

HERITAGE IMPACT STATEMENT AND ARCHAEOLOGICAL ASSESSMENT

WANDA ONE SYDNEY SSD 8110 - DEMOLITION OF BUILDINGS TO GROUND LEVEL

20 FEBRUARY 2017
SH904
FINAL
PREPARED FOR WANDA

URBIS

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

Director	Stephen Davies, B Arts Dip. Ed., Dip. T&CP, Dip. Cons. Studies
Senior Consultant	Karyn Virgin, B Arts (Adv.) (Hons Archaeology)
Report Number	SH904

TABLE OF CONTENTS

Executive Summary.....	i
1.1. Methodology	2
1.2. Author Identification	3
1.3. The Proposal.....	3
2. Site Description.....	7
2.1. Site Location, Access and Setting	7
2.2. Individual Elements within the Study Area	8
2.2.1. Gold Fields House – 1 Alfred Street	8
2.2.2. Fairfax House – 19-31 Pitt Street	9
2.2.3. Rugby Club – 31A Pitt Street.....	10
2.2.4. Rugby Place.....	11
3. Historical Overview	12
3.1. Pre-European Occupation and Landform	12
3.1.1. European Settlement and Shoreline Reclamation 1788- 1845	13
3.1.2. The Tank Stream and Semi-Circular Quay	19
3.1.3. The Study Area	21
3.1.4. Gold Fields House	26
3.1.5. Fairfax House.....	27
3.1.6. Rugby Club	28
4. Heritage Significance.....	29
4.1. Statement of Significance – The Study Area	29
4.2. Statement of Significance – Heritage Items in the Vicinity	29
4.2.1. Tank Stream Fountain and Herald Square	29
4.2.2. Ship Inn.....	29
4.2.3. Paragon Hotel.....	29
4.2.4. AMP Building	30
4.2.5. Customs House	30
4.2.6. Circular Quay Railway Station	30
4.2.7. The Rocks Conservation Area.....	30
4.2.8. The Sydney Opera House and Sydney Harbour Bridge.....	31
5. Heritage Listing	32
6. Impact Assessment.....	34
6.1. Built Heritage	34
6.1.1. Generally.....	34
6.1.2. Tank Stream	34
6.2. Archaeology	34
7. Conclusion and Recommendations	36
8. Bibliography and References.....	37
8.1. Bibliography	37
8.2. References.....	37
Disclaimer	39

Appendix A ‘Tank Stream Report’ prepared by Arup, September 2016

FIGURES:

Figure 1 – Location map (Study Area indicated)	2
Figure 2 – Section showing proposed demolition extent, Gold Field's House	iv
Figure 3 - Section showing proposed demolition extent, Rugby Club.....	v
Figure 4 - Section showing proposed demolition extent, Fairfax House	6
Figure 5 – Aerial view of the Study Area (red outline). The blue outline demarcates individual property boundaries	7
Figure 6 – Photographs of Gold Fields House (Urbis 2016)	9
Figure 7 – Photograph of Fairfax House (Urbis 2016)	10
Figure 8 – Photographs of the Rugby Club (Urbis 2016)	11
Figure 9 – View of Sydney from the western side of the cove, c. 1803, attributed to G.W. Evans	12
Figure 10 – March 1788 survey of the Head of Sydney Cove showing the approximate position of the Study Area. This plan shows the earliest positions of the European settlement on either side of the Tank Stream which can be seen emptying into the harbour. The long tidal zone and mud flats are shown on this plan	14
Figure 11 – Grimes' plan of Sydney Cove (1800) with Johnston's grant indicated by No. 29	15
Figure 12 – 1807 Plan of the Town of Sydney by James Meehan. This plan, with the Study Area indicated, shows the early leases along George Street which extended through the Study Area. These sites were developed early with shops and stores catering to the nearby wharves. Johnston's land is identified as No. 8 in this map	16
Figure 13 – 1833 Plan showing Weston's Grant and illustrating further reclamation of land along the Tank Stream	17
Figure 14 – 1822 Plan of the Town and Suburbs of Sydney. George Street and Bridge Street have been created as has Macquarie Place, all which are beginning to give shape to the area around the study site. The approximate position of the Study Area is shown in relation to the natural Tank Stream flow and the mud flats where it entered the harbour	18
Figure 15 – Joseph Fowles 1848 sketch of the northern section of George Street between Essex Lane and Queens Wharf showing the style of development fronting George Street. An approximate Study Area is given (in red). The bottom section is located outside and to the immediate north of the Study Area.....	19
Figure 16 – View of Sydney Port Jackson, New South Wales, taken from the Rocks on the western side of the Cove, ca. 1803, drawn by John William Lancashire.....	20
Figure 17 – Frederick Garling's 1842 watercolour shows the Tank Stream, emptying to Sydney Cove	20
Figure 18 – c1850 plan showing proposed reclamation with the Study Area shown. Note that the allotment boundary extends from George Street, with earlier buildings shown on it, to the east across the high water mark and mud flats of the Tank Stream delta. The proposed Quay extension is shown in relation to the earlier development	21
Figure 19 - 1855 Trigonometrical Survey showing the position of the Tank Stream drain running along Pitt Street and the buildings occupying the Study Area (Study Area indicated in blue ; other annotations are from the Casey & Lowe report).....	22
Figure 20 – 1865 Trigonometrical Survey showing the position of the Tank Stream drain running along Pitt Street and the buildings occupying the Study Area.....	23
Figure 21 – 1880 Dove's plan of Sydney. This shows the high density development on the subject site and around the George Street and Pitt Street areas. This part of the city was dominated by warehouses, merchants and shops dealing with the bustling maritime trade of Circular Quay and other nearby wharves	23
Figure 22 – Metropolitan Detail Series Map (1894) with the approximate boundary of the Study Area	24
Figure 23 – Sydney Fire Underwriters Association Plan 1924–1949. These plans were started during the 1920s and updated until the late 1940s. This plan shows the demolition of buildings in preparation for the construction of the Cahill Expressway and remodelling of Circular Quay. The work included the extension of Alfred Street through to meet George Street.....	25
Figure 24 – View south along Pitt Street with Suttons Chambers at right (1926)	26
Figure 25 – 1943 aerial showing the Study Area (indicated in red) and demolition of buildings to the north	27
Figure 26 – View of The Rugby Club, c. 1990s.....	28
Figure 27 – Sydney LEP 2012 heritage map	32
Figure 28 – Survey showing location of Tank Stream in relation to Study Area. Western extent of Tank Stream shown by red dashed line	35

PICTURES:

Picture 1 – View facing southwest from the eastern side of Pitt Street.....	9
Picture 2 – View facing southeast from Herald Square.....	9
Picture 3 – View facing southwest from the eastern side of Pitt Street. Gold Fields House visible at right of frame.....	10
Picture 4 – View of the Rugby Club facing northwest from within Rugby Place	11
Picture 5 – View of the ground floor of the Rugby Club facing northwest from within Rugby Place	11

EXECUTIVE SUMMARY

The following Heritage Impact Statement (HIS) and Archaeological Assessment (AA) has been prepared for a parcel of land herein referred to as the 'Study Area', which is located in proximity to Circular Quay and comprises the parcel of land now legally known as Lot 8 DP 1224258, which comprises the following buildings:

- 'Gold Fields House', located at 1 Alfred Street;
- 'Fairfax House', located at 19-31 Pitt Street; and
- 'Rugby Club' and part of Rugby Place, located at 31A Pitt Street.

This HIS and AA is intended to accompany a State Significant Development Application (SSDA 8110) for works to the Study Area, being:

- Demolition of all existing structures on the site to ground level only.

Given the nature of the proposed works, there are no identified heritage or archaeological impacts or constraints associated with their undertaking

1. INTRODUCTION

The following Heritage Impact Statement (HIS) and Archaeological Assessment (AA) has been prepared for a parcel of land located within the Sydney Central Business District (CBD), which falls within the Sydney Local Government Area (LGA) in the state of New South Wales (NSW). The parcel of land being assessed, which is herein referred to as the 'Study Area', is located in proximity to Circular Quay; it is bounded by Alfred Street to the north, Pitt Street to the east, George Street to the west, and Rugby Place to the south.

The Study Area comprises Lot 8 DP 1224258 and encompasses the following buildings/street addresses:

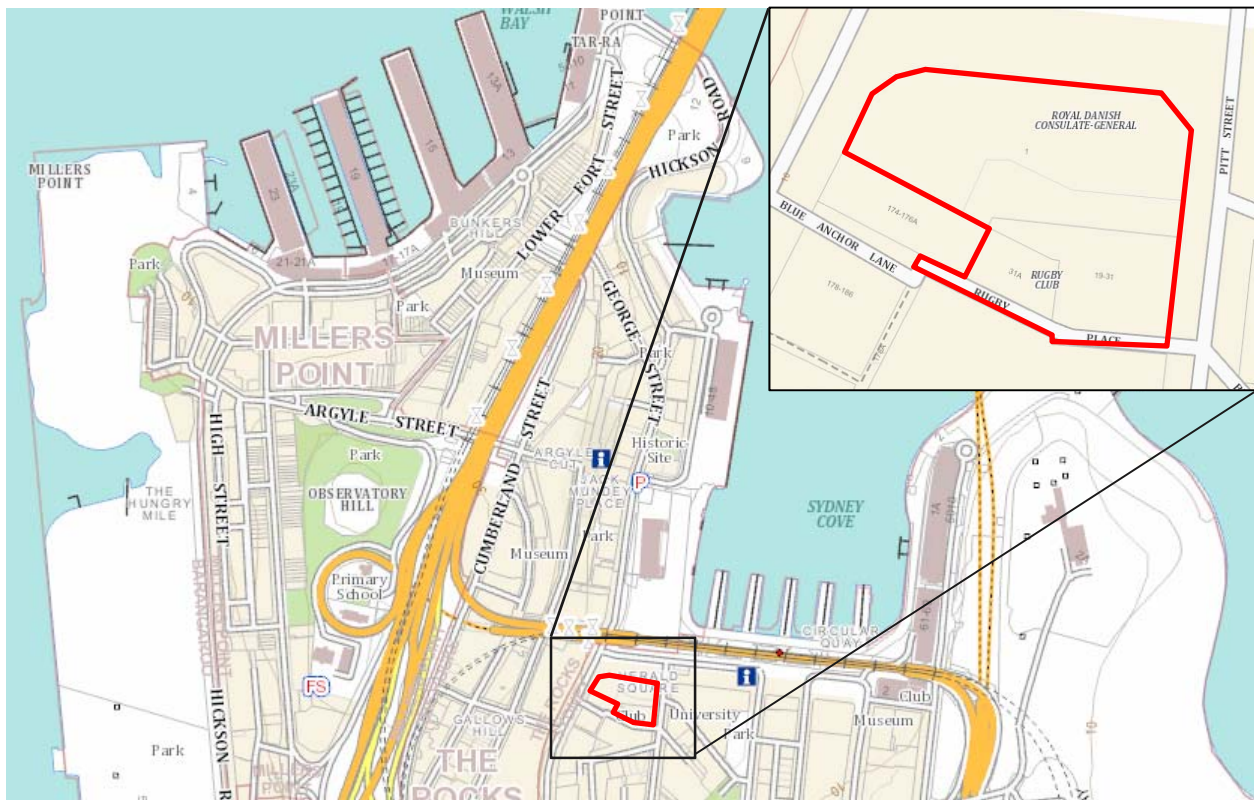
- 'Gold Fields House', located at 1 Alfred Street;
- 'Fairfax House', located at 19-31 Pitt Street; and
- 'Rugby Club' and part of Rugby Place, located at 31A Pitt Street.

The location of the Study Area is shown in Figure 1, below.

This HIS and AA is intended to accompany a State Significant Development Application (SSDA 8110) for works to the Study Area, being:

- Demolition of all existing structures on the site to ground level only.

Figure 1 – Location map (Study Area indicated)



Source: SixMaps 2016

1.1. METHODOLOGY

This Heritage Impact Statement has been prepared in accordance with the NSW Heritage Branch guideline 'Assessing Heritage Significance' (2001). The philosophy and process adopted is that guided by the *Australia ICOMOS Burra Charter* 1999 (revised 2013).

The proposal has been assessed against the relevant controls and provisions contained within the Sydney Local Environmental Plan (LEP) 2012, and been considered with reference to the Sydney Development Control Plan (DCP) 2012.

1.2. AUTHOR IDENTIFICATION

The following report has been prepared by Karyn Virgin (Senior Heritage Consultant).

Unless otherwise stated, all drawings, illustrations and photographs are the work of Urbis.

1.3. THE PROPOSAL

This HIS and AA is intended to accompany a SSDA (SSDA 8110) for works to the Study Area, being:

- Demolition of all existing structures on the site to ground level only.

The proposed demolition of buildings is shown, in section, in the below figures. As shown, no sub-surface works are proposed under this application, with either ground floor slabs or basement levels being retained intact.

Figure 2 – Section showing proposed demolition extent, Gold Field's House



Extent of
Demolition



Notes: Demolition to George
Street ground level
(including demolition of
retail and building podium
on eastern elevation),
leaving basement intact.

Drawing Number:
DEMO-002

Date: 04/01/2017

Drawing Title:

**Demolition Elevations -
North Elevation**



Not to scale

Source: Delta Group

LONGITUDINAL SECTION C

Complete demolition of Rugby Club as marked in red, ground slab to remain intact.

URBIS
URBIS HERITAGE IMPACT STATEMENT AND ARCHAEOLOGY SSD 8110 DEMO TO GROUND FEBRUARY 2017

[illegible]

6 INTRODUCTION

2. SITE DESCRIPTION

The following description of the Study Area has been compiled based on relevant aerial and topographic mapping, a review of previous and current land uses, and a field survey of the area, which was undertaken on 22 August 2016.

2.1. SITE LOCATION, ACCESS AND SETTING

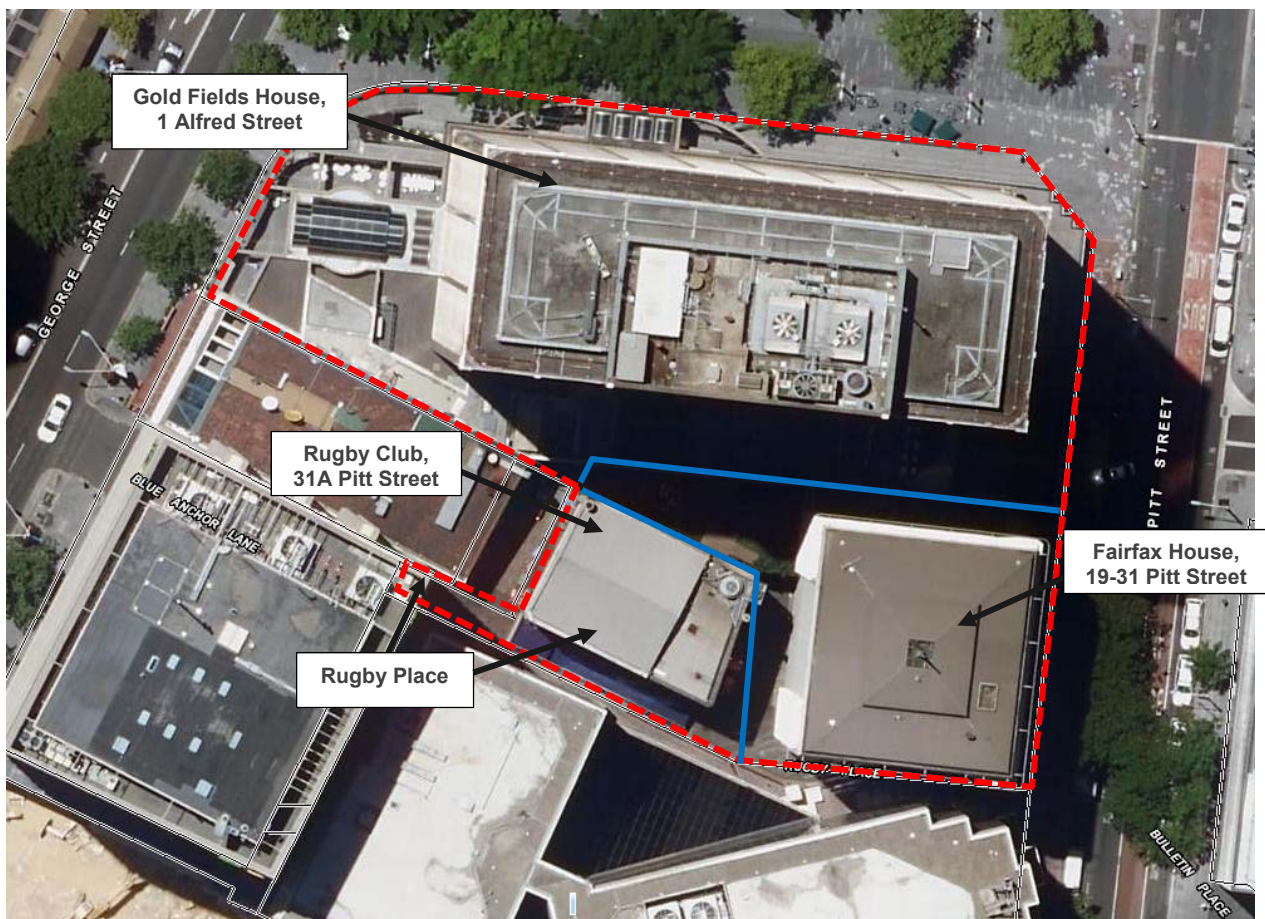
The Study Area is located within the Sydney CBD, which falls within the Sydney LGA. It is located in proximity to Circular Quay, and is bounded by Alfred Street to the north, Pitt Street to the east, George Street to the west, and Rugby Place to the south.

The Study Area comprises Lot 8 DP 1224258 and encompasses the following buildings/street addresses:

- 'Gold Fields House', located at 1 Alfred Street;
- 'Fairfax House', located at 19-31 Pitt Street; and
- 'Rugby Club' and part of Rugby Place, located at 31A Pitt Street.

Aerial imagery of the Study Area showing these buildings/addresses is provided in Figure 5, below.

Figure 5 – Aerial view of the Study Area (red outline). The blue outline demarcates individual property boundaries



Source: SixMaps 2016

In terms of accessibility, both Gold Fields House and Fairfax House are accessible by both pedestrians and vehicles via the surrounding streets. Pedestrian access to Gold Fields House is via Alfred Street to the north and Pitt Street to the east, while vehicle access is via Pitt Street alone. Pedestrian access to Fairfax House is

via Pitt Street, and vehicle access is via Rugby Place. Rugby Club does not contain parking facilities and is not accessible via vehicle. Pedestrian access to the building is via Rugby Place.

In terms of setting, the Study Area is located within a highly developed, urbanised landscape located in proximity to Circular Quay and at the northern end of the Sydney CBD. It is generally surrounded by comparable multi-storey development in all directions, though the lower-scale, three storey Ship Inn is located to the immediate east of Gold Fields House; this represents the lowest scale of development in the immediate vicinity of the Study Area.

To the immediate north of Gold Fields House is 'Herald Square'. To the north of this and on the opposite side of Alfred Street is Circular Quay Railway Station and associated railway line, which runs in an east-west. The Opera House is located approximately 700 metres to the northeast, and the Harbour Bridge is located approximately 800 metres to the north.

2.2. INDIVIDUAL ELEMENTS WITHIN THE STUDY AREA

The following description of individual elements contained within the Study Area has been sourced from the preliminary environmental assessment prepared by Coffey Environments Australia Pty Ltd to inform the Stage 1 SSD Application.¹

2.2.1. Gold Fields House – 1 Alfred Street

Gold Fields House, located at 1 Alfred Street, comprises 28 levels with a lower ground floor and two to three levels of basement (three to George Street and two to Pitt Street, due to slope of site). It was constructed in 1966.

The ground level of Gold Fields House is level with George Street to the west but is above street level to the east (i.e. at Pitt Street) and north (i.e. Alfred Street). The entrance to the building is from the north (i.e. Alfred Street). The ground level is currently occupied by the following:

- The main entrance lobby, escalators to the lower ground level and lifts to upper levels of Gold Fields House;
- The western portion of the ground level is occupied by retail spaces (currently occupied by a café and convenience store).

The lower ground level of Gold Fields House is below street level at the west (i.e. at George Street) but at street level to the east (i.e. at Pitt Street). The lower ground level is currently occupied by the following:

- Retail area along the north and east boundary of the Study Area (currently occupied by wine, food, coffee shop, gifts and boots store and a convenience store);
- Car park access at the south-eastern corner of the building on Pitt Street. The car park access leads to underground car park levels and is leased by Wilson Parking;
 - On-site security officer's room and a storage room for furniture.
- Tenant storage is also available at lower ground level;
- Tenant storage is also available on levels 1 to 12, which are also known as 'low rise' levels;
- Loading dock at the central portion of the southern boundary of the Study Area, accessed via George Street.

The basement levels are mainly occupied by car parking accessed via Pitt Street. The following additional features are also present:

¹ Coffey Environments Australia Pty Ltd, June 2015, *Wanda 1 Sydney Pty Ltd, Australia Sydney 1 Project, Environmental Phase 1 Assessment*, prepared for Wanda 1 Sydney Pty Ltd, Australia Sydney 1 Project: 4-7.

- Some storage areas and facility services, including fire control room, are present on the southern boundary;
- Diesel generator;
- Cleaners storage room;
- Grease trap room;
- Sump pits;
- An Energy Australia substation within a sealed room.

Figure 6 – Photographs of Gold Fields House (Urbis 2016)



Picture 1 – View facing southwest from the eastern side of Pitt Street



Picture 2 – View facing southeast from Herald Square

2.2.2. Fairfax House – 19-31 Pitt Street

Fairfax House, located at 19-31 Pitt Street, comprises 14 levels with one basement level. It was constructed in the late 1960s.

The ground level of Fairfax House is level with Pitt Street to the east and Rugby Place to the south. The entrance to the building is from the east (i.e. Pitt Street). The ground level is currently occupied by the following:

- The majority of the south eastern area of the ground level is occupied by a coffee shop;
- The central area of the ground level is occupied by lifts to upper levels of Fairfax House;

- The north eastern portion of the ground level is occupied by retail spaces (currently occupied by a jewellery store and other retail stores). These retail stores have separate entrances.

The basement level is mainly occupied by limited staff car park accessed via Rugby Place. The following features were observed:

- Car parking on concrete;
- Storage areas and facility services, including fire control room, switch room, main distribution frame for telecommunications, gas pipes and water meter are present on this level;
- Chemical storage area. A disused pit, which had been covered by a slightly elevated concrete slab is located in this room. The pit may have been used as an oil trap in the past as it has piping connected to it from the walls which a label stating 'Hp Oil Trans Pump'. No information was available with regard to the depth of the pit.

Figure 7 – Photograph of Fairfax House (Urbis 2016)



Picture 3 – View facing southwest from the eastern side of Pitt Street. Gold Fields House visible at right of frame

2.2.3. Rugby Club – 31A Pitt Street

The Rugby Club building, located at 31A Pitt Street, comprises six levels with no basement. It was constructed c. 1914.

The ground level of the Rugby Club building is level with Rugby Place to the south. The entrance to the building is from the south (i.e. Rugby Place). The ground level is currently occupied by the following:

- Bar, eating area and gaming room. To the east of the bar (north eastern boundary) is a small storage area containing gas cylinders, beer kegs and other beverage/retail items. A chilling room is located south west of this storage area and a cleaners storage room north of this area;

- Lifts to upper levels of the Rugby Club is located on the south eastern portion of the ground floor;
- The southern end of the ground level is an outdoor eating area (part of the bar area), at the entrance to the Rugby Club;
- A grease trap is located outside the building, at the south eastern boundary;
- A small electrical meter room is located at the south eastern corner of the building, adjacent to the grease trap and sprinkler system.

Figure 8 – Photographs of the Rugby Club (Urbis 2016)



Picture 4 – View of the Rugby Club facing northwest from within Rugby Place



Picture 5 – View of the ground floor of the Rugby Club facing northwest from within Rugby Place

2.2.4. Rugby Place

Rugby Place is a narrow street that runs in an east-west along the southern side of Fairfax House and the Rugby Club. It is accessible via both George Street to the west and Pitt Street to the east, and provides vehicle access to the Fairfax House basement parking and pedestrian access to the Rugby Club. It is currently asphalted with a raised footpath on either side.

3. HISTORICAL OVERVIEW

The following historical context has been sourced from the *Heritage Impact Statement and Preliminary Archaeological Assessment* prepared by GML Heritage in June 2014 for the current Study Area, which provides a comprehensive overview of the historical development of the Study Area.

Where required, this has been supplemented by further historical research undertaken by Urbis, as well as reference to other sources relevant to the immediate area.

3.1. PRE-EUROPEAN OCCUPATION AND LANDFORM

Prior to the arrival of Europeans in 1788, the Study Area was within the traditional lands of the Gadigal (or Cadigal) people, which covered the area south of Sydney Harbour from South Head to around Petersham. Aboriginal people had occupied the Sydney area for upwards of 15,000 to 20,000 years, as identified by archaeological sites in the Sydney district.²

At the time of arrival of the First Fleet in 1788 there were an estimated 1,500 Gadigal people living in the area of Sydney, although numbers have never been accurately recorded. As their territory extended along the harbour foreshore, as well as the wooded hills and valleys behind it, the Gadigal people were able to vary their diet with seafood and terrestrial foods, including edible plants and animals. Fish from the harbour were supplemented with shellfish and molluscs, including oysters, gathered from the foreshores and mudflats that characterised the natural shoreline of the harbour. The area includes the current study area, which straddled the estuarine mouth of the Tank Stream.

Figure 9 – View of Sydney from the western side of the cove, c. 1803, attributed to G.W. Evans



Source: State Library of NSW, <http://www.sl.nsw.gov.au/collection-items/sydney-western-side-cove>

The Tank Stream, as it was to be called by the First Fleet settlers, was one of a number of small streams and creeks that entered the harbour at the time of the European arrival. Its position in a sheltered cove was a

² Attenbrow, V, 2002, *Sydney's Aboriginal Past*, UNSW Press, Sydney: 3.

deciding factor in the choice of a landing site for the arriving Fleet. At the time of arrival, Sydney Cove was lined on the western shore by sandy white beaches graduating to mud banks at the entrance of the stream into the harbour.³

The slopes around the cove and the valley extending to the south would have been forested with indigenous trees and shrubs such as swamp mahogany, white gum, smooth-barked apple tree, bloodwood, turpentine and swamp oak, with an under-storey of acacia, banksias and other shrubs. The stream, which originated in marshy ground close to present day Hyde Park, ran north to meet the harbour at the tidal point close to the middle of present day Bridge Street. Its route to the harbour ran along the centre of a valley created by the stream through the sandstone bedrock, with the high points being approximately equivalent to the position of York and Macquarie Streets. The current alignment of Pitt Street, north from Bridge Street to Alfred Street, ran through the mud banks and into the open water of the original shore line.

The banks and valley area of the Tank Stream were utilised by the Gadigal people for campsites and gathering of food and fresh water. Archaeological excavation of sites in Sydney, including the Angel Place development site to the south of the Study Area (near the corner of Pitt Street and Martin Place, where a number of flaked-stone artefacts were retrieved from the remnant natural bed and banks of the Tank Stream), indicate the use of the Tank Stream Valley by the original inhabitants.⁴

The tank stream is shown on the view of the western side of the Cove at Figure 9 above. The GML report notes that despite the above, it is considered that because the Study Area sits within the *tidal zone and on the mud banks* of the original stream, particularly on the eastern portion of the Study Area, the likelihood of similar results being produced is somewhat lessened. The western side of the Study Area however, being located on the slightly elevated bank of the Stream, has a greater degree of the potential to contain artefactual material within residual and/or less disturbed soil profiles.

3.1.1. European Settlement and Shoreline Reclamation 1788- 1845

The arrival of the First Fleet in 1788 had an immediate impact on the shoreline of Sydney Cove and the Tank Stream. The impact of Europeans was felt immediately in the Tank Stream valley where convicts and marines went ashore on the first morning to begin felling trees and clearing the site for the settlement. Figure 10, a plan of the head of Sydney Cove as surveyed in March 1788, shows the positioning of the first shelters and buildings around the cove and on either side of the long tidal zone that formed the head of the stream. Within a few months of the arrival of the Fleet, a wooden bridge had been built over the head of the stream to allow crossings from one side to the other. A track leading down to the bridge became the basis of the future Bridge Street and represented the first east-west crossing in the new town.

In 1797, the first town leases were granted in Sydney, which included a number of sites along the western edge of the Tank Stream facing George Street. Although these areas had been previously occupied in an unofficial capacity, the issue of leases and conditions upon them represent the first phase of deliberate alteration to the stream and its bed. A number of the leases extended beyond the high watermark, across the mud flats to the edge of the actual stream bed (see Figure 12). Despite the growing population and increasing shipping trade in Sydney after 1800, much of the developing wharf accommodation, while being in Sydney Cove, was being developed on either side of the Cove rather than at the head of the Cove.

Wharfs and warehouses were being constructed further north of the study area, with the site remaining as open mud flats on the eastern side until the 1840s. Facing George Street, however, the site had buildings appearing from the 1790s.

³ Campbell, JF, 'The Valley of the Tank Stream', in *Journal of the Royal Australian historical Society*, Vol X, Part II, 1924: 69.

⁴ GML Heritage, Angel Place Project 1997, Archaeological Excavation Volume 3, Salvage Excavation of Site #45-6-2581, report prepared for AMP Asset Management Australia, the NSW Heritage Council and NPWS (NSW).

Figure 10 – March 1788 survey of the Head of Sydney Cove showing the approximate position of the Study Area. This plan shows the earliest positions of the European settlement on either side of the Tank Stream which can be seen emptying into the harbour. The long tidal zone and mud flats are shown on this plan



Source: *A Voyage to NSW: The Journal of William Bradley of HMS Sirius 1786-1792*, facsimile edition, 1969 with Urbis overlay (indicative only)

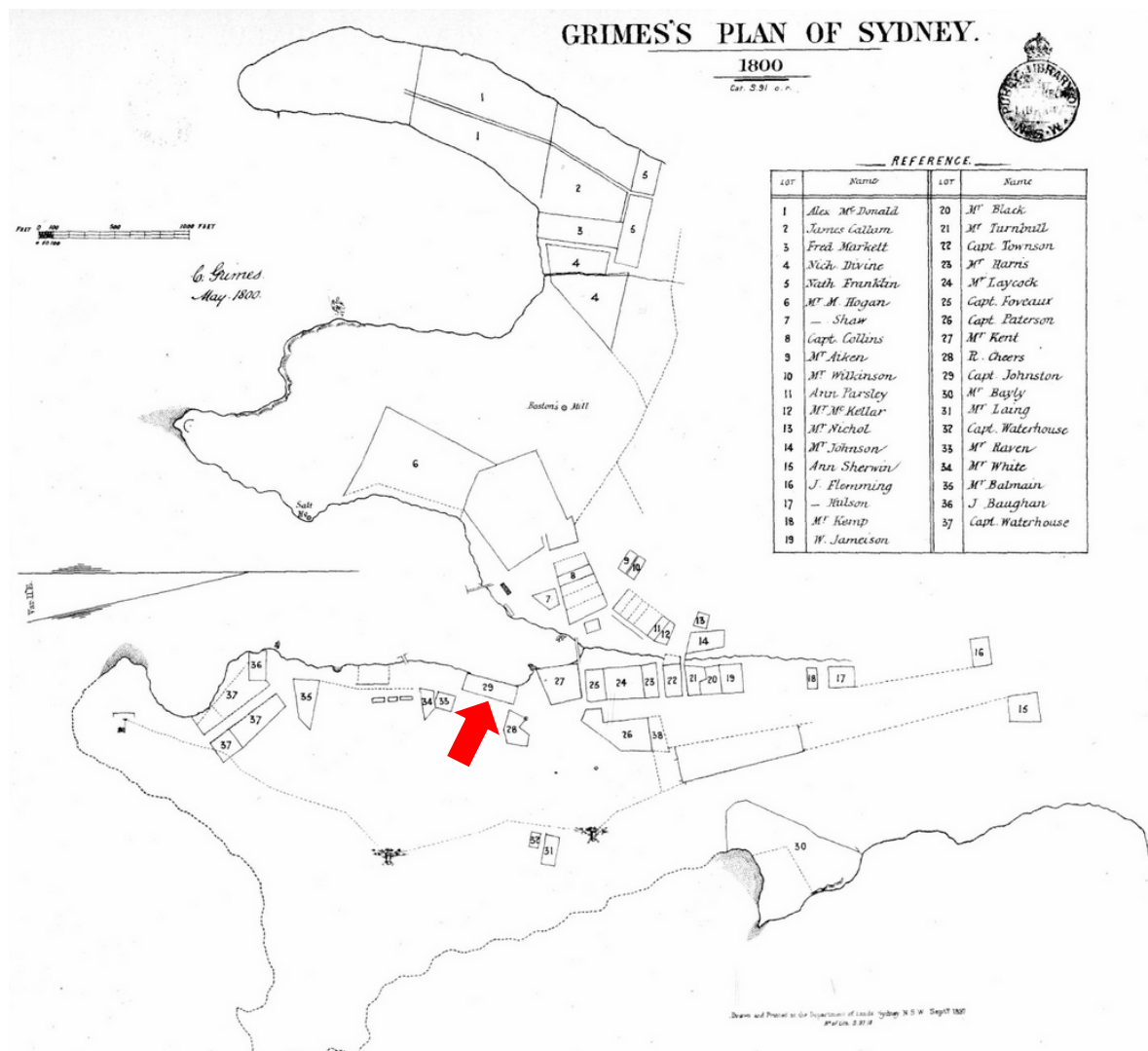
Major George Johnston's Grant

The Study Area appears to lie within the lease of Major George Johnston. Governor John Hunter leased Captain George Johnston land on the west side Sydney Cove on 7 January 1796. The allotment measured 360 feet (109.73m) 'in front' bearing west on the road leading to the hospital (later George Street) by 70 feet (21.34m) in depth. The 14-year lease specified the allotment's use for building and attracting a quit rent of 2 shillings and six pence per annum. According to Alan Roberts Johnston's early use of this land was for market gardening.⁵

⁵ Casey and Lowe, 2014, *Non-Aboriginal Archaeological Assessment & Impact Statement, Lend Lease Circular Quay Development – 182 & 33-35 Pitt Street, Sydney*, report to Lend Lease Development Pty Ltd, p: 23-24.

Johnston had arrived with the First Fleet and risen to prominence in the colony as commander of the Rum Corps, for his part in suppressing the uprising of convicts at Vinegar Hill in 1804 and as the head of the troops who arrested Governor Bligh during the Rum Rebellion in 1808.⁶ Although Johnston was returned to England and court-martialled for his involvement, he was allowed to return to the colony in 1813 where he remained until his death in 1823, farming on his large Annandale Farm estate.

Figure 11 – Grimes' plan of Sydney Cove (1800) with Johnston's grant indicated by No. 29



Source: State Library of NSW, Mitchell Library Z/Ce 89/13 ML SLNSW, Urbis arrow

Johnston reportedly took little interest in his town allotment until the early 19th century. Governor King renewed Johnston's lease in January 1806 with the area recorded, marginally reduced in size, as 340 feet (103.6m) by 70 feet (21.4m) and adjacent to William Blake's allotment (to the north). The eastern boundary of Johnston's lease appears to align with the high water mark however at low tide it was some distance from the waterline.⁷ The lease was again renewed in 1816 and by 1819 he was reputed to have been building houses. Johnston died in January 1823 and in June of that year Governor Brisbane granted

⁶ A. T. Yarwood, 'Johnston, George (1764 - 1823)', Australian Dictionary of Biography, Volume 2, Melbourne University Press, 1967: 20–22.

⁷ A. T. Yarwood, 'Johnston, George (1764 - 1823)', Australian Dictionary of Biography, Volume 2, Melbourne University Press, 1967: 20–22.

the land, now described as 288 rods (0.73 ha), to Johnston's daughters, Julia, Maria and Blanche Johnston⁸(refer Figure 13).⁹

Figure 12 – 1807 Plan of the Town of Sydney by James Meehan. This plan, with the Study Area indicated, shows the early leases along George Street which extended through the Study Area. These sites were developed early with shops and stores catering to the nearby wharves. Johnston's land is identified as No. 8 in this map



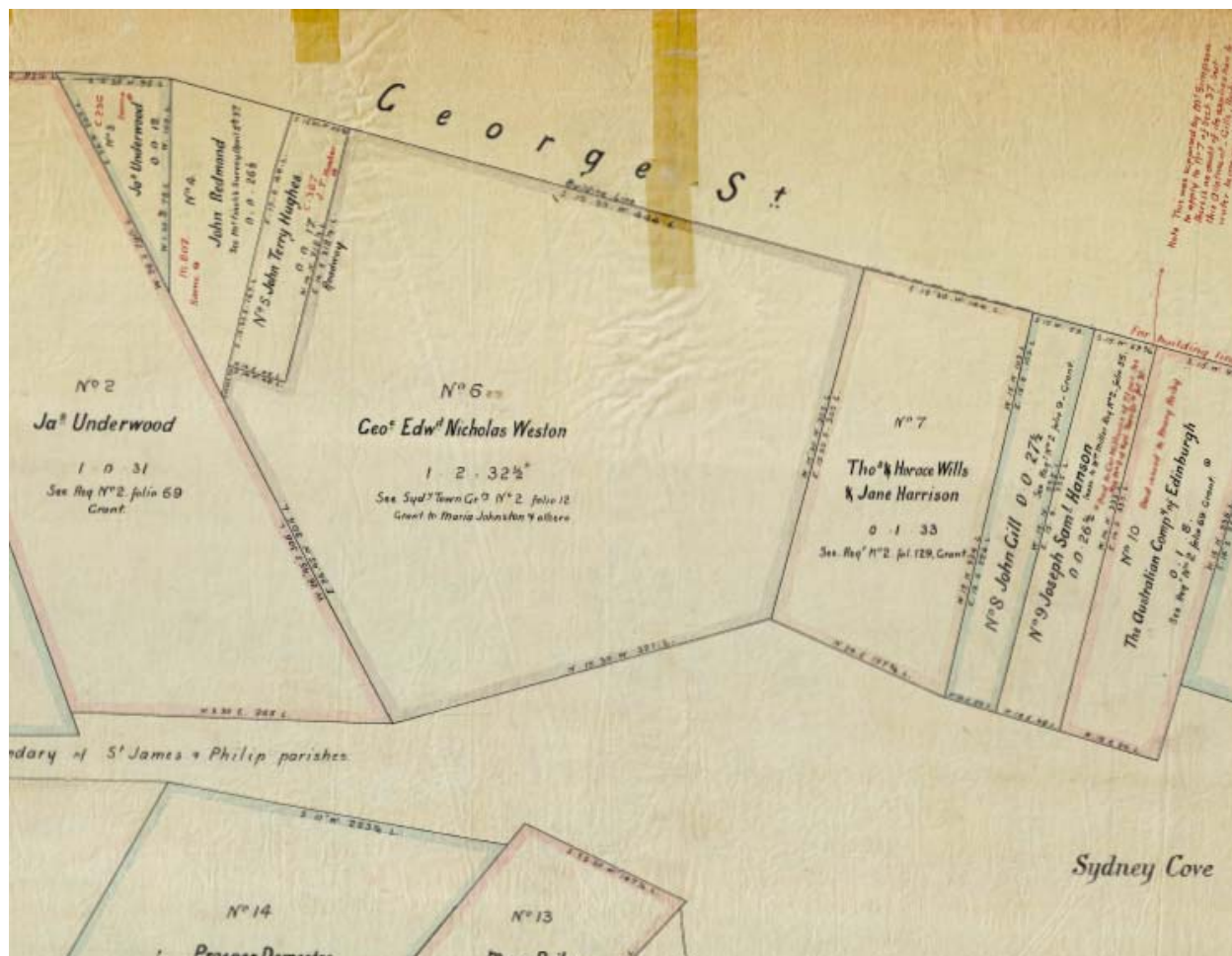
Source: Ashton, P and D Waterson, 2000, *Sydney Takes Shape*, HEMA, Sydney, Urbis overlay

⁸ A. T. Yarwood, 'Johnston, George (1764 - 1823)', Australian Dictionary of Biography, Volume 2, Melbourne University Press, 1967: 26.

⁹ Weingarh, J, The Head of Sydney Cove, in the Journal of the Royal Australian Historical Society, Vol X, Part V, 1924, p: 293.

The Assessment Book entry for 1845 records development on Weston's grant, and at least partially within the Study Area fronting George Street including two single storey, four room dwellings with a rated value of £25 and £30 respectively, the latter of which is noted to have been in a ruinous condition (and potentially redeveloped c. 1848 based on changing descriptions/valuations listed in the Rates Assessment Books). A two storey shop, store and dwelling is also recorded, incorporating a large yard with 70ft long 2 storey store and workshop (Ewen's premises shown on Fowles illustration at Figure 15 below).

Figure 13 – 1833 Plan showing Weston's Grant and illustrating further reclamation of land along the Tank Stream



William Blake's Grant (to the north)

Overlay of historical mapping suggests that the Study Area was located to the south and outside of William Blake's grant (designated by the 71 on the 1807 map above at Figure 12) which extended from George Street to the high watermark. Blake had sold the lease to Edward Wills in c1807 and buildings had been erected facing George Street by this time. Wills died in 1811 and his widow Sarah married George Howe, who had founded the Sydney Gazette and New South Wales Advertiser—Sydney's first newspaper—in 1803. Edward had run a store on the site, which was likely later used by Howe to house his publishing presses. Part of the Cove behind the store building had been resumed by the 1820s.

Figure 14 – 1822 Plan of the Town and Suburbs of Sydney. George Street and Bridge Street have been created as has Macquarie Place, all which are beginning to give shape to the area around the study site. The approximate position of the Study Area is shown in relation to the natural Tank Stream flow and the mud flats where it entered the harbour



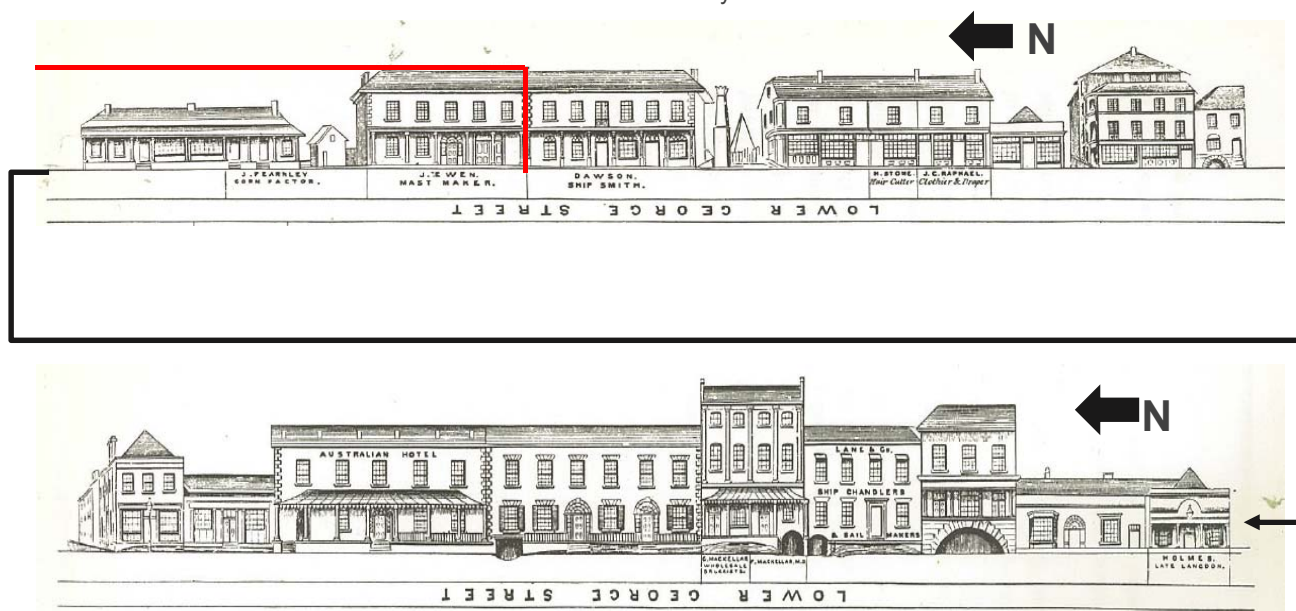
Source: Ashton, P and D Waterson, 2000, *Sydney Takes Shape*, HEMA, Sydney, Urbis overlay

Sketches of George Street in 1848 (Figure 15) show the eastern side of George Street between Essex Street and the Queens Wharf. The Study Area was north of Dawson's Foundry and appears to incorporate premises for J.Ewen, mastmaker and Fearnley's corn factor. The northernmost section includes the House of Isaac Nichols (1810) the first post master, the Australian Hotel, the premises of Shopgood, Hawkins and Co and at the far right, the home of John Lord Holmes; formerly George Howe's Sydney Gazette office. The latter was part of William Blake's grant as detailed above (refer to Figure 12 above). The illustration also shows openings under the buildings for access to the water's edge of the Tank Stream.

This section of George Street represented the hub of the colonial trade and mercantile scene, with houses, shops, warehouses, taverns and traders all vying for the trade generated by the nearby wharves and the ships that visited them. The street resembled a maritime English town, dependent largely on shipping for their subsistence.¹⁰

Fowles illustration is consistent with Rates and Assessment Book entry for 1848.

Figure 15 – Joseph Fowles 1848 sketch of the northern section of George Street between Essex Lane and Queens Wharf showing the style of development fronting George Street. An approximate Study Area is given (in red). The bottom section is located outside and to the immediate north of the Study Area



Source: Fowles, J, *Sydney in 1848*, facsimile edition 1962, Ure Smith

3.1.2. The Tank Stream and Semi-Circular Quay

The Tank Stream is not located *within* the Study Area, but is located to the immediate east. It comprises a three metre curtilage around its entirety, which extends into the Study Area. Despite this, it will not be impacted or exposed by the current proposal. The following historical overview is provided for context and reference regarding the development of the Study Area.

Although the original settlement around the head of Sydney Cove had depended on the Tank Stream for its fresh water needs, within the first twenty years of settlement the stream had been fouled with sewage, rubbish and run-off from piggeries and yards, making the water undrinkable and transforming the Tank Stream into an open sewer, with its attendant health and environmental problems.

The deterioration of the Tank Stream and the unpleasant odours emitted by accumulated waste encouraged land owners and their tenants to build as near as possible to the George Street boundary facing away from the cove. The exception was secondary buildings such as stores, sheds and workshops linked to trade and maritime activities that were built towards the centre of the leases in a haphazard fashion. The condition of the stream, along with the growing need for wharf space in Sydney Cove, prompted the gradual covering over of the Tank Stream and the infill of the tidal zone at the head of the harbour.

Work began on the scheme in the 1840s with the construction of a stone seawall along the western side of Sydney Cove. This was followed by a stone seawall along the eastern side. The mud flats in the centre were crossed by a wooden bridge extending east from Pitt Street (on the opposite side of the road to the Study Area), built by private enterprise to save pedestrians the trip to the Bridge Street crossing, and on which a halfpenny toll was charged. As it joined the Bon Accord Wharf in Pitt Street, it became known as the Bon Accord Bridge.¹¹

¹⁰Fowles, J, *Sydney in 1848*, facsimile edition 1962, Ure Smith, p.16.

¹¹ Andrews, G, 1986, *Port Jackson 200: 1786-1986*, Reed Books, Sydney, p. 67.

In the early 1850s, the City Council decided to continue the wharf around the Cove to join the two stone sections. However, due to the cost involved (and the dwindling convict resource since the end of transportation in the 1840s), the work was completed using timber. A plan showing the Extension of the Semicircular Quay, dated 1854, shows the extent of the timber wharf extension from a position north of Argyle Street (within the Overseas Passenger Terminal) along the western shore line and around to approximately between ferry wharves 5 and 6. The construction consisted of metal tipped timber piles driven into the harbour bed at regular intervals of approximately 9 feet (2.7m) apart. Batons were placed across the piles and a timber decking then laid out to form the new wharf. Behind the wharf the site was reclaimed and Pitt Street extended to meet the harbour (see Figure 18).

Figure 16 – View of Sydney Port Jackson, New South Wales, taken from the Rocks on the western side of the Cove, ca. 1803, drawn by John William Lancashire



Source: State Library of NSW, <http://acmssearch.sl.nsw.gov.au/search/itemDetailPaged.cgi?itemID=825803>

Figure 17 – Frederick Garling's 1842 watercolour shows the Tank Stream, emptying to Sydney Cove



Source: Mitchell Library, State Library of NSW - ML 420

As part of this work the Tank Stream was also enclosed. At the Circular Quay end adjacent to the Study Area, as this part of Sydney Cove now became known, the Tank Stream was enclosed within a stone semicircular drain with a separate sewer line running along its eastern side. The drain was approximately 3.5

metres wide, two metres high and three metres below the street level to its base. The newly formed sewer then entered the harbour at Circular Quay to the west of the present Wharf 6. This work, and the extension of Pitt Street formed the eastern edge of the Study Area (it is noted that the Tank Stream and separate sewer are both in proximity to but outside of the Study Area, i.e. located to the immediate east).

The creation of the extended Pitt Street allowed for new development along the street, including along the eastern portion of the Study Area (i.e. within the Study Area fronting Pitt Street).

Figure 18 – c1850 plan showing proposed reclamation with the Study Area shown. Note that the allotment boundary extends from George Street, with earlier buildings shown on it, to the east across the high water mark and mud flats of the Tank Stream delta. The proposed Quay extension is shown in relation to the earlier development



Source: State Records NSW AOMAP 5634 with GML overlay 2015

3.1.3. The Study Area

Following the completion of Circular Quay and the extension of Pitt Street, the 1855 Trigonometrical Survey shows two large iron shed buildings fronting Pitt Street. The sheds are later identified on Dove's 1880 plan, at which time they were occupied by a timber merchant and cement store. The sheds may pre-date the completion of Pitt Street and may originally have been associated with Fearnley's corn factor, which included large store buildings.

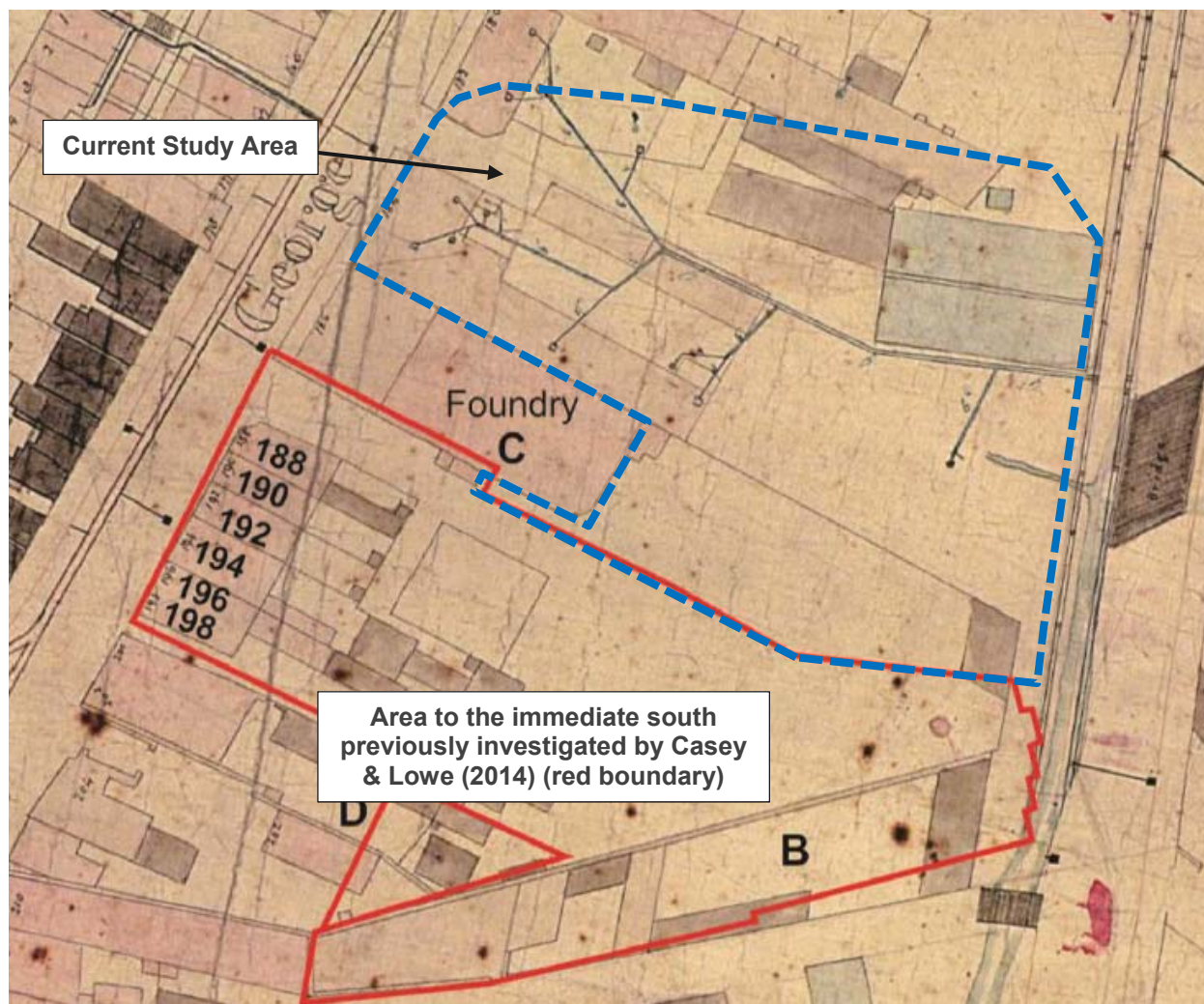
The Rates and Assessment book entry of 1858 does not record any occupation on Weston's grant on the Pitt Street frontage instead making reference to the extensively developed George Street frontage.¹² This would suggest that the eastern frontage remained largely undeveloped (excluding the iron stores referenced above) or that any development was associated primarily with the George Street development. The amended 1865 Trigonometrical survey shows similar occupation to Dove's 1880 plan; by 1865 some additional masonry buildings were constructed south of the stores and noted in the Rates Book as single storey houses¹³. At least one of these was later occupied by G.E Crane and the site was later redeveloped with two storey stores (c.1880).

¹² City of Sydney Rates and Assessment Book, 1858.

¹³ City of Sydney Rates and Assessment Book, 1867.

Dove's plan (refer to Figure 21 below) records the George Street frontage of the site as being occupied by two storey shop premises known as 172 George Street, occupied by Gee Ick Importers, and Loon Cheong Cabinet Makers (formerly Ewen's premises). The buildings were of masonry construction with stone and timber workshops to the rear.

Figure 19 - 1855 Trigonometrical Survey showing the position of the Tank Stream drain running along Pitt Street and the buildings occupying the Study Area (Study Area indicated in **blue**; other annotations are from the Casey & Lowe report)



Source: Casey and Lowe, 2014, *Non-Aboriginal Archaeological Assessment & Impact Statement, Lend Lease Circular Quay Development – 182 & 33-35 Pitt Street, Sydney*, report to Lend Lease Development Pty Ltd, Fig. 3.9

Way Key and Co Importers also falls partly within the Study Area at 166 George Street (formerly Fearnley's corn factor), Way Kee was a very well-known Chinese merchant (import/ export) and reputedly (little information available in the historical record) built 3 new stores on/ in proximity to the site which formed the basis of his substantial Australian property empire. The assessment book entry for 166 refers to the site as "pulled down" in 1882.

Livingstone's Timber Yards occupied the Pitt Street frontage of the site (known as 19-21), incorporating the two single storey iron sheds, one of which was used as a cement store. There is a large vacant area in the centre of the site, likely used in conjunction with the Timber Yards. To the north of Livingstone's shed building and partially within the subject site is the three storey Peacock's jam factory (17 Pitt Street), which was constructed sometime between 1865 and 1880.

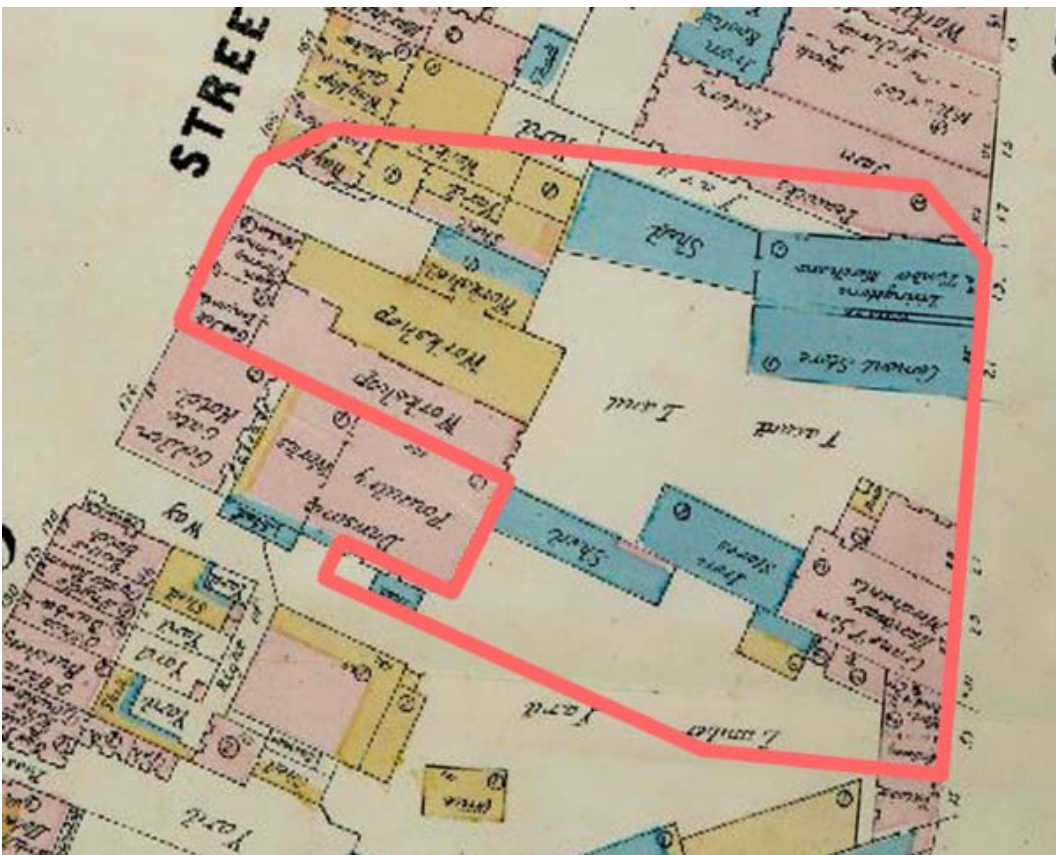
At the southeast corner, on Pitt Street the site was occupied by store buildings, a single storey and two double storey stores. The larger central store (as shown on Dove's plan) appears to have been constructed for Thomas Sutcliffe Mort (wool broker) in the mid-1870s (c.1877) but a few short years later they were occupied by Crane and Son Hardware Merchants. Three timber and iron stores are also recorded to the rear. Crane and sons traded at the site into the early 1900s, after which they relocated to a new purpose built premises to the south of the site. The stores were thereafter variously occupied as shops and stores before being redeveloped for Carleton and Sutton's Chambers.

Figure 20 – 1865 Trigonometrical Survey showing the position of the Tank Stream drain running along Pitt Street and the buildings occupying the Study Area



Source: Department of Lands with GML overlay 2015

Figure 21 – 1880 Dove's plan of Sydney. This shows the high density development on the subject site and around the George Street and Pitt Street areas. This part of the city was dominated by warehouses, merchants and shops dealing with the bustling maritime trade of Circular Quay and other nearby wharves



Source: City of Sydney Council Archives with Urbis overlay

Dove's Plan corresponds with City of Sydney Rates and Assessment Books for the same year, which records Livingstone's Timber Yards and the iron store, with a rated value of £46 as well as Crane's stores, (redeveloped) albeit with a minor variation in street numbering at 31 and 33 Pitt Street. Further analysis of the Rates and Assessment Books indicates that Livingstone took over the premises of W.H Rolfe¹⁴ (along with Rolfe's second timber yard fronting Alfred Street at Circular Quay). Crane is previously recorded in the Rates Books as occupying a large single storey brick and stone store on the site in 1871.¹⁵

Much the same configuration of development is shown on the Metropolitan Detail Series mapping for the site (both the 1884 and 1894 editions – refer to the 1894 plan below at Figure 22). G.E Crane hardware stores occupied the bulk of the Pitt Street frontage into the early 1900s.

Figure 22 – Metropolitan Detail Series Map (1894) with the approximate boundary of the Study Area



Source: State Library of NSW with Urbis overlay

By the early 20th century the Pitt Street frontage had been substantially redeveloped. There was a new laneway access on the southern site boundary known as Crane Place. Carleton Chambers was constructed c.1914 at 23-29 Pitt Street. The two storey building housed various shops and offices. It is first recorded in the Sands Directory in 1914 as occupied by consulting marine and general engineers, a hairdresser, broker, customs agents, estate agent and the office of the Frankfurt Sausage Company (which had adjoining premises to the south).¹⁶

The three storey Sutton's Chambers was constructed on the site of the former iron shed buildings on the north side of the Study Area c. 1907. The building housed various tenancies and achieved some notoriety as

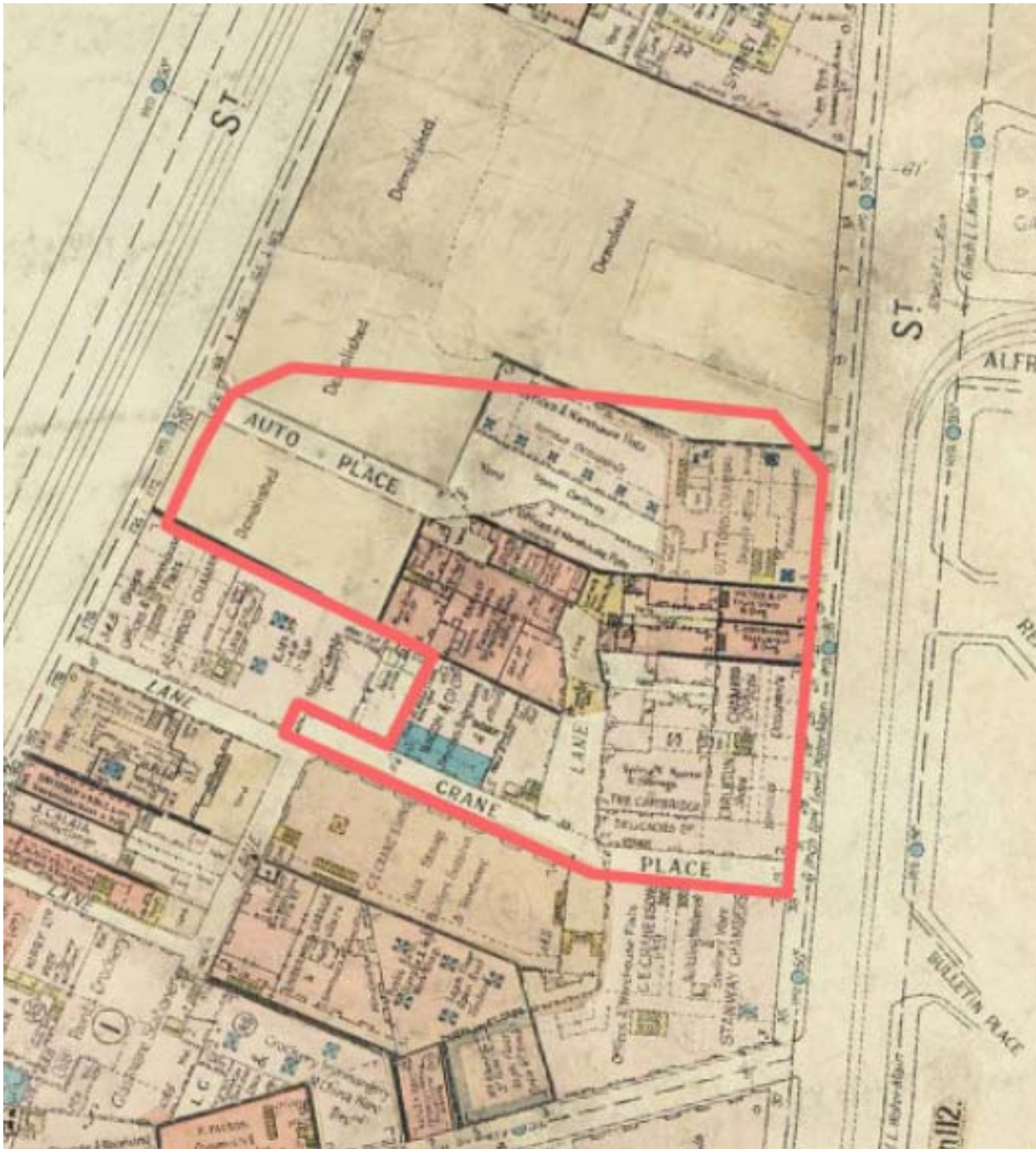
¹⁴ City of Sydney Rates and Assessment Books, 1871.

¹⁵ City of Sydney Rates and Assessment Books, 1871.

¹⁶ Sands Directory, 1914.

the site of a gruesome murder of one of its former occupants, a money lender Daniel Condon, in 1927. Two additional 2 storey shops were also constructed around this time at 19 and 21 Pitt Street, which were variously occupied including housing a, pawnbroker, fruit shop and restaurant. Within the area of the former yard (at the centre of the site) Bacon and Company's 5-6 storey warehouse (process engravers) was constructed c.1913 along with a smaller factory building to the north, probably constructed in the 1920s and later occupied by Bain and Company. This development is illustrated on the Fire Underwriters Association plan at Figure 23.

Figure 23 – Sydney Fire Underwriters Association Plan 1924–1949. These plans were started during the 1920s and updated until the late 1940s. This plan shows the demolition of buildings in preparation for the construction of the Cahill Expressway and remodelling of Circular Quay. The work included the extension of Alfred Street through to meet George Street



Source: <http://www.photosau.com.au/cosmaps/maps/pdf/FU/Block125.pdf> with Urbis overlay

Of the above development only the Bacon Company Building remains extant (now known as Rugby Club). The remainder of development was cleared in the latter part of the 20th century, in conjunction with the construction of Gold Fields and Fairfax House.

Figure 24 – View south along Pitt Street with Suttons Chambers at right (1926)



Source: City of Sydney Archives, Sydney Reference collection: 044\044594

3.1.4. Gold Fields House

In 1958, the Cahill Expressway was opened to traffic. Its completion created a route for traffic from the Sydney Harbour Bridge to the eastern suburbs and allowed the final link of the city circle railway. Originally proposed as part of the city railway and harbour crossing in the early twentieth century, work to resume and demolish buildings in its path had been interrupted by World War II, although any construction work came later. By 1943 though, a number of buildings between George and Pitt Streets had been demolished primarily along an alignment with Alfred Street. The demolition of these buildings created the northern boundary of the study site. With the extension of the Cahill Expressway west to east across the front of Circular Quay, the remainder of the buildings in this part of George and Pitt Streets were demolished (see Figure 25).

The site bounded by George, Pitt and Alfred Streets had been resumed by the Department of Railways as part of the City Circle extension. In 1959 the Department wrote to the Council informing them that tenders had been called to develop the block bounded by George, Alfred and Pitt Streets and with it envisaged that the accepted tender would demolish the existing buildings, which included a three-storey chambers and an old warehouse, and erect a 'modern multi-storied building thereon, somewhat comparable to the proposed new AMP Building which is now in the course of construction'.¹⁷

The AMP building, completed in 1961 at the eastern end of the Cahill Expressway, was the first tall modern tower building in Australia and the first built in Sydney following the lifting of the 150 feet height restrictions that had been imposed on the Sydney skyline since the early 1910s. The proposed Gold Fields House was to act as a 'bookend' to Circular Quay, mirroring the ground-breaking AMP building. The architects Peddle Thorp & Walker, who had designed the AMP building, were also commissioned to design the Gold Fields House development.

Work began on site in late 1963 with deep excavation through bedrock for building foundations, underground parking, plant and equipment rooms and the lift well. The excavation was taken to all four edges of the two allotments and extended two and a half levels below Alfred Street. In the process the site was cleared of any remaining footings or remnant structures from the earlier development phases, as well as any existing pre-

¹⁷ Letter Department of Railways to Cumberland County Council 17 September 1959, Sydney City Council Archives.

European landform or evidence. The edges of the excavation, which extended below the high water mark, were lined with steel sheeting and then braced to prevent their collapse. The Tank Stream lay outside the actual building allotment boundary below the Pitt Street footpath, with the strata through which the water course was cut restrained by the steel sheeting.

Gold Fields House was completed in 1966 as an office and commercial high rise tower development. It has maintained the same role and mix of occupation until the present time.

Figure 25 – 1943 aerial showing the Study Area (indicated in red) and demolition of buildings to the north



Source: Sixmaps 2016 with Urbis overlay

3.1.5. Fairfax House

Fairfax House, at 19–31 Pitt Street, is a fifteen storey commercial office building which was constructed in the late 1960s by Mainline Constructions Pty Ltd, for a cost of \$1.5m.¹⁸

This building lies on part of allotment 6 Section 47 of the City of Sydney originally leased to Major George Johnston, and after his death in 1823 granted to his three daughters Julia, Maria and Blanche Johnston. When Pitt Street was extended from Hunter Street to Circular Quay in 1853, it ran through Johnston's original land grant. By the 1860s this part of Pitt Street was occupied by lumber yards and merchant stores.¹⁹

¹⁸ Rappaport Pty Ltd, Statement of Heritage Impact 19-31 Pitt Street, 2010: 20.

¹⁹ 1865 Trig Survey, City of Sydney Archives.

From the 1880s this area was part of the land owned by G.E Crane & Co hardware merchants.²⁰ Crane's Lane (now Rugby Place) runs along the southern side of the Study Area.

The area was redeveloped in the 1920s and the subject site was occupied by Carleton Chambers and the Commonwealth Bank (23–31 Pitt Street) plus two smaller buildings at 21 and 19 Pitt Street occupied by a restaurant (21) and fruit shop with dwelling above (19).²¹ These buildings were demolished in 1968 for the construction of Fairfax House.

3.1.6. Rugby Club

The Rugby Club is a six storey brick warehouse building that was built in c. 1914²² and initially occupied by Bacon & Co Ltd photo engravers. It was known for many years as Bacon's Building.²³ Prior to the construction of this building the site was part of the land owned by G. E. Crane & Co and contained limited development. The property was purchased by the Greater Sydney Investment Company Ltd in the late 1920s.²⁴ Access to the building was via a lane off Pitt Street originally known as Crane's Lane (now Rugby Lane).

Figure 26 – View of The Rugby Club, c. 1990s



Source: City of Sydney Archives, Sydney Reference collection: 031/031387

In 1952 this building was sold to the Rugby Union Club.²⁵ The Rugby Club was formed in 1945 as a city base for all rugby players and lovers of the game. The Rugby Club was originally the HQ of the NSW Rugby Union and later the ARU and was where Wallaby touring teams were presented their jerseys. It was also where the Australian and New Zealand Rugby Boards agreed to establish the Rugby World Cup and later the Super Rugby and Tri-Nations competitions.²⁶

²⁰ Certificate of Title Volume 947 folio 213, Department of Lands.

²¹ Sydney Fire Underwriters Association Plan of Sydney 1924–1949, City of Sydney Archives.

²² Sands Sydney and Suburban Directory.

²³ 1956 City Plan, City of Sydney Archives.

²⁴ Certificate of Title Volume 3784 Folio 237, 238, Department of Lands.

²⁵ Certificate of Title Volume 4151 Folio 27, Department of Lands.

²⁶ The Rugby Club, <<http://www.rugbyclub.com.au/about/>> viewed 12 June 2015.

4. HERITAGE SIGNIFICANCE

4.1. STATEMENT OF SIGNIFICANCE – THE STUDY AREA

The Study Area does not contain any listed heritage items, and is not located within a heritage conservation area.

Previous assessments of the Study Area have not identified any of its elements to be of heritage significance.

Demolition of all buildings on site was assessed by GML as part of a previous Stage 1 SSDA heritage impact statement and archaeological assessment, and no heritage constraints were identified in association with the removal of the buildings currently present on site.

There are therefore no identified heritage constraints associated with the proposed demolition of all buildings within the Study Area.

4.2. STATEMENT OF SIGNIFICANCE – HERITAGE ITEMS IN THE VICINITY

The following statements of significance for heritage items in the vicinity have been sourced directly from the state heritage inventory (SHI) citations for the items.

4.2.1. Tank Stream Fountain and Herald Square

The sculpture is of historical, aesthetic and social significance. The sculpture relates well to the simple rectilinear shape of Herald Square. It is an excellent example of civic sculpture rich with symbolism and artisanship.²⁷

4.2.2. Ship Inn

The remaining facades of the Ship Inn, formerly a three storey rendered brick building, are significant as a fine external example of Federation Free Classical style facades as used on a hotel.

The Ship Inn was one of five remaining hotels of this style in the city the others being the Metropolitan, the Bristol Arms, the Harbour View, and the Lismore and was significant as part of a network of small hotels providing a social / recreational venue and budget accommodation in the immediate area of the waterfront. This significance has been greatly reduced with the changed use of the building and subsequent termination of its association with the hotel trade in 1985.

The external facades are a representative example of the small corner hotel in this harbour side location and, although heavily modified in the early decades of the twentieth century, still retain moderate aesthetic significance and with the removal of tower and glazing of balconies, reflected the changing architectural ideas of the early twentieth century and the evolving character of the immediate area.²⁸

4.2.3. Paragon Hotel

The Paragon Hotel, a two storey rendered brick and sandstone building dating from the 1860s, is significant as a fine external example of a corner hotel which evolved over nearly a century and a half to present the existing uniform Victorian Regency style facades.

The hotel has significance as part of a network of small hotels providing a social / recreational venue and budget accommodation as well as dining facilities in the immediate area of the waterfront. This significance has been somewhat reduced with the changed use of the building but the retention of bar facilities at the rear of the building continues an association with the hotel trade.

²⁷ <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2426030>

²⁸ <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2423708>

*It is representative as an example of the evolutionary process of the small corner hotel and is particularly significant as a remaining example of a waterside hotel in this part of the city. The facades of the building retain aesthetic significance due to their simplified Victorian Regency ornamentation which reflected the social character of the immediate area.*²⁹

4.2.4. AMP Building

The AMP Building adjacent to Circular Quay is a 25 storey tower of Post war International Style. The building is historically significant as the first building to officially break the 1912 Sydney height of Buildings Limit of 150 feet and thus become the tallest building in Australia, at the time of its construction.

It is both historically and socially significant for its powerful ability to exemplify the dominant role of the AMP Society in the Australian insurance industry. The building is socially significant for its ability to reflect through its location and form, the considerable public controversy created by its construction of a massive curved facade on such a prominent site so close to Circular Quay. The building is aesthetically significant as an important work by a significant firm of architects Peddle Thorp and Walker and as a landmark site at Circular Quay.

*The building is aesthetically significant as the first fully free standing skyscraper in the city of Sydney which set a precedent keeping its tower free of the podium.*³⁰

4.2.5. Customs House

The Sydney Customs House occupies a unique symbolic and physical position on the site of the First Fleet Landing. Its location is a physical reminder of the importance of Circular Quay as the original maritime centre for the colony.

The Customs House contains parts of the oldest surviving building of its type in Australia, used continuously for 145 years. It is a physical record of the history of the Customs Service and its importance in the history of Australia.

The Customs House embodies the work of three successive and individually distinguished government architects: Mortimer Lewis, James Barnet and Walter Liberty Vernon.

*Because of the scarcity of documentary evidence about the early stages of construction, the surviving building fabric from these stages constitutes the principal source of additional evidence about the early history of the building and its occupants.*³¹

4.2.6. Circular Quay Railway Station

Circular Quay Station and viaduct are of state significance as the closing section in the city rail loop that was over 40 years in planning and construction. As prominent landmarks across the northern end of the city they serve as a visual boundary between the city and the harbour.

The station exhibits aspects of Inter-War Functionalist and some Art Deco stylistic features, completed long after both styles had been largely discontinued in major urban architectural form, reflecting the pre-war planning of the station and the subsequent delays in construction.

*The station design and location have been subject to ongoing analysis and debate and have remained controversial in Sydney's planning history. The use of riveted technology as part of the viaduct represents the last phase of this construction technique in Sydney railway infrastructure.*³²

4.2.7. The Rocks Conservation Area

The Rocks, with its complex layering of significant fabric, uses and associations, is a precinct of national cultural significance. The Rocks is valued as a place of major social history, reflecting more than two centuries of significant activity; including European invasion, early contact between Aboriginal people and European settlers, and colonial settlement.

²⁹ <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2423694>

³⁰ <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2423922>

³¹ <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5044985>

³² <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5011971>

The drama of cross-cultural encounters reflects The Rocks' focal location as a place linking continental, colonial, city and maritime histories. The Rocks was saved through fierce battles for its conservation, and by government ownership.

Despite ongoing incremental change in The Rocks, continuity and authenticity remain major themes, manifest in increasingly rare and fragile relics of original topography and built fabric, remnants of history and a living community.³³

4.2.8. The Sydney Opera House and Sydney Harbour Bridge

The Sydney Opera House is a national icon of exceptional significance located on Bennelong Point. It is of historical importance for its successful functioning as a performing arts centre of world renown. It is of significance for the extensive associations of the site with various periods in Australian history, including its association with the Aboriginal identity Bennelong.

The building is of exceptional aesthetic significance because of its spectacular quality as a sculpture in the round, both day and night, and the appropriateness of its design in relation to its setting, the picturesque quality of the setting, and the way in which its fabric reflects a contemporary philosophy of building creative forms from machine made parts. It is significant for the quality of finishes used throughout the interiors including service areas. It is of exceptional scientific significance for the development of new European construction and tendering techniques.³⁴

The bridge is one of the most remarkable feats of bridge construction. At the time of construction and until recently it was the longest single span steel arch bridge in the world and is still in a general sense the largest. The bridge, its pylons and its approaches are all important elements in townscape of areas both near and distant from it. The curved northern approach gives a grand sweeping entrance to the bridge with continually changing views of the bridge and harbour.

The bridge has been an important factor in the pattern of growth of metropolitan Sydney, particularly in residential development in post-World War II years. In the 1960s and 1970s the Central Business District had extended to the northern side of the bridge at North Sydney which has been due in part to the easy access provided by the bridge and also to the increasing traffic problems associated with the bridge.³⁵

³³ <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=4500458>

³⁴ <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=2423567>

³⁵ <http://www.environment.nsw.gov.au/heritageapp/ViewHeritageItemDetails.aspx?ID=5045703>

The Former Customs House (Item No.I1661);

- The AMP Building (Item No.1662);
- Circular Quay Railway Station (Item No.I1660); and
- The Sydney Harbour Bridge approaches group (Item No.I539).

Items in the vicinity listed on the SHR are:

- Customs House (former) (Listing No.00727);
- Circular Quay Railway Station Group (Listing No.01112), also included on the Transport for NSW Section 170 Register; and
- Sydney Harbour Bridge, Approaches and Viaducts (Listing No.00781).

The Circular Quay Ferry Wharves are listed on the Roads and Maritime Services (RMS) Section 170 Register. The Rocks is adjacent to the Study Area, on the northern side of the Cahill Expressway, and is managed by the Sydney Harbour Foreshore Authority (SHFA). The Rocks Conservation Area is included on the SHFA Section 170 Register.

The Sydney Opera House and the Sydney Harbour Bridge are listed on the National Heritage List, and the Sydney Opera House is listed on the World Heritage List. The Study Area is not located within the identified buffer or curtilage of these items, nor does it form part of any identified significant view lines.

6. IMPACT ASSESSMENT

6.1. BUILT HERITAGE

6.1.1. Generally

The proposed works are for the demolition of existing buildings on site to ground level only. As such, there are no identified physical or visual impacts to any heritage items in the vicinity.

The potential visual impacts associated with the proposed new buildings to be constructed on site are considered in separate applications and associated heritage impact statement reports, which have already been submitted to the City of Sydney and NSW Heritage Division for comment and approval.

6.1.2. Tank Stream

As already noted, the Tank Stream itself is located outside of the site, approximately 0.8 metres from the eastern site boundary adjacent to Gold Fields House, and approximately 0.82 metres from the eastern site boundary adjacent to Fairfax House. However, the three-metre curtilage which extends outwards from all surfaces of the Tank Stream is located within the allotments of the Study Area.

To assess potential physical impacts that may occur to the Tank Stream in association with the proposed demolition of buildings within the Study Area, as well as the subsequent redevelopment of the site (assessed under separate SSD applications), the 'Tank Stream Report' has been prepared by Arup, Engineering Consultants.

This report concludes that *all* works to be undertaken at the site, including all demolition works, will **not result in any identified impact to the Tank Stream**. The Tank Stream will be in no way exposed or otherwise impacted by the current proposal. Again, no works are currently proposed to be undertaken below ground (street) level under SSD 8110.

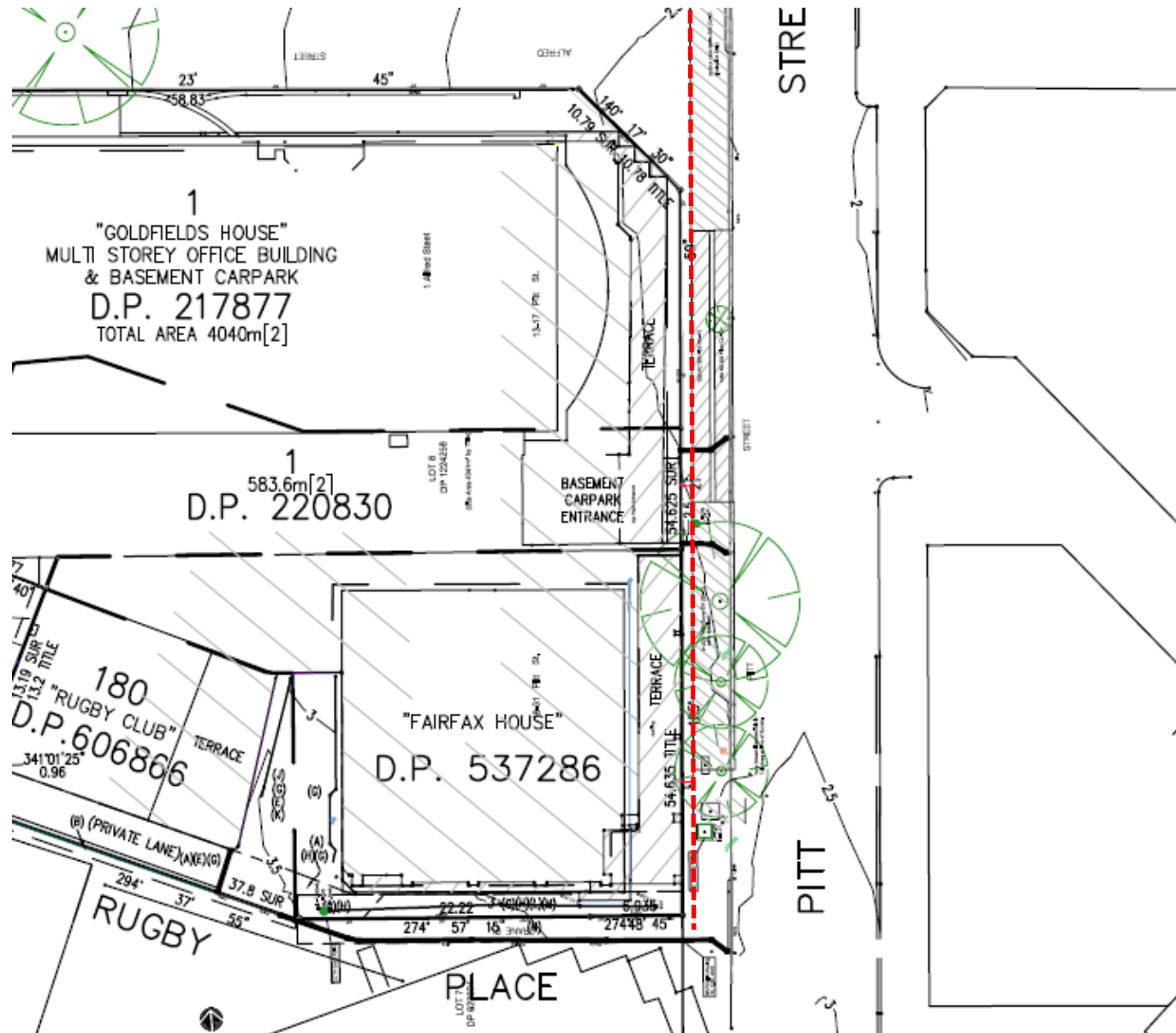
Based on the above, it is considered that the proposal will not result in any structural impact to the Tank Stream, despite occurring within the nominated three metre curtilage from all surfaces. It is noted that the Tank Stream Report identifies that all works are to be suitably monitored to ensure that no structural impacts to the Tank Stream occur throughout the duration of works proposed.

6.2. ARCHAEOLOGY

As noted above, the proposed works are for the demolition of existing buildings on site to ground level only; no sub-surface works are proposed under this application.

As no sub-surface works are proposed under this application, there are no identified archaeological impacts or constraints.

Figure 28 – Survey showing location of Tank Stream in relation to Study Area. Western extent of Tank Stream shown by red dashed line



Source: Wanda One Sydney

7. CONCLUSION AND RECOMMENDATIONS

As outlined in this report, there are no identified built heritage or archaeological impacts associated with the proposed works.

The potential visual impacts associated with the proposed new buildings to be constructed on site are considered in separate applications and associated heritage impact statement reports, which have already been submitted to the City of Sydney and NSW Heritage Division for comment and approval.

The proposed works will involve the demolition of existing structures to ground level only. As such, there will be no sub-surface disturbances associated with the proposal.

Further, the Tank Stream will be in no way exposed or otherwise impacted by the current proposal.

8. BIBLIOGRAPHY AND REFERENCES

8.1. BIBLIOGRAPHY

Department of Lands 2011, Spatial Information eXchange, Department of Lands, Sydney, available at: <<http://imagery.maps.nsw.gov.au/>>.

Google Maps 2011, Aerial view of subject site, available at: <<http://maps.google.com.au/maps?hl=en&tab=wl>>.

NSW Roads and Traffic Authority 2005, *From the Skies: Aerial photographs of Sydney in 1943*, CD-ROM, NSW Roads and Traffic Authority, Surry Hills.

RP Data 2011, Property Information search of subject site, available at: <<http://www.rpdata.net.au/>>.

Telstra Corporation 2011, *WhereiS.com*, Digital Maps, Telstra Corporation, available at: <<http://www.whereis.com/whereis/map.do>>.

8.2. REFERENCES

A.T. Yarwood, 'Johnston, George (1764 - 1823)', Australian Dictionary of Biography, Volume 2, Melbourne University Press, 1967.

Andrews. G, 1986, Port Jackson 200: 1786-1986, Reed Books, Sydney.

Attenbrow, V, 1992, 'Shell Bed or Shell Midden', *Australian Archaeology* No. 34.

Attenbrow, V, 2002, Sydney's Aboriginal Past, UNSW Press, Sydney.

Austral Archaeology Pty Ltd, 2005, *Towns Place Archaeological Monitoring Project*, prepared for Walsh Bay Finance Pty Ltd.

Australia ICOMOS 1999, *The Burra Charter: 2013 The Australia ICOMOS Charter for Places of Cultural Significance*, Australia ICOMOS, Burwood.

Bickford, A and S Sullivan 1984, 'Assessing the Research Significance of Historic Sites', in Sullivan S and S Bowdler (eds), *Site Surveys and Significance Assessment in Australian Archaeology* (Proceedings of the 1981 Springwood Conference on Australian Prehistory), Department of Prehistory, Research School of Pacific Studies, The Australian National University, Canberra.

Campbell, JF, 'The Valley of the Tank Stream', in *Journal of the Royal Australian historical Society*, Vol X, Part II, 1924.

Casey and Lowe, 2014, *Non-Aboriginal Archaeological Assessment & Impact Statement, Lend Lease Circular Quay Development – 182 & 33-35 Pitt Street, Sydney*, report to Lend Lease Development Pty Ltd.

Coffey Environments Australia Pty Ltd, June 2015, Wanda 1 Sydney Pty Ltd, Australia Sydney 1 Project, Environmental Phase 1 Assessment, prepared for Wanda 1 Sydney Pty Ltd, Australia Sydney 1 Project.

Coffey Geotechnics Pty Ltd, June 2015, Wanda 1 Sydney Pty Ltd, Australia Sydney 1 Project, Geotechnical Desktop Study, prepared for Wanda 1 Sydney Pty Ltd, Australia Sydney 1 Project.

Coffey Geotechnics Pty Ltd, October 2015, Wanda 1 Sydney Pty Ltd, Australia Sydney 1 Project, Geotechnical Investigation Report, prepared for Wanda One Sydney Pty Ltd.

Comber, J, 2012, *Darling Quarter (formerly Darling Walk), Darling Harbour, Aboriginal Archaeological Excavation Report*, unpublished report to Casey & Lowe Pty Ltd on behalf of Lend Lease Bovis.

Cultural Resources Management (CRM), 2003, *The KENS site Sydney: application S140 excavation permit; Archaeological Excavation Project Reports 1 and 2*, prepared for Leighton Properties.

- Edward Higginbotham Consultant Archaeological Services, 1986, *Report on Archaeological Watching Brief Gateway Plaza Circular Quay, Sydney, NSW*, prepared for Gateway Plaza Pty Ltd.
- GML Heritage, 1992, *Little Pier Street Precinct Archaeological Excavation—Volume 2 Main Report*, prepared for the Darling Harbour Authority.
- GML Heritage in association with Wendy Thorp, 1993, *Market City Paddy's Market Archaeological Excavation—Volume 2 Main Report*, prepared for Rockvale Pty Ltd.
- GML Heritage, 1998, *Angel Place Project 1997 Archaeological Excavation—Volumes 1–3*, prepared for AMP Asset Management Australia Ltd and the NSW Heritage Council.
- GML Heritage, 2012, *200 George Street, Sydney, Aboriginal Archaeological Excavation*, report prepared for Mirvac Property.
- GML Heritage, 2012, *200 George Street, Sydney, Historical Archaeological Research Design*, report prepared for Mirvac Property.
- GML Heritage, 2014, *Gold Fields House—Heritage Impact Statement and Preliminary Archaeological Assessment*, prepared for Dalian Wanda Group.
- Higginbotham, E., 1985, *Australian Historical Archaeology*, Vol. 3, 'Excavation Techniques in Historical Archaeology'.
- Heritage Office and Department of Urban Affairs & Planning 1996, *NSW Heritage Manual*, Heritage Office and Department of Urban Affairs & Planning (NSW), Sydney.
- Heritage Office 2001, *Assessing Heritage Significance*, Heritage Office, Parramatta.
- Letter Department of Railways to Cumberland County Council 17 September 1959, Sydney City Council Archives.
- Robertson & Hindmarsh, 2008, *Former Crane Warehouse, 117-119 Harrington Street, The Rocks Conservation Management Plan*, prepared for the Sydney Harbour Foreshore Authority.
- Sydney 1:100,000 Geological Series Sheet, 9130 Edition, 1983) and Soil Landscape Series Sheet (9130 Edition, 1983)
- The Rugby Club, <<http://www.rugbyclub.com.au/about/>> viewed 12 June 2015.
- Weingarh, J, The Head of Sydney Cove, in the *Journal of the Royal Australian Historical Society*, Vol X, Part V, 1924.
- Wendy Thorp Consultant Archaeologist, 1987, *Archival and Archaeological Report, Dalley Street Telephone Exchange Site*, prepared for the Department of Housing and Construction.
- Wendy Thorp Cultural Resources Management, 1998, *Customs House Sydney, Monitoring of Archaeological Deposits*, prepared for Council of the City of Sydney.
- [Note: Some government departments have changed their names over time and the above publications state the name at the time of publication.]

DISCLAIMER

This report is dated 20 February 2017 and incorporates information and events up to that date only and excludes any information arising, or event occurring, after that date which may affect the validity of Urbis Pty Ltd's (**Urbis**) opinion in this report. Urbis prepared this report on the instructions, and for the benefit only, of Wanda (**Instructing Party**) for the purpose of Heritage Impact Statement (**Purpose**) and not for any other purpose or use. To the extent permitted by applicable law, Urbis expressly disclaims all liability, whether direct or indirect, to the Instructing Party which relies or purports to rely on this report for any purpose other than the Purpose, and to any other person which relies or purports to rely on this report for any purpose whatsoever (including the Purpose).

In preparing this report, Urbis was required to make judgements which may be affected by unforeseen future events, the likelihood and effects of which are not capable of precise assessment.

All surveys, forecasts, projections and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to Urbis at the date of this report, and upon which Urbis relied. Achievement of the projections and budgets set out in this report will depend, among other things, on the actions of others over which Urbis has no control.

In preparing this report, Urbis may rely on or refer to documents in a language other than English, which Urbis may arrange to be translated. Urbis is not responsible for the accuracy or completeness of such translations and disclaims any liability for any statement or opinion made in this report being inaccurate or incomplete arising from such translations.

Whilst Urbis has made all reasonable inquiries it believes necessary in preparing this report, it is not responsible for determining the completeness or accuracy of information provided to it. Urbis (including its officers and personnel) is not liable for any errors or omissions, including in information provided by the Instructing Party or another person or upon which Urbis relies, provided that such errors or omissions are not made by Urbis recklessly or in bad faith.

This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

APPENDIX A 'TANK STREAM REPORT' PREPARED BY ARUP, SEPTEMBER 2016

To	Ashleigh Ryan (URBIS) Karyn Virgin (URBIS) Tracey Johnson (TTThinc) Nick Geracitano (Wanda)	Date 30 September 2016
Copies	Craig Leech (Arup) Tom Keeler (TTThinc) Rain Li (Wanda)	Reference number 247747-00
From	Guy Hollingum (Arup)	File reference TSTR_001
Subject	Wanda Sydney: Tank Stream Report	

Structural Input for D2015/1049 Condition 38 – Heritage Council Conditions

1 Introduction

This memo has been prepared to provide structural description of the works associated with the demolition of existing buildings and construction of the below grade works at the new Wanda Sydney Project at 1 Alfred Street, Sydney. These works are in close proximity to the adjacent heritage-listed Tank Stream.

This report is intended to supplement the Historical Archaeological Assessment prepared by Urbis Heritage.

Tank Stream

The heritage listed Tank Stream runs parallel to the eastern boundary of the site, underneath the Pitt St footpath and carriageway. It is immediately adjacent to the property boundary and approximately 800mm from the existing two storey concrete basement wall at Goldfield's House and the single storey basement wall at Fairfax House, Figure 2, Figure 5, and Figure 6.

This stone arch water outlet is classified as having state significant heritage listing. The arch Tank Stream transitions to a brick oviform at the southern boundary of the site, adjacent to the existing Fairfax Building, Figure 3.

CBD Rail Tunnel:

A Sydney CBD rail easement boundary also intersects with the north-east corner of the site, below ground.

Memorandum

2 Site

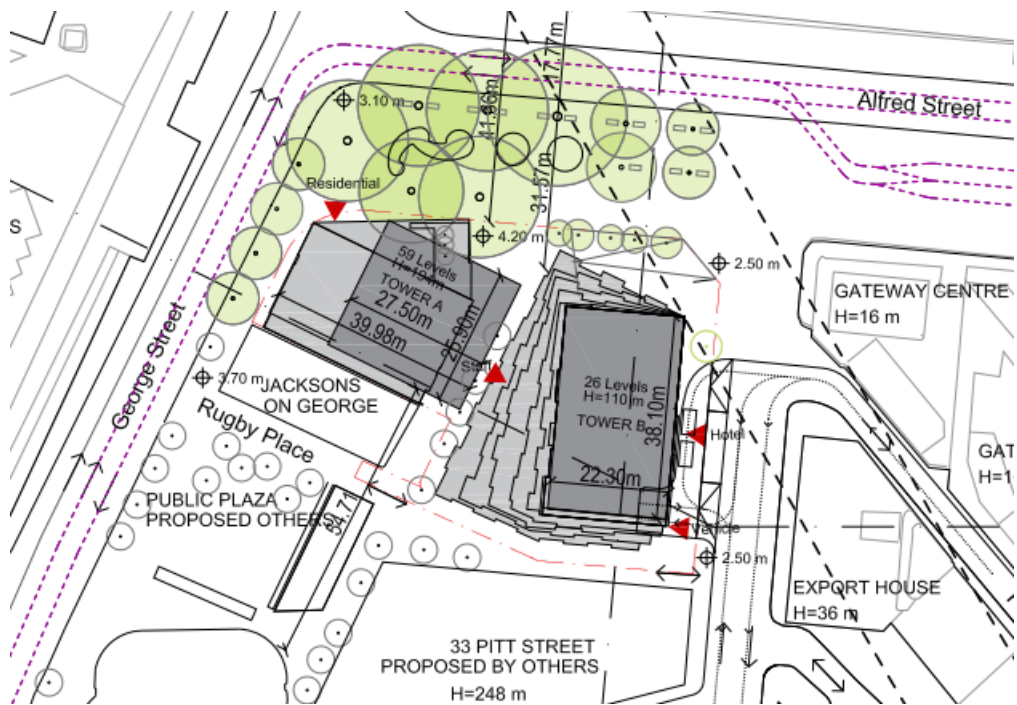


Figure 1: Site Plan

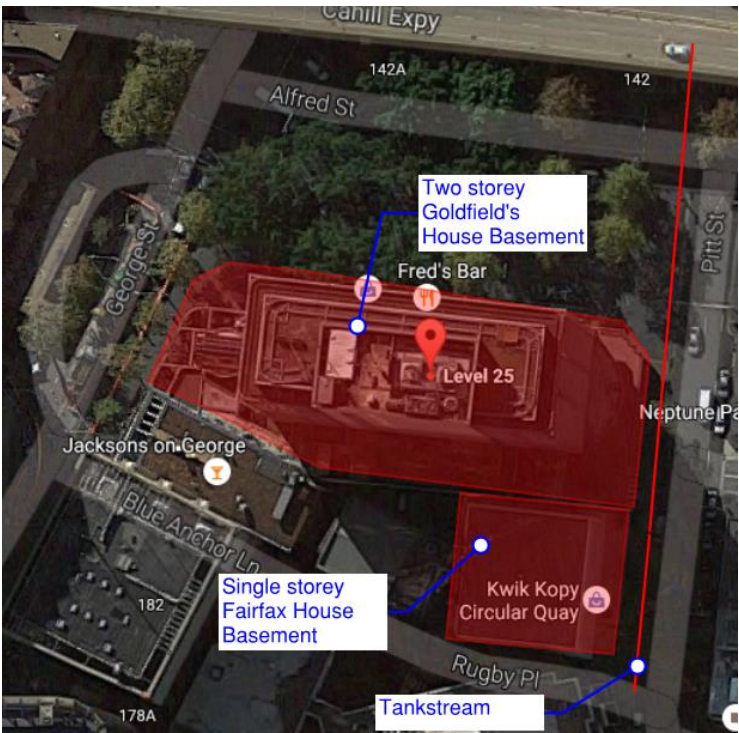


Figure 2 Existing Building basements

Memorandum

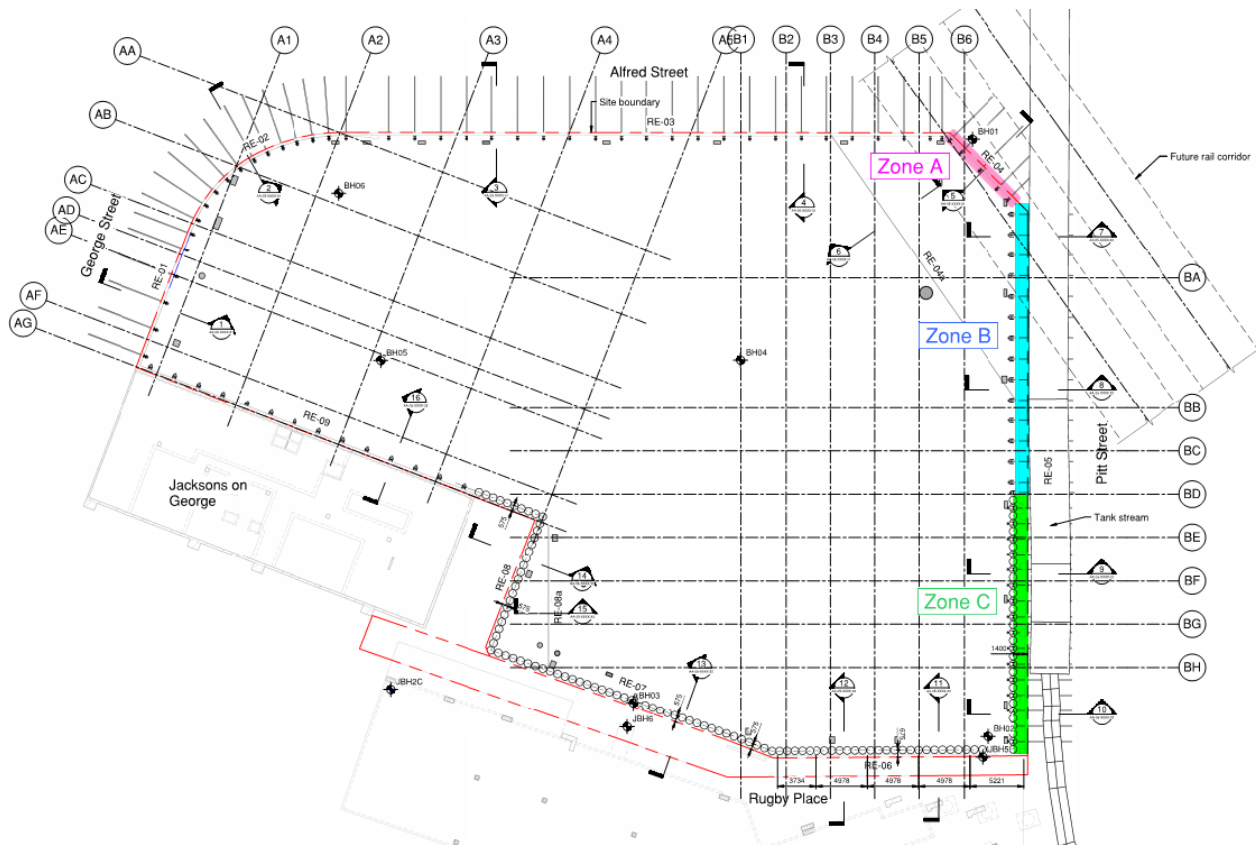


Figure 3: Extent of Proposed basement excavation

3 Retention Concept

The proposed development will require the removal of existing localised basement slabs, and excavation of fill, soil and rock below existing basement levels. There is potential risk that such works impact on the Tank Stream.

The following retention system concept design has been developed to minimise vibration and instability risks to the Tank Stream during construction of the proposed development.

3.1 Temporary Retention Concept

In order to minimize unnecessary disturbance to the Tank Stream structure, the existing eastern retaining walls of Goldfields House and the Fairfax House will remain and be incorporated into the final retaining and basement structure. This methodology physically protects the Tank Stream during excavation and works on site at all times, Figure 5.

Before demolition of the existing buildings below the ground plane, a temporary retention system will be constructed around the perimeter of the planned basements. The proposed temporary retention system is typically described as:

Memorandum

3.1.1 Goldfield House:

- The erection of temporary soldiers and waler beams internal to the site, restrained by temporary tensioned anchors into rock, Figure 5; and
- The footing level of the existing retaining wall at Goldfield's House effectively cuts off water inflow from the alluvium fill. In-flow from the vertically cut sandstone will be managed as part of the drained basement strategy, refer separate Groundwater Assessment submission.

3.1.2 Fairfax Building:

- The construction of permanent secant piling through the existing basement level into Class 2 sandstone, Figure 6;
- The toe level of the proposed secant pile wall will cut off water inflow from the alluvium fill. In-flow from the vertically cut sandstone will be managed as part of the drained basement strategy; and
- The drilling and construction of the secant pile wall will use rotary drilling rigs to minimize disturbance to the Tank Stream.
- The permanent secant wall is installed inboard of the existing wall with the gap filled during construction with lean mix concrete.

We are proposing two alternative methodologies for the design of the temporary retention schemes:

- At both the Fairfax House and Goldfield's House geometries, movements on the existing retaining wall may be controlled and adjusted through the use of structural jacking and shimming between the temporary retention system and the existing retaining wall. This method reduces the size of the temporary system, but requires frequent monitoring and control until the permanent structure below ground is complete;
- At both the Fairfax House and Goldfield's House geometries, movements on the existing retaining wall are limited to the values provided Table 1.

Both scenarios of the proposed retention system require verification via comprehensive analysis software to confirm details of the proposed system and quantify the impact on settlement or movement in the Tank Stream structure during all stages of construction and excavation.

Attached to this report are drawings showing the indicative staging for excavation and demolition in Zone B, adjacent Goldfields House. A similar sequence is proposed for Zone A and Zone C.

3.2 Demolition

The current demolition is considered to be piecemeal and doesn't substantiate specific structural methodologies or techniques.

Demolition of the existing slabs from ground-level down shall only commence once the retention system is in place and has been verified by the Engineer. Existing retaining walls will remain and be supported by the temporary retention system. These will be incorporated into the final basement structure and are not part of demolition scope.

Memorandum

Risk assessments with demolition strategies for controlling ground vibration and peak particle velocity during demolition are further explained in the Construction Management Plan. Arup are satisfied that peak particle velocities can be managed using industry standard demolition techniques.

During both demolition and construction, the local disturbance of soil immediately adjacent to the Tank Stream for services connection or other works not covered by this report should be avoided and temporary platforms or similar may be required to avoid damage from vehicles, cranes and other heavy construction equipment.

3.3 Excavation

Once demolition of existing structure has been completed with the temporary retention system installed, excavation can begin. Before reaching sandstone, there is a layer of alluvium fill to be excavated beneath Rugby House and Fairfax House. The depth of this fill varies between 1 to 2m below the bottom of existing structures.

After removal of the fill, typical excavation will follow standard Sydney sandstone excavation techniques with special consideration being given to minimizing rock hammering and vibrations in the vicinity of the eastern boundary. Further information can be found in the Construction Management Plan.

Excavation should be routinely inspected by the Geotechnical Engineer who will identify the need for specific, local rock-bolting and patching of seams and other irregularities within the sandstone. There are not any known major CBD faults within the site excavation. This has been confirmed by our testing and also testing for the development to the south of our site.

Dial-before-you-dig drawings do not show any existing services that run beneath the existing structures to be demolished and excavated.

The excavation approach is manageable and uses industry standard excavation techniques.

Excavation of the rock will induce some horizontal movement of the rock as the Sydney Basin stresses are redistributed. The lateral displacement strain at the rock supporting the Tank Stream is estimated to be 200 to 300 μ strain. This is far below the limits proposed in Table 1. Further details of the analysis can be found in the Arup TfNSW Geotechnical Report.

3.4 Construction

Construction of foundations and basement slabs will follow typical construction methodologies.

New basement slabs will restrain the perimeter walls before the removal of the temporary anchors.

At Fairfax House, these basement slabs will be anchored directly into the secant pile walls after allowing for necessary shrinkage movements in the slabs (56 day pour strips around perimeter).

At Goldfields House; a new reinforced concrete wall will be poured against the existing wall to the Basement 1 Level to provide confidence in waterproofing and durability before the retention system is systematically removed after 56 days. Pockets and recesses left by the retention system will then be patched up using standard construction techniques.

Memorandum

The movements in existing walls will be carefully monitored during the de-stressing and removal of anchors and jacks (if used).

3.5 Survey

A detailed 3D survey will be required to confirm dimensional assumptions and clearances. This survey should be combined with a pre and post dilapidation survey such that important points along the Tank Stream can be monitored for movement during excavation.

3.6 Groundwater

Groundwater levels measured at the site vary between -0.4 m AHD and 0.2 m AHD. The water table in the vicinity of the Tank Stream is expected to lie at elevations consistent with those measured. Groundwater levels are therefore expected to be consistent with the base channel elevation of the Tank Stream structure (within the Fill/Alluvium).

Drawdown of groundwater in the vicinity of the Tank Stream may cause ground settlement and should therefore be minimised during construction. The use of the existing perimeter retaining walls, and the new secant wall construction at Fairfax House, ground water inflow into the site is limited to seepage through sandstone cut surfaces and should thus have no meaningful effect on the Tank Stream.

A groundwater monitoring programme is proposed in the Arup Groundwater Assessment report and is intended to be constantly monitored during excavation. Should local ingress of water occur, pressure injection of rock cracks and defects will be required and is common practice during such excavations.

3.7 Monitoring sequence during excavation

3.7.1 Vibration monitoring

To avoid damage to the Tank Stream due to vibration-producing construction work, it is proposed that vibration monitoring is carried out. Vibration-producing construction activities include pile and temporary anchor installation, building demolition, rock breaking and excavation. Seismographs or the equivalent may be used for monitoring the velocities of ground vibration resulting from construction activities.

It is intended to locate the seismograph vibration sensors (geophones) at selected locations including points on the ground surface between 1m and 2m from the faces of the Tank Stream. In addition to the vibration monitoring system, it is proposed that an automated visual alarm be provided and apparent to the machine operator in order to notify the machine operator of any breach of vibration acceptance criteria which would trigger an immediate cessation of works.

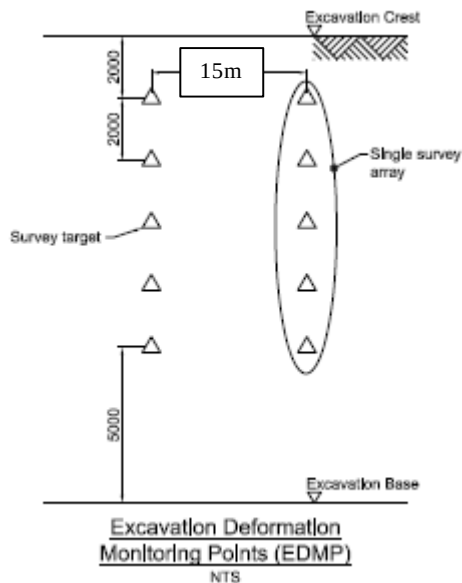
3.7.2 Ground movement monitoring

The lateral ground movement in proximity to the Tank Stream due to the excavation work is proposed to be monitored by Inclinator and Excavation Deformation Monitoring Points (EDMP). Where space permitted, inclinometer will be installed in between the basement retention system and

Memorandum

the Tank Stream. It is anticipated that the inclinometers are to be installed at 30m spacing and to at least 3m below the toe level of the basement retention wall.

The area of the basement retention wall and excavation surface between inclinometers will be monitored using EDMP which consists of arrays of survey target as depicted below. It is anticipated that the array spacing would be approximately 15m to provide lateral ground movement data of the basement retention wall and the excavation surface of the Sandstone.



Surface Settlement Points are proposed at the ground surface along the Tank Stream route at spacing of approximately 20m to observe any vertical ground movement.

3.7.3 Tank Stream settlement monitoring

Tank Stream Settlement Monitoring Points are proposed to be installed on the ground surface which has a moveable steel rod at each monitoring point extending to the crown of the Tank Stream. The intent of the Tank Stream Settlement Monitoring Points is to observe the vertical settlement of the Tank Stream along the route. The spacing of monitoring point is approximately 20m.

3.7.4 Groundwater monitoring

Standpipe monitoring points will be installed at the outside the perimeter of the excavation to observe the groundwater response within the Fill/Alluvium and the Sandstone at the Tank Stream catchment. It is intended that the proposed basement retention wall will cut off water seepage from the perched water within the Fill/Alluvium and thus the water drawdown is expected to be insignificant. Groundwater inflows from the Sandstone rock mass into the excavation will through the rock defects and local clay seams.

Proposed monitoring regime

Instrument Type	Monitoring Frequency
-----------------	----------------------

Memorandum

Vibration Monitoring	• Baseline reading prior to vibration-producing activities (2 weeks) • Weekly when vibration-producing activities are active
Inclinometer	• Baseline reading prior to commencement of excavation (2 weeks) • Reading every 2m of excavation or weekly (whichever occurs first)
Excavation Deformation Monitoring Point	• Baseline reading at the existing basement wall prior to commencement of excavation and removal of basement slabs (2 weeks) • Reading every 2m of excavation or weekly (whichever occurs first)
Surface Monitoring Point	• Baseline reading prior to commencement of excavation and removal of basement slabs (2 weeks) • Reading every 2m of excavation or weekly (whichever occurs first)
Tank Stream Settlement Monitoring Point	• Baseline reading prior to commencement of excavation and removal of basement slabs (2 weeks) • Reading every 2m of excavation or weekly (whichever occurs first)
Groundwater Monitoring Point	• Baseline reading prior to commencement of excavation (2 weeks) • Reading every 2m of excavation or weekly (whichever occurs first)

Memorandum

4 Retention Sections

4.1 Zone A

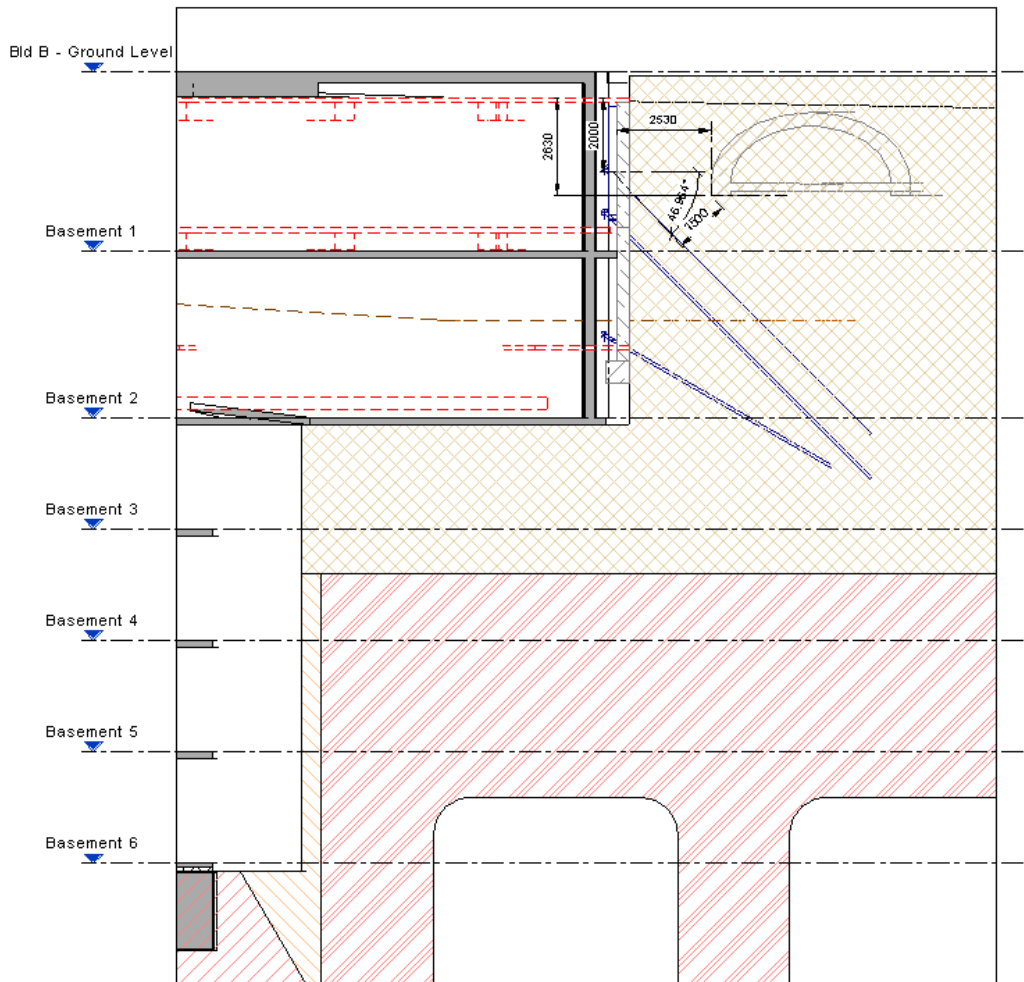


Figure 4 Typical anchor location at Sydney Trains easement

Zone A, refer Figure 3, is a stepped section of excavation comprising of a 10m length of existing Goldfields House concrete retaining wall, extending to 2 levels of basement, which then steps back over the proposed CBD rail corridor to a 32m length vertical rock cut (parallel to the rail tunnel corridor) for the remaining 4 levels of basement, up to a final excavation of approximately RL - 18.000m.

Memorandum

4.2 Zone B

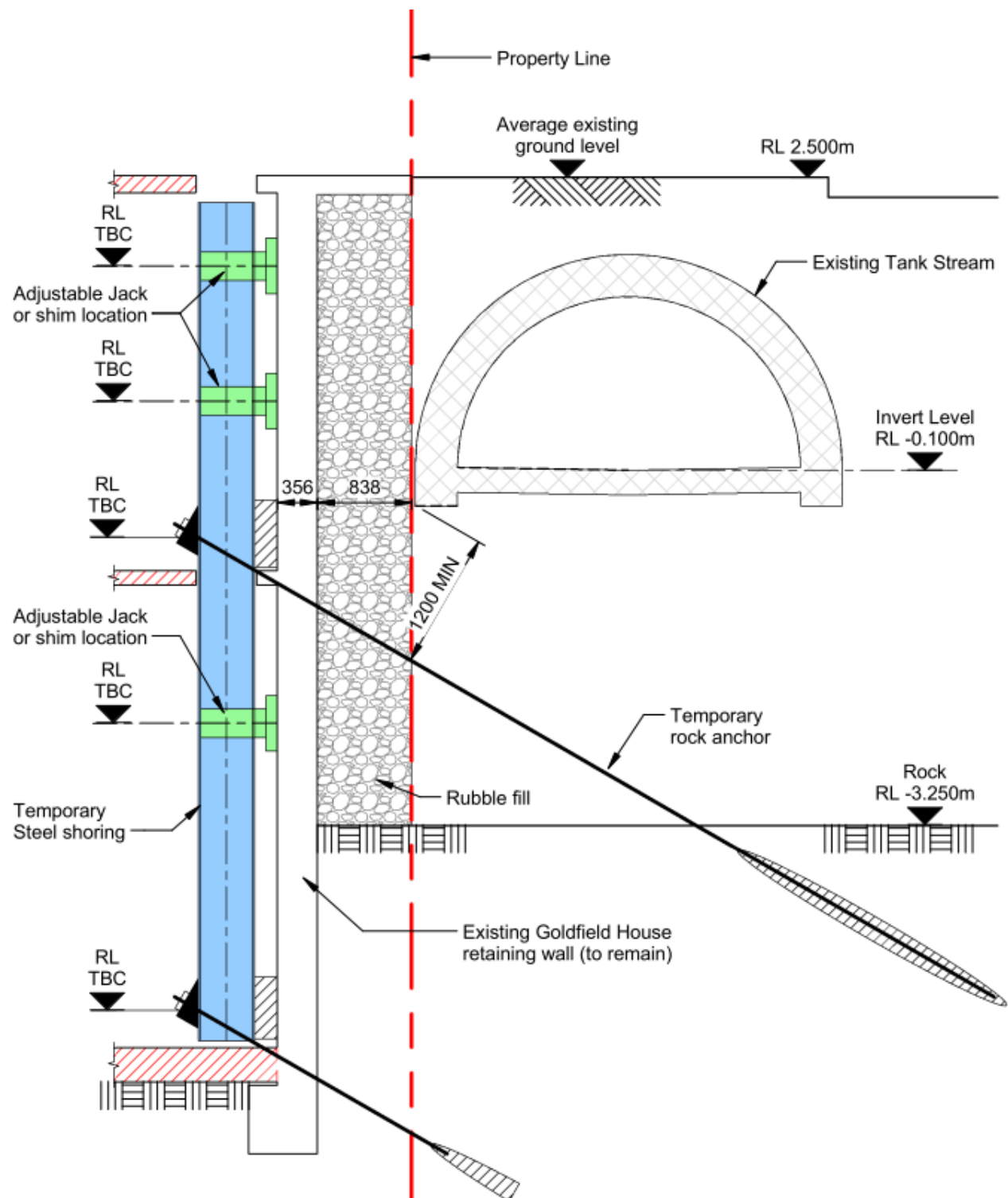


Figure 5 Typical retention at Goldfield's House

Memorandum

Zone B comprises of approximately 19m of existing retaining wall from the Goldfields House development, running parallel to Pitt Street. The intention during excavation is for this existing retaining wall to remain permanently in order to minimise disturbance on the Tank Stream.

Due to the proximity of the Tank Stream to the existing retaining walls, the vertical level of the first row of anchors is proposed to be as close the invert level of the Tank Stream as practical, to provide confidence in a stiff support at this location. There will be greater certainty of controlling movements in the wall if there is a stiff support point on the existing wall in this location.

Anchors will be installed at 30 degrees to the horizontal to provide the greatest amount of horizontal stiffness to the existing wall.

Using information from the 1878 Sydney Sewage work drawings (OCP 267), the invert level of the Tank Stream is estimated to be -0.1 m AHD at the southern end of the site and sloping towards circular quay with a 1:200 gradient. Wall thickness of the tank stream along this zone is assumed from drawings to be 370mm. Clearance to the existing Tank Stream is estimated at 1200mm.

Because of the sensitive nature of the existing Tank Stream and the relative proximity of the anchors to the Tank Stream (approx.. 1200mm), the temporary anchors to be installed will have a specified installation tolerance at the Tank Stream of not more than +/- 75mm, vertical and lateral.

Upon de-stressing and removal these anchor pockets will then be grouted up to ensure minimal disturbance risk for the Tank Stream.

Memorandum

4.3 Zone C

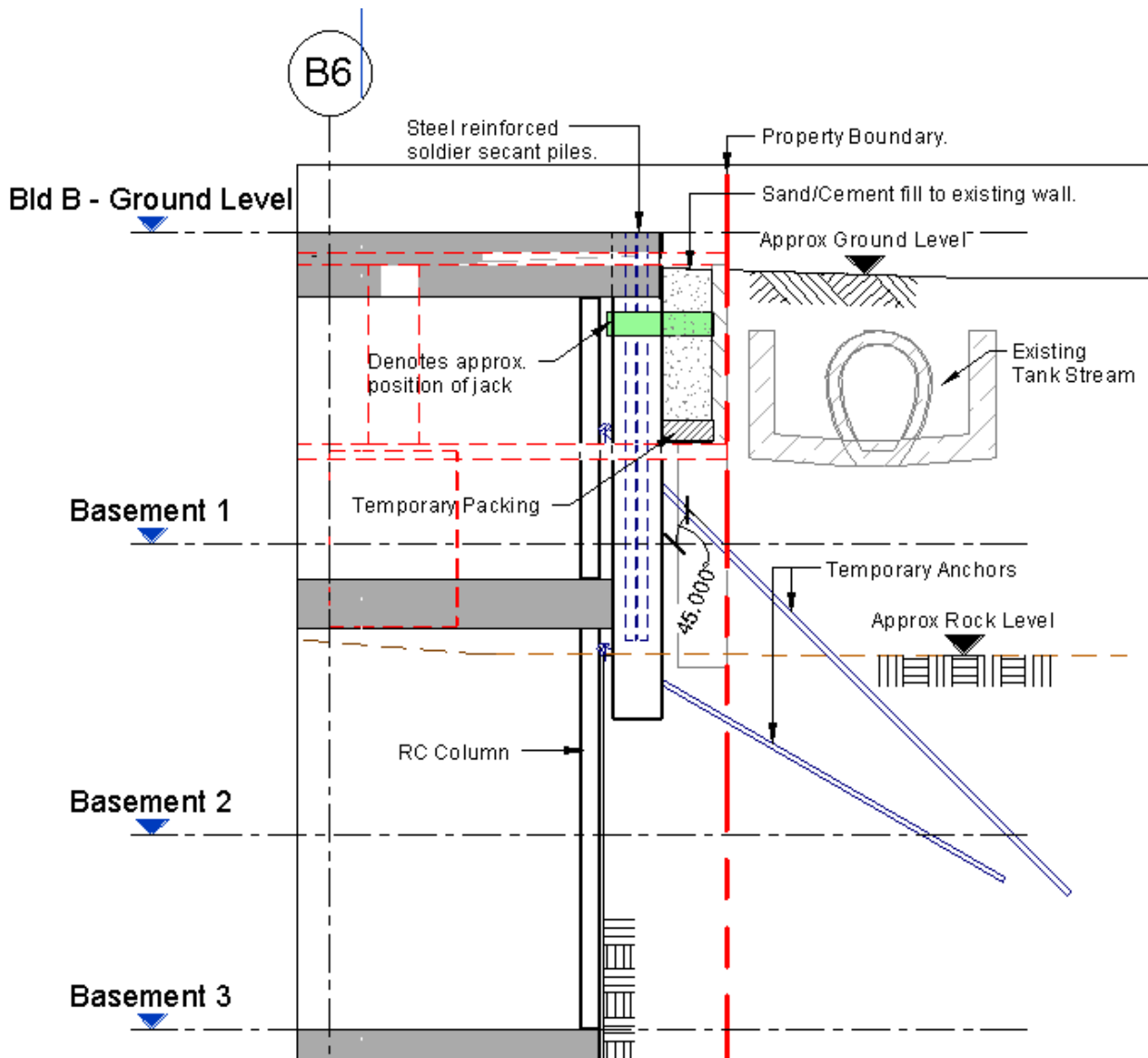


Figure 6 Retention at Fairfax House

Zone C follows the extent of the existing Fairfax building. A secant pile wall will be drilled inboard of the existing retaining wall to align with the Goldfield's House wall and avoid existing bell-mouth piers to rock under Fairfax House perimeter columns. Either concrete or steel columns will extend to ground level providing restraint to the existing perimeter wall to allow demolition of the slabs. Excavation will then progress and accompany the installation of temporary anchors to support the pile wall. Jacking can be controlled from the steel retention against the existing retaining wall in order to minimise movements on the wall.

The purpose of the secant pile wall is to provide a permanent waterproof barrier in the alluvium fill between the existing Fairfax slab and the rock level. Implications for ground water, location and survey are as per Zone B

Memorandum

Wall thickness of the brick oviform profile is assumed at 230mm per Sydney Sewage Works drawings (1878).

5 Thresholds for Impact to Tank Stream

Settlement and strain thresholds for in-ground masonry drainage structures are not available in the Australian Standards or the literature. Surrogate thresholds have been developed based on widely adopted thresholds for the assessment of potential damage to in-ground services and above-ground masonry buildings due to excavation-induced movements.

The thresholds should be considered preliminary and may require revision based on additional information (such as dilapidation and survey data for the Tank Stream).

Table 1 Wall and Tankstream Movement Criteria

Item	Criteria Type	Scope of works	Relevant Standards	Recommended criteria at Tank Stream
1	Vibration	Demolition, basement excavation, retention system piling, anchor installation and new infrastructure works	No Australian Standard British Standard BS 7385 Part 2: 1993 Evaluation and Measurement for Vibration in Buildings Part 2 German standard DIN 4150 – Part 3 – Structural Vibration in Buildings – Effects on Structures	Peak particle velocity of less than 3 mm/s
2	Strain, deflection and differential settlement (“tilt”)	Demolition, basement excavation and new infrastructure works	No Australian Standard Refer to Burland and Wroth (1974, 1975), Boscardin and Cording (1989), Burland et al (2007)	Ratio of horizontal strain to angular distortion of less than 0.44. Tensile strain less than 0.05% (500µstrain) Deflection ratio (sagging ratio) less than approximately 1 in 600
3	Groundwater fluctuation	Basement excavation, anchor installation and new infrastructure works.	None	Groundwater drawdown less than 1m.

Memorandum

6 Preliminary Deflection Analysis Results

The analysis of the proposed retention system has been undertaken in 2D finite element soil mechanics program, Plaxis, as it is essential to understand the non-linear behaviour of deformation and the impact on the Tank Stream. This analysis has been staged to correspond with the proposed retention sequence, namely:

1. Install packers and steel soldiers with jacking plates
2. Install upper row of anchors
3. Remove existing top slab
4. Install second row of anchors
5. Remove existing middle slab
6. Remove existing base slab
7. Excavate stages 1, 2, 3 and 4
8. Reinstall the top, middle and base slabs
9. Remove anchors
10. Activate footing pressures for new building

There are three primary Plaxis models to be developed and analysed:

1. Atypical retention along corner of Goldfields House (Zone A) with building footing loads and tunnel excavation below
2. Typical retention of Goldfields House (Zone B)
3. Typical retention of Fairfax House building (Zone C)

Preliminary results are presented for the first analysis below.

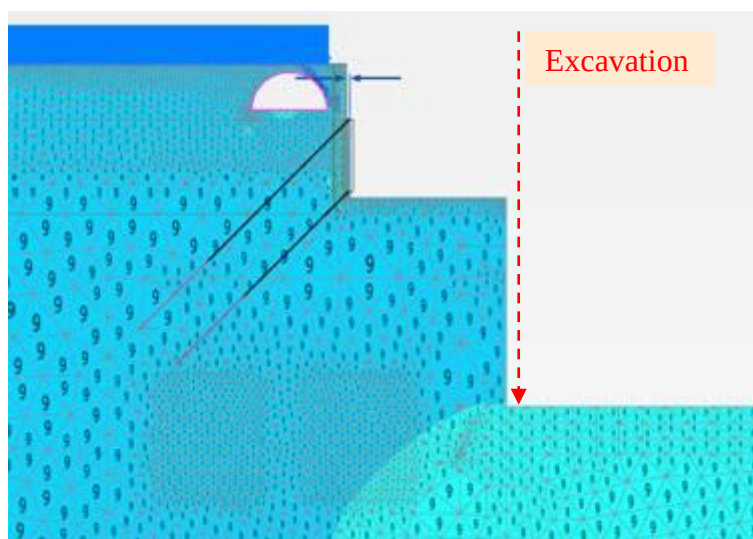


Figure Plaxis Section

Memorandum

This model is sufficient to identify the expected strain at the rock surface due to the excavation of the rock. It is well known that Sydney sandstone moves between 0.5mm and 2mm per meter of excavation. However this translation is not felt by the Tank Stream, instead it is affected by the rate of displacement change, i.e. the strain.

The expected strain at the top of rock in the vicinity of the Tank Stream due to the bulk excavation is approximately 140 μ strain. Well within the acceptable limit of 500 μ strain for tensile strain.

A sensitivity study on rock properties will need to be undertaken in the detailed design phase to confirm the analysis parameters and refine the predicted range of movement.

A sensitivity study will also need to be undertaken on the various geometries and distances of the rock bench in Zone A, as this changing geometry may influence the relative movement along the length of the Tank Stream.

Please note that these strains do not include the local deformation of the temporary retention wall as this will be determined during detailed design.

7 Conclusion

Without defined criteria for quantifying impact on the Tank Stream, Arup have proposed internationally accepted limits, presented in Section 5. The adoption of these thresholds, and the proposed methodologies for retention, excavation, and construction will result in no structural impact on the tank stream.

Monitoring during construction will verify the satisfactory performance of the designed scheme.

Preliminary finite element analysis models described in Section 6 confirms that the strains and movements resulting from the excavation are well within allowable thresholds, and thus would not cause impact on the Tank Stream.

The groundwater drawdown within the overburden Fill and Alluvium soil bodies will be limited by the reuse of the existing walls and the use of secant wall construction at Fairfax House down to the rock level, where, after further excavation, there will then be limited seepage through the local rock defects in the sandstone. The sandstone has a separate regional groundwater table. Monitoring of the groundwater tables has been proposed in the Arup Groundwater Assessment Report.

8 Reference Documents

The following documents are referenced in this memorandum:

- TfNSW Geotechnical Report, Arup (30/09/16)
- Groundwater Assessment Report, Arup (30/09/16)
- TfNSW Structural Easement Report, Arup (30/09/16)
- GEOTLOV24001AF - Groundwater Monitoring Results, Coffey (2/10/16)
- GEOTLCOV24001AF-AB Final Geotechnical Investigation Report, Coffey (2/10/16)

Memorandum

- Linker Survey 150302, Detail Issue 3, (16/09/2016)
- 174-182 George St and 33-35 Pitt Street Sydney, Tank Stream Conservation Report, Coffey, October 2015.
- German Standard DIN 4150 – Part 3 – Standard vibration in buildings – Effects on Structures.
- Burland, J.B., and C.P. Wroth (1974), Settlement of Buildings and Associated Damage, State-of-the-art Review, Proc. Conf. Settlement of Structures, Cambridge, Pentech Press, London, p611.
- British Standard BS 7385: Evaluation and measurement for vibration in buildings Part 2.
- Boscardin, M.D., and E.J. Cording (1989), Building Response to Excavation-Induced Settlement, Journal of Geotechnical Engineering, American Society of Civil Engineers, Vol. 115, No. 1, pp. 1-21.



Sequentially demolish pockets through existing Goldfields House slabs.



T-S2.1	Drop steel shoring soldier through slabs resting on basement floor.
T-S2.2	Grout up packing against existing wall.
T-S2.3	Monitor and record wall movements.



Install Temporary anchor and prestress.
Record wall movements before and after stressing.



Install lower temporary anchor and prestress
Record wall movements before and after
prestressing.



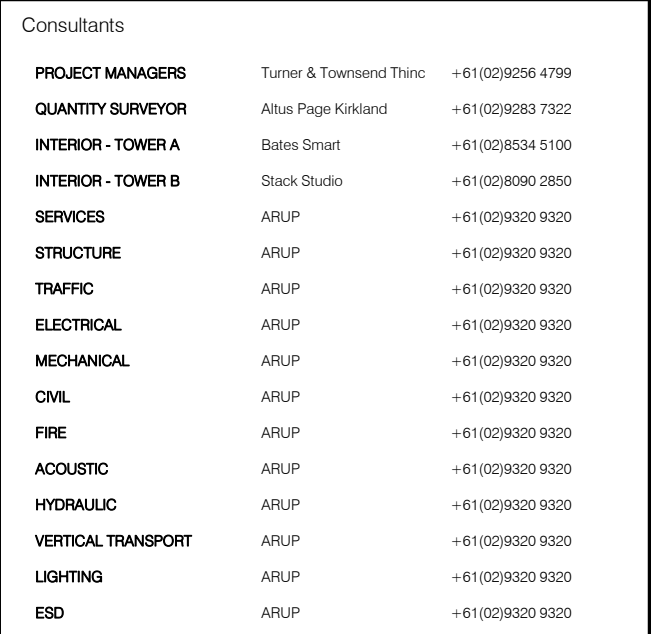
T-S5.1	Install Jack and packing at top of steel soldier
T-S5.2	Repeat Stage 1 to Stage 5 for adjacent steel soldiers and pockets.
T-S5.3	Monitor and record movements.
T-S5.4	Compile movement report and issue.



T-S6.1	Monitor and adjust jacking force whilst carefully demolishing existing Goldfields House Slabs
T-S6.2	Monitor and record movements.
T-S6.3	Compile movement report and issue.

Reference Drawings:

- AP-ST-AA-00-XXXX-00 to 04 - General Notes
- AP-ST-AA-00-XXXX-05 to 09 - Costing Notes
- AP-ST-AA-00-XXXX-10 - Reinforcement Laps & Development Tables
- AP-ST-AA-00-XXXX-20 to 24 - Loading Plans
- AP-ST-AA-00-XXXX-30 to 99 - Typical Details



Client

万达集团

Wanda Group

Executive Architect

PTW Architects

PTW

Level 13, 9 Castlereagh St
Sydney NSW Australia 2000

T +612 9232 5877
F +612 9221 4139

NW Nonrated Architects
9 Persons Architect No.0009
D Jones Architect No.4778
A Ross Architect No.0027

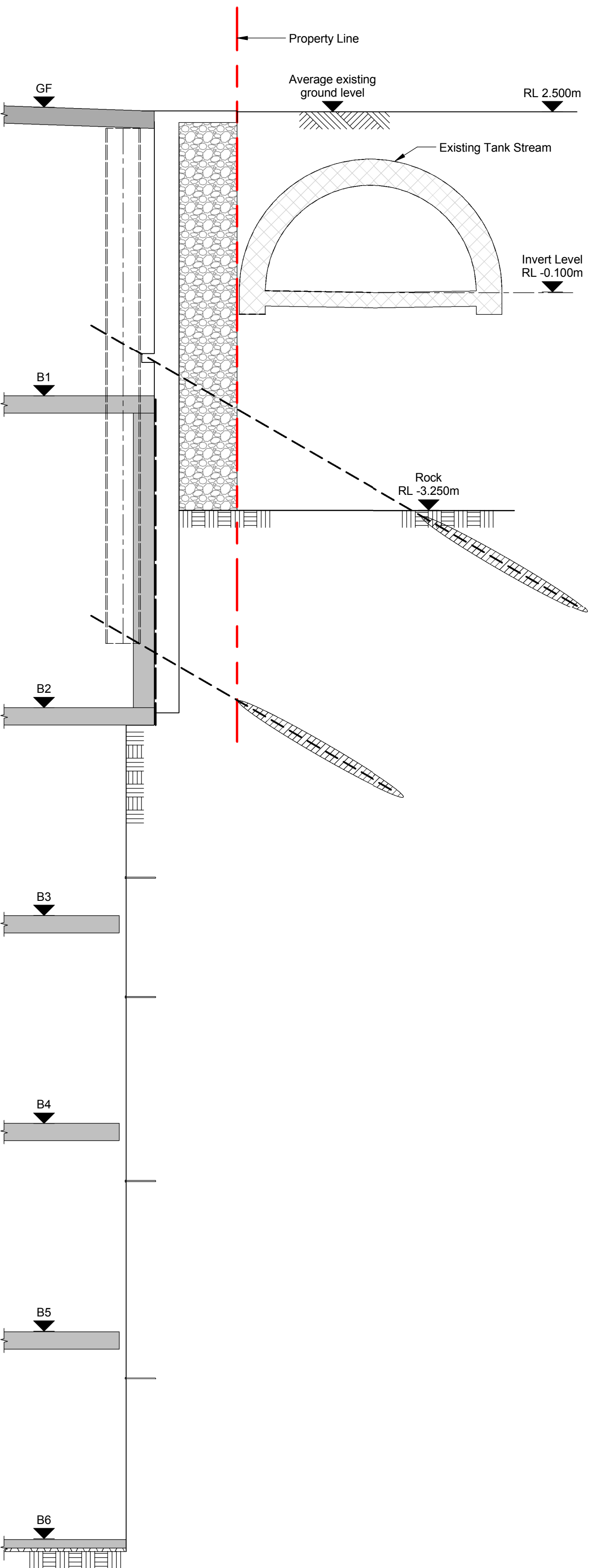
Approvals	By:	Date:
PTW Approval:		
Client Approval:		

NOT TO BE USED
FOR CONSTRUCTION

Project:
Wanda Sydney Project
1 Alfred Street

Title: Tank Stream Sequence - Sheet 1

0	0.5	1	2	3	4m
Scale:		Plot Date:		Job No:	
@A1		30/09/2016 4:37:55 PM		247747	
Dwg No:			Revision:		
AP-ST-AA-05-XXXX-60					
Suitability:					



Stage 10

Scale 1:50

- | | |
|---------|--|
| T-S10.1 | After minimum of 28 days completion of ground level and top of capping beam pour strip de-stress temporary anchors (written approval from the Engineer). |
| T-S10.2 | Remove jacking and steel soldiers |
| T-S10.3 | Compile movement report and issue. |
| T-S10.4 | Pour infill concrete in pockets left by soldiers/anchors. |

Suitability:



BRISBANE

Level 7, 123 Albert Street
Brisbane QLD 4000
Australia
T +61 7 3007 3800

GOLD COAST

45 Nerang Street,
Southport QLD 4215
Australia
T +61 7 5600 4900

MELBOURNE

Level 12, 120 Collins Street
Melbourne VIC 3000
Australia
T +61 3 8663 4888

PERTH

Level 14, The Quadrant
1 William Street
Perth WA 6000
Australia
T +61 8 9346 0500

SYDNEY

Tower 2, Level 23, Darling Park
201 Sussex Street
Sydney NSW 2000
Australia
T +61 2 8233 9900

CISTRI – SINGAPORE

An Urbis Australia company
#12 Marina View
21 Asia Square, Tower 2
Singapore 018961
T +65 6653 3424
W cistri.com