last 10 blows for zero penetration
								END OF BOREHOLE at -2.30 m depth after penetrating 42 inch diameter storm-water pipe.				

key

method
AS auger screwing*
AD auger drilling
R roller/tricone
W washbore
CT cable tool
* bit shown by suffix:
B — blank bit

support
C casing
M mud

penetration
1 2 3
no resistance
ranging to
refusal

water

notes — samples and tests
U50 — undisturbed sample 50 mm diameter
D — disturbed sample
N — standard penetration test: figure = result
N* — SPT + sample
Nc — cone penetrometer

classification symbols and soil description
based on unified classification system

moisture
D — dry
M — moist
W — wet

consistency/relative density
VS — very soft
S — soft
F — firm
St — stiff
VSt — very stiff
H — hard
Fb — friable
VL — very loose
L — loose
MD — moderately dense

Department of Main Roads (Tas)
Materials and Research Division

engineering log – borehole

borehole no. 3
sheet 1 of 1

file:

project: POLICE HEADQUARTERS, HOBART
borehole location: refer site plan.

hole commenced: 12-11-79
hole completed: 13-11-79
supervised by: N.D. JOHNSON
log checked by: B.D. WELDON

drill model and mounting: GEMCO (trailer)
hole diameter: 110 mm
slope: Vert deg.
bearing: — deg.
R.L. surface: m
datum:
operator: J. Hammersley

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency, rel. density	hand penetrometer kPa 100 200 300 400	structure and additional observations
					0			CONCRETE				
				N* = 4 (1,2,2)	1.0		CH	CLAY, high plasticity, moisture content (M.C.) greater than plastic limit (P.L.); black to brown colour minor amounts (<2%) of highly weathered dolerite fine grained gravel	M	F		FILL OR TERTIARY SEDIMENTS
				N* = 7 (3,4,3)	2.0				H	F-St		
				N* = 9 (3,3,6)	3.0		CH	CLAY; high plasticity M.C. ≤ P.L.; speckled and mottled colouring of brown-grey-white showing remnant dolerite fabric. Minor amount (up to 5%) of sand size mineral grains; some earthy and powdery calcite veins & lenses.	W			EXTREMELY WEATHERED IN SITU DOLERITE
				N* = 23 (5,10,13)	4.0		CH		M	VSt		
				N* = 25 (7,11,14)	5.0		CH		M	VSt-H		
				N* > 60 (23,27,30)	6.0		CH		M	H		N.B. Last 30 blows for only 50 mm penetration
				N* > 60	7.0				M	H		N.B. 55 blows for only 150 mm penetration
								END OF BOREHOLE at -7.15 m depth.				

key

method
AS auger screwing*
AD auger drilling*
R roller/tricone
W washbore
CT cable tool
* bit shown by suffix:
B — blank bit

support
C casing
M mud

penetration
1 2 3 no resistance ranging to refusal

water

notes — samples and tests
U50 — undisturbed sample 50 mm diameter
D — disturbed sample
N — standard penetration test: figure = result
N* — SPT + sample

classification symbols and soil description
based on unified classification system

moisture
D — dry
M — moist
W — wet

consistency/relative density
VS — very soft
S — soft
F — firm
St — stiff
VSt — very stiff
H — hard
Fb — friable
VL — very loose
L — loose

Department of Main Roads (Tas)
Materials and Research Division

borehole no: 1
sheet 2 of 2

engineering log – borehole

file:

project: POLICE HEADQUARTERS, HOBART
borehole location: refer site plan

hole commenced: 7-11-79
hole completed: 8-11-79
supervised by: N.D. JOHNSON
log checked by: B.D. WELDON

drill model and mounting: GEMCO (trailer)
hole diameter: 110 mm
slope: vert deg.
bearing: — deg.
R.L. surface: m
datum:
operator: J. Hammersley

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency, rel. density	hand penetrometer 100 200 300 400 kPa	structure and additional observations
A.S.				$N^* > 60$ (20, 29, 45)	9.0		CH	CLAY, as above but with more sand sized mineral grains.	M	H-Fb		
				$N^* > 60$ (23, 31, 52)	10.0		CH					
				$N^* > 60$ (20, 33, 30)			CH					N.B. lost 30 blows for 100 mm penetration
								END OF BOREHOLE at -10.4 m depth				

key

method
AS auger screwing*
AD auger drilling*
R roller/tricone
W washbore
CT cable tool
* bit shown by suffix:
B – blank bit
V – "V" bit

support
C casing
M mud

penetration
1 2 3 no resistance ranging to refusal

water
10 Oct. 73 water level

notes – samples and tests
U50 – undisturbed sample 50 mm diameter
D – disturbed sample
N – standard penetration test: figure = result
N* – SPT + sample
Nc – cone penetrometer

classification symbols and soil description
based on unified classification system

moisture
D – dry
M – moist
W – wet

consistency/relative density
VS – very soft
S – soft
F – firm
St – stiff
VSt – very stiff
H – hard
Fb – friable
VL – very loose
L – loose
MD – moderately dense

Department of Main Roads (Tas)
Materials and Research Division

engineering log — excavation

sheet 1 of 1

file: 04-053

project: POLICE HEAD QUARTERS HOBART

pit location: S. E.S. CAR PARK

pit commenced: 17-9-79
pit completed: 17-9-79
supervised by: W DOE
log checked by:

equipment type and model: FORD 420

excavation dimensions: 1·5 m long, 0·5 m wide

R.L. surface: -3·145 m

datum: BRISBANE ST operator: SMITH

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency, rel. density	hand penetrometer 100 kPa 200 300 400	structure and additional observations
								HOTMIX				
B/H					0·5 / 0·75		GP	GRAVEL COARSE WITH CLAYEY FINES DECOMPOSED DOLERITE	D ↓ M	L / MD		
								INSITU DOLERITE				NEAR VERTICAL JOINTING

key

method
- N natural exposure
- E existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper

support
- T timbering

penetration
1 2 3 — no resistance ranging to refusal

water
10 Oct, 73 water level on date shown

notes
- U50 — undisturbed sample 50 mm diameter
- D — disturbed sample
- N — standard penetration test: figure = result
- N* — SPT + sample
- Nc — cone penetrometer

classification symbols and soil description
based on unified classification system

moisture
- D — dry
- M — moist
- W — wet

consistency/relative density
- VS — very soft
- S — soft
- F — firm
- St — stiff
- VSt — very stiff
- H — hard
- Fb — friable
- VL — very loose
- L — loose
- MD — moderately dense

Department of Main Roads (Tas)
Materials and Research Division

engineering log — excavation

pit no: 4
sheet 1 of 1

file: 04.053

project:
pit location: S.E. CORNER MET. ARCH. CAL. PARK

pit commenced: 17-9-79
pit completed: 17-9-79
supervised by: W DOE
log checked by:

equipment type and model: FORD 420
excavation dimensions: 2 m long, 0.5 m wide

R.L. surface: ~3.670 m
datum: BRISBANE ST operator: SMITH

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. depth metres	graphic log	classification symbol	material (soil type: plasticity or particle characteristics, colour, secondary and minor components.)	moisture condition	consistency, rel. density	hand penetrometer 100 kPa 200 300 400	structure and additional observations
BH							GP	GRAVEL FINE CLAYEY DECOMPOSED DOLERITE	M	L MD		
				FILL	0.5		CH	CLAY WITH DOLERITE STONE	M	MD		
					1.0			GRAVEL COARSE WITH CLAYEY FINES DECOMPOSED DOLERITE	M	VD		WATER ENTERS AT THIS LEVEL
								1.3 m HOLE DISCONTINUED				LOCAL DRAINAGE ONLY

key

method
- N natural exposure
- E existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper

support
- T timbering

penetration
- 1 2 3 no resistance ranging to refusal

water
- ▼ 10 Oct, 73 water level

notes — samples and tests
- U50 — undisturbed sample 50 mm diameter
- D — disturbed sample
- N — standard penetration test: figure = result
- N* — SPT + sample

classification symbols and soil description
based on unified classification system

moisture
- D — dry
- M — moist
- W — wet

consistency/relative density
- VS — very soft
- S — soft
- F — firm
- St — stiff
- VSt — very stiff
- H — hard
- Fb — friable
- VL — very loose
- L — loose

Department of Main Roads (Tas)
Materials and Research Division

engineering log — excavation

pit no 2
sheet 1 of 1

file: 04·063

project: POLICE HEAD QUARTERS HOBART

pit location: N W CORNER MET. ARCH. CAR PARK

pit commenced: 17-9-79
pit completed: 17-9-79
supervised by: W DOE
log checked by:

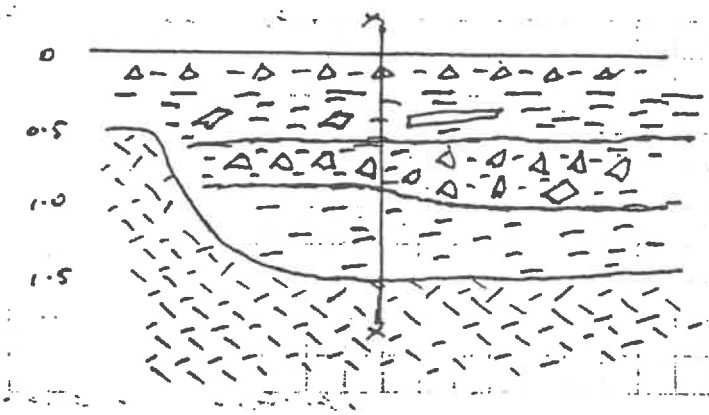
equipment type and model: FORD 420

excavation dimensions: 2·5 m long, 0·5 m wide

R.L. surface: -3·375 m

datum: BELLERIVE ST operator: SMITH

method	penetration 1 2 3	support	water	notes samples, tests, etc.	R.L. depth metres	graphic log	classification symbol	material: soil type: plasticity or particle characteristics, colour, secondary and minor components.	moisture condition	consistency, rel. density	hand penetrometer 100 kPa 200 300 400	structure and additional observations
BH					0·5		GC	GRAVEL FINE PLASTIC BROWN GC DECOMP. DOLERITE	M	Fb		
							CH	FILL CLAYEY RUBBLE + LOGS CH.	M	L/MD	-	
							GP	COARSE GRAVEL WITH CLAYEY FINES BROWN DECOMP DOLERITE	M	MD		LOCAL MATERIAL
					1·0		CL	CLAYEY SAND FINE WHITE	M	F/Fb		CRYSTALLINE NATURE INSITU HIGHLY DECOMP DOLERITE
					1·5			INSITU DR COMP. DOL	M	MD		VERTICAL JOINTED 25mm SPACING
										VD		



key

method
- N natural exposure
- E existing excavation
- BH backhoe bucket
- B bulldozer blade
- R ripper

support
- T timbering

penetration
- 1 2 3 no resistance ranging to refusal

water
- 10 Oct, 73 water level

notes — samples and tests
- U50 — undisturbed sample 50 mm diameter
- D — disturbed sample
- N — standard penetration test:figure = result
- N* — SPT + sample
- Nc — cone penetrometer

classification symbols and soil description
based on unified classification system

moisture
- D — dry
- M — moist
- W — wet

consistency/relative density
- VS — very soft
- S — soft
- F — firm
- St — stiff
- VSt — very stiff
- H — hard
- Fb — friable
- VL — very loose
- L — loose
- MD — moderately dense

DEPARTMENT OF PUBLIC WORKS (TAS.)
MATERIALS AND RESEARCH DIVISION

engineering log — cored borehole

borehole no: 6
sheet 2 of 2

File No.

project: POLICE HEADQUARTERS, HOBART
borehole location: refer site plan

hole commenced: 14-11-79
hole completed: 15-11-79
supervised by: N.D. JOHNSON
log checked by: B.D. WELDON

drill model and mounting: GEMCO (Holder) slope: Vert deg.
barrel type and length: NMLC 2.40m fluid H_2O bearing: — deg.

R. L. surface: m
datum: Driller J. Hammersley

drilling information				rock substance				rock mass defects	
method	case-lift	water	R.L. depth metres	graphic log / core loss	substance description: rock type, grain characteristics, colour, structure, minor components.	weathering	strength Is(50) EL VL L M H VH	defect spacing mm 30 100 300 1000 3000	defect description: thickness, type, inclination, planarity, roughness, coating. particular / general
			1.0		Continued from engineering log - borehole sheet				
			2.0						
			2.50						
			1.60		CORE LOSS				
			3.0		DOLERITE, medium to coarse grained; blue-grey colour, some calcite or zeolite veins along joints	SW			subhorizontal and 60-70° joints; some clay lined, most iron stained; some zeolite or calcite infilling
			4.0						
			5.0		END of BOREHOLE at -5.00 m depth				
			6.0						
			7.0						

key

method
AS auger screwing
AD auger drilling
R roller/tricone
W washbore

case-lift
casing used
barrel withdrawn

water
10 Oct, 73 water level

graphic log/core loss
core recovered

weathering
Fr — fresh
SW — slightly weathered
MW — moderately weathered

strength (indirect tensile strength)
EL — extremely low
VL — very low
L — low
M — medium

SURVEY NOTES

SHEET 1 OF 1 SHEETS

Registered Number

CROSS REFERENCE PLAN NUMBERS USED AS PART OF THIS SURVEY

DESCRIBE BY REPORT THE EVIDENCE USED TO DETERMINE BOUNDARIES

Survey commenced : 3/2/94

Survey completed : 17/2/94

Error of close : see calcs

All boundaries are open unless shown otherwise

All walls are 230mm brick unless shown otherwise

SURVEY CERTIFICATE

I, GARRY BRUCE COOMBE of BLACKMANS BAY in Tasmania a registered surveyor HEREBY CERTIFY that:

(a) this survey is based upon the best evidence that the nature of the case admits

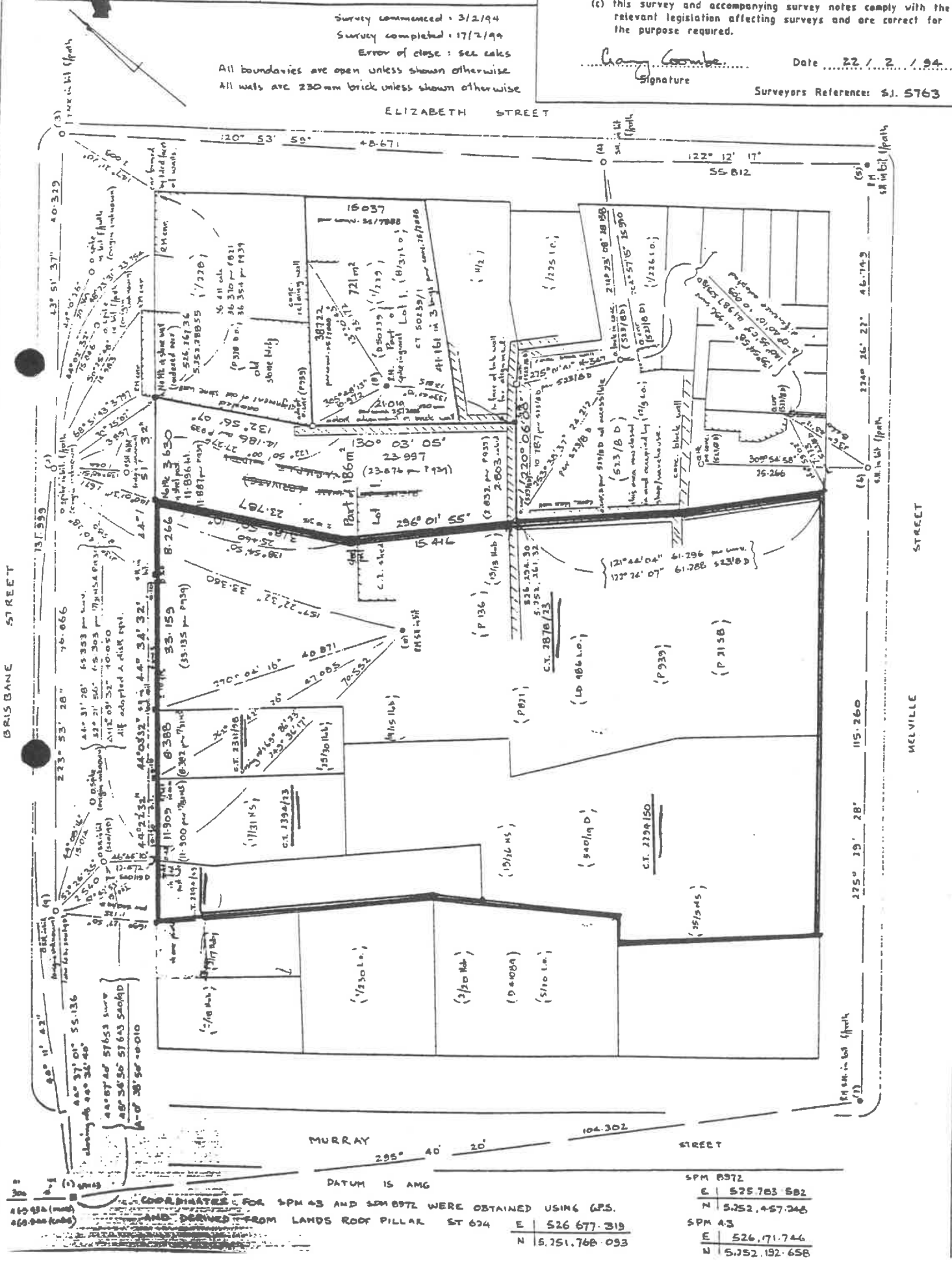
(b) the survey notes have been truly compiled from surveys made by me or made under my supervision; and

(c) this survey and accompanying survey notes comply with the relevant legislation affecting surveys and are correct for the purpose required.

Garry Coombe. Date 22 / 2 / 94

Signature

Surveyors Reference: S.J. 5763



TASMANIA
REAL PROPERTY ACT, 1862, as amended

CERTIFICATE OF TITLE

Register Book
Vol. 2878 Fol. 23

HER MAJESTY THE QUEEN is now seised in demesne by right of Her Imperial Crown subject nevertheless to such encumbrances liens and interests as are notified by Memorial underwritten or endorsed hereon of all that piece of land situated in the CITY OF HOBART containing

ONE ACRE THIRTY PERCHES AND FOUR TENTHS OF A PERCH on the

Plan hereon and comprising whole of OA-1R-6½Ps. granted to WILLIAM LINDSAY, whole of 33 perches granted to HENRY PRIEST, whole of 14 perches granted to WILLIAM PRIEST, whole of 17 perches granted to JOSEPH MOLLOY, whole of 1.4/10 perches granted to CRISP & GUNN CO.OPERATIVE LIMITED, whole of 27.6/10 perches and part of 25.2/10 perches granted t both EMMA CRISP and FREDERICK VERNON CRISP, part of OA-1R-8 perches granted to WILLIAM WILLETT and BRYANT WEBB, part of OA-1R-37 perches granted to LEWIS RILEY, part of 31 perches granted to HENRY WILKS. delineated in the public maps of the State deposited in the Office of the Surveyor-General originally granted to the above and duly surrendered as appears by Transfer No. A348760.

IN WITNESS whereof I have hereunto signed my name and affixed my Seal this [illegible] 1970

Recorder of Titles

NOTE.—ENTRIES CANCELLED UNDER SIGNATURE OF THE RECORDER OF TITLES ARE NO LONGER SUBSISTING.

COPY ONLY
26 OCT 1994
SP 114102
per

Meas. in ft. & ins. P.821. 14/15Hob. P.939

RST Edition. Registered 18 NO 1970
erived from C.T. Vol.2294.Fol.51. Transfer A348760 Crisp & Gunn Ltd.

FIRST SCHEDULE (*continued*)

REGISTERED PROPRIETOR	Registered	Signature of Recorder of Titles	Seal

SECOND SCHEDULE (*continued*)

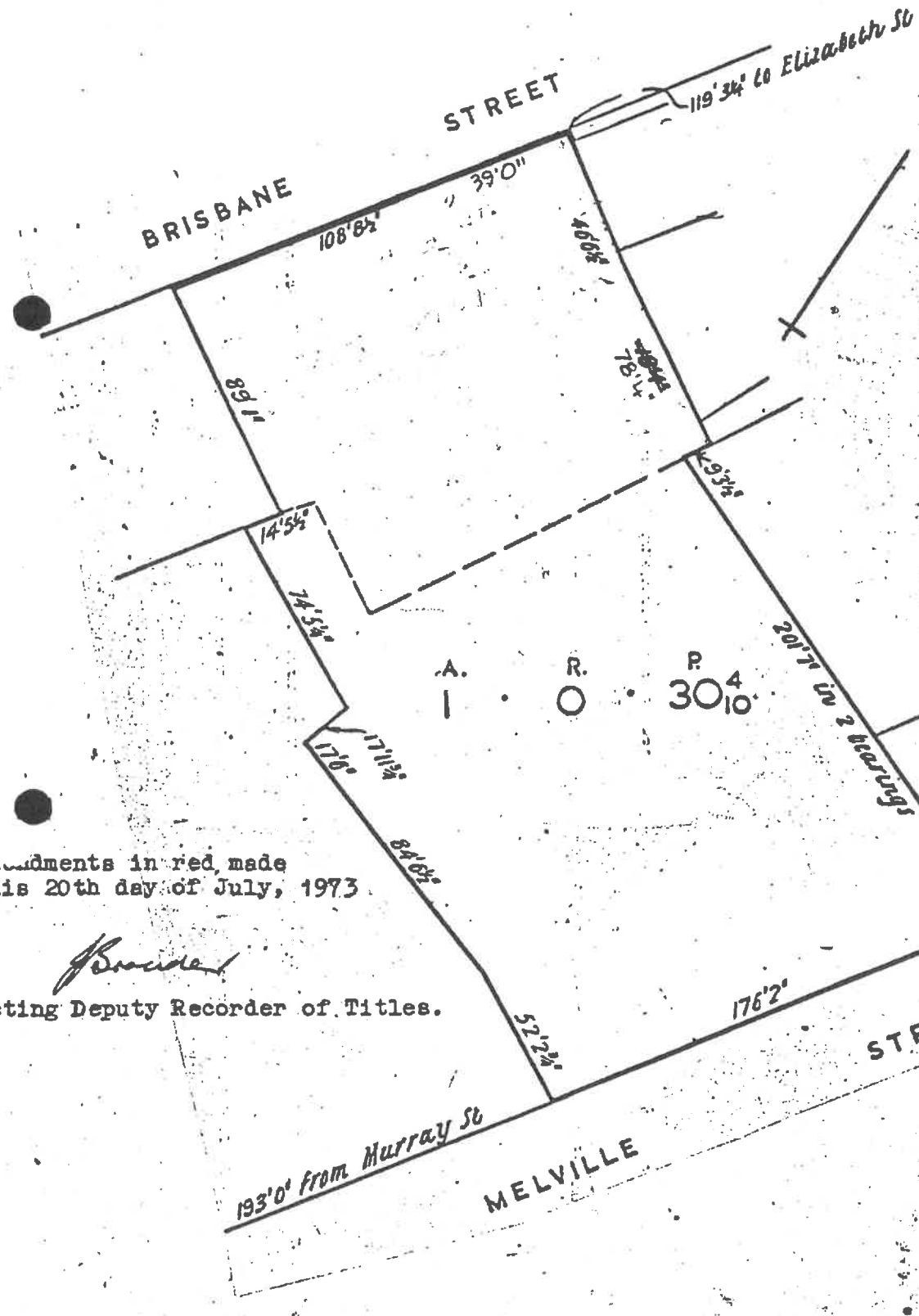
PARTICULARS	Registered	Signature of Recorder of Titles	CANCELLATION	
			Number	Signature of Recorder of Titles

R.P. 512

VOL. FOL.

ANNEXURE TO CERTIFICATE OF TITLE 2878 23

Recorder of Titles



Amendments in red made this 20th day of July, 1973

Acting Deputy Recorder of Titles.

FIRST SCHEDULE (*continued*)

REGISTERED PROPRIETOR	Registered	Signature of Recorder of Titles	Seal

SECOND SCHEDULE (*continued*)

PARTICULARS	Registered	Signature of Recorder of Titles	CANCELLATION	
			Number	Signature of Recorder of Titles

2394 23

TASMANIA

REAL PROPERTY ACT, 1862, as amended

CERTIFICATE OF TITLE

Register Book

Vol. 2294 Fol. 50

HER MAJESTY THE QUEEN is now seised in demesne by right of Her Imperial Crown subject nevertheless to such encumbrances liens and interests as are notified by Memorial underwritten or endorsed hereon of all that piece of land situated in the City of Hobart containing ——

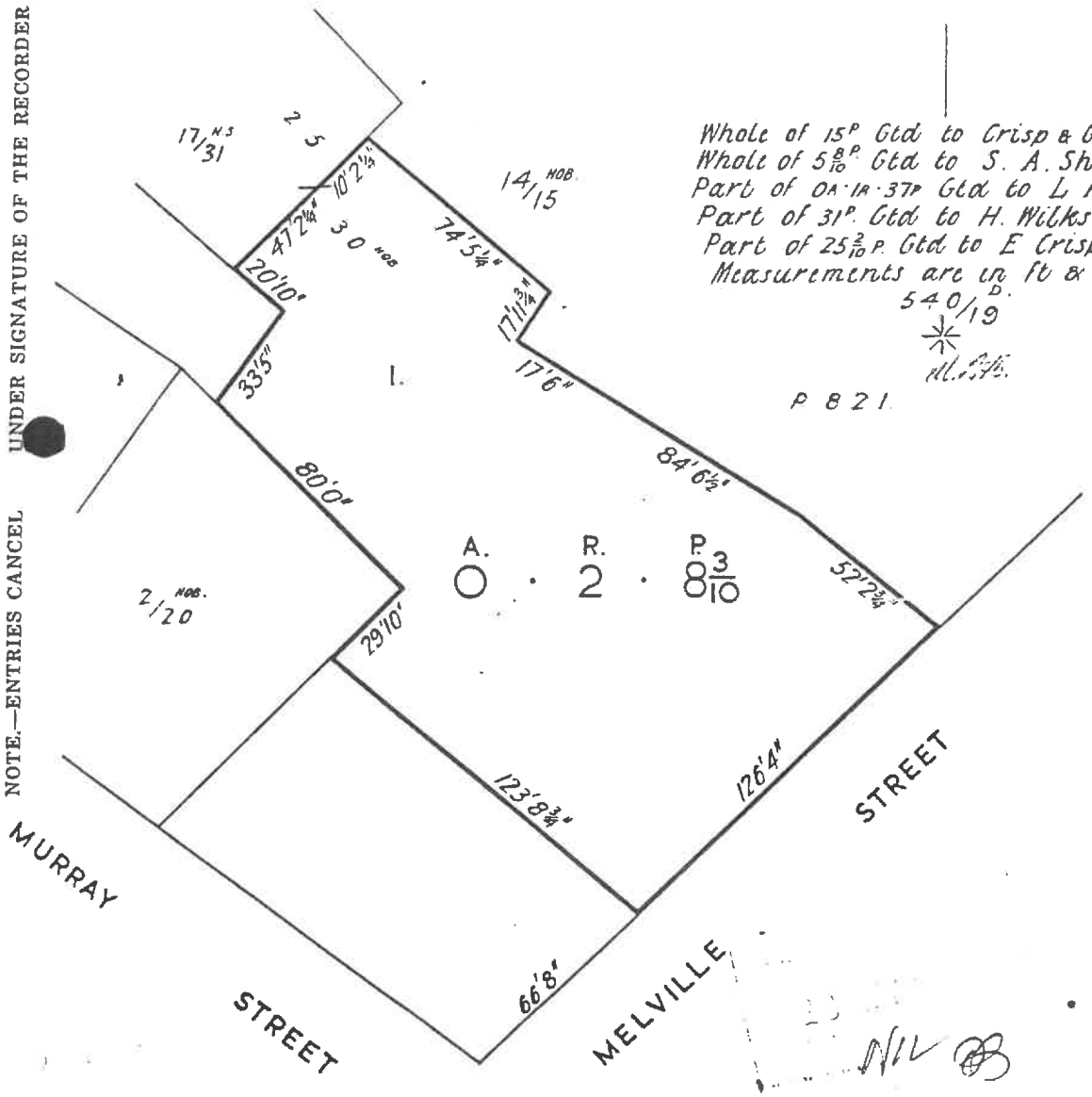
TWO ROODS EIGHT PERCHES AND THREE TENTHS OF A PERCH

delineated in the diagram hereon and in the public maps of the State - deposited in the Office of the Surveyor-General originally granted to Crisp & Gunn Co. Op. Ltd., Sarah Ann Shirley, Lewis Riley, Henry Wilks Emma Crisp and Frederick Vernon Crisp and duly surrendered as - - appears by Transfer No. A264718 ——

IN WITNESS whereof I have hereunto signed my name and affixed my seal this 12 DEC 1967

RECORDER OF TITLES.

REGISTRAR OF TITLES TASMANIA



Whole of 15P Gtd to Crisp & Gunn Co-op Ltd
Whole of 5 8/10P Gtd to S. A. Shirley
Part of 0A 1R 37P Gtd to L Riley
Part of 31P Gtd to H. Wilks
Part of 25 3/10P Gtd to E Crisp & Anr
Measurements are in ft & ins
540/19 D.
M.374.
P 821

NIL

NOTE.—ENTRIES CANCEL UNDER SIGNATURE OF THE RECORDER OF TI... RE NO LONGER SUBSISTING.

First Edition. Registered 12 DEC 1967

OWNER THE CROWN & ANTONIO ALFRED LONGO & MARIO AUGUSTO LONGO

FOLIO REFERENCE
CT 2878/23 & CT 50239/1

GRANTEE
Part of 0-0-17 Granted to JOSEPH MOLLOY & Part of 0-1-8 Granted to WILLIAM WILLET & BRYANT WEBB

PLAN OF SURVEY

BY SURVEYOR Garry Bruce Coombe

LOCATION

CITY OF HOBART

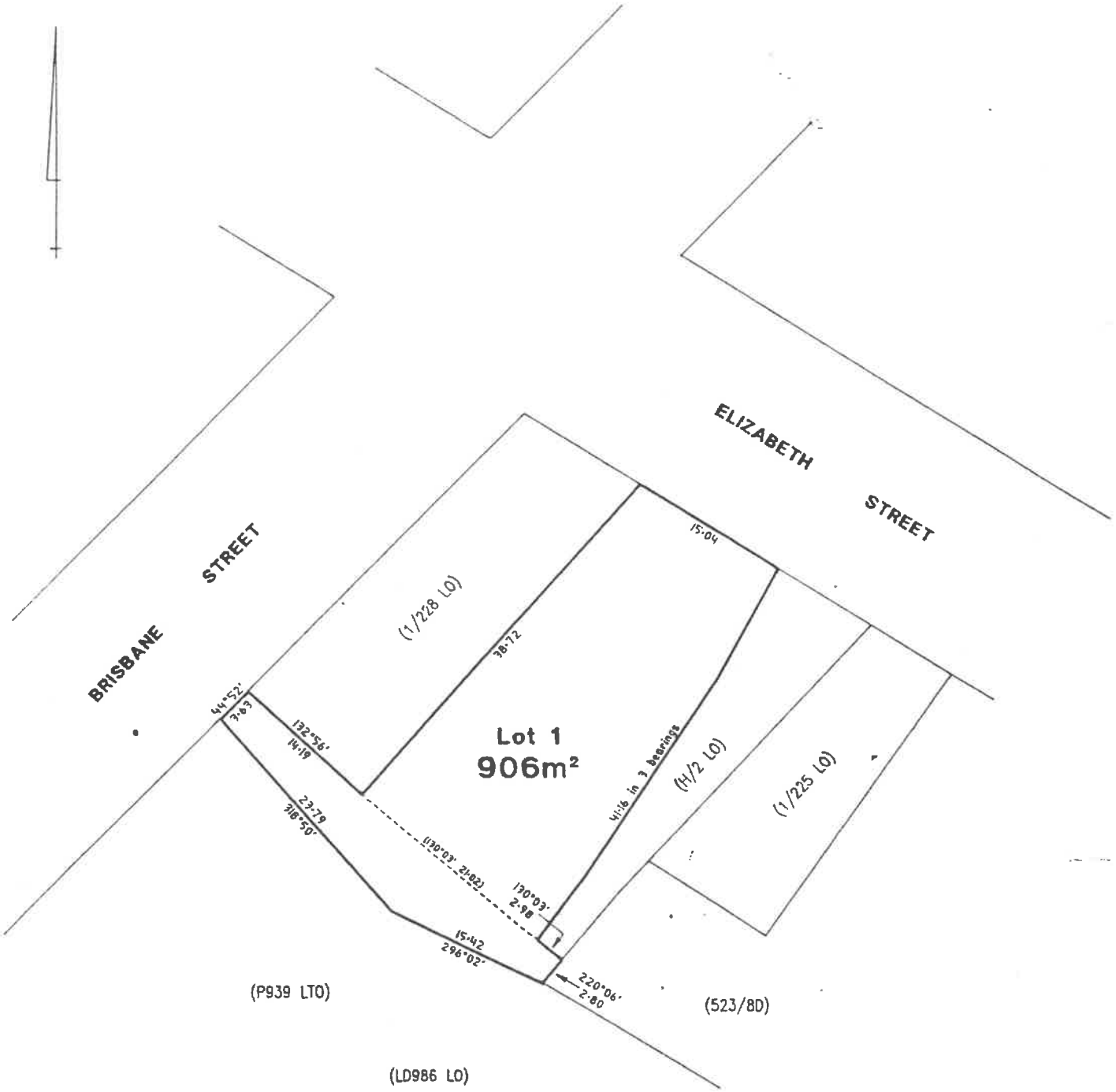
SCALE 1:400 LENGTHS IN METRES

REGISTERED NUMBER
SP114102

APPROVED
EFFECTIVE FROM .....

Recorder of Titles

MAPSHEET MUNICIPAL CODE No.	LAST UPI No.	LAST PLAN No.	ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN



OWNER
THE CROWN

FOLIO REFERENCE
CT 2878/23

GRANTEE
Whole of 0.1.16½ Granted to WILLIAM LINDSAY, Whole of 0.0.33 Granted to HENRY PRIEST, Whole of 0.0.17 Granted to JOSEPH MOLLOY, Whole of 0.0.1¾ Granted to CRISP & GUNN CO-OPERATIVE LTD, Whole of 0.0.27¾ and part of 0.0.25¾ Granted to EMMA CRISP & FREDERICK VERNON CRISP, Part of 0.1.8 Granted to WILLIAM WILLETT & BRYANT WEBB, Part of 0.1.37 Granted to LEWIS RILEY and Part of 0.0.31 Granted to HENRY WILKS

PLAN OF SURVEY

BY SURVEYOR

LOCATION

CITY OF HOBART

SCALE 1:600 LENGTHS IN METRES

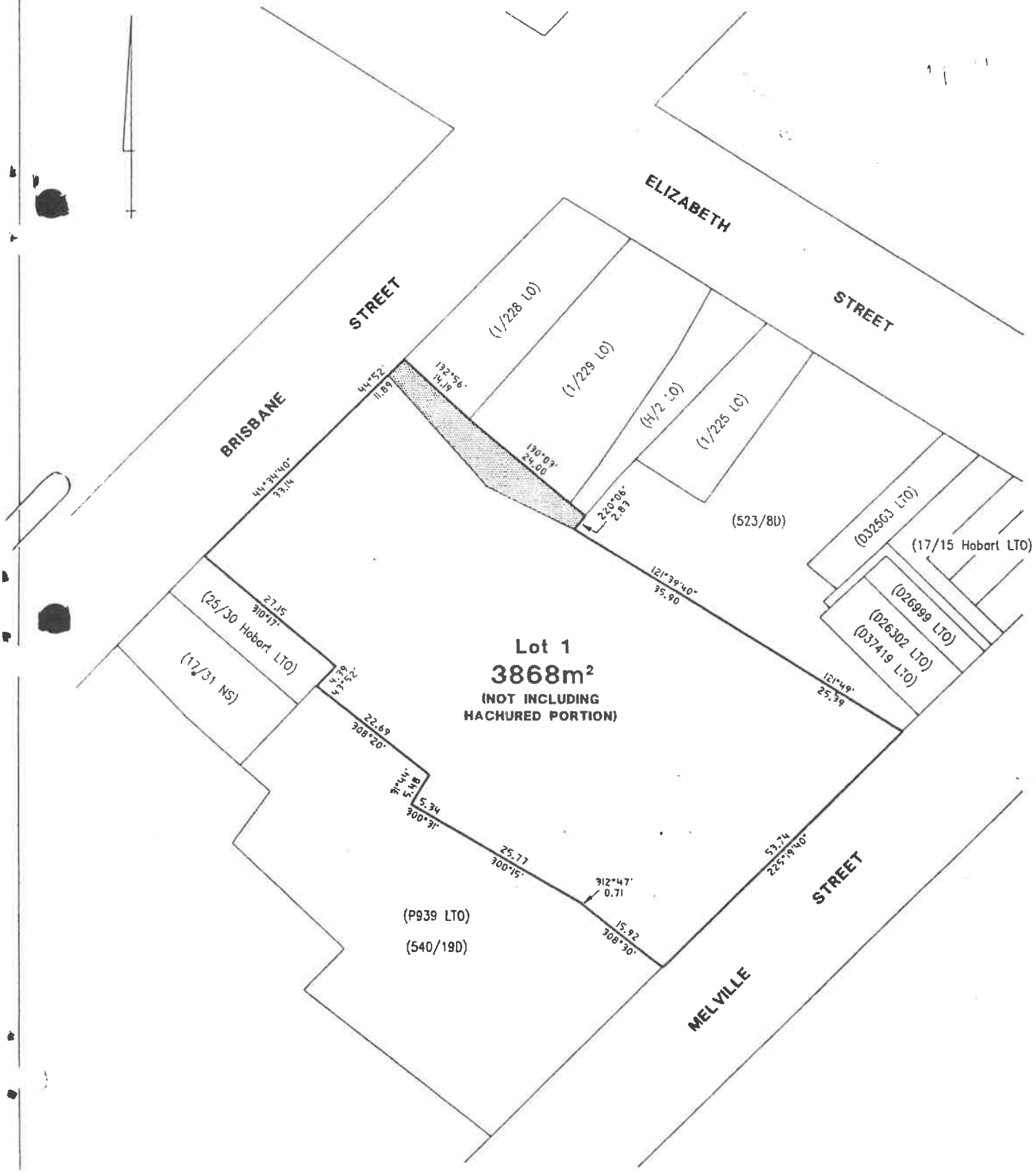
REGISTERED NUMBER
P 114103

APPROVED
EFFECTIVE FROM .....

Recorder of Titles

MAPSHEET MUNICIPAL CODE No>	LAST UPI No> 0536	LAST PLAN No>	ALL EXISTING SURVEY NUMBERS TO BE CROSS REFERENCED ON THIS PLAN

BALANCE PLAN



5669571
P/83/671

Inquiries: Adam Friend/Liz Canning
Phone : (03) 62336176
Fax : (03) 62333800
E-mail : (030662: wc/melv_2) ADF/tm
Our ref :
Your ref : 20 January 1997

Department *of* Environment
and Land Management
134 Macquarie Street
or GPO Box 44A
Hobart Tasmania 7001

COPY

Mr Peter Radovanovic
C/o Forestry Tasmania Construction Site Office
78-83 Melville Street
HOBART TAS 7000

Dear Mr Radovanovic

FORESTRY TASMANIA REDEVELOPMENT PROJECT
79-83 MELVILLE STREET

Environment Tasmania has reviewed the *Environmental Remediation and Validation, December 1996* report for the above mentioned site, prepared for Civil and Civic Laver by Stoklosa Engineering. The Division considers the remediation and validation works undertaken to be satisfactory and is in agreement with the consultants findings and recommendations.

With regards to hydrocarbon contamination associated with the unanticipated underground storage tank, Environment Tasmania concurs with the consultants opinion that contaminated soil identified under the UST represents a localised hot spot and that "it is highly unlikely that the contamination has migrated off site, or that it will do so in the future". Given that the area is to be sealed and used as an access road to the premise, no further remedial action is required.

Thus Environment Tasmania considers the site suitable for its intended use. However, if the site is to be redeveloped for a more sensitive use in the future, further remediation of contaminated soil left *in situ* may be required. As recommended by the consultant, the presence of localised hydrocarbon contamination should be disclosed to future occupants of the site.

Liz Canning may have further comments regarding the site upon her return from leave in early February. If you have any questions please contact Adam Friend on (03) 6233 6176.

Yours sincerely

Ian Woodward
MANAGER - OPERATIONS BRANCH

cc. Mr Jamie Clark
Hobart City Council
GPO Box 503E
HOBART TAS 7001

cc. Richard Stoklosa
Stoklosa Engineering
205 Davey Street
HOBART TAS 7000

Environment Tasmania

Inquiries: Liz Canning
Phone : (03) 62336716
Fax : (03) 62333800
Our ref : (030662:WC/melv_1) EAC/tm
Your ref :

Department of Environment
and Land Management
188 Collins Street
or GPO Box 1396P
Hobart Tasmania 7001

23 September 1996

Mr Peter Radovanovic
C\o Forestry Tasmania Construction Site Office
79-83 Melville Street
HOBART TAS 7000
Fax: 002 315463

Dear Mr Radovanovic

FORESTRY TASMANIA REDEVELOPMENT PROJECT, 79-83 MELVILLE STREET

Environment Tasmania received your letter reports regarding the above mentioned site dated 8 September and 18 September 1996. A meeting was held on 10 September between yourself and Liz Canning of this Division in order to provide the report and briefly discuss the consultants conclusions. It is understood that the reports were provided to satisfy Council conditions regarding the landfill area. Although information on the UST excavations was not required by Environment Tasmania in this situation, the results were provided to satisfy "due diligence".

The meeting held on 10 September resulted in the provision of guidelines relating to health risk (not environmental risk) to yourself and agreement that the consultant would reassess the recommendations regarding the landscaping area in the light of the heavy metal soil guidelines provided. The issue of contamination around the "unanticipated tank" was also discussed. The consultant recommended further testing in this area to determine the lateral extent of contamination. Given the very elevated levels of light hydrocarbons in the sample taken at the base of the excavation Liz Canning agreed with the consultants recommendation to sample further. The potential for "environmental harm" resulting from spread of hydrocarbons into surrounding soil and groundwater was discussed and Environment Tasmania understood that this issue would be investigated. In addition the need for bore logs to be provided was mentioned as it is not possible to assess results without knowledge of the depth that samples were taken at and the geology and hydrogeology of the sample site.

The following comments are provided on the letter dated 18 September:

Heavy metals at location of UST:
It is unclear whether the area around FT9 is proposed for excavation based on the levels of copper present. A decision regarding the requirement for this could include an assessment of whether this is naturally occurring or in fill material.

The classification of the copper will be based on the concentrations present in the stockpile. Although the *health risk* levels for copper may provide an acceptable level of 1000 mg/kg for residential use (Contaminated Sites Monograph Series no. 5) this does not refer to the potential for leaching and phytotoxic effects. The slightly acidic landfill environment will increase the leachability of heavy metals and thus a level of copper exceeding 60 mg/kg must have a leachate test completed prior to disposal to landfill. In any case the sample containing elevated Cu also contains TPH at levels corresponding to a Hazardous Waste.

As discussed, the levels of Zn reported would not preclude reuse of the material on-site based on health risk.

Heavy metals in landscaping area:
Environment Tasmania concurs with the consultants opinion that the soil may be reused on-site as fill. The elevated Zn is only present in one sample out of four and given the future use of the site would be very unlikely to pose a health or environmental risk.

Unanticipated UST:
It is unclear why the consultants original conclusions recommending further sampling have now changed. A site visit to check for surface odours does not appear to resolve the issue of environmental harm resulting from lateral spread of hydrocarbons. You have suggested in conversations that a sample was taken next to the UST excavation (FT8?) but this is unclear from the information given in the reports. Bore logs would help clarify this.

Yours sincerely

Ian Woodward
MANAGER - OPERATIONS BRANCH

cc. Stokloss Engineering
205 Davey Street
HOBART, TAS 7000

STOKLOSA
ENGINEERING
PTY LTD

A.C.N. 065 135 051

18 September 1996

Civil & Civic
Attention: Mr. Peter Radovanovic
c/- Forestry Tasmania Construction Site Office
79-83 Melville Street
Hobart, Tasmania 7000

Subject: Forestry Tasmania Redevelopment Project, 79-83 Melville Street, Hobart

Dear Peter:

Thank you for requesting my firm to investigate the possibility of soil contamination at the location of an unanticipated underground storage tank (UST) near Melville Street, and in the area of planned landscaping improvements. The attached site diagram, chain of custody records, and laboratory reports detail the information that is currently available to interpret the environmental condition of the site.

The following advice is presented to manage evidence of contaminated soils:

Soil contamination near the unanticipated UST:

Soil taken from the base of the UST pit (samples FT-2 and FT-9) exhibit clear evidence of petroleum contamination, presumably from the UST that was discovered last week. We did not witness removal of the tank, and did not have an opportunity to confirm whether the source of this contamination was from the tank or another undiscovered source that may be present in the vicinity of the site works.

At this point, we know that light hydrocarbons (C6-C9 fraction) and xylene are the compounds of concern at the pit location. There is some uncertainty in whether additional UST's are present in the vicinity, and we do not know the depth or the areal extent of contamination.

Prior reconnaissance of the confined foundation area beneath the former State Fire Commission building revealed that the structure is supported on piers over bare ground, adjacent to the site of the UST pit. It should be noted that no petroleum odours were detected at that time. Reinspection of the foundation area was conducted on 17 September, and no evidence of petroleum odours was noted. The detectable odour threshold for xylene, for example, is less than 1 ppm, and the unsatisfactory exposure limit is 100 ppm (data for *ortho*-xylene, for a duration of 60 minutes). This suggests that petroleum contamination is probably limited to the area outside of the building footprint, and does not pose a hazard to building occupants.

We understand that the UST pit has been backfilled with clean material. Under these circumstances, no further work would be required, as this portion of the site is to be sealed. There appears to be no significant risk of exposure to workers or visitors to the site.

205 Davey Street
t, Tasmania 7000

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(03) 6224 8870

facsimile:
(03) 6224 8871

electronic mail:
r.stoklosa
trumpet.com.au

Detection of heavy metals at the location of the UST:

The stockpiled soil from the base of the UST pit was found to contain a slightly elevated zinc concentration (318 ppm) in the single screening level soil test (sample location FT-8). This soil should not be considered "hazardous waste" under the May 1996 Environment Tasmania guidelines for soil disposal, as it only slightly exceeds the applicable criteria. This soil should be regarded as "fill material" for the purposes of disposal or placement on other areas of the planned development site, as the level of zinc is well below published health-based guidelines for commercial and residential garden settings (7,000 ppm).

Similarly, the soil at the base of the UST pit (FT-9), which we recommend excavating as discussed above, revealed a slightly elevated concentration of copper (117 ppm). This soil should not be considered "hazardous waste" as a result of the copper concentration that was detected. This soil should be regarded as "fill material", as the level of copper is well below published health-based guidelines (1,000 ppm).

Detection of heavy metals in the planned landscaping area:

One of four screening level soil tests in the planned landscaping area (at location FT-5) revealed evidence of slightly elevated zinc levels, and returned levels of lead and copper that nearly exceeded the criteria for "fill material". All of the soils in the landscaping area should be regarded as suitable for the intended use. No remediation of this area of the site is recommended, as the concentrations of zinc, lead and copper are well within the health-based guidelines for residential garden settings. These soils are not expected to pose a risk to workers or persons visiting the property.

We understand that you discussed our findings and recommendations with Ms Liz Canning of Environment Tasmania on 9 September, and we would suggest that you present this advice to her office for review and acknowledgment.

The known UST near the Brisbane Street access ramp to the subject property has been previously assessed for evidence of contamination (refer to Stoklosa Engineering report, dated 19 January 1996). It is recommended that works to remove the tank proceed in accordance with advice given in the previous assessment. A quote was obtained from Gilbarco, dated 19 June 1996, for tank removal (copy attached for reference).

Additional soil sampling is recommended prior to removal of the known UST. Stoklosa Engineering must be present to witness removal of the UST, and to obtain soil samples of the UST pit backfill sand upon removal. It is recommended that additional material is excavated from the UST pit, if evidence of contamination is observed during tank removal activities, prior to backfilling the pit with clean material. Soils removed from the UST pit must be stockpiled on site, pending the results of soil testing.

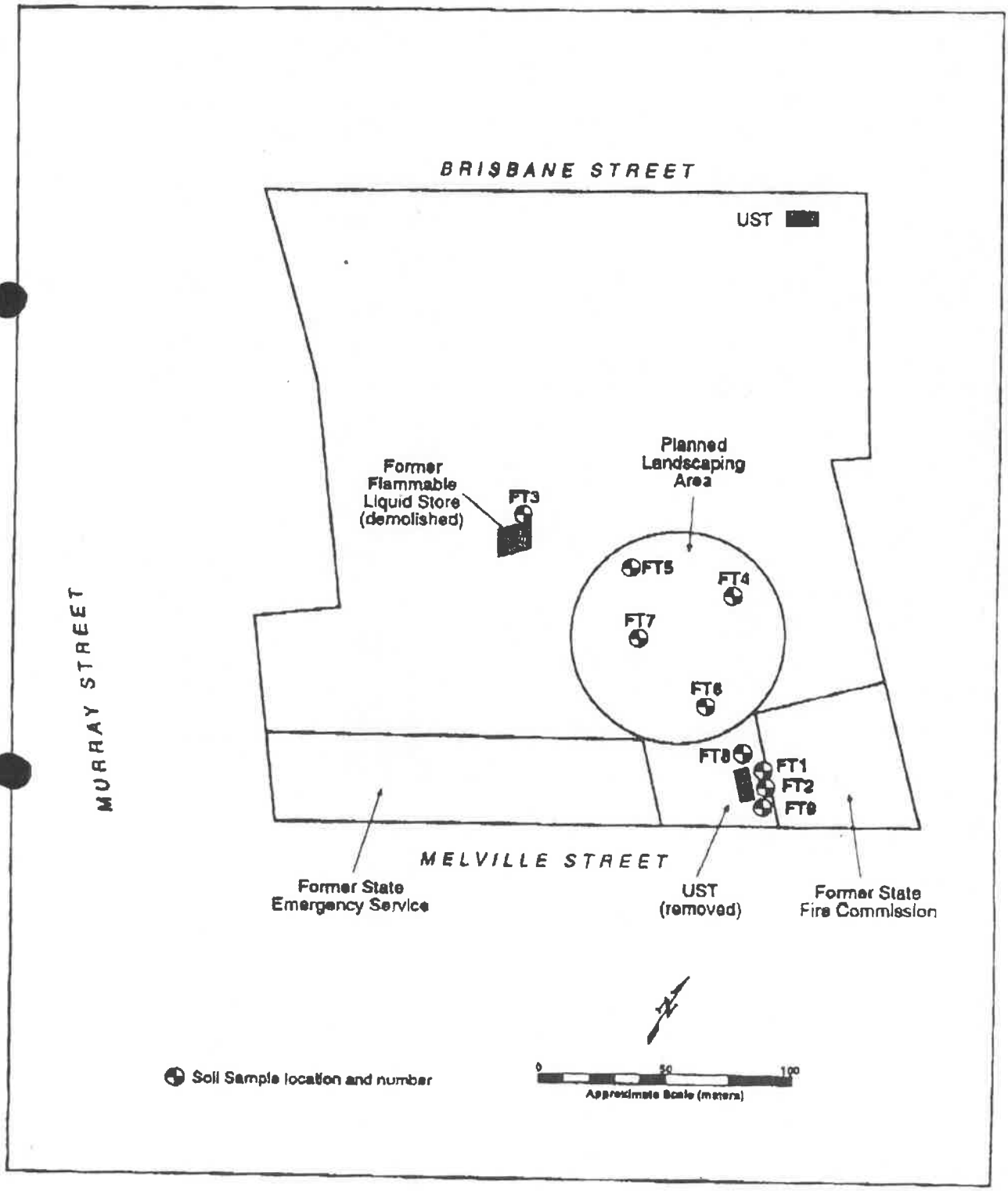
We believe that the foregoing approach will ensure proper short term and long term environmental management of the property, given the evidence of contamination that has been discovered. Please contact us if further information would be helpful.

Regards,

Richard Stoklosa

Richard Stoklosa

Attachments


BRISBANE STREET
UST
Former Flammable Liquid Store (demolished)
FT3
Planned Landscaping Area
FT5
FT4
FT7
FT6
FT8
FT1
FT2
FT9
MURRAY STREET
MELVILLE STREET
Former State Emergency Service
UST (removed)
Former State Fire Commission
Soil Sample location and number
0
50
100
Approximate Scale (meters)

CHAIN OF CUSTODY RECORD

Stoklosa Engineering Pty Ltd
A.C.N. 065 135 051
205 Davey Street
Hobart, Tasmania 7000
Telephone: (002) 24 8870
Facsimile: (002) 24 8871

PROJECT NAME:	PROJECT NO.
CIVIL & CIVIC FORESTRY TASMANIA	C155

COLLECTED BY (NAME):	SIGNATURE:
R. STOKLOSA	R. Stoklosa

Site ID	Lab Sample No.	Collector's Sample No.	Collection Date	Collection Time	Sample Type	Analyses to be Performed: TPH	BTEX	LEAD	Number of Containers	Remarks / Special Instructions
FT-1		FT-1	26.8.96	1630	SOIL	✓	✓	✓	2	1800 MM
FT-2		FT-2	26.8.96	1635	SOIL	✓	✓	✓	2	2500 MM

Relinquished By (Signature): Richard Stoklosa	Organisation: STOKLOSA ENGINEERING	Date: 26.8.96	Time: 1730	Remarks
Received By (Signature)	Organisation	Date	Time	Remarks
Relinquished By (Signature)	Organisation	Date	Time	Remarks
Received By (Signature)	Organisation	Date	Time	Remarks
Relinquished By (Signature)	Organisation	Date	Time	Remarks
Received for Laboratory By (Signature): [illegible]	Laboratory Name: DEL LAB	Date: 26/8/96	Time: 1730	Remarks

Department of Environment and Land Management
Environmental Chemistry Laboratory
C/- Chemistry Department, University of Tasmania
Box 252C GPO Hobart 7001, Hobart
Telephone (03) 6228 7175 Fax (03) 6220 7825

eport Number: 7328
ubmitted By: R. Stoklosa
eported To: R. Stoklosa
st Method: GC

Lab. No: 963537-963538
Date Sampled: 26/8/96
Date Received: 26/8/96
Date Reported: 27/8/96

SOILS - STOKLOSA ENGINEERING P/L

ab. No.	Sample ID	TPH mg/kg DMB	C6-C9 mg/kg DMB	C10-C14 mg/kg DMB	C15-C28 mg/kg DMB	C29+ mg/kg DMB	Benzene mg/kg DMB	Toluene mg/kg DMB	E. Benzene mg/kg DMB	Xylene mg/kg DMB
963537	FT-1	ND	ND	ND	ND	ND	ND	ND	ND	ND
63538	FT-2	660	530	130	ND	ND	ND	4	7	66
hod Detection Limit		5	5	5	5	5	1	1	1	1

- Dry Matter Basis
Not Detected

Disposal as "Hazardous Waste"
(prior Council approval required)

Department of Environment and Land Management
Environmental Chemistry Laboratory
C/- Chemistry Department, University of Tasmania
Box 252C GPO Hobart 7001, Hobart
Telephone (03) 6220 7175 Fax (03) 6220 7825

Report Number: 7328-1
Submitted By: R. Stoklosa
Reported To: R. Stoklosa
Test Method: DELM Method Metals in Sediments

Lab. No: 963537-963538
Date Sampled: 26/8/96
Date Received: 26/8/96
Date Reported: 28/8/96

SOILS - STOKLOSA ENGINEERING P/L

Lab No.	Sample ID	Pb mg/kg DMB
963537	FT-1	243
963538	FT-2	52

DMB - Dry Matter Basis

Disposal as "Fill Material"

R.D. Dineen
SENIOR CHEMIST

CHAIN OF CUSTODY RECORD

Stoklosa Engineering Pty Ltd
A.C.N. 065 135 051
205 Davey Street
Hobart, Tasmania 7000
Telephone: (002) 24 8870
Facsimile: (002) 24 8871

PROJECT NAME:	PROJECT NO.
FORESTRY TASMANIA / C&C	C155

COLLECTED BY (NAME):	SIGNATURE:
R STOKLOSA	R Stoklosa

Site ID	Lab Sample No.	Collector's Sample No.	Collection Date	Collection Time	Sample Type	Analyses to be Performed: TPH	BTEX	LEAD	CADMIUM	CHROMIUM	COPPER	ZINC				Number of Containers	Remarks / Special Instructions
FT-3		FT-3	28.8.96	1715	SOIL	✓	✓	✓	✓	✓	✓	✓				2	200mm F.L.S.
FT-4		FT-4		1725	SOIL			✓	✓	✓	✓	✓				1	SURFACE 100mm
FT-5		FT-5		1735	SOIL			✓	✓	✓	✓	✓				1	SURFACE 100mm
FT-6		FT-6		1745	SOIL			✓	✓	✓	✓	✓				1	"
FT-7		FT-7		1750	SOIL			✓	✓	✓	✓	✓				1	"
FT-8		FT-8		1755	SOIL	✓	✓	✓	✓	✓	✓	✓				2	UST STOCKPILE (surface)
FT-9		FT-9		1800	SOIL	✓	✓	✓								2	UST PIT 2500mm

Relinquished By (Signature): R. Stoklosa	Organisation: STOKLOSA ENGINEERING	Date: 28.8.96	Time: 1900	Remarks
Received By (Signature):	Organisation: DELM	Date	Time	Remarks
Relinquished By (Signature)	Organisation	Date	Time	Remarks
Received By (Signature)	Organisation	Date	Time	Remarks
Relinquished By (Signature)	Organisation	Date	Time	Remarks
Received for Laboratory By (Signature)	Laboratory Name	Date	Time	Remarks

Department of Environment and Land Management
Environmental Chemistry Laboratory
C/- Chemistry Department, University of Tasmania
Box 252C GPO Hobart 7001, Hobart
Telephone (03) 6220 7175 Fax (03) 6220 7825

Report Number: 7333-1
Submitted By: R. Stoklosa
Reported To: R. Stoklosa
Test Method: GC

Lab. No: 963554-963560
Date Sampled: 28/8/96
Date Received: 28/8/96
Date Reported: 30/8/96

SOILS - STOKLOSA ENGINEERING P/L

Lab. No.	Sample ID	TPH mg/kg DMB	C6-C9 mg/kg DMB	C10-C14 mg/kg DMB	C15-C28 mg/kg DMB	C29+ mg/kg DMB	Benzene mg/kg DMB	Toluene mg/kg DMB	E. Benzene mg/kg DMB	Xylene mg/kg DMB
963554	FT-3	8	ND	ND	ND	ND	ND	ND	ND	ND
963559	FT-8	7	ND	ND	ND	ND	ND	ND	ND	ND
963560	FT-9	1 790	1 350	440	ND	ND	2	8	14	176
Method Detection Limit		5	5	5	5	5	1	1	1	1

DMB - Dry Matter Basis
ND - Not Detected

Exceeds "Hazardous Waste" Disposal Criteria
(consultation with Council / DELM will be required)

Also very high result, requires consultation prior to disposal.

This document must not be reproduced except in full.
Samples analysed as received

M. C. Johnson
SENIOR CHEMIST

Department of Environment & Land Management
Environmental Chemistry Laboratory
C/- Chemistry Department, University of Tasmania
Box 252C GPO Hobart 7001, Hobart
Telephone (002) 207475 Fax (002) 207825

Report Number: 7333
Submitted By: R. Stoklosa
Reported To: R. Stoklosa
Test Method: DELM Method Metals in Sediments

Lab. No: 963554-963560
Date Sampled: 28/1/96
Date Received: 28/1/96
Date Reported: 30/1/96

SOILS - STOKLOSA ENGINEERING

Lab No.	Sample ID	Pb mg/kg DMB	Zn mg/kg DMB	Cu mg/kg DMB	Cd mg/kg DMB	Cr mg/kg DMB
963554	FT-3	138	104	51	<0.5	11
963555	FT-4	71	187	32	<0.5	15
963556	FT-5	288	326	58	<0.5	14
963557	FT-6	60	40	14	<0.5	13
963558	FT-7	43	101	46	<0.5	7
963559	FT-8	48	318	7	<0.5	3
963560	FT-9	26	67	117	<0.5	21

DMB – Dry Matter Basis

NATA

This laboratory is registered by the National Testing Authorities, Australia. The tests reported herein have been performed in accordance with its terms of registration. This document must not be reproduced except in full. Samples analysed as received.

Disposal as "Hazardous Waste"
(prior Council approval required)

M.G. Johnson
SENIOR CHEMIST

C&C

17/02/1996 05:03 002315463

Certificate of Disposal

Issued to

Laver Pty. Ltd.,

70 Browns Road,
Kingston, 7050

*Removal and disposal of **2,500 litres** **of contaminated hydrocarbon** on the 28th August, 1996 from;*

79 Melville Street,
Hobart, 7000

Service performed by licensed operator

COLLEX WASTE MANAGEMENT PTY. LTD.
A.C.N. 051 316 584

Dated: Thursday, August 29, 1996

John Brennan
MANAGER - ENVIRONMENT & SAFETY

79 to 85 Melville Street
Site Assessment and Planning Impact Report

Principal Consultant
James Douglas & Associates Planning and Development Consultants

Consultants in Association

James Douglas	Town Planning
Barry Neilsen	Structural Assessment and Building Survey
Robert Vincent	Heritage Assessment
Richard Stoklosa	Environmental Hazards Assessment

Acknowledgment

The consultants wish to acknowledge the existing research undertaken by Michael Court & Kerry Edwards, Historical Consultants with respect to the Statement of Cultural Significance for Number 79 Melville Street. This statement is included as an attachment to this report.

Disclaimer

The information contained in this report and its related appendices has been compiled with all due care. However, the information has been collected for the purposes of, the Tasmanian Property Services Group to facilitate the disposal of the subject site and not as a basis for testing individual project feasibility or for any other purpose. Accordingly, no person should act on the information contained herein without prior verification.

The views expressed herein are those of James Douglas & Associates and do not necessarily represent the views of any other party.

Contents

Figures

Appendices

1. Purpose of The Report.

The Crown wishes to sell the subject site. The purpose of this report is to describe the current asset and identify the constraints and opportunities for its marketing and re-development. Specifically, this has involved the following tasks ;

- A description of the site and structures
- An assessment of the structural significance of the buildings and of their capabilities for reuse, particularly the possibility of stratum subdivision
- The identification and assessment of the impact of statutory and strategic planning provisions with emphasis on those relating to demolition
- The assessment of the heritage and streetscape value of the site and structures
- The identification of any relevant legal constraints to disposal of the site
- An audit of the site for possible contamination
- A summary of the constraints and opportunities for re-development

2. Site Description

The subject site is located on the periphery of Hobart's Central Business District with frontage to Melville and Brisbane Streets. A Location Plan identifying the site is shown in Figure 1. The site is presently used as office accommodation for the State Emergency Service and Tasmanian Fire Service and as parking and storage for various government agencies. Surrounding land uses include two major Hobart City Council carparks, retail and offices.

The existing structures on the site are of one to three stories in height and are constructed of pressed clay brick with galvanised roofing and have frontage to Melville Street. To the rear of these frontages there are substantial single storey, timber trussed storage buildings. All these structures date to 1922 and were purpose built for 'Crisp and Gunn' who operated a timber milling and merchandising business from the site. More detailed descriptions of these buildings are contained in the structural analysis and heritage assessments following in this report. Approximately 4,428 square meters of the site is developed with the balance being in gravelled and bitumen hard standing and used for parking. This unenclosed space of approximately ~~2,763~~ 3445 square meters is

accessed from Brisbane Street and is approximately one storey below the level of Brisbane Street.

The site in its entirety has an area of ~~2191~~ 7873 square meters and there are few, if any, such substantial parcels within close proximity to the Cental Business District. As can be seen in the following Site Plan (Figure 2), the subject site is comprised of five lots, which are defined as follows;

- Lot 1 - 79 to 81 Melville Street, Title reference - part of CT 2878 / 23 (see P114103) ~~3868~~ 4615.9 m² - 175m² = 4440m² sq. meters
- Lot 2 - 83 to 85 Melville Street, Title reference - CT 2294 / 50, - ~~2323~~ 2233 m² sq meters
- Lot 3 - 88 Brisbane Street, Title reference - CT 2311 / 98, - 228 sq meters
- Lot 4 - 90 Brisbane Street, Title reference - CT 2394 / 23, - 347 sq meters
- Lot 5 - 92 Brisbane Street, Title reference - CT 2294 / 49, - 425 sq meters

3. Structural Assessment and Re-development Potential

(refer Figure 3 Building Envelope Plan)

3.1 79 Melville Street (Lot 1).

This is a substantial brick and timber structure with identified heritage and streetscape value. It is two storeys at the front with a floor area of 442 square meters and a single storey at the rear with a floor area of 203 square meters . The floors are timber throughout. There is an original internal stair and an external steel fire escape. Two roof lights provide natural lighting to the rear internal areas and the large ceiling heights would allow for the installation of ducted air conditioning if desired. The building appears in good condition throughout.

It is possible to create a separate title for this building, the possible boundary locations are shown on Figure 3. As shown, the western boundary would need to be located three meters from the western wall to allow retention of the windows on that face (and also to accommodate the external fire escape). The current openings in the rear wall of the main building would also need to be blocked up. Whilst further stratum subdivision of the property is technically feasible under the provisions of the Building

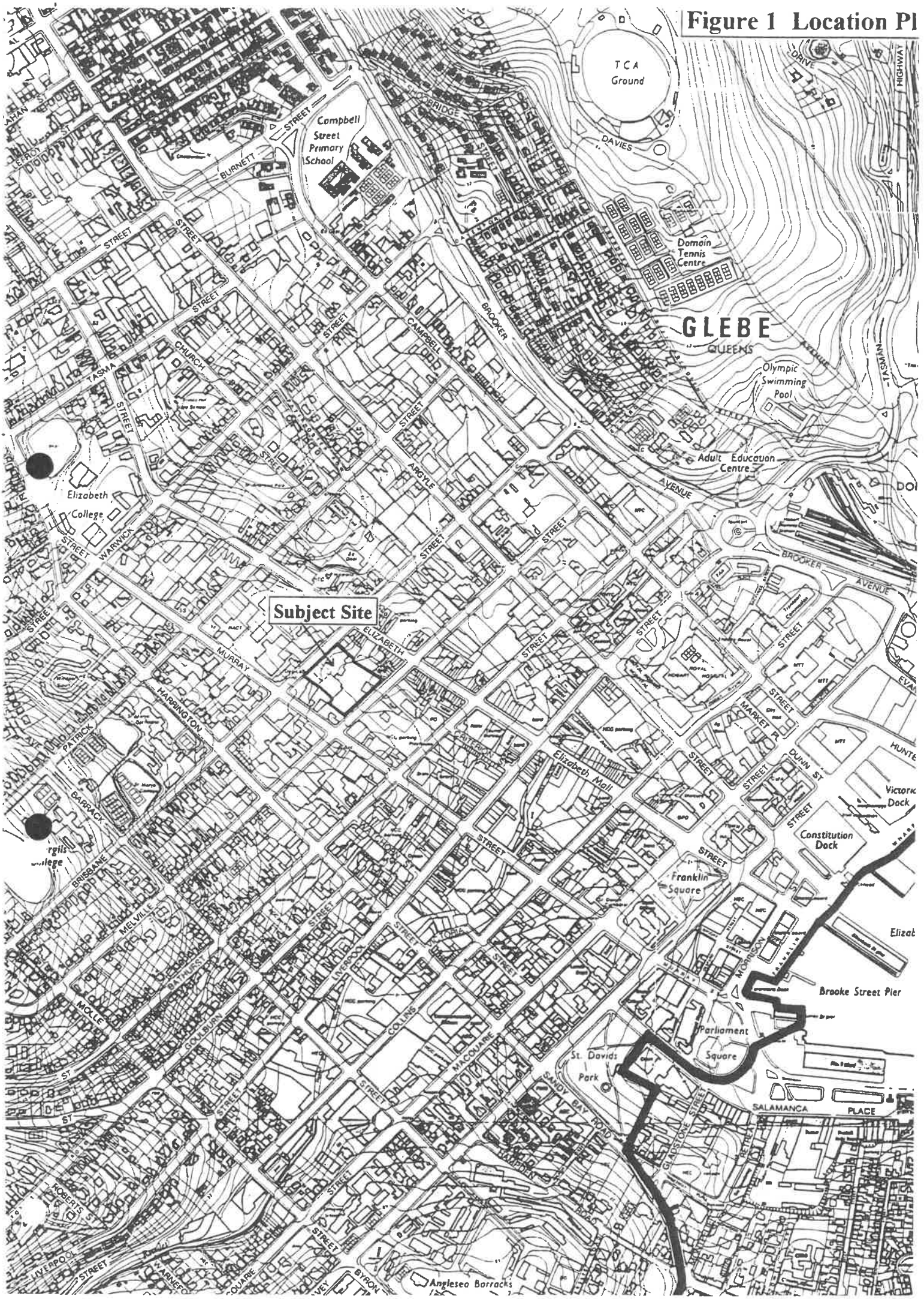


Figure 1 Location Pl
Subject Site
GLEBE
TCA Ground
Campbell Street Primary School
Domain Tennis Centre
Olympic Swimming Pool
Adult Education Centre
Elizabeth College
Elizabeth Mall
Franklin Square
Constitution Dock
Victoria Dock
Brooke Street Pier
Parliament Square
St. Davids Park
Anglesea Barracks
BROOKER AVENUE
MACQUARIE STREET
ELIZABETH STREET
MURRAY STREET
HARRINGTON STREET
LIVERPOOL STREET
BATHURST STREET
COLLINS STREET
MACQUARIE STREET
SALAMANCA PLACE
DAVIES AVENUE
CAMPBELL STREET
ARGYLE STREET
WARWICK STREET
PATRICK STREET
BARRACK STREET
BRISBANE STREET
MELVILLE STREET
MOLLE STREET
GOULBURN STREET
ROBERTS STREET
MARKET STREET
DUNN ST
MORRISON ST
GLADSTONE STREET
SANDY BAY ROAD
HAMPDEN ROAD
BURNETT STREET
CHURCH STREET
TASMA STREET
QUEENS AVENUE
TASMAN HIGHWAY

Code of Australia, the location of the single internal stairway makes such a proposal impractical without major modifications.

3.2 81 Melville Street (Lot 1)

This three storey building, currently used as offices, is of brick construction with timber floors and it totals some 767 square meters in area. It is served by a single fire isolated stair at the front corner and also has access openings through the dividing wall to Number 83 - 85. These openings through the party wall would need to be blocked up if the properties are to be dealt with separately.

The original building structure appears in sound condition although much of the internal partitioning is of varying date and quality and adds little to the buildings worth.

A large proportion of the remainder of the site is covered with timber trussed, single storey storage buildings. These consist of three discreet but conjoined structures comprising floor areas of 1911 square meters, 298 square meters and 88 square meters. From a structural viewpoint, while these buildings provide adequate accommodation for their current use (the informal storage of vehicles, building materials and safety equipment etc.) they provide little realistic potential for upgrading for other uses.

The rearmost of these storage buildings (behind 79 Melville Street and closest to Brisbane Street) has been affected by a recent boundary adjustment and it is apparent that it now straddles the boundary with an adjacent lot (see SP 114102, and SP 114103, Appendix 4). The disposal of the subject property may require the resolution of this situation. If this is necessary, two options are available;

- Demolition of the structure, or
- The installation of a new fire rated masonry wall on the new boundary. This would involve construction of a new footing and re-supporting the roof structure on either side of the new wall which would extend up as a parapet. The wall could be built of double brick cavity or simple skin concrete block. This option would allow the subsequent removal of either "half" of the building at the requirement of either owner.

The rear section of the site, adjacent to Brisbane Street, is considerably below the footpath level, which is supported by very old brick and sandstone retaining walls.

Large diameter sewer and stormwater mains run through the centre of this site. This will most likely require re-alignment in any re-development of the site as usual Hobart City Council policy is not to allow new buildings over mains.

3.3 83 - 85 Melville Street (Lot 2)

The front portion of this lot contains a two-storey office building of similar construction to Number 81 and co-joined to it with a common party wall. The upper floor is at the same level as the upper level of Number 81 but the lower floor is between the two lower levels of the adjacent building. The building has a fire- isolated stair (recent addition) as well as another open internal stair. Vehicular access from Melville Street to the rear of the lot exists through an access way in the building. Depending on future uses, provision of ducted air - conditioning may be required and the floor to floor height would be sufficient to accommodate such an installation.

There is a substantial single storey storage building to the rear (similar to the adjacent property).

3.3 88 and 90 Brisbane Street (Lots 3 and 4 respectively)

These two properties are vacant and unused and both contain some ruins of old buildings (of no current heritage or streetscape value).

The title to Number 88 indicates an old 'roadway' along the western boundary which appears to have been used as a right of way and drainage easement for Number 90. The possibility of expunging this encumbrance should be investigated.

3.4 92 Brisbane Street (Lot 5)

This property is vacant and is currently used for car parking and access to the rear of the 83 - 85 Melville Street buildings.

4. Planning Provisions - Statutory

The principal statutory document controlling development on the site is The City of Hobart Planning Scheme 1982. The scheme area is comprised of Land Use Zones. Each zone is divided into Precincts with an associated 'Statement of Desired Future

Character'. These statements provide a finer definition to the desired form of development within an area and provide guidance in the application of the general principles of development control and the various schedules within the scheme ordinance.

The following is a summary of the principle relevant provisions of the Scheme. It should be noted that only the principle provisions are identified sufficient to assess the development potential of the site, further detailed planning assessment will be required in association with any development proposal.

4.1 Zoning;

The subject site is contained within the Central Commercial and Administrative Zone and is in Precinct 8A. The objective of this zone as identified in Clause 5.3 of the scheme is as follows;

" The Objective of the Central Commercial and Administrative Zone is to provide for the administrative, commercial, financial and professional headquarters of the State, for intensive generators of employment, and for cultural and community activities and supporting uses associated with those functions."

The Statement of Desired Future Character for Precinct 8A within this zone is identified in Section 5.3.5 as,

" The Elizabeth Street Precinct should maintain its function as a retail, wholesale and office area, with residential use being an important subsidiary activity.

New development should maintain the linear image of Elizabeth Street which is a dominant feature of the overall character of the Precinct."

The above statements provide for a wide range of land uses and development forms. Whilst not specifically identifying a preferred use or uses, neither to they constrain the possible range of uses that would in practice be considered on the site.

4.2 Land Use;

Schedule A, Table A1 of the Scheme provides further definition of the types of Land Uses that may be considered for the site. These provisions relate to the 'use component' of a development proposal only ie. a development which is a 'permitted use' may still be subject to the exercise of a discretion by Council in respect to it's car parking or boundary setback provisions and accordingly could receive a conditional

approval or refusal based on these grounds. The provisions of Table A1 are summarised as follows;

Permitted Uses - these are uses 'permitted as of right' including :- all types of residential development, consulting rooms, community centre, office, shop, hotel/motel, service industry, show room

Prohibited Uses - these uses are prohibited (except in specific circumstances relating to existing non- conforming uses) :- Transport depot, timber yard, (heavy) industry

Discretional Uses - these uses may be permitted or refused at Council's discretion, they include all other use types not identified above.

As can be seen, most use types can be contemplated for the subject site with the exception of those of a heavy industrial nature which would generate substantial movements of heavy vehicles or be potentially hazardous or noxious.

4.3 Development Density;

Development density is determined by two principle provisions:- plot ratio and lot size. Under Schedule B. of the Scheme the following apply to the subject site;

Plot Ratio - Basic 2.25 Maximum 3.00 (maximum floor area relative to site area)

Minium lot size - 120m2 Min. Frontage 6m (for subdivision)

4.4 Boundary Setbacks;

No specific boundary setbacks are required under the Planning Scheme, building setbacks would be determined by the requirements of the Building Regulations.

4.5 Height;

The maximum permissible height for buildings on the subject site is 12 meters pursuant to Table C1 of the Scheme. 'Height' is defined under the Scheme as the distance measured between the natural surface level and the topmost habitable floor level of a building.

4.6 Car Parking and Access;

Parking and access standards are identified in Schedule E of the Scheme. The Schedule contains parking space requirements for individual land use groups. However there is provision to vary these requirements and it is reasonable to expect that an exercise of discretion in regard to any of these standards could be granted subject to adequate justification being provided within a planning submission for development. Council may require 'cash-in-lieu' for any car spaces not provided on site (currently $9,000 per space). The provisions of Schedule E should therefore be read as a guide rather than an absolute in respect to the subject site.

4.7 Demolition;

The potential for demolition of any existing structure will be determined by the assessment of it's historic and streetscape value (see Section 6 of this report). None of the existing structures are listed on the National Estate or are identified by the National Trust, the Royal Australian Institute of Architects List or the City of Hobart Planning Scheme as having specific merit. Accordingly it may be said that there is no absolute prohibition upon their demolition, it would be a matter to be decided at Council's discretion or on the basis of a possible appeal lodged with The Resource Management and Planning Appeals Tribunal.

Based upon the historic assessment contained in this report, it is considered that, in practical terms, any successful re-development proposal would encompass the retention of the existing structure at 79 Melville Street in it's entirety and make every effort to retain the structure at 81-85 Melville Street by its adaptation and reuse. The demolition of the existing structures at 81-85 Melville Street should only be proposed if it can be satisfactorily demonstrated that their retention would deny the economic and efficient re-development of the site and their replacement structures would enhance the existing streetscape.

There is no apparent restriction to the demolition of the garage/store at the rear of 79 and 81-85 Melville Street based on historic or streetscape values. Any application for it's demolition should include the completion of an historical record of the building prior to demolition and provisions for the future treatment of the affected portion of the subject site either as an interim or permanent measure, in accordance with Principle 5 of the Scheme which states;

" The demolition of any building shall not be permitted until a further or replacement development, which may include temporary landscaping of that land, has been approved unless such demolition is required by statutory order."

5. Planning Provisions - Strategic

The Hobart City Council released the 'Central Area Strategy Plan' (CASP) for public comment in the early part of 1994. This document provides an insight to the existing demand and floor space supply patterns within the C.B.D. and an indication of Council's intention with respect to possible changes to statutory planning provisions in the future.

CASP is the culmination of nearly three years research into the functionality of the C.B.D. of Hobart. It's broad aim is to provide a strategy to guide and manage the development and enhancement of the C.B.D for the next ten years. The following points are extracted from CASP and may assist in the formulation of a purchase and development strategy for the subject site.

- *" The Central Area remains the single largest employment location in Tasmania. So far as the Metropolitan Area is concerned it is the principal place of employment for the resident population....Its significance as a shopper destination has been confirmed by the household survey conducted as part of the Retail Topic Report and more recently through a larger sample of 600 households carried out by the City Heart Business Association. Around two thirds of people from the Hobart Metropolitan Area claim to have visited the city centre within the pervious week. The surveys also found that the city centre fulfils an important role for activities such as paying bills, banking, conducting business, eating out and entertainment."*

- CASP identifies the development opportunities for the subject site as :- *" Major retail store and possibly a City Heart supermarket with car parking."* and states *" Efforts will be made to strengthen the role and function of Elizabeth Street as far as Brisbane Street, and extend the shopping choices available in the City Heart by the promotion of the development opportunities offered by Council's*

Melville Street car park site and former Crisp and Gunn site at 83 Melville Street."

- The principle development controls proposed in CASP that relate to the subject site are:- Plot Ratio : 3.0
  Height : 20 metres
  Car Parking : no requirement

The following Figures 4 and 5 have been extracted from CASP as indicators of demand potential and existing floor space supply in the C.B.D. It should be noted that the Central Area of the City remains the single largest employment location in Tasmania (see Figure 4).

Figure 4

EMPLOYMENT CHANGE IN HOBART AND THE METROPOLITAN AREA 1971-1991

	1971	1976	1981	1986	1991
Greater Hobart	60,038	67,881	69,431	71,895	73,945
Central Area	24,378	24,426	21,611	21,564	21,378[I]

Sources: A.B.S. and Employment & Economic Base Topic Report

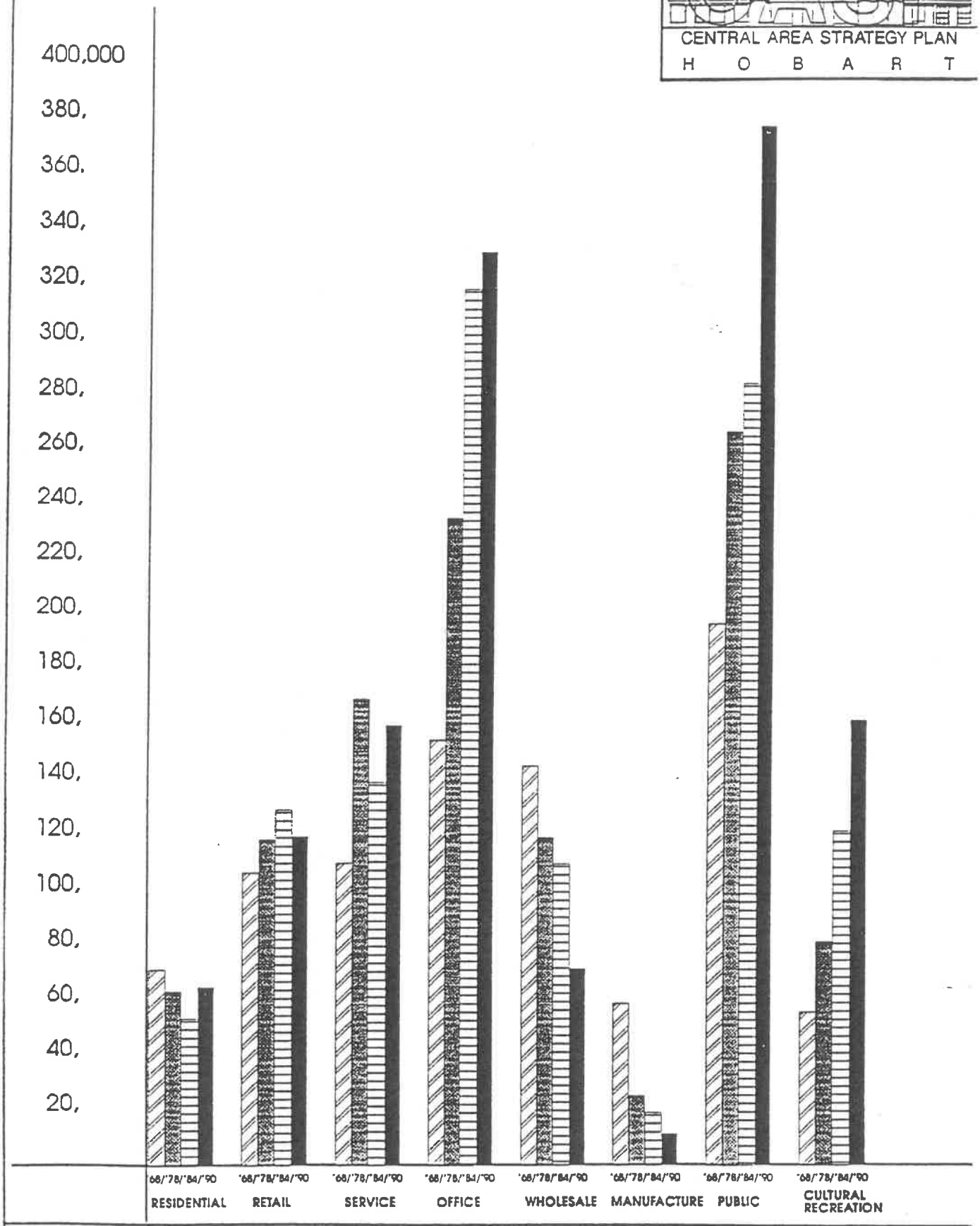
Notes: I = 1990 Figure

6. Heritage and Streetscape Impact Assessment

Detailed assessments of the heritage / streetscape values of the existing structures form Appendix 1 to this report. These reports have been prepared by acknowledged experts in the field of conservation and contain detailed descriptions of the site history, building fabric and essential elements to be considered for conservation in any re-development proposal. Additionally, a statement of opinion from officer's of the Hobart City Council relating to the 'Streetscape and Heritage Significance" of the subject site has been obtained and this written advice forms Appendix 2.

Figure 5

CENTRAL AREA STRATEGY PLAN
H O B A R T



CENTRAL AREA FLOORSPACE 1968-1990

DIAGRAM 1

It is on the basis of these heritage assessments that Council will consider any application for demolition and re-development. Accordingly, the recommendations for the retention of essential elements on the site based on heritage and/or streetscape significance are summarised as follows.

79 Melville Street

The whole of the building at 79 Melville Street should be retained and the elements that date from the building construction (1922) should be retained and re-instated where possible. Recent adaptation and alterations to the fabric should be removed where the alterations are reversible.

For example, removal of the false frame under the barrel vault light well & removal of the wall through the middle of the light well at the base of the main stair, caused by the female toilet rest room addition, would be actions which would move towards re-instating the building to the previous known state. The building should be properly surveyed to identify all the internal fittings and items of significance.

81 -85 Melville Street

The building at 81-85 Melville Street originally built as the Joinery Workshop and Hardware Store of Crisp and Gunn in 1922 should be retained. The facade has a strong townscape quality. However, this complex could be adapted and recycled for a new use, if the extension or adaptation respects the 1922 fabric of the building.

Garage / Store

The timber store at the rear of 79 and 81-85 Melville Street is currently used as a garage/store. It has little remaining significance and could be demolished to make way for new uses on the site. It should be photographed and a measured drawing undertaken as part of an historical record prior to demolition. This record should be lodged with the Archives Office of Tasmania.

Open Space

The remainder of the site is defined as Open Space. It is accessible from Brisbane Street and has remnant elements of building fabric. These elements have no known cultural significance.

The sandstone wall to Brisbane Street boundary should not be destroyed. However, its relevance is unclear.

7. Environmental Hazard Assessment

7. 1 Screening Level Environmental Assessment

A screening level environmental assessment of the subject site has been conducted as part of the analysis involved in the preparation of this report, this is contained in Appendix 3.

The purpose of the assessment is to investigate the possibility of site contamination from previous and existing land uses. It has comprised a review of the site history and land use
(including examination of aerial photographs and historical review documents), review of available state and local records, and site reconnaissance. The following points are extracted from the assessment as a brief summary, but reference should be made to the assessment in its entirety.

7. 2 Possible Sources of Contamination

The current and past land uses on the site have involved the storage and handling of potentially hazardous materials. The extent of possible sources of contamination, based on the initial investigation, appear to consist of the following.

- A 1,000 gallon petrol underground storage tank and bowser licensed to the Shell Company of Australia in 1973 (under the Inflammable Liquids Act 1929) by the State Department of Mines. The licence indicates that the petrol tank and bowser was to be operated by the State Supply and Tender Department. Notes attached to the licence further indicate that the petrol tank was previously used by Crisp and Gunn and abandoned prior to the licence date (probably circa 1965 when operations ceased). It is not known how old the tank is, or what other materials may have been stored in it.

- In addition to the underground petrol tank, there is a small outdoor flammable liquid store (enclosed by a locked, chain fence) reported to contain 44 gallon

drums of chain saw fuel and kerosene. It is located at the rear of the State Emergency Service (SES) building and store at 81 -85 Melville Street.

- It is not known what other materials may have been stored on the site, but it is unlikely that the site was subject to exposure from large quantities of other hazardous materials, given the nature of the present and past land uses. Small quantities of chemicals
  (solvents, paints, etc) were probably part of the historical hardware merchandising activities.

- Insulation was noted above ceiling panels in some of the upstairs office spaces at 79 Melville Street. The type of insulation used at the property is not known.

7. 3 Extent of Further Work Required

The assessment should be regarded as a screening level exercise only and further investigative and possible remedial actions may be required in the course of the sites re-development or prior to its disposal, if this was considered desirable. The following are recommended.

- Testing of soils and possibly some of the building materials (insulation) for potential contamination and/or identification of hazardous materials.
- Access to fenced and locked portions of the store area is also necessary to fully investigate the nature and condition of the facility. Of interest are the ground-level access covers that were observed, and the reported triple interceptor oil and sediment trap. A more thorough examination of council drainage plans and other site drawings, with field confirmation, is necessary in the inaccessible areas of the property.
- Due to the presence of the underground petrol storage tank and other materials at the site, a sampling program is indicated to adequately assess the environmental condition of the site.
- Upon completion of these further investigations, recommendations can be made on the short term and long term environmental management of the property.
- Consideration has been given to the order of costs involved in undertaking the identified actions. These indicative costs are:-

Investigation and analysis as outlined above	$ 3,000
Removal of underground storage tank	$ 2,000
Possible remedial actions if required	to be costed

8. Legal Constraints

A title search has been undertaken in the preparation of this report. Copies of the relevant titles are included as Appendix 4 and these are referred to in Section 2 of this report.

There are no apparent legal constraints to the disposal and re-development of the subject site identified by this investigation other than the storage buildings behind 79 Melville Street which have been affected by a recent boundary adjustment (see Section 2). The disposal of the subject property may require the resolution of this situation.

9. Summary of Constraints and Opportunities for Re-development

9.1 It is possible to create a separate title for 79 Melville Street, the possible boundary locations are shown on Figure 3. As shown, the western boundary would need to be located three meters from the western wall to allow retention of the windows on that face (and also to accommodate the external fire escape). The current openings in the rear wall of the main building would also need to be blocked up. Whilst further stratum subdivision of the property is technically feasible under the provisions of the Building Code of Australia, the location of the single internal stairway makes such a proposal impractical without major modifications.*(page 5)*

9.2 The openings through the party wall between 81 and 83-85 Melville Street would need to be blocked up if the properties are to be dealt with separately.

A large proportion of the remainder of the site is covered with timber trussed, single storey storage buildings. These consist of three discreet but conjoined structures comprising floor areas of 1911 square meters, 298 square meters and 88 square meters. From a structural viewpoint, they provide little realistic potential for upgrading for other uses.

The rearmost of these storage buildings (behind 79 Melville Street and closest to Brisbane Street) has been affected by a recent boundary adjustment and it is apparent that it now straddles the boundary with an adjacent lot. The disposal of the subject property may require the resolution of this situation. If this is necessary, two options are available;

- Demolition of the structure, or
- The installation of a new fire rated masonry wall on the new boundary. *(page 6)*

9.3 The title to Number 88 Brisbane Street indicates an old 'roadway' along the western boundary which appears to have been used as a right of way and drainage easement for Number 90. The possibility of expunging this encumbrance should be investigated *(page 7)*

9.4 Under the provisions of the City of Hobart Planning Scheme 1982, most use types can be contemplated for the subject site with the exception of those of a heavy industrial nature which would generate substantial movements of heavy vehicles or be potentially hazardous or noxious.*(page 9)*

9.5 Under Schedule B. of the Scheme the following development density provisions apply to the subject site; *(page 9)*

Plot Ratio - Basic 2.25 Maximum 3.00
(maximum floor area relative to site area)

Minium lot size - 120m2 Min. Frontage 6m
(for subdivision)

9.5 No specific boundary setbacks are required under the Planning Scheme, building setbacks would be determined by the requirements of the Building Regulations.*(page 9)*

9.6 The maximum permissible height for buildings on the subject site is 12 meters. 'Height' is defined under the Scheme as the distance measured between the natural surface level and the topmost habitable floor level of a building. *(page 9)*

9.7 Parking and access standards are identified in Schedule E of the Scheme. The Schedule contains parking space requirements for individual land use groups. However there is provision to vary these requirements and it is reasonable to expect that an exercise of discretion in regard to any of these standards could be granted subject to

adequate justification being provided within a planning submission for development. Council may require 'cash-in-lieu' for any car spaces not provided on site. *(page 10)*

9.8 Based upon the historic assessment contained in this report, it is considered that, in practical terms, any successful re-development proposal would encompass the retention of the existing structure at 79 Melville Street in it's entirety and make every effort to retain the structure at 81-85 Melville Street by its adaptation and reuse. The demolition of the existing structures at 81-85 Melville Street should only be proposed if it can be satisfactorily demonstrated that their retention would deny the economic and efficient re-development of the site and their replacement structures would enhance the existing streetscape.

There is no apparent restriction to the demolition of the garage/store at the rear of 79 and 81-85 Melville Street based on historic or streetscape values. Any application for it's demolition should include the completion of an historical record of the building prior to demolition and provisions for the future treatment of the affected portion of the subject site either as an interim or permanent measure. *(page 10)*

9.9 The extent of possible sources of contamination of the site, based on the initial investigation, appear to consist of the following.

- A 1,000 gallon petrol underground storage tank and bowser
- A small outdoor flammable liquid store (enclosed by a locked, chain fence) reported to contain 44 gallon drums of chain saw fuel and kerosene.
- Insulation above ceiling panels in some of the upstairs office spaces at 79 Melville Street. The type of insulation used at the property is not known. *(page 15)*

9.10 Possible remedial actions may be required in the course of the site's re-development or prior to its disposal, if this was considered desirable. The following are recommended.

- Testing of soils and possibly some of the building materials (insulation) .
- A more thorough examination of council drainage plans and other site drawings, with field confirmation, is necessary in the inaccessible areas of the property.
- Due to the presence of the underground petrol storage tank and other materials at the site, a sampling program is indicated to adequately assess the environmental condition of the site.

9. 11 Consideration has been given to the order of costs involved in undertaking the identified actions. These indicative costs are:-

Investigation and analysis as outlined above	$ 3,000
Removal of underground storage tank	$ 2,000
Possible remedial actions if required	to be costed *(page 15)*

9. 12 There are no apparent legal constraints to the disposal and re-development of the subject site identified by this investigation other than the storage buildings behind 79 Melville Street which have been affected by a recent boundary adjustment. The disposal of the subject property may require the resolution of this situation.*(page 16)*

Site Location Plan – 79 Melville Street, Hobart

WSP | PARSONS BRINCKERHOFF


Observed extent of carpark, internal wall
Aproximate location of bitumin and two gatic covers
Parking bays
1 CARPARK
6000 X 2600
PIT REFER DRAINAGE DETAILS
Open grated surface water drain marked as draining into River Derwent
24 CARPARKS
5400 X 2600 Min.
Assumed concrete sewer cover with confined space warning
3 CARPARKS
5400 X 2600 Min.
6900
6600


Grated surface water drain
Concrete manhole cover (assumed sewer)

Site inspection photos – 79 Melville St, Hobart- 07/04/2017

WSP | PARSONS BRINCKERHOFF

WSP | PARSONS BRINCKERHOFF

From: Warren Jordan
To: Peter Topliss; Nicole Reineker
Subject: Fwd: 79-85 Melville Street – 7 April 2017 - Site Inspection
Date: Friday, 28 September 2018 6:52:04 PM
Attachments: 79 Melville St Hobart.pdf
ATT00001.htm
ERLUR.PDF
ATT00002.htm
Photos and plans.pdf
ATT00003.htm

Hi Peter and Nicole
Some further info for you here

Cheers Warren

Sent from my iPhone

Begin forwarded message:

From: "Leigh Roberts" <leigh@nekon.com.au>
To: "Warren Jordan" <warren.jordan@utas.edu.au>
Subject: FW: 79-85 Melville Street – 7 April 2017 - Site Inspection

Hi Warren

Our partners, Abacus, undertook a WorkSafe search in 2017 and the results of that search are attached. WSP were engaged by Abacus to investigate and the results of that investigation are below and attached. They could not locate any petrol tank.

Also, briefcase is being dropped off this afternoon to the ground floor of the original building

Cheers

Leigh Roberts
Nekon Pty ltd
Mobile 0408 141 316

From: Laurie Angeli [mailto:langeli@abacusproperty.com.au]
Sent: Friday, 28 September 2018 10:45 AM
To: Leigh Roberts
Subject: FW: 79-85 Melville Street – 7 April 2017 - Site Inspection

Leigh

This is something that maybe of use

Laurie Angeli | Senior Portfolio Manager
Abacus Property Group | Level 34 Australia Square | 264-278 George Street | Sydney NSW 2000
T 02 9253 8605 | M 0415 565 393 | F 02 9253 8616 | E langeli@abacusproperty.com.au
www.abacusproperty.com.au

From: Charles Scarafiotti <charles@nekon.com.au>
Sent: Thursday, 27 September 2018 10:22 AM
To: Laurie Angeli <langeli@abacusproperty.com.au>
Cc: Leigh Roberts <leigh@nekon.com.au>
Subject: RE: 79-85 Melville Street – 7 April 2017 - Site Inspection

Hi Laurie, re the below, yes it goes back a wee while !! Do you have a copy of the Workplace Standards Tas application to obtain the search documents ?

Thanks

Charles

Charles Scarafiotti
Nekon Pty. Ltd.

Tel. (03) 6224 6511
Fax. (03) 6224 6522
Mob. 0418 136 397

From: Laurie Angeli [mailto:langeli@abacusproperty.com.au]
Sent: Tuesday, 1 August 2017 2:12 PM
To: Chris Brookwell (chris.brookwell@sttas.com.au)
Cc: Charles Scarafiotti; Robert Rockefeller; Peter Strain
Subject: FW: 79-85 Melville Street – 7 April 2017 - Site Inspection

Gents

Please see attached and comments below from the consultant

Laurie Angeli | Portfolio Manager
Abacus Property Group | Level 34 Australia Square | 264-278 George Street | Sydney NSW 2000
T 02 9253 8605 | M 0415 565 393 | F 02 9253 8616 | E langeli@abacusproperty.com.au
www.abacusproperty.com.au

From: Moore, Peter [mailto:peter.moore@wspgroup.com]
Sent: Monday, 10 April 2017 8:26 AM
To: Laurie Angeli; Peter Strain
Subject: FW: 79-85 Melville Street – 7 April 2017 - Site Inspection

Laurie,

Please find attached report from Daniel Laver of site inspection and documents sourced for the Dangerous goods search for the Hobart property.

Cheers Peter

Peter Moore
Associate Director

D: +61 2 8925 6720
M: +61 4 1623 5034
peter.moore@wspgroup.com

From: Laver, Daniel
Sent: Friday, 7 April 2017 4:55 PM
To: Moore, Peter
Subject: 79-85 Melville Street – 7 April 2017 - Site Inspection

79-85 Melville Street – 7 April 2017 - Site Inspection

Hi Peter,

A site inspection was undertaken today at the above property by Daniel Laver (Senior Environmental Scientist - WSP). During the site inspection Chris Brookwell (Executive General Manager - Forestry Tasmania) provided an A3 plan of the carpark layout and levels. An annotated photo of the plan is attached along with photos.

The following observations were made during the inspection:

- Two metal gatic covers were observed located on a square of reinstated bitumen approximately 1x1m in size
- Two plastic covers were removed which reviewed two vertical pipes of approximately 3-4 inches in diameter

- No hydrocarbon odours were noted when the covers were removed
- The periodic horizontal flow of water was observed at the base of the standpipes approximately 2.9 m below surface
- the covers aligned with the services indicated on the plan and observed onsite, which are believed to relate to sewer and surface water (refer to annotated plan).

The dangerous goods information requested from WorkSafe Tasmania is attached and reported that a tank was present at 79-83 Melville St between 1955 to 1967. This was associated with Shell and Crisp & Gunn Co-OP Ltd.

Taking the above observations into account and information provided by WorkSafe is believed that the vertical pipes were most likely installed to inspect or allow access to the existing services.

The periodic flow of water and their location in relation to existing services suggests it may be associated with the sewer or stormwater water drainage services.

Regards

Daniel Laver
Senior Environmental Scientist

D: +61 8 8405-4410
M: +61 429 476303
DLaver@pb.com.au

Calbourne Nominees
GPO Box 1406
Hobart Tas 7001

Invoice No.: 00011933
Date: 27/04/2018
Job No.: 1940-02

Construction 3 Pty Ltd

ACN 109 213 336

Tax Invoice

Description	Amount
Attention: Charles Scarafiotti	
Works associated with the cleaning sump at the former Forestry Building, fill with sand after clean and cap	
Labour	$1,152.00
Materials	$357.00
Tip fees	$61.00
Total Exc GST:	$1,570.00
GST:	$157.00
Total Inc GST:	$1,727.00
Less Amount Paid:	$0.00
Balance Due:	$1,727.00

This is a payment claim under the Building and Construction Industry Security of Payment Act 2009.

Terms: 30 days from date of invoice
Interest at the rate of 17% p.a. will be charged on overdue accounts

Direct Deposit Details:

BSB: **017 - 318**

Account No.: **4992 - 30963**

20 Watchorn Street, Hobart, Tasmania 7000
Phone: 03 6231 1998 Fax: 03 6231 1996
Email: admin@construction3.com.au
ABN 22 109 213 336

From:	Warren Jordan
To:	Peter Topliss; Nicole Reineker
Subject:	FW: Oil Sump Removal/Treatment
Date:	Thursday, 27 September 2018 10:44:29 AM
Attachments:	Con3 Inv 00011933.pdf Motor Vehicle Workshop Oil Sump Removal.pdf

Hi Peter and Nicole

Just in from Nekon for Forestry, see attached.

Cheers Warren

Warren Jordan
Senior Manager, Design and Development
Infrastructure Services and Development

T +61 3 6226 7353 | M 0439 995 663
Private Bag 15 Hobart TASMANIA 7001
www.utas.edu.au/csd

UNIVERSITY of TASMANIA
CRICOS 00586B

From: Leigh Roberts <leigh@nekon.com.au>
Sent: Thursday, 27 September 2018 9:59 AM
To: Warren Jordan <warren.jordan@utas.edu.au>
Subject: FW: Oil Sump Removal/Treatment

Hi Warren, please see email below and attached in regards to the remediation of an oil sump in the workshop

Cheers

Leigh Roberts
Nekon Pty ltd
Mobile 0408 141 316

From: Charles Scarafiotti
Sent: Thursday, 27 September 2018 9:53 AM
To: Leigh Roberts
Subject: Oil Sump Removal/Treatment

Leigh, re the oil sump treatment, please see attached.

Thanks

Charles

Charles Scarafiotti
Nekon Pty. Ltd.

Tel. (03) 6224 6511
Fax. (03) 6224 6522

Mob. 0418 136 397

ghd.com

→ The Power of Commitment

Appendix G

Geotechnical report – Brisbane Street

UTAS Forestry Building Redevelopment
Sewer and stormwater relocations

Summary Geotechnical Report

March 2022

Cover photo
View west to mechanical auger drilling at Site 1 outside *Choices* at 79 Brisbane Street, Hobart, 16 March 2022.
Photo: Bill Cromer

Refer to this report as
Cromer, W. C. (2022). *Summary Geotechnical Report, UTAS Forestry Building Redevelopment: stormwater and sewer relocations.* Unpublished report by William C. Cromer Pty Ltd for University of Tasmania, 28 March 2022.

1 INTRODUCTION

1.1 Background

The University of Tasmania (UTAS) is redeveloping the former Forestry Building between Melville and Brisbane Streets, Hobart (Attachment 1).

Existing sewer and stormwater pipes pass beneath Brisbane Street and the building and need to be relocated (Attachment 2).

William C Cromer Pty Ltd (WCCPL) was commissioned by JMG Engineers and Planners (JMG) on behalf of UTAS to undertake geotechnical investigations at four locations along a section of the pipe alignment in Brisbane Street outside retail premises *Choices* and *Freedom*, and down the access ramp on the northeastern side of the *Freedom* building.

The purpose of the subsurface investigations was to aid engineering design of the realignment, and to provide information for prospective tenderers.

Related geotechnical investigations were conducted at the Forestry Building in 2018 and 2021[1] (Attachment 2).

Locations and depths of investigation of the four sites (here designated Sites 1 – 4) were specified by JMG. Nominal depths of investigation (Attachment 2) were 5.2m, 5.5m, 5.0m and 3.0m for Sites 1 – 4 respectively.

1.2 Methodology

Excavator and augering

It was originally intended that each site would be investigated using a combination of hollow auger and (if required) diamond drilling. However, drilling rigs were unavailable to do the work until mid-April at the earliest.

JMG indicated that this timing would unacceptably delay engineering design, and on WCCPL's suggestion, a combination of excavator test pitting and solid mechanical augering was agreed upon. Where appropriate, dynamic cone penetrometer (DCP) profiling was to be used to supplement the test pitting and augering.

It was recognised that the excavator/auger combination would not provide much information on the type and strengths of any bedrock which might be present. On the other hand, test pits would provide detailed information on material types, strengths and excavabilities, and a combination of augering (with pullback and material recovery) and DCP profiling would provide similar information below the reach of an excavator. An undesirable situation would be the presence of bedrock at depths considerably shallower than the nominated investigation depths at any of the four sites.

Surveying

Sites 1 – 4, and the grating above the existing stormwater main, were dumpy-levelled with respect to SPM43 (24.42mAHD) on the corner of Brisbane and Murray Streets.

[1] Cromer, W. C. (2018). *Redevelopment of 79 – 85 Melville Street, Hobart: Geotechnical notes on preliminary test pitting, DCP profiling and drilling.* Unpublished report by William C. Cromer Pty Ltd, 11 February 2018; 24 pages, and Cromer, W. C. (2021). *Summary Geotechnical Report, UTAS Forestry Building, Melville Street, Hobart.* Unpublished report by William C. Cromer Pty Ltd, 6 September 2021.

Site contamination sampling

UTAS commissioned GHD to conduct a site contamination assessment of the materials along the pipeline realignment. WCCPL and GHD cooperated so that sampling could be done in test pits and from solid auger flights during the current investigations.

1.3 Dates of investigation and personnel

Sites 1 – 4 were cleared of underground services by *Auslocations* on 16 August 2021. Site 1 investigations were completed the same day. The test pit was backfilled with compacted 3% stabilised sand (in accord with Hobart City Council requirements), and bitumen was reinstated.

Sites 2, 3 and 4 were investigated on 17 March 2022, and bitumen was reinstated the same day.

The 4.5t excavator was supplied by *G. Edwards Excavations*, and operated by Seaton Waterfield.

Peter Hofto, consultant geologist and Principal of *Rock Solid Geotechnics*, supplied and operated the *Sampler 25* 4WD-mounted mechanical auger.

Spectran Group prepared traffic management plans and conducted traffic management on both days. Spectran crews also cut the test pit holes in bitumen, and re-instated the bitumen.

Bill Cromer logged and photographed all holes, and was assisted by technician Richard Mackintosh. As part of the site contamination investigation, Nicole Reineker from GHD attended on both days and sampled soils from the test pits and auger flights.

2 RESULTS

2.1 Presentation of results

Attachment 1 includes cadastre, streets, aerial imagery and published geology, all from www.thelist.tas.gov.au. Sites 1 – 4 are superimposed on the images.

Attachment 2 includes the locations of test sites from the 2018 and 2021 geotechnical investigations, and (second page) shows the locations of the four sites on a preliminary plan provided by JMG.

Engineering logs and photographs of all four sites are presented in Attachment 3.

Figure 1 is a conceptual and interpretative cross section[2] between Sites 1 – 4, based on the results of the geotechnical investigation.

2.2 Published geology is different from observed geology

The published geological map in Attachment 2 shows four rock types within the immediate vicinity of Sites 1 – 4: Triassic sandstone intruded by Jurassic dolerite, Tertiary boulder beds, and Quaternary creek sediments.

Instead, the observed geology at each of the sites was:

[2] There are inherent limitations to the cross section, as explained in the "Limitations of this geotechnical report" on page 2.

Site 1 (Brisbane Street)
Up to at least 5.2m of unconsolidated material, interpreted as (mostly clayey) fill. Auger refusal at 5.2m may be bedrock (dolerite?, sandstone?) or possibly boulders either in the Tertiary materials, or in the floor of the (now filled) creek bed[3].

Site 2 (Brisbane Street)
The excavator refused on dolerite bedrock at 1m.

Site 3 (near top of ramp)
The auger refused at the base of extremely weathered dolerite bedrock at 2.5m

Site 4 (bottom of ramp)
The excavator refused on relatively fresh dolerite bedrock at 0.65m.

The unconsolidated Quaternary creek sediments appear in this vicinity to be considerably narrower than the published geological map.

2.3 Groundwater

No shallow groundwater was encountered at any of the sites.

3 DISCUSSION

3.1 Interpreted geological cross section

Figure 1 is a conceptual (interpreted) cross section about 100m long through the four sites, starting at the inspection grating in the gutter above the existing stormwater pipe in Brisbane Street outside *Choices*, and ending at the bottom of the *Freedom* ramp.

In this interpretation:

- Site 1 is in the valley of the former creek, possibly near its deepest point. Here, the auger bottomed below the invert of the stormwater pipe.
- The valley of the creek has been filled in with unconsolidated materials. Between Sites 1 and 2, the valley floor rises almost to the current ground surface.
- The bedrock between Sites 1 and 2 may partly be sandstone and siltstone, but passes into dolerite before Site 2.
- Dolerite bedrock extends the remaining distance between Sites 2 and 4. At Site 3, it is extremely weathered to depths of about 2.5m, but is moderately fresh and of higher strength at Sites 2 and 4.

3.2 Suggested further investigations

Only Site 1 achieved its nominal depth of investigation. At Sites 2, 3 and 4, refusal was encountered by the excavator and/or auger at depths considerably shallower than the target depths.

[3] A tributary of Hobart Rivulet passes beneath Brisbane Street and the *Freedom* and Forestry Building. In this area at least, it has been brick-lined as a stormwater pipe, and at its inspection grating in Brisbane Street within a few metres of Site 1, the invert of the pipe is 4.4m below gutter level (17.0mAHD).

Consideration might be given to delaying engineering design so one or more of the three sites could be explored to required depths by diamond drilling. It is assumed that good core recovery could be obtained. The intended extra information from this approach would be (a) confirmation of bedrock type, and (b) rock strength and excavability, derived principally from joint sets and spacings in the rock mass.

3.3 Advice to engineers and tenderers

In the absence of further site investigations, the following inferences arise from the current site investigations:

- Expect variability in material types and strengths along the full distance between Sites 1 and 4. Changes will be potentially abrupt, and unpredictable.
- Excavability for trenching to depths up to about 5m or so is related to material strength and (in rock) fracture intensity. The unconsolidated fill at Site 1 to about 5m, and the extremely weathered dolerite at Site 4 to about 2m, will be easily excavable. Elsewhere, plant larger than the 4.5t excavator used on site will be required, probably with single tooth ripper and rock breaking capability.
- Trench shoring between Sites 2 and 4 is unlikely to be required, but is likely to be needed at and near Site 1, and for an uncertain distance towards Site 2.
- Groundwater is unlikely to be encountered along the proposed trench, except perhaps along the alignment of the original creek near Site 1. If so, near Site 1 the rate of water ingress is expected to be low and dewatering is unlikely to be a major issue.
- During test pitting, a slight to moderate earthy-acidic odour was noted in all materials at Site 1. At the time of writing, no results are available from the site contamination investigation. Depending on these, some form of management of contaminated material may be required during trenching and pipe installation.

W. C. Cromer
Principal

This report is and must remain accompanied by the following Attachments:

Attachment 1. Cadastre, aerial imagery, published geology and investigation sites 1 – 4 (3 pages)

Attachment 2. Locations of test sites for the 2018, 2021 and 2022 (March) investigations (2 pages)

Attachment 3. Engineering logs and photographs of test pits at Sites 1 – 4 (14 pages)

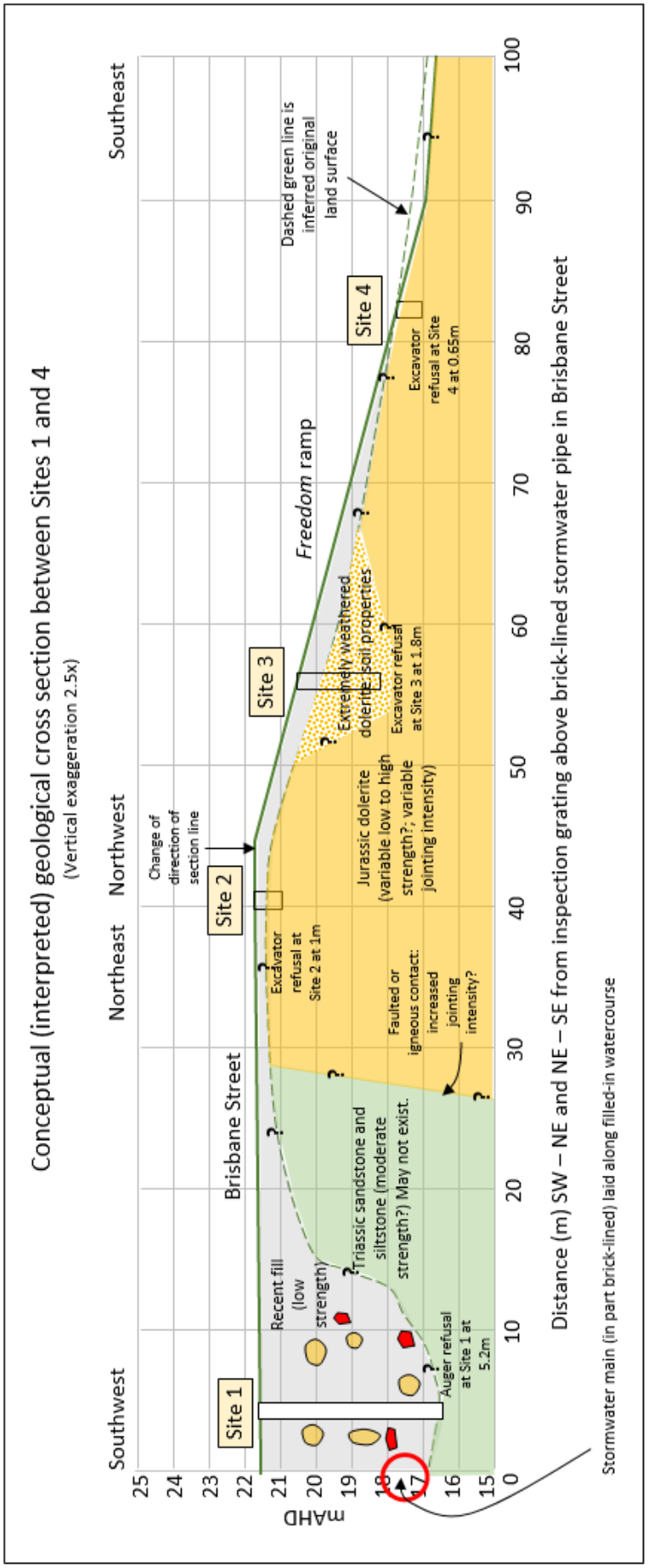
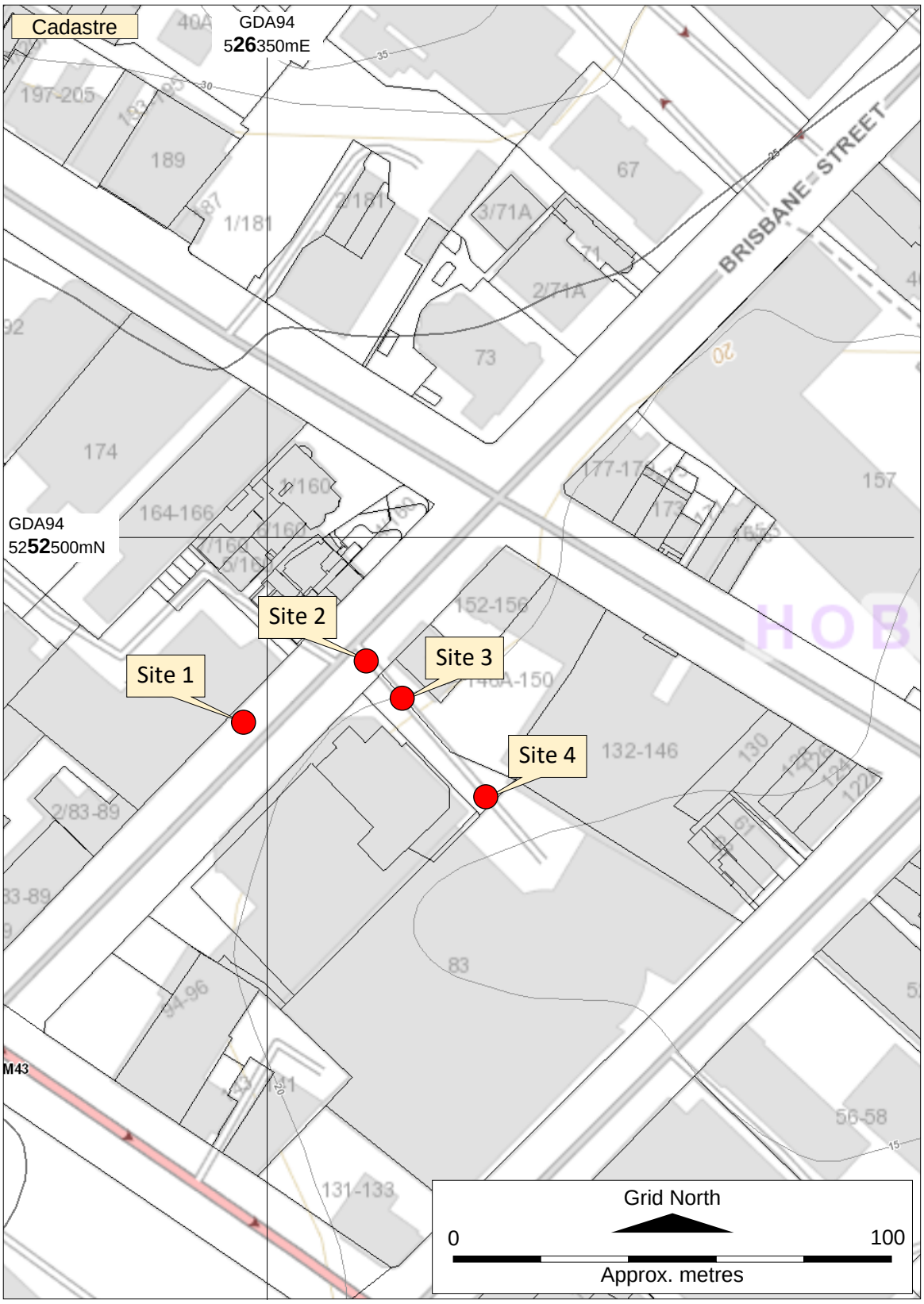


Figure 1. Conceptual geological cross section between Sites 1 and 4. See text for comments.

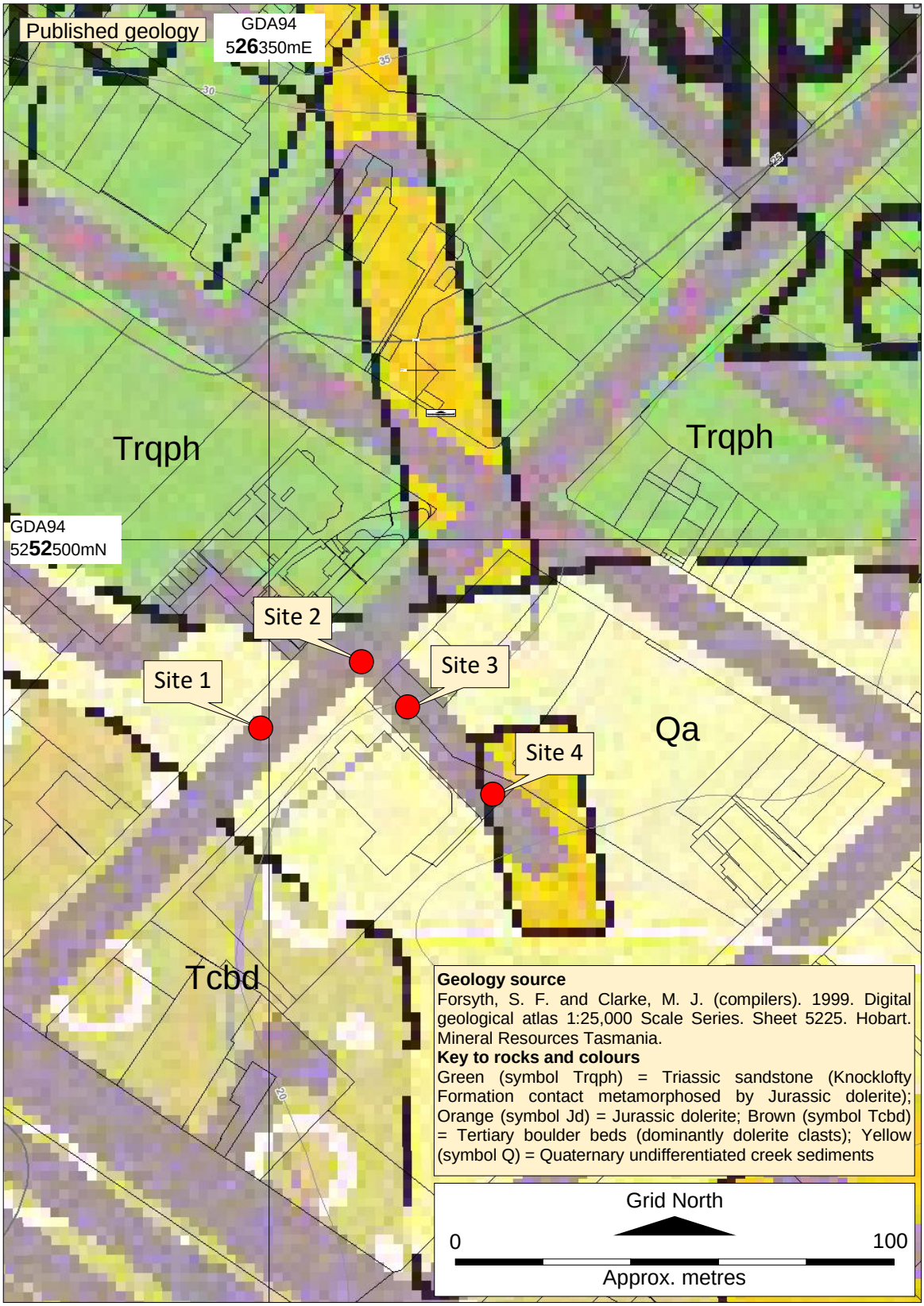
Attachment 1

(3 pages)

Cadastre, aerial imagery, published geology and investigation sites 1 – 4



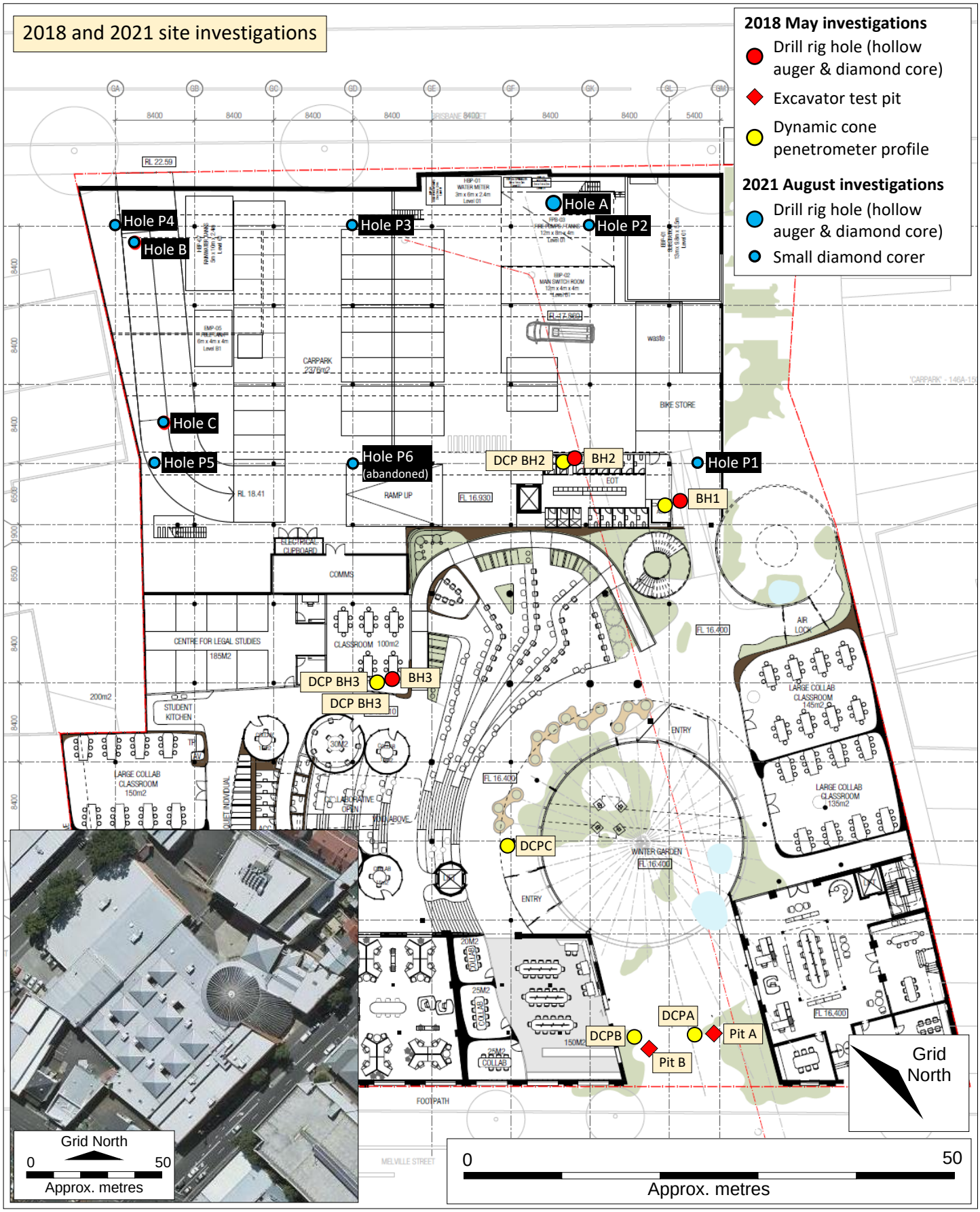

Aerial imagery
GDA94
526350mE
GDA94
5252500mN
Site 1
Site 2
Site 3
Site 4
Grid North
0
100
Approx. metres


Published geology
GDA94
526350mE
GDA94
5252500mN
Trqph
Trqph
Site 1
Site 2
Site 3
Site 4
Qa
Tcbd
Geology source
Forsyth, S. F. and Clarke, M. J. (compilers). 1999. Digital geological atlas 1:25,000 Scale Series. Sheet 5225. Hobart. Mineral Resources Tasmania.
Key to rocks and colours
Green (symbol Trqph) = Triassic sandstone (Knocklofty Formation contact metamorphosed by Jurassic dolerite); Orange (symbol Jd) = Jurassic dolerite; Brown (symbol Tcbd) = Tertiary boulder beds (dominantly dolerite clasts); Yellow (symbol Q) = Quaternary undifferentiated creek sediments
Grid North
0
100
Approx. metres

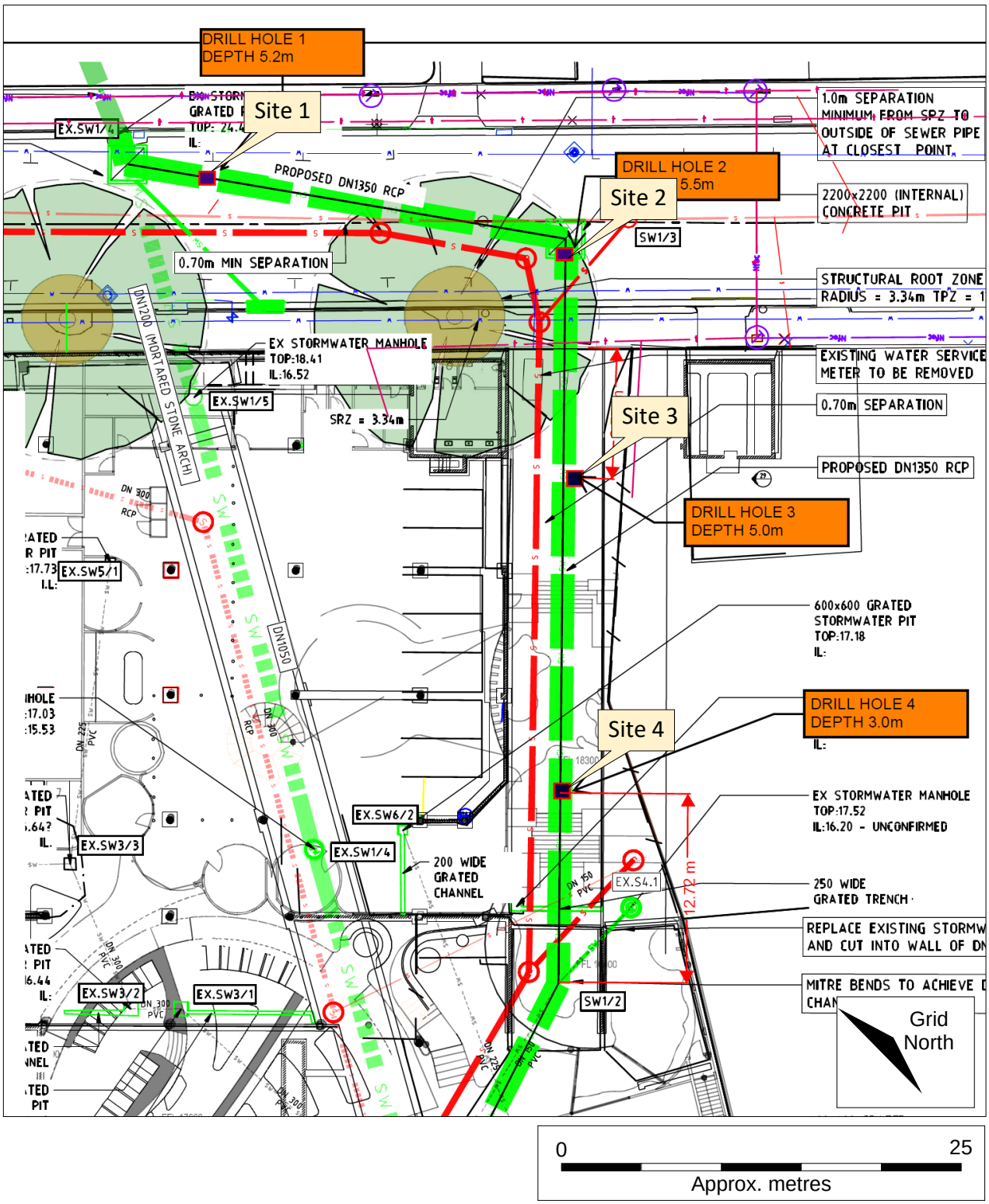
Attachment 2

(2 pages)

Locations of test sites for the 2018, 2021 and March 2022 investigations



2022 March 16 and 17 site investigations
(Base plan: Part of JMG Preliminary Drawing C06 DA1 25 Jan 2022)



Attachment 3

(14 pages including this page)

Engineering logs and photographs of test pits at Sites 1 – 4

The staff/scale in these photos is graduated in red- and black numbered segments each one metre long. The larger numbers are decimetres and the smaller numbers are centimetres.


Choices
Carpet
Timber
Choices
BARBECUES GALORE
Site 1


STREET
16 MAR 22
SITE 1

Excavation log

William C Cromer Pty Ltd Consulting engineering, groundwater and environmental geologists
www.williamccromer.com

ID SITE 1 Sheet 1 of 1

Project UTAS Forestry Building Redevelopment **Location** Brisbane Street, outside #79 (*Choices*)

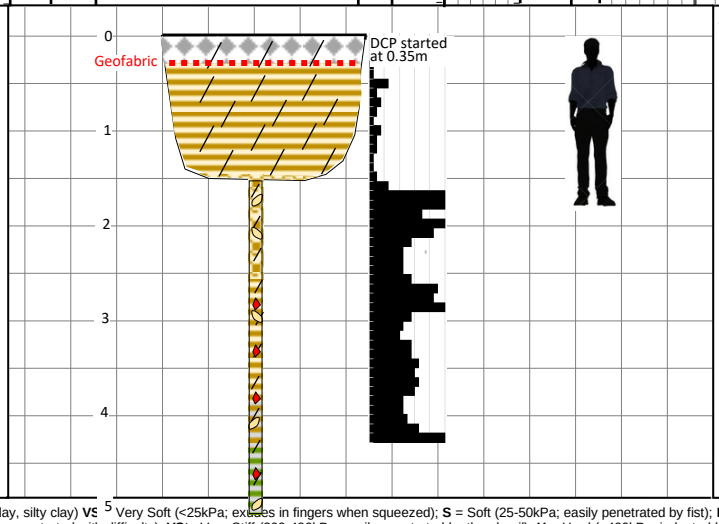
Coordinates 526344mE; 5252453mN
Datum GDA94
RL Approx. 21.5mAHD
Dimensions (m) Depth 5.2m Length 2.2m Width 0.6m

Exposure type Test pit and drill hole
Equipment 4.5t *Kubota* excavator (450mm GP bucket, 4 teeth) and 4WD-mounted *Sampler 25* solid auger (100mm)
Operators Seaton Waterfield (excavator; *G. Edwards Excavations*) and Peter Hofto (auger; *Rock Solid Geotechnics*)

Date dug 16 March 2022
Date logged 16 March 2022
Logged by W. C. Cromer
Checked by W. C. Cromer

Excavator
Mechanical auger

Penetration (1 2 3)	Support	Notes (Samples and tests (GHD site contamination samples))	RL (mAHD)	Depth (metres)	Graphic log	USCS	Materials (SOIL: Soil name, plasticity or particle characteristics, colour, secondary and minor components. ROCK: Rock name, grain size and type, colour, fabric, texture, inclusions or minor components, moisture content, durability, strength, weathering, defects)	Moisture	SOIL: Consistency / Density index	SOIL: DCP (blows/100mm)	SOIL: Shear Vane (kPa)	SOIL: PID (ppm)	ROCK: Weathering (FR SW MW HW XW RS)	ROCK: Alteration (SA MA HA XA)	ROCK: Strength (VL L M H VH EH)	ROCK: Reaction to 10% HCL (None Slow Fast)	Defects (symbol)	Structure, geology, interpretation
	None	GHD(0.15m)				GW	Bitumen (80mm)	D	D-VD	DCP started at 0.35m		1.5						FILL
		GHD(0.5m)	21.0			CH	Silty sandy GRAVEL: light grey; on geofabric	M <> PL	VSt			0.8						
		GHD(1m)		1			CLAY and gravelly CLAY: yellowish brown; mod – high plasticity; +/- 10% angular extremely weathered siltstone clasts to 50m; occasional rounded dolerite cobbles to 0.2m					0.9						
		GHD(1.5m)	20.0			GC, GM	Clayey silty GRAVEL: brown; some sand; gravel is dolerite-derived; low plasticity to non-plastic; occasional rounded dolerite? cobbles (to 0.2m?)	M	Disturbed by augering			0						
		GHD(2m)		2								0.2						
			19.0															
		GHD(3m)		3		GC, GM	CLAY: brown, grey-brown 4-4.5m, greenish grey > 4.5m; high plasticity; trace red brick fragments; occasional rounded dolerite? cobbles (to 0.2m?; refusal at 3.1m; pulled out, moved 0.3m, redrilled)	M <> PL				0.5						
			18.0															
		GHD(4m)		4								0.7						
			17.0															
		GHD5(5m)		5								0.4						
			16.0				Auger refusal @ 5.2m											
				6														
			15.0															
				7														



V and H scale: m / m

MOISTURE
D = Dry M = Moist W = Wet

Water
Water level
Water inflow
Water outflow
GNE = Groundwater not encountered

PENETRATION
1 2 3 4
No resistance
Refusal

SOILS

SYMBOLS
Clay (CH, CL)
Silt (SM)
Sand (SP)
Gravel (GP, GW)
Cobbles (63-200mm)
Boulders (>200mm)

DEFECTS
Parting (P)
Fissure (F; soil) Joint (J; rock)
Sheared seam (SS)
Sheared surface (S; soil) (Z rock) rock)
Softened zone (SZ)

ROCKS

SYMBOLS
Sandstone
Siltstone
Conglomerate
Dolerite
Basalt

DEFECTS (ROCK SEAMS)
Sheared seam (SS)
Crushed seam (CS; soil properties)
Infilled seam (IS; soil into open joint)
Softened zone (SZ)

SOIL: Consistency (silt, clay, sandy clay, silty clay) **VS** Very Soft (<25kPa; exudes in fingers when squeezed); **S** = Soft (25-50kPa; easily penetrated by fist); **F** = Firm (50-100kPa; easily penetrated by thumb); **St** = Stiff (100-200kPa; indented by thumb, penetrated with difficulty); **VSt**= Very Stiff (200-400kPa; easily penetrated by thumbnail); **H** = Hard (>400kPa; indented by thumbnail with difficulty); **Fb** = Friable (crumbles or powders when scraped by thumbnail)
Relative density (sand and gravel) **VL** = Very Loose (ravelling); **L** = Loose (easy shovelling); **MD** = Medium Dense (hard shovelling); **D** = Dense (picking); **VD** = Very Dense (hard picking)
ROCK: **Weathering (changes caused by subaerial processes)**: **FR** = Fresh (no decomp or colour changes); **SW** = Slightly Weathered (stained/bleached on joints; no or little change in strength); **MW** = Moderately Weathered (Whole rock stained/bleached; original colour not recognisable; no or little change in strength); **HW** = Highly Weathered (Whole rock stained/bleached; original colour not recognisable; significant change in strength; some primary minerals now clay; change in porosity); **XE** = Extremely Weathered (material has soil properties; structure, texture and fabric still visible); **RS** = Residual Soil (material has soil properties; original texture, fabric no longer visible; no significant transport)
Alteration (changes caused by hot gases/liquids at depth): **SA** = Slightly Altered (Slightly discoloured; no or little change in strength); **MA** = Moderately Altered (Whole rock stained/bleached; original colour not recognisable; no or little change in strength); **HA** = Highly Altered (Whole rock stained/bleached; original colour not recognisable; significant change in strength; some primary minerals now clay; change in porosity); **XA** = Extremely Altered (material has soil properties; structure, texture and fabric still visible)
Strength **VL** = Very Low (Material crumbles under firm blow with sharp end of pick; can be peeled with knife; pieces up to 30mm thick broken by finger pressure); **L** = Low (Easily scored with knife; indentations 1-3mm with firm blow of pick point; dull hammer sound; sharp edges friable, broken by handling); **M** = Medium (Readily scored with knife; piece of core 150mm x 50mm broken by hand with difficulty); **H** = High (rock rings under hammer; piece of core 150mm x 50mm broken by pick with single firm blow); **VH** = Very High (hand specimen breaks with >1 blow of pick; rock rings); **EH** = Extremely High (specimen needs many hammer blows to break; rock rings under hammer)


Site 2


UTAS
BRISBANE
STREET
17 MAR22
SITE 2
Choices
Vinyl


BRISBANE
STREET
17 MAR 22
SITE 2
Excavator refusal in dolerite bedrock at 1.0m

Excavation log

William C Cromer Pty Ltd Consulting engineering, groundwater and environmental geologists
www.williamccromer.com

ID SITE 2 Sheet 1 of 1

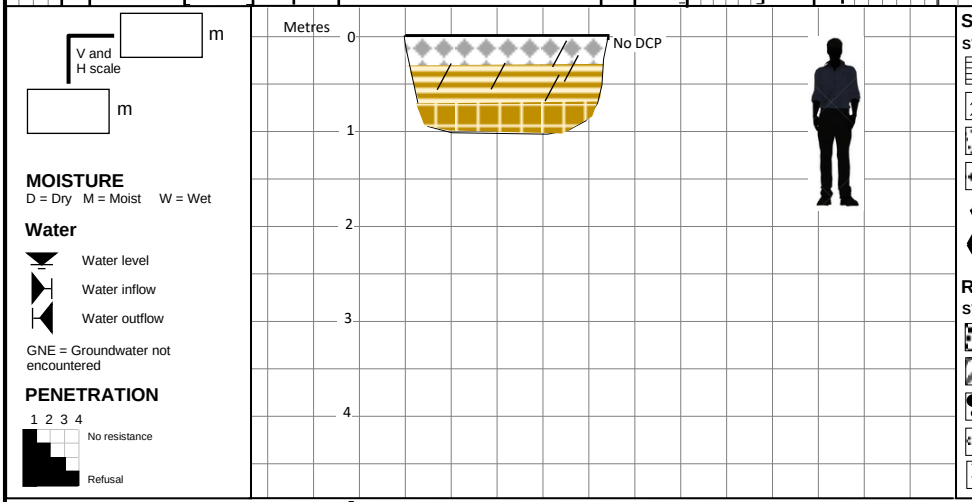
Project UTAS Forestry Building Redevelopment **Location** Brisbane Street, outside ramp of #80 (*Freedom*)

Coordinates 526370mE; 5252489mN
Datum GDA94
RL Approx. 21.6mAHD
Dimensions (m) Depth 1.0m Length 2.2m Width 0.6m

Exposure type Test pit
Equipment 4.5t *Kubota* excavator (450mm GP bucket, 4 teeth)
Operator Seaton Waterfield (excavator; *G. Edwards Excavations*)

Date dug 17 March 2022
Date logged 17 March 2022
Logged by W. C. Cromer
Checked by W. C. Cromer

Penetration (1 2 3)	Support	Notes (Samples and tests (GHD site contamination samples))	RL (mAHD)	Depth (m)	Graphic log	USCS	Materials (SOIL: Soil name, plasticity or particle characteristics, colour, secondary and minor components. ROCK: Rock name, grain size and type, colour, fabric, texture, inclusions or minor components, moisture content, durability, strength, weathering, defects)	Moisture	SOIL: Consistency / Density index	SOIL: DCP (blows/100mm) (4 8 12 16 20)	SOIL: Shear Vane (kPa)	SOIL: PID (ppm)	ROCK: Weathering (FR SW MW HW XW RS)	ROCK: Alteration (SA MA HA XA)	ROCK: Strength (VL L M H VH EH)	ROCK: Reaction to 10% HCl (None Slow Fast)	Defects (symbol)	Structure, geology, interpretation
	None	GHD(0.2m)	21.0	0		GW	Bitumen (80mm)	D	D-VD	No DCP		0.3						FILL
		GHD(0.5m)				GC	Silty sandy GRAVEL: light grey Gravelly CLAY: brown; mod – high plasticity; occasional brick fragments	M< >PL	VSt			0.3						Subsoil (B horizon)
				1			Dolerite: grey brown; strongly fractured; highly weathered grading to moderately weathered; irregular angular joint blocks up to 0.25m											Bedrock (CB horizon)
			20.0	2			Excavator refusal in dolerite bedrock @ 1.0m											
			19.0	3														
			18.0	4														
			17.0	5														
			16.0	6														
			15.0	7														



SOILS

SYMBOLS: Clay (CH, CL); Silt (SM); Sand (SP); Gravel (GP, GW); Cobbles (63-200mm); Boulders (>200mm)

DEFECTS: Parting (P); Fissure (F; soil) Joint (J; rock); Sheared seam (SS); Sheared surface (S; soil) (Z rock) rock); Softened zone (SZ)

ROCKS

SYMBOLS: Sandstone; Siltstone; Conglomerate; Dolerite; Basalt

DEFECTS (ROCK SEAMS): Sheared seam (SS); Crushed seam (CS; soil properties); Infilled seam (IS; soil into open joint); Softened zone (SZ)

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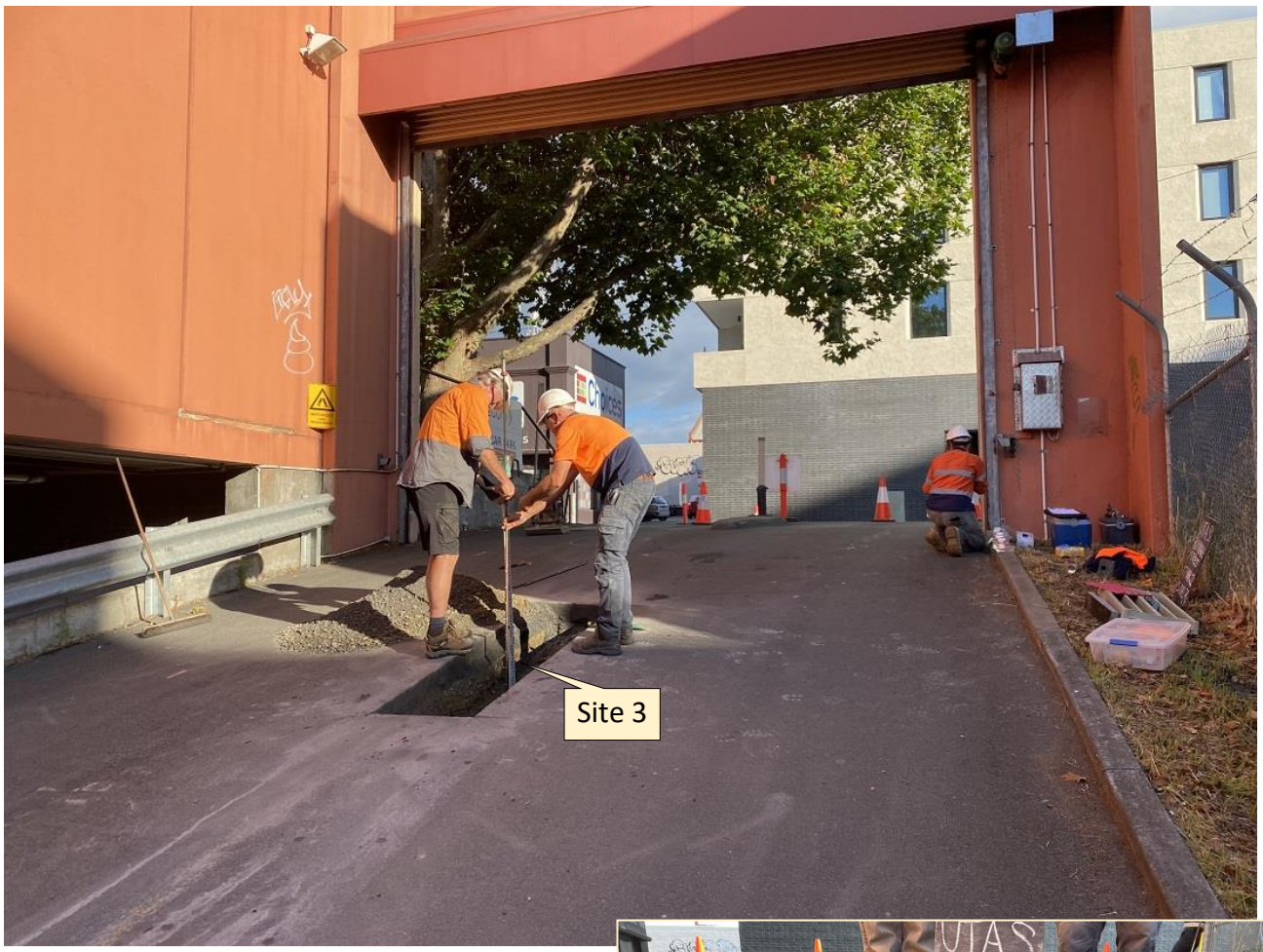

Site 3


UTAS
BRISBANE
STREET
17 MAR 22
SITE 3

Excavation log

William C Cromer Pty Ltd Consulting engineering, groundwater and environmental geologists
www.williamccromer.com

ID SITE 3
Sheet 1 of 1

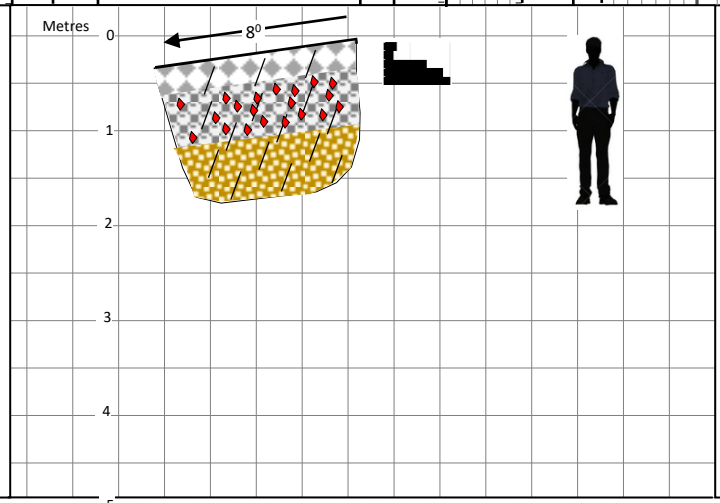
Project UTAS Forestry Building Redevelopment **Location** On ramp of #80 Brisbane Street (*Freedom*)

Coordinates 526380mE; 5252459mN
Datum GDA94
RL Approx. 20.7mAHD
Dimensions (m) Depth 2.5m Length 2.2m Width 0.6m

Exposure type Test pit and drill hole
Equipment 4.5t *Kubota* excavator (450mm GP bucket, 4 teeth) and 4WD-mounted *Sampler 25* solid auger (100mm)
Operators Seaton Waterfield (excavator; *G. Edwards Excavations*) and Peter Hofto (auger; *Rock Solid Geotechnics*)

Date dug 17 March 2022
Date logged 17 March 2022
Logged by W. C. Cromer
Checked by W. C. Cromer

Penetration (1 2 3)	Support	Notes (Samples and tests (GHD site contamination samples))	RL (mAHD)	Depth (m)	Graphic log	USCS	Materials	Moisture	SOIL: Consistency / Density index	SOIL: DCP (blows/100mm)	SOIL: Shear Vane (kPa)	SOIL: PID (ppm)	ROCK: Weathering (FR SW MW HW XW RS)	ROCK: Alteration (SA MA HA XA)	ROCK: Strength (VL L M H VH EH)	ROCK: Reaction to 10% HCL (None Slow Fast)	Defects (symbol)	Structure, geology, interpretation
Excavator	None	GHD(0.05m)				GP	Bitumen over concrete (80mm)											
		GHD(0.5m)				GW	Silty sandy GRAVEL: dark grey to yellow brown	M	VD			0.3						FILL
		GHD(1m)	20.0	1		SC SP	Silty sandy GRAVEL: grey flecked with black and red; nonplastic; gravel doleritic; c.25-30% angular red brick fragments to 0.1m; some fine roots and grass at base	M	Fb-			0.3						
		GHD(1.5m)	19.0	2			Silty clayey gravelly SAND: light yellowish brown; fine- coarse grained, low plasticity to non-plastic; doleritic; sand and gravel are doleritic; clay content decreases with depth	M D	Disturbed by augering			0.4 0.3 0.3						Extremely weathered dolerite bedrock
Mechanical auger		GHD(2m)	18.0	3			Auger refusal @ 2.5m											
			17.0	4														
			16.0	5														
			15.0	6														
				7														



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UTAS
BRISBANE
STREET
17 MAR 22
SITE 4


UTAS
BRISBANE
STREET
17 MAR 22
SITE 4


UTAS
BRISBANE
STREET
17 MAR 22
SITE 4


Site 4

Excavation log

William C Cromer Pty Ltd Consulting engineering, groundwater and environmental geologists
www.williamccromer.com

ID SITE 4 Sheet 1 of 1

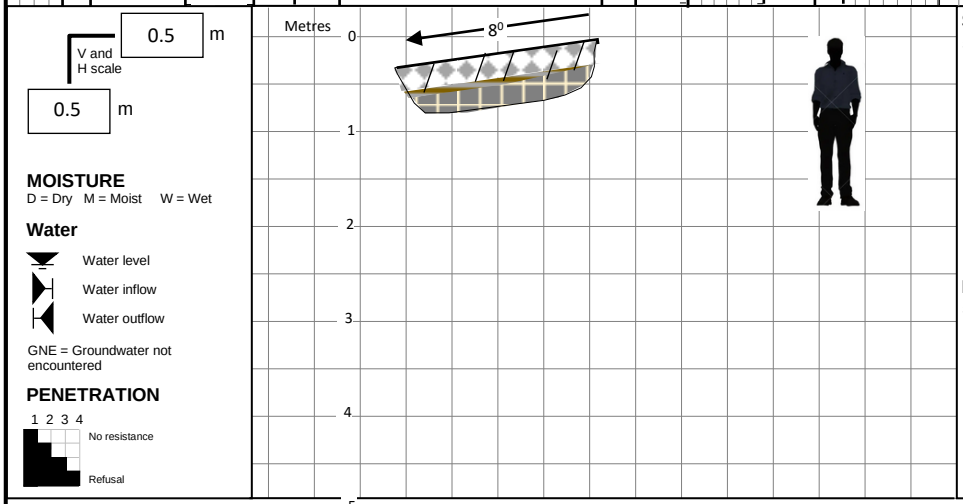
Project UTAS Forestry Building Redevelopment **Location** On ramp of #80 Brisbane Street (*Freedom*)

Coordinates 526399mE; 5252440mN
Datum GDA94
RL Approx. 17.6mAHD
Dimensions (m) Depth 0.65 Length 2.2m Width 0.6m

Exposure type Test pit and drill hole
Equipment 4.5t *Kubota* excavator (450mm GP bucket, 4 teeth)
Operator Seaton Waterfield (excavator; *G. Edwards Excavations*)

Date dug 17 March 2022
Date logged 17 March 2022
Logged by W. C. Cromer
Checked by W. C. Cromer

Penetration (1 2 3)	Support	Notes (Samples and tests (GHD site contamination samples))	RL (mAHD)	Depth	Graphic log	USCS	Materials (SOIL: Soil name, plasticity or particle characteristics, colour, secondary and minor components. ROCK: Rock name, grain size and type, colour, fabric, texture, inclusions or minor components, moisture content, durability, strength, weathering, defects)	Moisture	SOIL: Consistency / Density index	SOIL: DCP (blows/100mm) (4 8 12 16 20)	SOIL: Shear Vane (kPa)	SOIL: PID (ppm)	ROCK: Weathering (FR SW MW HW XW RS)	ROCK: Alteration (SA MA HA XA)	ROCK: Strength (VL L M H VH EH)	ROCK: Reaction to 10% HCl (None Slow Fast)	Defects (symbol)	Structure, geology, interpretation
	None	GHD(0.1m)			GP		Bitumen (30mm)											
		GHD(0.5m)					Silty sandy GRAVEL: dark grey to olive grey	M	D	No DCP		1.1						FILL
					CH		CLAY: grey brown; high plasticity	M	VSt			0.5						Dolerite bedrock
			17.0	1			DOLERITE: grey; fine grained; slightly weathered; high strength; variably jointed (spacings 0.1 – >0.5m); subvertical joints trend 210°T and 300°T.											
			16.0	2			Excavator refusal @ 0.65m											
			15.0	3														
			14.0	4														
			13.0	5														
			12.0	6														
				7														



MOISTURE
D = Dry M = Moist W = Wet

Water
Water level
Water inflow
Water outflow
GNE = Groundwater not encountered

PENETRATION
1 2 3 4
No resistance
Refusal

SOILS

SYMBOLS
Clay (CH, CL)
Silt (SM)
Sand (SP)
Gravel (GP, GW)
Cobbles (63-200mm)
Boulders (>200mm)

DEFECTS
Parting (P)
Fissure (F; soil) Joint (J; rock)
Sheared seam (SS)
Sheared surface (S; soil) (Z rock) rock)
Softened zone (SZ)

ROCKS

SYMBOLS
Sandstone
Siltstone
Conglomerate
Dolerite
Basalt

DEFECTS (ROCK SEAMS)
Sheared seam (SS)
Crushed seam (CS; soil properties)
Infilled seam (IS; soil into open joint)
Softened zone (SZ)

SOIL: Consistency (silt, clay, sandy clay, silty clay) **VS** = Very Soft (<25kPa; exudes in fingers when squeezed); **S** = Soft (25-50kPa; easily penetrated by fist); **F** = Firm (50-100kPa; easily penetrated by thumb); **St** = Stiff (100-200kPa; indented by thumb, penetrated with difficulty); **VSt**= Very Stiff (200-400kPa; easily penetrated by thumbnail); **H** = Hard (>400kPa; indented by thumbnail with difficulty); **Fb** = Friable (crumbles or powders when scraped by thumbnail)
Relative density (sand and gravel) **VL** = Very Loose (ravelling); **L** = Loose (easy shovelling); **MD** = Medium Dense (hard shovelling); **D** = Dense (picking); **VD** = Very Dense (hard picking)
ROCK: **Weathering (changes caused by subaerial processes)**: **FR** = Fresh (no decomp or colour changes); **SW** = Slightly Weathered (stained/bleached on joints; no or little change in strength); **MW** = Moderately Weathered (Whole rock stained/bleached; original colour not recognisable; no or little change in strength); **HW** = Highly Weathered (Whole rock stained/bleached; original colour not recognisable; significant change in strength; some primary minerals now clay; change in porosity); **XE** = Extremely Weathered (material has soil properties; structure, texture and fabric still visible); **RS** = Residual Soil (material has soil properties; original texture, fabric no longer visible; no significant transport)
Alteration (changes caused by hot gases/liquids at depth): **SA** = Slightly Altered (Slightly discoloured; no or little change in strength); **MA** = Moderately Altered (Whole rock stained/bleached; original colour not recognisable; no or little change in strength); **HA** = Highly Altered (Whole rock stained/bleached; original colour not recognisable; significant change in strength; some primary minerals now clay; change in porosity); **XA** = Extremely Altered (material has soil properties; structure, texture and fabric still visible)
Strength **VL** = Very Low (Material crumbles under firm blow with sharp end of pick; can be peeled with knife; pieces up to 30mm thick broken by finger pressure); **L** = Low (Easily scored with knife; indentations 1-3mm with firm blow of pick point; dull hammer sound; sharp edges friable, broken by handling); **M** = Medium (Readily scored with knife; piece of core 150mm x 50mm broken by hand with difficulty); **H** = High (rock rings under hammer; piece of core 150mm x 50mm broken by pick with single firm blow); **VH** = Very High (hand specimen breaks with >1 blow of pick; rock rings); **EH** = Extremely High (specimen needs many hammer blows to break; rock rings under hammer)

ghd.com

→ The Power of Commitment

RESULT OF SEARCH

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

SEARCH OF TORRENS TITLE

VOLUME	FOLIO
149231	0
EDITION	DATE OF ISSUE
2	22-Feb-2017

SEARCH DATE : 24-Nov-2022
SEARCH TIME : 02.28 PM

DESCRIPTION OF LAND

City of HOBART
The Common Property for Strata Scheme 149231
Derivation : SEE PLAN.
Prior CT 125745/1

SCHEDULE 1

E70820 STRATA CORPORATION NO. 149231-1, 80 BRISBANE STREET, HOBART (in relation to that part of the site comprising Lot 1 on Strata Plan No. 149231) and STRATA CORPORATION NO. 149231-2, 79-83 MELVILLE STREET, HOBART (in relation to that part of the site comprising Lot 2 on Strata Plan No. 149231)

SCHEDULE 2

Reservations and conditions in the Crown Grant if any
B971184 ADHESION ORDER under Section 110 of the Local Government (Building and Miscellaneous Provisions) Act 1993 Registered 26-Sep-1996 at 12.01 PM
M607987 APPLICATION by body corporate to amend strata plan 149231 by increasing the vertical boundaries of Lots 1 & 2 and decreasing the common property Registered 22-Feb-2017 at noon
E70820 NOTICE of division of body corporate Registered 22-Feb-2017 at 12.01 PM

UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

CITY/TOWN HOBART
SUBURB
FOLIO REFERENCE C.T.125745-1
SITE COMPRISES THE WHOLE OF
LOT 1 ON PLAN No. P125745

STRATUM PLAN
SHEET 1 OF ~~4~~ 5 SHEETS

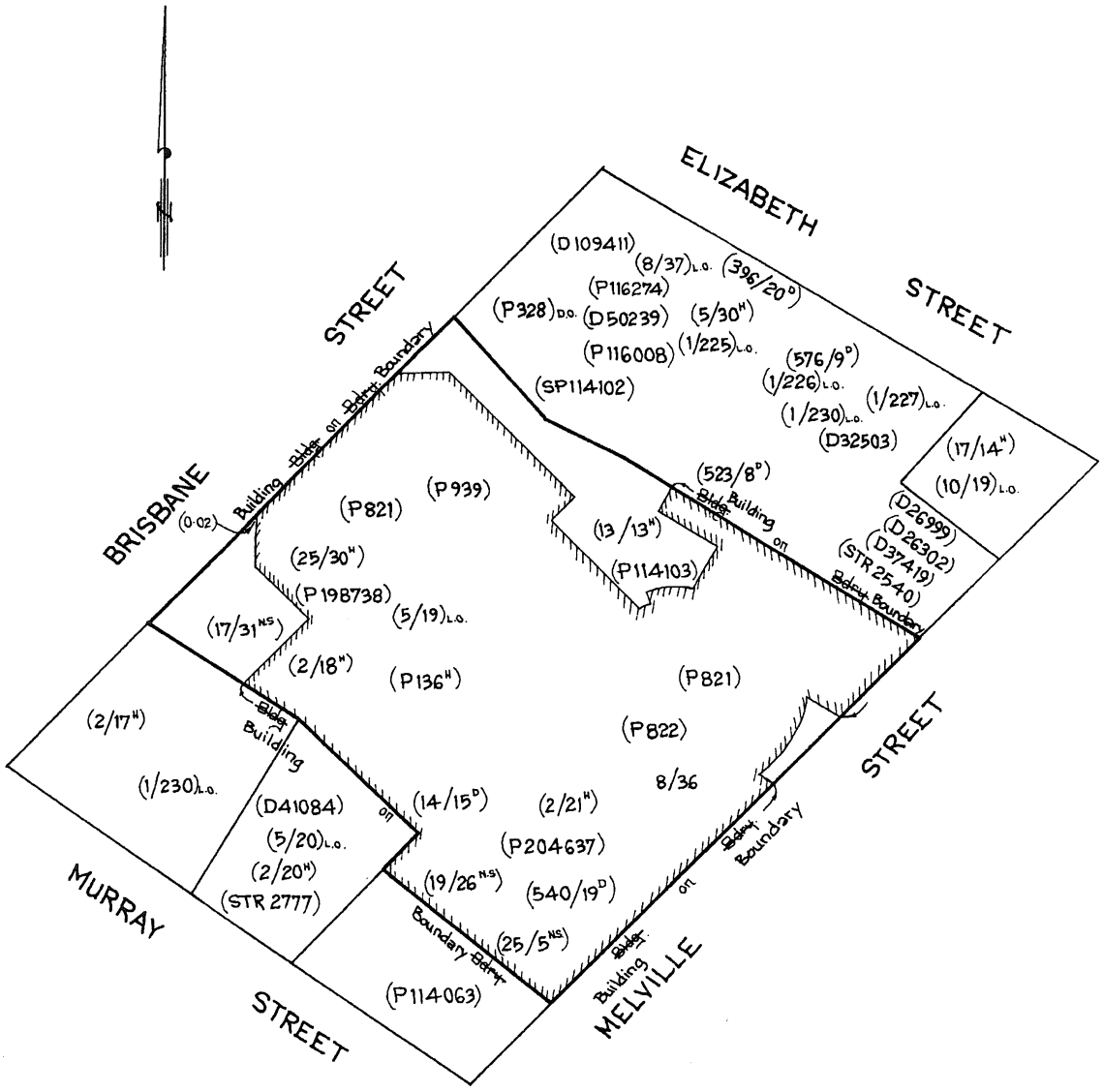
NAME OF BUILDING
79-83 Melville Street & 80 Brisbane Street - Hobart.

REGISTERED NUMBER
149231

REGISTERED - 3 OCT 2007
Alice Kawa
Recorder of Titles.

MAPSHEET MUNICIPAL CODE No. 114 | LAST UPI No. FEZ64 | SCALE 1: 750 | LENGTHS IN METRES

SITE PLAN



NOTES: ALL BUILDINGS ON THE SITE TO BE SHOWN ON SHEET 1.
BUILDING TO SITE BOUNDARY OFFSETS OF LESS THAN 2·00 METRES TO BE SHOWN ON SHEET 1.
THE FEE SIMPLE OF THE SITE IS CONTAINED WITHIN THE STRATUM PLAN/BODY CORPORATE FOLIO.
FLAT FOLIOS ARE HELD SUBJECT TO STRATUM PLAN ENDORSEMENTS.

STRATA DEVELOPMENT CONTRACT No. (IF APPLICABLE)

LODGED BY PAGE SEAGER

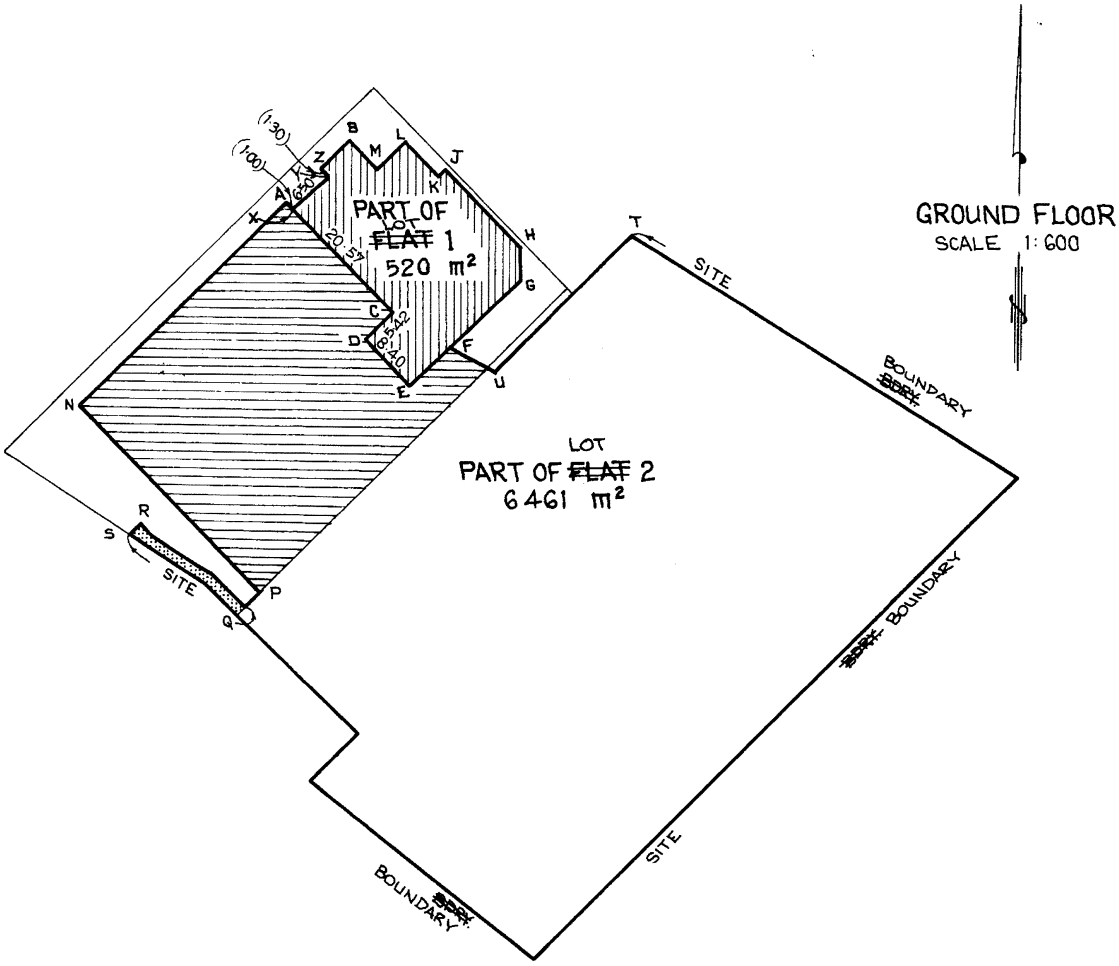
A-149

STRATUM PLAN

NEW M607987

SHEET 2 OF 4 SHEETS

Registered Number
149231



The horizontal ~~flat~~ lot boundaries are shown by heavy unbroken lines and defined by:

- site boundaries
- edge of bitumen or extension thereof labelled YZ B & A.N.P.Q.
- centre of concrete & steel posts & extension there of labelled AXC.
- open & perpendicular to A.C. & through the centre of column where labelled D.C.
- open & perpendicular to D.C. where labelled D.E.
- open & through the centre of concrete columns & extension thereof where labelled E.F.
- open & from centre of concrete column at F. to inside face of brick wall where labelled F.G.
- inside face of brick wall labelled G.H.J.K.L.
- edge of concrete steps & extension there of labelled L.M.
- inside face of brick wall & extension thereof labelled M.B.
- centreline of wall Q.R.S.
- northwest face of low block wall and extension thereof labelled T.U.
- edge of concrete labelled U.F.

U. & F. are the centres of columns.

- open & parallel to NA where labelled XY.

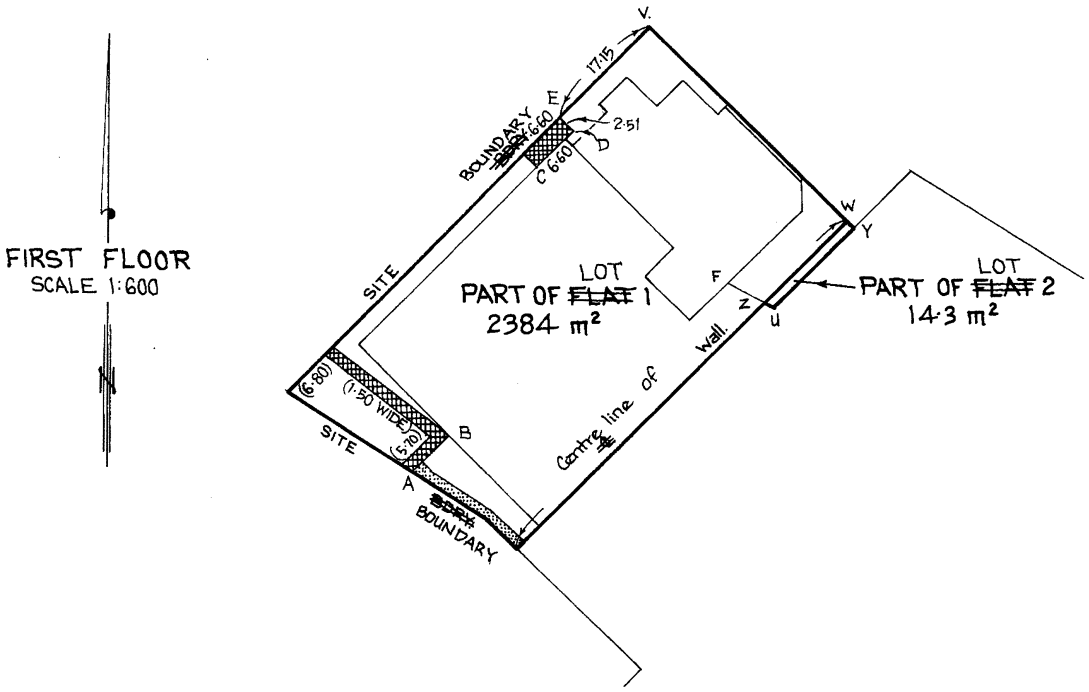
The vertical ~~flat~~ lot boundaries extend from 5m below ground level to a height of ~~14~~ 50m above ground level except for:

- the hachured portions which extend from 5m below ground level to the centre of the concrete slab above and
- the dotted portion which extends from 5m below ground level to the centre of the ceiling of the fire escape tunnel above.

STRATUM PLAN

NEW SHEET 3 OF 4 SHEETS
M607987

Registered Number
149231



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- centreline of wall
- outer face of wall V.W. & extension thereof labelled W.Y.
- open where labelled Y.U.Z.

U.Y. is on the line of the vertical extension of the north west face of the low block wall below labelled U.T on sheet 2.
U.Z. is on the line between the centre of columns ~~(U. & F.)~~ below labelled U F on sheet 2.

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The cross hachured portions of Lot 1 are restricted under Section 151(b) for use by Lot 2 as emergency access ways.

AB is the centreline of a wall.

~~B is the intersection of the centreline of the wall AB & the outer face of the wall perpendicular thereto.~~

CDE is the face of wall or the extension thereof.

IF FURTHER SHEETS ARE REQUIRED USE STRATUM PLAN ANNEXURE SHEETS COMMENCING AT SHEET 4

STRATA PLAN

SHEET 4 OF 5 SHEETS

Registered Number
149231

POSTAL ADDRESS FOR SERVICE OF NOTICES ON THE BODY CORPORATE:

Trust Company of Australia
C/- Heine Property Management
P.O. Box 7639
Melbourne 3004.

NAME OF BODY CORPORATE: STRATA CORPORATION No 149231, 79-83 MELVILLE STREET & 80 BRISBANE STREET, HOBART

SURVEYORS CERTIFICATE

I. Craig McDowall Terry

of Hobart

a surveyor registered under the Land Surveyors Act 1909 hereby certify that the building erected on the site and drawn on sheet 1 of this plan is within the external boundaries of the folio stated on sheet 1.

Registered Surveyor ..... 16/12/97 date ..... W405C ref no

UNIT ENTITLEMENTS FOR THIS BODY CORPORATE

LOT	UNIT ENTITLEMENT	LOT	UNIT ENTITLEMENT
1	1897		
2	8103		

TOTAL ENTITLEMENTS FOR STRATA PLAN = 10,000

COUNCIL CERTIFICATE

I certify that the HOBART CITY Council has:
(a) approved the subdivision shown in this plan and
(b) issued a building certificate in respect of each flat in this plan, in accordance with Section 119 of the Local Government (Building & Miscellaneous Provisions) Act 1993

General Manager / SURVEYING SERVICES MANAGER ..... 22.1.2001 date ..... 5669571 ref no

(FOR OFFICE USE ONLY)
MEMORIALS AFFECTING THE STRATUM PLAN

STRATA PLAN

~~NEW~~ SHEET 5 OF 5 SHEETS

E70820

STRATA TITLES ACT 1998

Registered Number

149231

NOTE: THIS SHEET SHOULD ONLY BE USED WHERE:-
(i) THE LOTS HAVE A SPECIAL UNIT ENTITLEMENT, OR
(ii) THE BODY CORPORATE HAS BEEN DIVIDED

Registered Land Surveyor

Date 22/9/2016

Council Delegate

Date

THE PURPOSES UNDER SECTION 16 FOR WHICH A SPECIAL UNIT ENTITLEMENT MAY BE USED

(i) for fixing the proportionate contribution to be made by the owner of the lot to the body corporate; or
(ii) for fixing the owner's proportionate interest in the common property; or
(iii) for fixing the number of votes to be exercisable by the owner of the lot at a general meeting of the body corporate; or
(iv) for fixing the proportion of the body corporate's income to be apportioned to the owner of the lot.

NAME OF (THIS) BODY CORPORATE	NAME OF (THIS) BODY CORPORATE	NAME OF (THIS) BODY CORPORATE
STRATA CORPORATION NO. 149231-1, ~~79-83 MELVILLE ST AND~~ 80 BRISBANE ~~ST~~ STREET, HOBART	STRATA CORPORATION NO. 149231-2, 79-83 MELVILLE ~~ST AND~~ STREET, ~~80 BRISBANE ST HOBART~~ HOBART	
ADDRESS FOR THE SERVICE OF NOTICES STRATA CORPORATION No. 149231-1, 80 BRISBANE ST, HOBART C/- HEINE PROPERTY MANAGEMENT PO BOX 7639 MELBOURNE 3004	ADDRESS FOR THE SERVICE OF NOTICES STRATA CORPORATION No. 149231-2, 79-83 MELVILLE ST, HOBART C/- HEINE PROPERTY MANAGEMENT PO BOX 7639 MELBOURNE 3004	ADDRESS FOR THE SERVICE OF NOTICES

LOT No.	UNIT ENTITLEMENT GENERAL	SPECIAL (IF ANY) (i)	(ii)	(iii)	(iv)	LOT No.	UNIT ENTITLEMENT GENERAL	SPECIAL (IF ANY) (i)	(ii)	(iii)	(iv)	LOT No.	UNIT ENTITLEMENT GENERAL	SPECIAL (IF ANY) (i)	(ii)	(iii)	(iv)
1	1897					2	8103										
TOTAL	1897					TOTAL	8103					TOTAL					

RESULT OF SEARCH

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

SEARCH OF TORRENS TITLE

VOLUME	FOLIO
149231	1
EDITION	DATE OF ISSUE
8	04-Nov-2021

SEARCH DATE : 24-Nov-2022
SEARCH TIME : 02.36 PM

DESCRIPTION OF LAND

City of HOBART
Lot 1 on Strata Plan 149231 and a general unit entitlement operating for all purposes of the Strata Scheme being a 1897 undivided 1/10,000 interest
Derived from Strata Plan 149231
Derivation : SEE PLAN.

SCHEDULE 1

M915268 TRANSFER to UNIVERSITY OF TASMANIA Registered 04-Nov-2021 at 12.01 PM

SCHEDULE 2

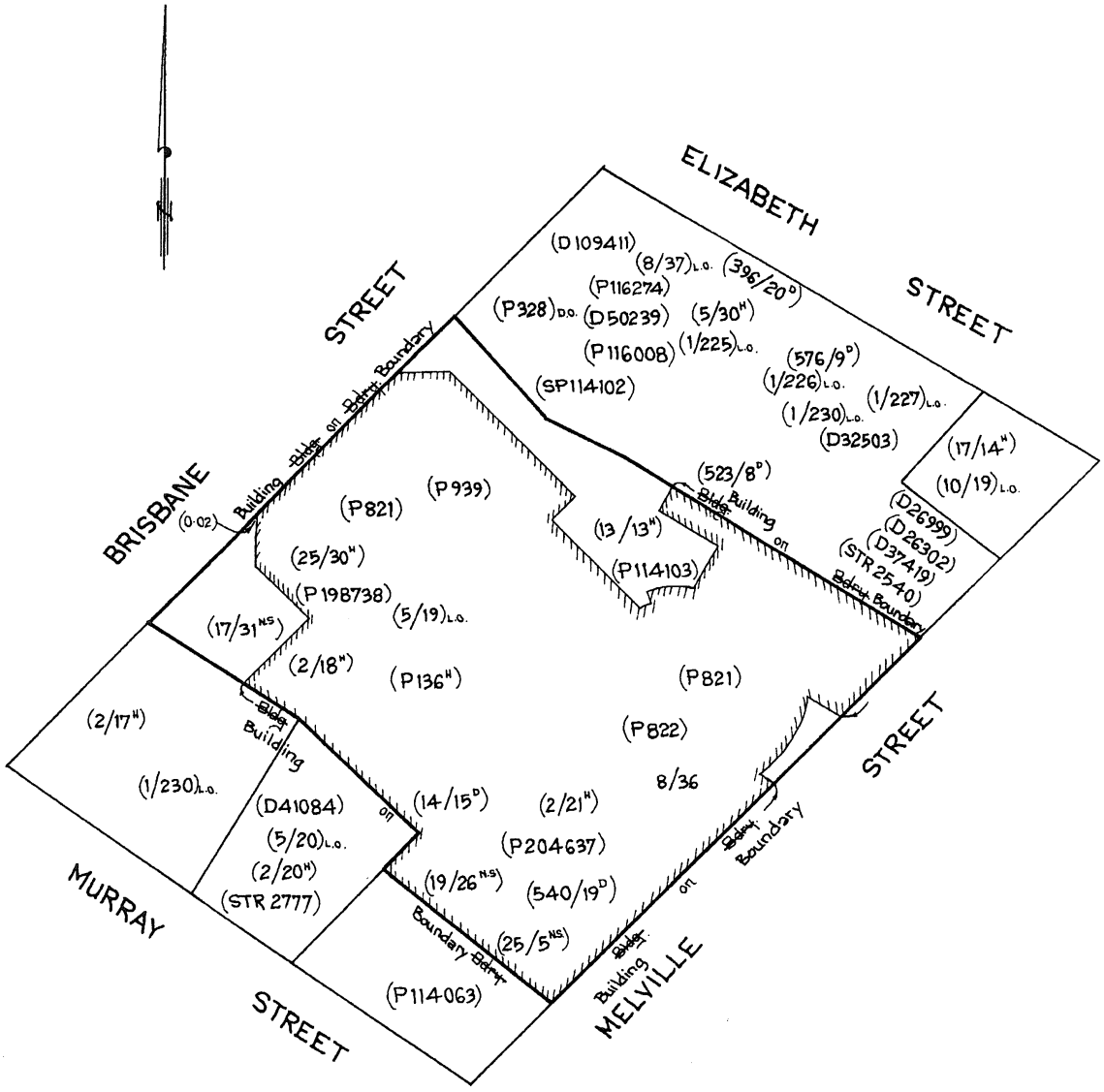
Reservations and conditions in the Crown Grant if any
The registered proprietor holds the lot and unit entitlement subject to any interest noted on common property Folio of the Register volume 149231 folio 0

UNREGISTERED DEALINGS AND NOTATIONS

E295811 APPLICATION for cancellation of a strata plan Lodged by PAGE SEAGER on 17-Nov-2022 BP: E295811

CITY/TOWN HOBART SUBURB FOLIO REFERENCE C.T.125745-1 SITE COMPRISES THE WHOLE OF LOT 1 ON PLAN No. P125745	STRATUM PLAN SHEET 1 OF ~~4~~ 5 SHEETS NAME OF BUILDING 79-83 Melville Street & 80 Brisbane Street - Hobart.	REGISTERED NUMBER 149231 REGISTERED - 3 OCT 2007 Alice Kawa Recorder of Titles.
MAPSHEET MUNICIPAL CODE No. 114 / LAST UPI No. FEZ64	SCALE 1: 750	LENGTHS IN METRES

SITE PLAN



NOTES: ALL BUILDINGS ON THE SITE TO BE SHOWN ON SHEET 1.
BUILDING TO SITE BOUNDARY OFFSETS OF LESS THAN 2·00 METRES TO BE SHOWN ON SHEET 1.
THE FEE SIMPLE OF THE SITE IS CONTAINED WITHIN THE STRATUM PLAN/BODY CORPORATE FOLIO.
FLAT FOLIOS ARE HELD SUBJECT TO STRATUM PLAN ENDORSEMENTS.

STRATA DEVELOPMENT CONTRACT No. (IF APPLICABLE)

LODGED BY PAGE SEAGER

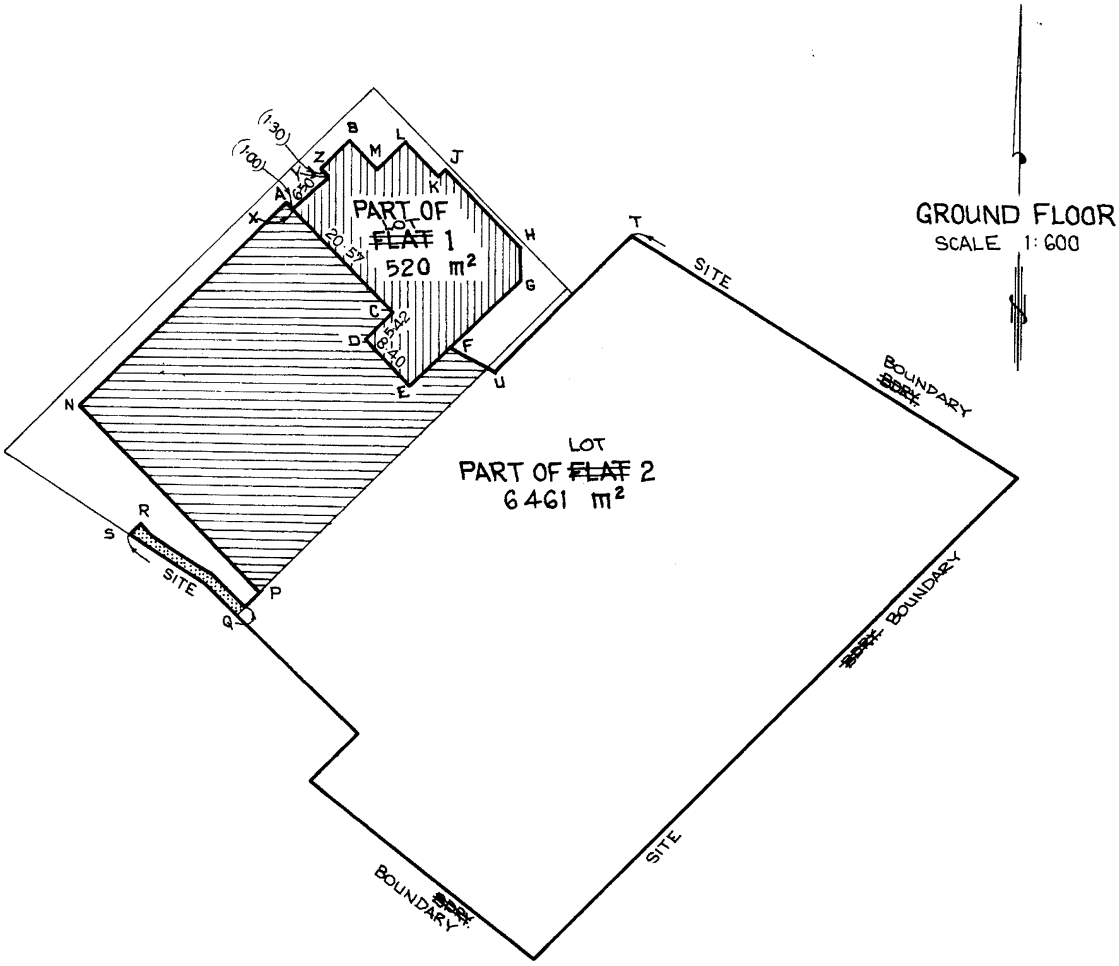
A-149

STRATA PLAN

NEW M607987

SHEET 2 OF 4 SHEETS

Registered Number
149231



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- open & perpendicular to A.C. & through the centre of column where labelled D.C.
- open & perpendicular to D.C. where labelled D.E.
- open & through the centre of concrete columns & extension thereof where labelled E.F.
- open & from centre of concrete column at F. to inside face of brick wall where labelled F.G.
- inside face of brick wall labelled G.H.J.K.L.
- edge of concrete steps & extension there of labelled L.M.
- inside face of brick wall & extension thereof labelled M.B.
- centreline of wall Q.R.S.
- northwest face of low block wall and extension thereof labelled T.U.
- edge of concrete labelled U.F.

U. & F. are the centres of columns.
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- the dotted portion which extends from 5m below ground level to the centre of the ceiling of the fire escape tunnel above.

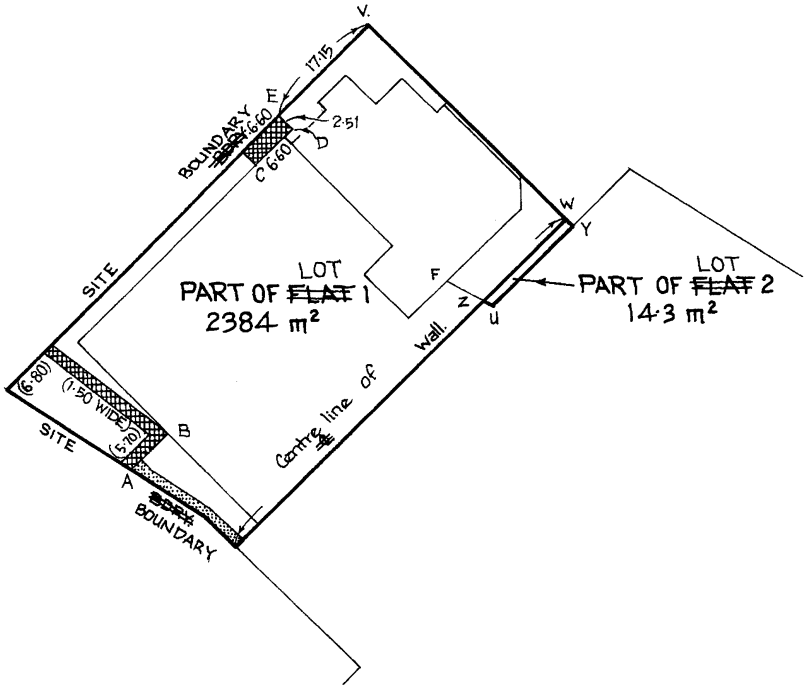
STRATUM PLAN

NEW SHEET 3 OF 4 SHEETS
M607987

Registered Number
149231

IF FURTHER SHEETS ARE REQUIRED USE STRATUM PLAN ANNEXURE SHEETS COMMENCING AT SHEET 4

FIRST FLOOR
SCALE 1:600



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- the dotted portion which extends from the centre of the ceiling of the fire escape tunnel below to 14m above ground level.

The cross hachured portions of Lot 1 are restricted under Section 151(b) for use by Lot 2 as emergency access ways.

AB is the centreline of a wall.

~~B is the intersection of the centreline of the wall AB & the outer face of the wall perpendicular thereto.~~

CDE is the face of wall or the extension thereof.

STRATA PLAN

SHEET 4 OF 5 SHEETS

Registered Number
149231

POSTAL ADDRESS FOR SERVICE OF NOTICES ON THE BODY CORPORATE:

Trust Company of Australia
C/- Heine Property Management
P.O. Box 7639
Melbourne 3004.

NAME OF BODY CORPORATE: STRATA CORPORATION No 149231, 79-83 MELVILLE STREET & 80 BRISBANE STREET, HOBART

SURVEYORS CERTIFICATE

I, Craig McDowall Terry
of Hobart
a surveyor registered under the Land Surveyors Act 1909 hereby certify that the building erected on the site and drawn on sheet 1 of this plan is within the external boundaries of the folio stated on sheet 1.

Registered Surveyor ..... 16/12/97 date ..... W405C ref no

UNIT ENTITLEMENTS FOR THIS BODY CORPORATE

LOT	UNIT ENTITLEMENT	LOT	UNIT ENTITLEMENT
1	1897		
2	8103		

TOTAL ENTITLEMENTS FOR STRATA PLAN = 10,000

COUNCIL CERTIFICATE

I certify that the HOBART CITY Council has:
(a) approved the subdivision shown in this plan and
(b) issued a building certificate in respect of each flat in this plan, in accordance with Section 119 of the Local Government (Building & Miscellaneous Provisions) Act 1993

General Manager / SURVEYING SERVICES MANAGER ..... 22.1.2001 date ..... 5669571 ref no

(FOR OFFICE USE ONLY)
MEMORIALS AFFECTING THE STRATUM PLAN

STRATA PLAN

~~NEW~~ SHEET 5 OF 5 SHEETS

E70820

STRATA TITLES ACT 1998

Registered Number

149231

NOTE: THIS SHEET SHOULD ONLY BE USED WHERE:-
(i) THE LOTS HAVE A SPECIAL UNIT ENTITLEMENT, OR
(ii) THE BODY CORPORATE HAS BEEN DIVIDED

Registered Land Surveyor

Date 22/9/2016

Council Delegate

Date

THE PURPOSES UNDER SECTION 16 FOR WHICH A SPECIAL UNIT ENTITLEMENT MAY BE USED

(i) for fixing the proportionate contribution to be made by the owner of the lot to the body corporate; or
(ii) for fixing the owner's proportionate interest in the common property; or
(iii) for fixing the number of votes to be exercisable by the owner of the lot at a general meeting of the body corporate; or
(iv) for fixing the proportion of the body corporate's income to be apportioned to the owner of the lot.

NAME OF (THIS) BODY CORPORATE	NAME OF (THIS) BODY CORPORATE	NAME OF (THIS) BODY CORPORATE
STRATA CORPORATION NO. 149231-1, ~~79-83 MELVILLE ST AND~~ 80 BRISBANE ~~ST~~ STREET, HOBART	STRATA CORPORATION NO. 149231-2, 79-83 MELVILLE ~~ST AND~~ STREET, ~~80 BRISBANE ST HOBART~~ HOBART	
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1	1897					2	8103										
TOTAL	1897					TOTAL	8103					TOTAL					

RESULT OF SEARCH

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

SEARCH OF TORRENS TITLE

VOLUME	FOLIO
149231	2
EDITION	DATE OF ISSUE
8	04-Feb-2019

SEARCH DATE : 24-Nov-2022
SEARCH TIME : 02.37 PM

DESCRIPTION OF LAND

City of HOBART
Lot 2 on Strata Plan 149231 and a general unit entitlement operating for all purposes of the Strata Scheme being a 8103 undivided 1/10,000 interest
Derived from Strata Plan 149231
Derivation : SEE PLAN.

SCHEDULE 1

E109603 TRANSFER to UNIVERSITY OF TASMANIA Registered 04-Feb-2019 at 12.01 PM

SCHEDULE 2

Reservations and conditions in the Crown Grant if any
The registered proprietor holds the lot and unit entitlement subject to any interest noted on common property Folio of the Register volume 149231 folio 0

UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

CITY/TOWN HOBART
SUBURB
FOLIO REFERENCE C.T.125745-1
SITE COMPRISES THE WHOLE OF
LOT 1 ON PLAN No. P125745

STRATUM PLAN

SHEET 1 OF ~~4~~ 5 SHEETS

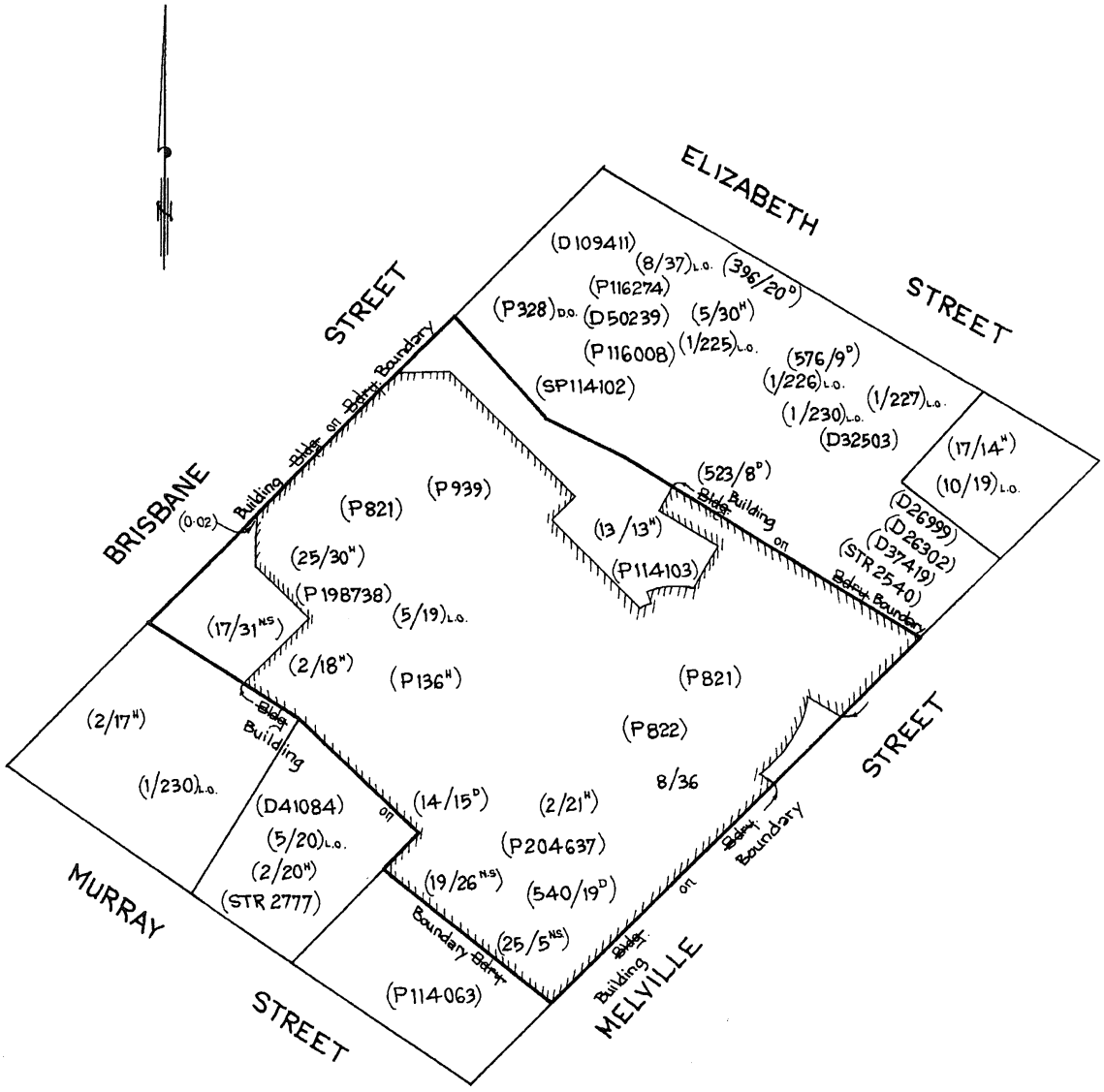
NAME OF BUILDING
79-83 Melville Street & 80 Brisbane Street - Hobart.

REGISTERED NUMBER
149231

REGISTERED - 3 OCT 2007
Alice Kawa
Recorder of Titles.

MAPSHEET MUNICIPAL CODE No. 114 | LAST UPI No. FEZ64 | SCALE 1: 750 | LENGTHS IN METRES

SITE PLAN



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THE FEE SIMPLE OF THE SITE IS CONTAINED WITHIN THE STRATUM PLAN/BODY CORPORATE FOLIO.
FLAT FOLIOS ARE HELD SUBJECT TO STRATUM PLAN ENDORSEMENTS.

STRATA DEVELOPMENT CONTRACT No. (IF APPLICABLE)

LODGED BY PAGE SEAGER

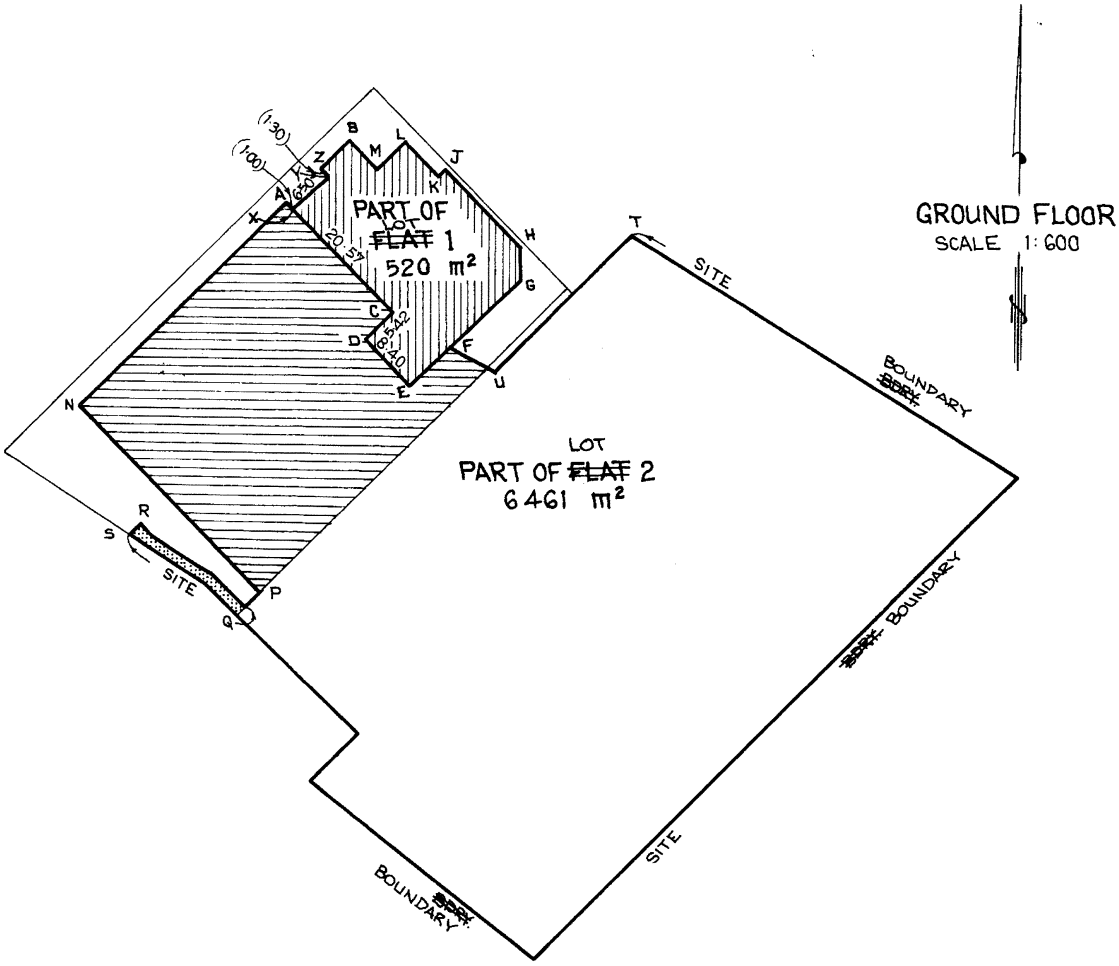
A-149

STRATA PLAN

NEW M607987

SHEET 2 OF 4 SHEETS

Registered Number
149231



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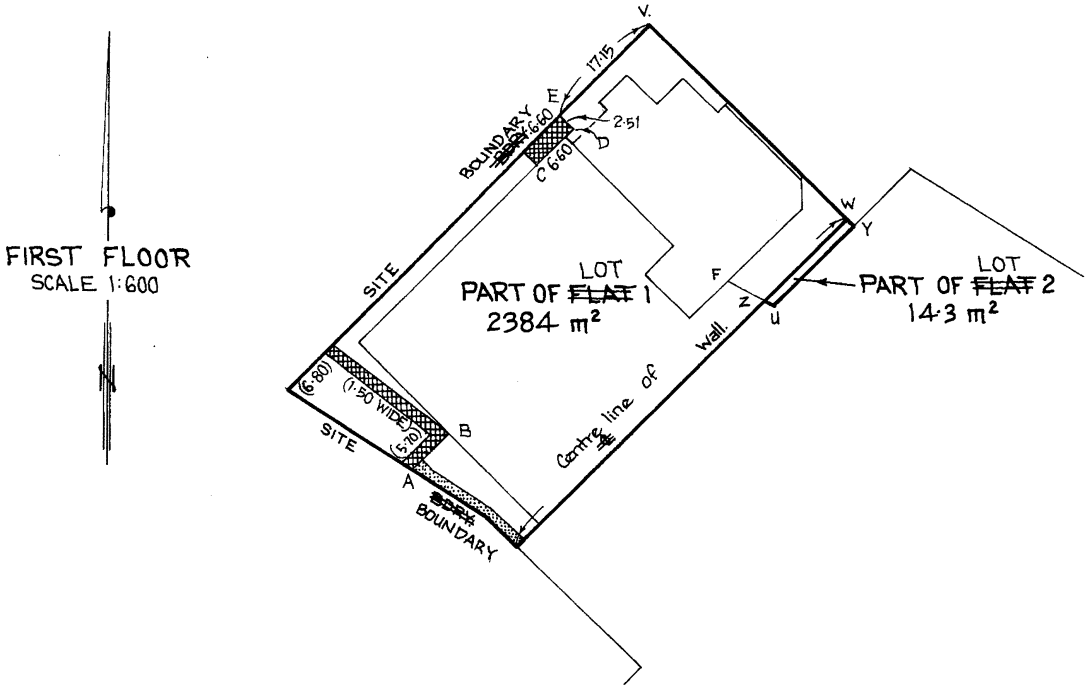
STRATUM PLAN

NEW SHEET 3 OF 4 SHEETS
M607987

Registered Number
149231



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IF FURTHER SHEETS ARE REQUIRED USE STRATUM PLAN ANNEXURE SHEETS COMMENCING AT SHEET 4

STRATA PLAN

SHEET 4 OF 5 SHEETS

Registered Number
149231

POSTAL ADDRESS FOR SERVICE OF NOTICES ON THE BODY CORPORATE:

Trust Company of Australia
C/- Heine Property Management
P.O. Box 7639
Melbourne 3004.

NAME OF BODY CORPORATE: STRATA CORPORATION No 149231, 79-83 MELVILLE STREET & 80 BRISBANE STREET, HOBART

SURVEYORS CERTIFICATE

I. Craig McDowall Terry
of Hobart
a surveyor registered under the Land Surveyors Act 1909 hereby certify that the building erected on the site and drawn on sheet 1 of this plan is within the external boundaries of the folio stated on sheet 1.

Registered Surveyor ..... 16/12/97 date ..... W405C ref no

UNIT ENTITLEMENTS FOR THIS BODY CORPORATE

LOT	UNIT ENTITLEMENT	LOT	UNIT ENTITLEMENT
1	1897		
2	8103		

TOTAL ENTITLEMENTS FOR STRATA PLAN = 10,000

COUNCIL CERTIFICATE

I certify that the HOBART CITY Council has:
(a) approved the subdivision shown in this plan and
(b) issued a building certificate in respect of each flat in this plan, in accordance with Section 119 of the Local Government (Building & Miscellaneous Provisions) Act 1993

General Manager / SURVEYING SERVICES MANAGER ..... 22.1.2001 date ..... 5669571 ref no

(FOR OFFICE USE ONLY)
MEMORIALS AFFECTING THE STRATUM PLAN

STRATA PLAN

~~NEW~~ SHEET 5 OF 5 SHEETS

E70820

STRATA TITLES ACT 1998

Registered Number

149231

NOTE: THIS SHEET SHOULD ONLY BE USED WHERE:-
(i) THE LOTS HAVE A SPECIAL UNIT ENTITLEMENT, OR
(ii) THE BODY CORPORATE HAS BEEN DIVIDED

Registered Land Surveyor

Date 22/9/2016

Council Delegate

Date

THE PURPOSES UNDER SECTION 16 FOR WHICH A SPECIAL UNIT ENTITLEMENT MAY BE USED

(i) for fixing the proportionate contribution to be made by the owner of the lot to the body corporate; or
(ii) for fixing the owner's proportionate interest in the common property; or
(iii) for fixing the number of votes to be exercisable by the owner of the lot at a general meeting of the body corporate; or
(iv) for fixing the proportion of the body corporate's income to be apportioned to the owner of the lot.

NAME OF (THIS) BODY CORPORATE	NAME OF (THIS) BODY CORPORATE	NAME OF (THIS) BODY CORPORATE
STRATA CORPORATION NO. 149231-1, ~~79-83 MELVILLE ST AND~~ 80 BRISBANE ~~ST~~ STREET, HOBART	STRATA CORPORATION NO. 149231-2, 79-83 MELVILLE ~~ST AND~~ STREET, ~~80 BRISBANE ST HOBART~~ HOBART	
ADDRESS FOR THE SERVICE OF NOTICES STRATA CORPORATION No. 149231-1, 80 BRISBANE ST, HOBART C/- HEINE PROPERTY MANAGEMENT PO BOX 7639 MELBOURNE 3004	ADDRESS FOR THE SERVICE OF NOTICES STRATA CORPORATION No. 149231-2, 79-83 MELVILLE ST, HOBART C/- HEINE PROPERTY MANAGEMENT PO BOX 7639 MELBOURNE 3004	ADDRESS FOR THE SERVICE OF NOTICES

LOT No.	UNIT ENTITLEMENT GENERAL	SPECIAL (IF ANY) (i)	(ii)	(iii)	(iv)	LOT No.	UNIT ENTITLEMENT GENERAL	SPECIAL (IF ANY) (i)	(ii)	(iii)	(iv)	LOT No.	UNIT ENTITLEMENT GENERAL	SPECIAL (IF ANY) (i)	(ii)	(iii)	(iv)
1	1897					2	8103										
TOTAL	1897					TOTAL	8103					TOTAL					

RESULT OF SEARCH

RECORDER OF TITLES

Issued Pursuant to the Land Titles Act 1980

SEARCH OF TORRENS TITLE

VOLUME	FOLIO
149231	0
EDITION	DATE OF ISSUE
2	22-Feb-2017

SEARCH DATE : 24-Nov-2022
SEARCH TIME : 02.36 PM

DESCRIPTION OF LAND

City of HOBART
The Common Property for Strata Scheme 149231
Derivation : SEE PLAN.
Prior CT 125745/1

SCHEDULE 1

E70820 STRATA CORPORATION NO. 149231-1, 80 BRISBANE STREET, HOBART (in relation to that part of the site comprising Lot 1 on Strata Plan No. 149231) and STRATA CORPORATION NO. 149231-2, 79-83 MELVILLE STREET, HOBART (in relation to that part of the site comprising Lot 2 on Strata Plan No. 149231)

SCHEDULE 2

Reservations and conditions in the Crown Grant if any
B971184 ADHESION ORDER under Section 110 of the Local Government (Building and Miscellaneous Provisions) Act 1993 Registered 26-Sep-1996 at 12.01 PM
M607987 APPLICATION by body corporate to amend strata plan 149231 by increasing the vertical boundaries of Lots 1 & 2 and decreasing the common property Registered 22-Feb-2017 at noon
E70820 NOTICE of division of body corporate Registered 22-Feb-2017 at 12.01 PM

UNREGISTERED DEALINGS AND NOTATIONS

No unregistered dealings or other notations

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