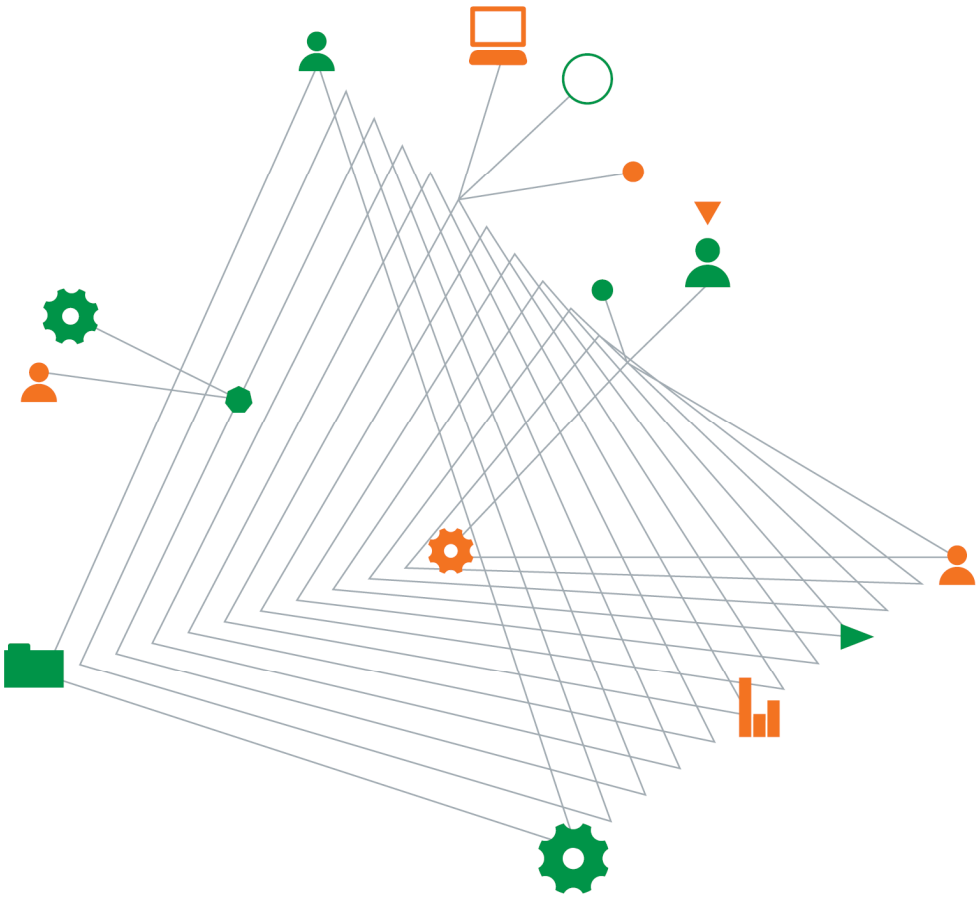
Lend Lease Development Pty Limited

Lend Lease Circular Quay

174-182 George Street and 33-35 Pitt Street, Sydney
Tank Stream Conservation Report

October 2015



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Lend Lease Circular Quay

Prepared for
Lend Lease Development Pty Limited

Prepared by
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October 2015

Our ref: GEOTLCOV24730AA-BD

Attention: Warwick Bowyer

Dear Warwick,

Coffey Geotechnics Pty Ltd (Coffey) is pleased to present this report in relation to conservation of the Tank Stream for the proposed Lend Lease Circular Quay redevelopment of 174-182 George Street and 33-35 Pitt Street, Sydney. If you have any questions regarding our report please contact the undersigned on 9406 1000.

For and on behalf of Coffey

Ben Rotter
Senior Engineer

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1. Introduction

Coffey Geotechnics Pty Ltd (Coffey) has carried out a Tank Stream conservation study for the proposed Lend Lease Circular Quay (LLCQ) redevelopment at 174-182 George Street and 33-35 Pitt Street, Sydney. The Tank Stream is located adjacent to the Pitt Street boundary of the proposed LLCQ redevelopment site. In this location, the Tank Stream is conveyed in a brick-lined tunnel approximately 2.1 m high.

This assessment report was prepared in support of the Planning Proposal submission for the LLCQ project to be lodged by Lend Lease with the City of Sydney.

The objectives of this study were to:

- Review historical research materials (research undertaken by others) provided by an archaeologist appointed by Lend Lease that sets out the nature and location of the Tank Stream adjacent to 33-35 Pitt Street (including both the stone drainage channel and the oviform drainage channel)
- Develop a geotechnical model of the Tank Stream adjacent to 33-35 Pitt Street that considers the Tank Stream location, tunnel construction and dimensionality in the context of the proposed LLCQ redevelopment
- Develop Tank Stream-specific conservation engineering criteria considered appropriate to address vibration, deflection, differential settlement (including “twist”), clearance, groundwater fluctuation and other engineering impacts that would need to be satisfied during adjacent LLCQ redevelopment works at 33-35 Pitt Street so as to reduce the risk of detrimental impacts on the Tank Stream both during and post the proposed redevelopment works
- Develop a retention system concept design for the portion of the proposed LLCQ basement adjacent to the site boundary at 33-35 Pitt Street that lies adjacent to the Tank Stream which can be constructed utilising industry-standard design and construction techniques such that the conservation engineering criteria developed above will be satisfied both during and post the proposed redevelopment works.

2. Proposed Redevelopment

A Planning Proposal submission for the LLCQ project will be lodged by Lend Lease with the City of Sydney. The purpose of the LLCQ Planning Proposal submission is to facilitate the lodgement of a development application for the LLCQ scheme in 2016.

The Planning Proposal relates to the land parcels listed in Table 1 and shown in Figure 1.

Table 1: Land Parcels Covered by the Planning Proposal

Informal Title	Address	Lot and DP	Ownership
The Pitt Street Property	33-35 Pitt Street	Lot 7 DP 629694	Lend Lease (Circular Quay) Pty Ltd
The George Street Property	182 George Street	Lot 182 DP 606865	Lend Lease (Circular Quay) Pty Ltd
Jacksons on George	174-176A George Street	Lot 181 DP 606865	Lend Lease Development is the owner of Jacksons on George
Mirvac Triangle	Part of 200 George Street development site	Lot 1 in DP 69466 and Lot 4 in DP 57434. The part of these Lots to which the Planning Proposal relates is referred to as Lot 2 in the draft plan of subdivision dated 13 November 2012 (Issue 7) contained in the executed VPA between the City of Sydney and Mirvac	Mirvac owns the land. Mirvac will transfer the new Lot 2 to the City of Sydney who will then transfer to Lend Lease in return for an equivalent area of completed public realm
Crane Lane including walkway (aerial bridge)	Crane Lane extending east from George St, then north to Rugby Place	Lot 1 and 2 in DP 880891. Lot 1 is in stratum above Lot 2	City of Sydney
Rugby Club (Optional Site)	Rugby Place	Lot 180 DP 606866	Wanda One Sydney Pty Ltd

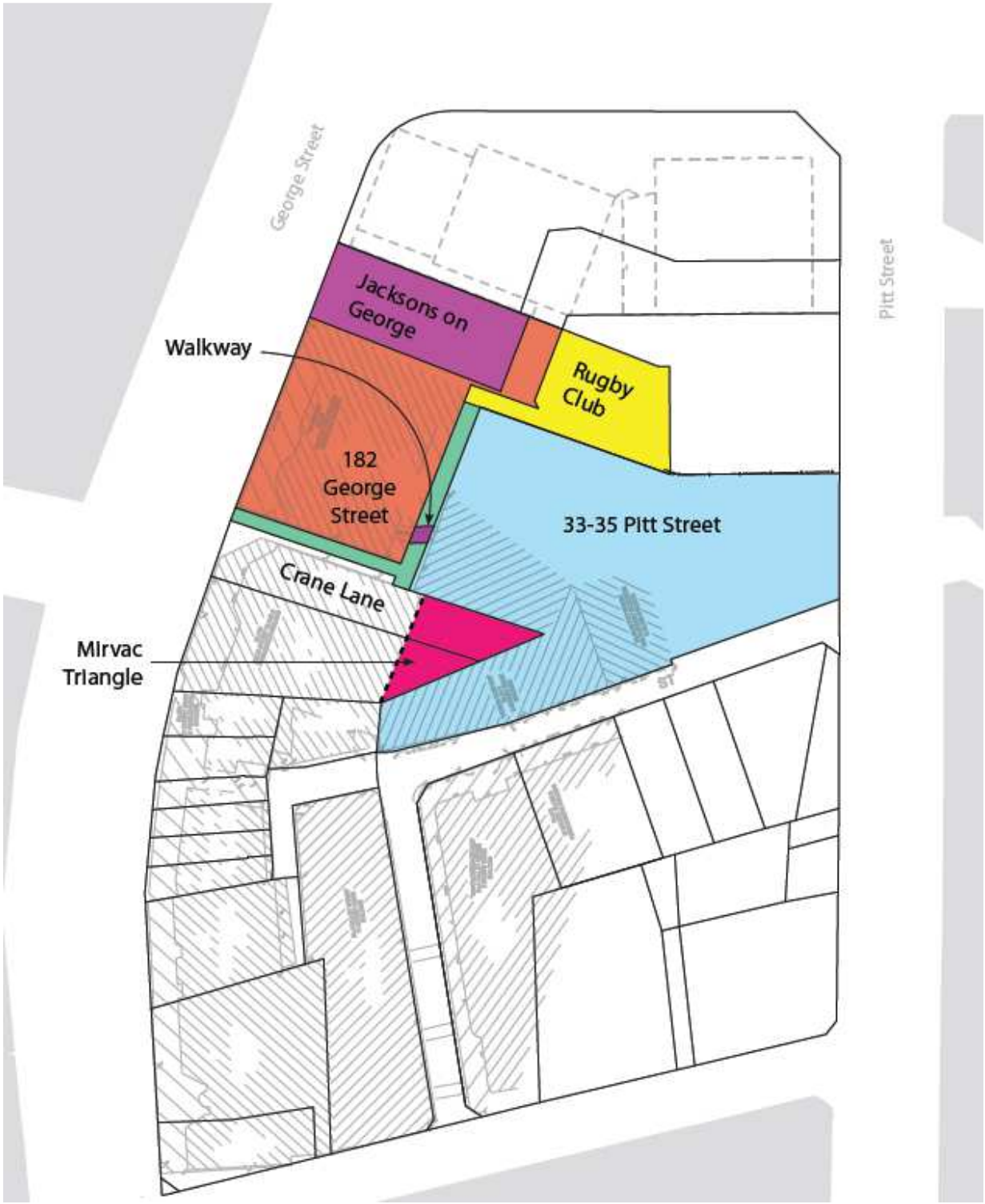

Figure 1: Land Parcels Covered by the Planning Proposal

The LLCQ site is located towards the northern end of Pitt Street, bounded to the south by Underwood Street, to the north by Rugby Place and to the west by George Street. There are existing multi-storey developments adjacent to the site's northern, southern and western boundaries.

The 33-35 Pitt Street site (the land parcel closest to the Tank Stream) is presently occupied by a three-storey brick building with a partial single basement level fronting Underwood Street and a multi-storey (12 level) concrete and glass building fronting Pitt Street.

Figure 2 shows the footprint of the proposed LLCQ development and the location of the Tank Stream.

The LLCQ scheme contemplates:

- Demolition of existing commercial office buildings at both 182 George Street and 33-35 Pitt Street (and possibly Rugby Club), including the removal and disposal of hazardous materials (where relevant)
- The retention, modification and adaptive reuse of Jacksons on George
- Site preparatory works including (where relevant):
    - The erection of hoardings and overhead protection structures
    - Remediation of contamination
    - Undertaking of archaeological investigation and protection works
    - Augmentation and diversion of existing infrastructure services
- The erection of a commercial office tower up to 248 m in height, up to 70,000 m^2 of gross floor area, and approximately three basement levels
- Delivery of new public realm consisting of a public plaza on George Street and new interconnecting laneway extensions between Underwood Street and Rugby Place
- The construction of shared laneway and plaza retail for the purpose of activating the new public realm
- Internal traffic amendments to Rugby Place.

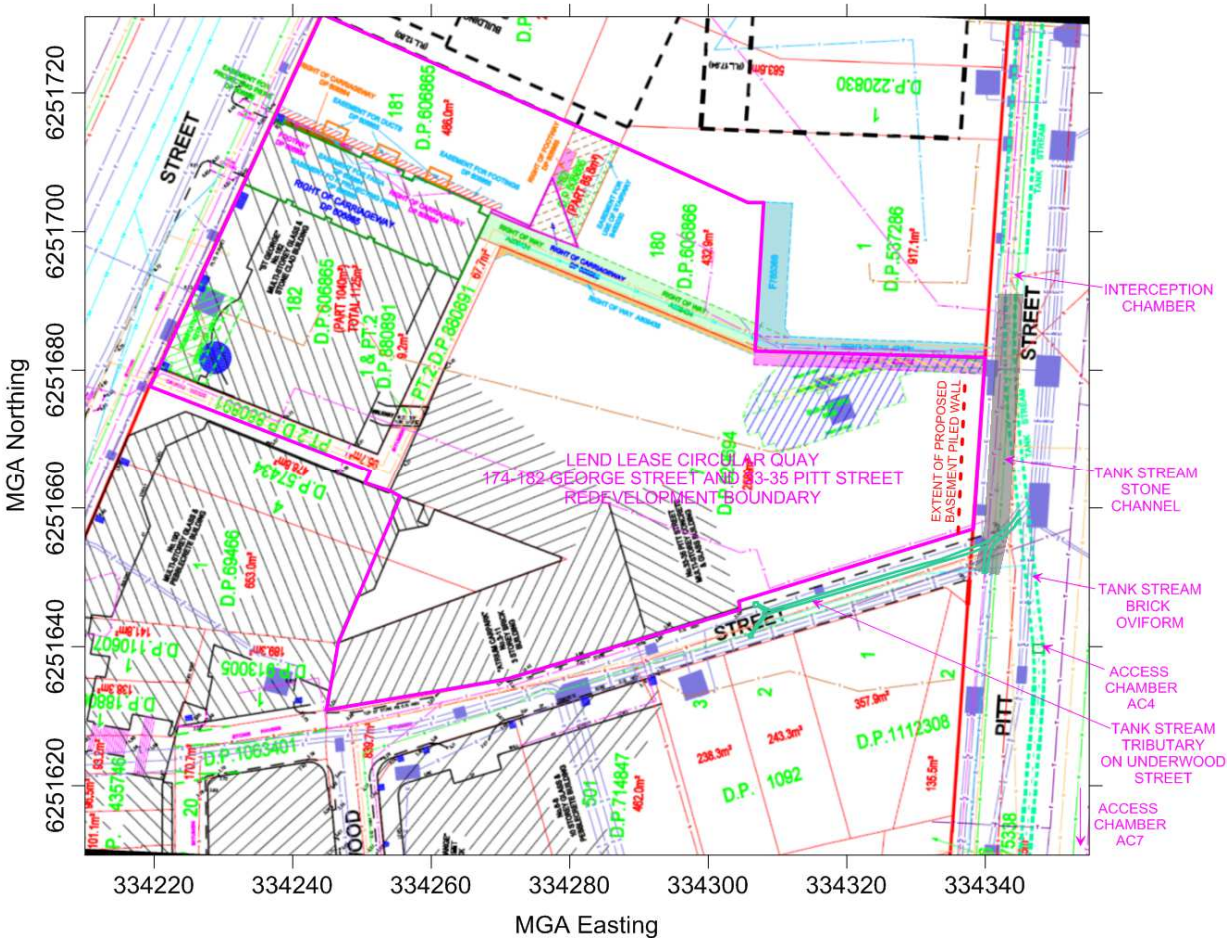

Figure 2: Location of Tank Stream Curtilage in Vicinity of 33-35 Pitt Street

3. Review of Historical Research Materials

Coffey has reviewed historical research materials (undertaken by others and provided by an archaeologist appointed by Lend Lease) that sets out the nature of Tank Stream adjacent to 33-35 Pitt Street, including the construction, location, depth and material composition of the Tank Stream.

Coffey has reviewed the following information (provided by Lend Lease):

- Godden Mackay Logan Heritage Consultants, One Alfred Street Redevelopment – Heritage Impact Statement and Archaeological Assessment, Report prepared for Valad Fields Trust, November 2010
- Casey & Lowe Pty Ltd Archaeology and Heritage, Tank Stream Issues, 33-35 Pitt Street, Sydney, Report for Lend Lease, September 2013
- Sydney Water Corporation Limited, Tank Stream Conservation Management Plan, January 2005

- A drawing by Rygate & Company Surveying Pty Limited - Plan Showing Title Boundaries of Land Bounded by George, Alfred, Pitt and Dalley Streets, Reference no. 74697, dated 3 March 2011 (and Drawing Reference 75585, dated 2 November 2012)
- A drawing (OCP 138) by Sydney Sewerage Works of the Tank Stream (held by Sydney Water), showing the route of the Tank Stream, and dated 10 June 1878
- A drawing (OCP 267) of the Deviation of the Tank Stream Drawing by Sydney Sewerage Works (held by Sydney Water), showing route and sections of the Tank Stream, and dated 18 July 1878
- A Dial Before You Dig plan by Sydney Water Corporation showing the route of the Tank Stream, produced 11 July 2011
- A drawing showing Relative Value of Levels – Primary Reference Station, issued by the Metropolitan Water Sewerage and Drainage Board of Sydney (drawing no. WBS1623), dated 24 February 1982
- A sewer snake camera photograph of the Tank Stream in a section between access chambers AC7 and AC4.

The above information is provided in Appendix A (with the exception of the photograph which is presented below in Figure 4).

3.1. Description of the Tank Stream

The Tank Stream was the name given to a fresh watercourse which originally drained a catchment within the modern Sydney CBD, with the primary watercourse running northwards from the present-day Hyde Park to its termination in Sydney Harbour at the present-day Circular Quay.

The Tank Stream provided an important water source for the early European settlers of Sydney. With time, however, the watercourse became fouled with sewerage and rubbish, essentially converting it to an open sewer (Godden Mackay Logan Heritage Consultants, 2010). The natural channel was progressively enclosed with a stone and/or brick semi-circular drain from the 1840's through to the 1870's. Sections of the drain were redeveloped throughout the 1900's (and in 2000) with concrete/steel piping or boxes.

Over the sections of the Tank Stream adjacent to 33-35 Pitt Street, the Tank Stream is reported to have been constructed in two stages (Casey & Lowe Pty Ltd Archaeology and Heritage, 2013):

- Construction of a stone drainage channel during the 1850's
- Construction of brick oviform profile circa 1878 within the stone drainage channel.

Sections of the Tank Stream vary in profile and the nature of construction materials used to build the drainage structure.

Sydney Sewerage Works drawings (listed above) show that, adjacent to 33-35 Pitt Street, the alignment of the Tank Stream was diverted in the 1870's from its original watercourse path located along immediately west of Pitt Street to an alignment that lies within Pitt Street. The stone drainage channel from the 1850's construction (located immediately west of Pitt Street) was filled and covered over during the realignment works. The nature of the fill is unknown.

3.2. Tank Stream Curtilage and Heritage Status

The Tank Stream was listed on the NSW State Heritage Register in 1999. Coffey understands that the heritage protection is associated with the operational portion of the Tank Stream which, in the vicinity of 33-35 Pitt Street, relates to the oviform drainage channel but not the stone drainage channel (Casey & Lowe Pty Ltd Archaeology and Heritage, 2013).

The Tank Stream curtilage is 3 m from all surfaces (Casey & Lowe Pty Ltd Archaeology and Heritage, 2013) of the operational Tank Stream. Developments within 10 m of the Tank Stream structure should be approved by a suitably qualified structural engineer (Casey & Lowe Pty Ltd Archaeology and Heritage, 2013). Activities that may impact the operational Tank Stream within a 3 m buffer zone (which extends form the outer face of the fabric of the operational Tank Stream) requires approval under the Heritage Act 1977.

In the vicinity of 33-35 Pitt Street, the stone drainage channel is no longer in use and the operational portion of Tank Stream structure is limited to the oviform channel.

Over the northern portion of the Tank Stream adjacent to 33-35 Pitt Street, the stone drainage channel lies within the operational (oviform channel) Tank Stream curtilage and is therefore considered part of heritage protected structure (Casey & Lowe Pty Ltd Archaeology and Heritage, 2013). However, over the southern portion of the Tank Stream adjacent to 33-35 Pitt Street, the stone drainage channel lies outside the operational (oviform drainage channel) Tank Stream curtilage and it is not clear whether this portion of the structure is heritage protected.

For the purposes of this report, both the oviform drainage channel and the stone drainage channel are considered to be heritage protected.

The proposed basement wall is located at distances of up to 6 m beyond the Tank Stream curtilage.

3.3. Location of Tank Stream in Vicinity of Site

The alignment of the brick oviform drainage channel varies between the northern and southern boundary of 33-35 Pitt Street. To the north, the brick oviform drainage channel was constructed within the stone drainage channel, but to the south it was constructed to the east of the stone drainage channel.

The locations of both the stone drainage channel and the brick oviform drainage channel in the vicinity of 33-35 Pitt Street are shown in Figure 2. The location of the brick oviform drainage channel is consistent with Sydney Water Corporation's Dial Before You Dig Plan (11 July 2011). Sydney Water Corporation's Dial Before You Dig Plan (11 July 2011) does not show the location of the stone drainage channel. The location of the stone drainage channel is consistent with that shown in Sydney Sewerage Works drawing (OCP 267), dated 18 July 1878.

Sydney Water Corporation Limited (2005) reports that the section of the oviform drainage channel running to the east of the 33-35 Pitt Street property is the section between access chamber AC4, located in Pitt Street some 25 m south of the site boundary, and the Interception Chamber, located in Pitt Street some 25 m north of the northern site boundary.

A number of active and disused inlets enter the oviform drainage channel, forming tributaries to the main channel. Sydney Sewerage Works drawing (OCP 267), dated 18 July 1878, shows a drainage outlet running down Underwood Street, connecting to the oviform drainage channel in Pitt Street. This is also shown on Figure 2. Sydney Water Corporation Limited (2005) does not provide information in relation to this particular tributary. Sydney Water Corporation's Dial Before You Dig Plan (11 July 2011) does not show this drainage tributary. The tributary shown on Sydney Sewerage Works drawing OCP 267 is shown as being narrower than the Tank Stream. The shape and construction

materials of the tributary structure are unknown. The materials are likely to comprise a brick oviform structure constructed during the realignment works during the 1870's.

The distance of the Tank Stream from the proposed basement walls has been estimated considering multiple drawings. Conceptual basement architectural drawings developed by Lend Lease (see Appendix B) for the Lend Lease Circular Quay redevelopment, Sydney (Drawing References APDG_ASK150 to APDG_ASK152, dated 14 November 2012) show the location of the proposed basement walls.

The location of the oviform drainage channel is shown on Sydney Water Corporation's Dial Before You Dig Plan (11 July 2011) and on the drawing prepared by Rygate & Company Surveying Pty Limited showing land title boundaries. The location of the stone drainage channel is only shown on Sydney Sewerage Works drawing (OCP 267), dated 18 July 1878.

The distance of the Tank Stream structure from the proposed redevelopment is assessed to be as follows:

- The edge of the oviform drainage channel lies approximately 6 m from the edge of the proposed basement piled wall at the north eastern corner of the site (based on Sydney Water Corporation's Dial Before You Dig Plan, 11 July 2011; this distance is consistent with the drawing developed by Rygate & Company Surveying Pty Limited)
- The edge of the oviform drainage channel lies approximately 9 m from the edge of the proposed basement piled wall at the south eastern corner of the site (based on Sydney Water Corporation's Dial Before You Dig Plan, 11 July 2011; this distance is consistent with the drawing developed by Rygate & Company Surveying Pty Limited)
- The edge of the stone drainage channel lies approximately 4 m from the edge of the proposed basement piled wall at the north eastern corner of the site (based on Sydney Sewerage Works drawing OCP 267, dated 18 July 1878)
- The edge of the stone drainage channel lies approximately 3 m from the edge of the proposed basement piled wall at the south eastern corner of the site (based on Sydney Sewerage Works drawing OCP 267, dated 18 July 1878)
- The edge of the tributary channel located in Underwood Street generally lies approximately 3 m from the edge of the existing development at 33-35 Pitt Street over the southern side of the site. The distance between the tributary and the basement wall of the redevelopment will similar.

3.4. Shape, Dimensions and Construction Materials of Tank Stream in Vicinity of Site

The brick oviform profile in the vicinity of 33-35 Pitt Street is reported to be similar to the brick oviform profile in other sections of the Tank Stream (e.g., between access chambers AC35 and AC34). The base of the brick oviform in this section is reported to comprise a "flat bottom of terracotta elements" (Sydney Water Corporation Limited, 2005).

Sydney Water Corporation Limited (2005) report that, along the section of the Tank Stream adjacent to 33-35 Pitt Street, the rendered brickwork of the oviform is in 'good' condition and the terracotta bottom channel is in 'fair' condition.

Sydney Sewerage Works Deviation of the Tank Stream Drawing (1878) shows the stone drainage channel as some 3.8 m wide and 1.8 m high, with a wall approximately 0.4 m thick. The brick oviform

profile at the location of access chamber AC4 is shown to possess an internal height of 1.66 m, an internal width of 1.12 m, and a wall thickness of 0.23 m. Based on this drawing, the height of the terracotta base is approximately 0.23 m.

McIllwraith (1951) reports that the brick oviform profile generally has different dimensions to those nominated by Sydney Water Corporation Limited (2005): an internal height of 1.37 m and an internal width of 0.91 m. The thickness of the wall is not nominated by Sydney Water Corporation Limited (2005) over these sections but, if consistent with the brick oviform profile between access chambers AC35 and AC34, it is expected to be approximately 0.23 m thick.

Sydney Water Corporation Limited (2005) report that the brick oviform profile has an internal height of 1.22 m and an internal width of 0.81 m.

Table 1 provides a summary of the reported dimensions of the Tank Stream adjacent to 33-35 Pitt Street.

Table 1: Summary of Reported Dimensions of Tank Stream Adjacent to 33-35 Pitt Street

Stone Drainage Channel				
Location	**Height (m)**	**Total Width (m)**	**Wall Thickness (m)**	**Reference**
Immediately south of the Interception Chamber	1.81	3.02	0.37	Sydney Sewerage Works Deviation of the Tank Stream Drawing (1878)
Oviform Drainage Channel				
Location	**Internal Height (m)**	**Internal Width (m)**	**Wall Thickness (m)**	**Reference**
At access chamber AC4	1.66	1.12	0.23	Sydney Sewerage Works Deviation of the Tank Stream Drawing (1878)
Typical brick oviform profile	1.37	0.91	0.23 (assumed)	McIllwraith (1951)
Between access chamber AC4 and the Interception Chamber	1.22	0.81	Not reported	Sydney Water Corporation Limited (2005)

Assuming the oviform drainage channel adjacent to 33-35 Pitt Street is consistent with the profile reported for access chamber AC4, the total height of the oviform drainage channel in the vicinity of the site is approximately 2.1 m (internal height + wall thickness at top + terracotta base thickness) and the total width is 1.6 m. The larger dimensions are expected to represent a more sensitive structure and have been adopted here to provide a conservative basis for development of conservation engineering criteria.

Figure 3 presents the shape of the Tank Stream adjacent to 33-35 Pitt Street considering these dimensions. Note that as the alignment of the oviform drainage channel runs south, it shifts increasingly to the east, such that it ultimately lies outside the stone drainage channel.

Figure 4 shows a photograph, captured by a sewer snake camera, from inside the oviform drainage channel between access chambers AC7 and AC4.

Figure 5 shows a recovered section of the oviform drainage channel on display at the General Post Office building in Sydney. The brickwork and terracotta base may be seen in the recovered section, and is likely similar to the oviform drainage channel adjacent to 33-35 Pitt Street.

The dimensions of the Tank Stream tributary channel located in Underwood Street are unknown.

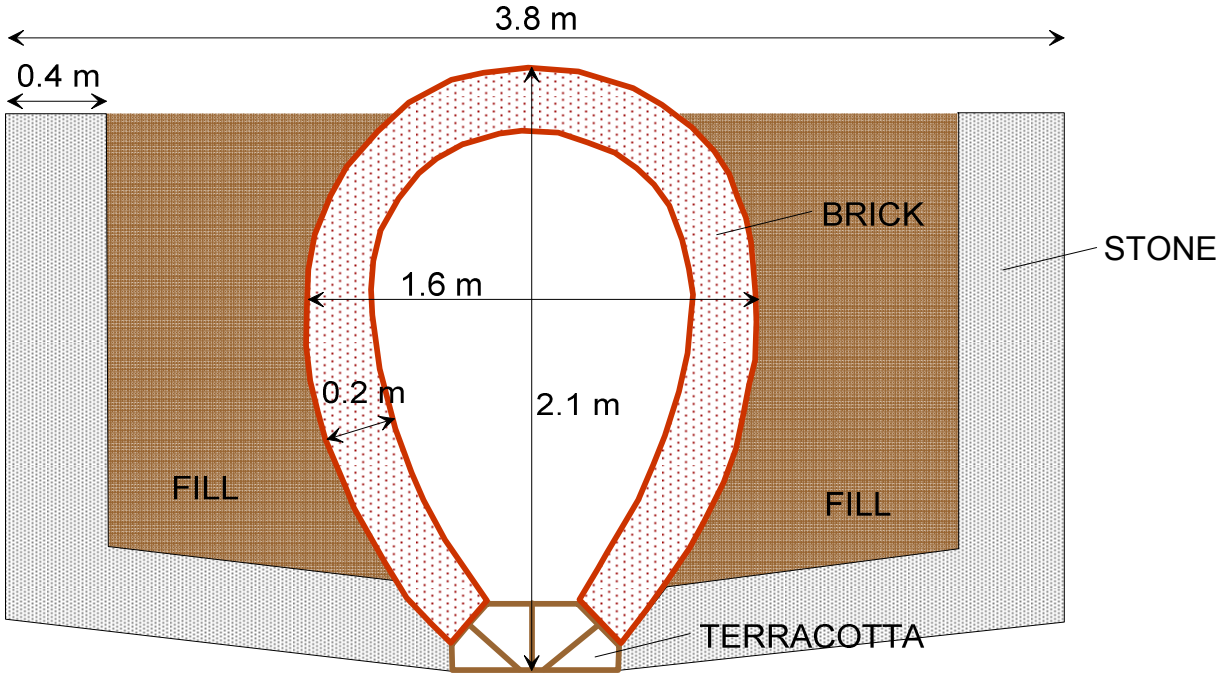

Figure 3: Shape, Dimensions and Construction Materials of Tank Stream in the Vicinity of 33-35 Pitt Street

Figure 4: Photograph Taken Inside the Tank Stream Drainage Structure Between Access Chambers AC7 and AC4

Figure 5: Photograph of Section of the Oviform Tank Stream With Terracotta Base on Display at the General Post Office, Sydney (image from Casey & Lowe Pty Ltd Archaeology and Heritage, 2013)

3.5. Invert Level of Tank Stream in Vicinity of Site

In order to understand the potential impacts of the proposed development on the Tank Stream, and to develop a basement retention concept design that reduces the risk of adverse impacts to the Tank Stream, it is important to identify the location of the Tank Stream in relation to the proposed development. The invert level of the Tank Stream identifies the vertical location (elevation) of the Tank Stream.

Sydney Sewerage Works drawing (OCP 267), dated 18 July 1878, shows the invert level of the oviform drainage channel (at the corner of Underwood Street and Pitt Street, and on the southern side of the Interception Chamber) at approximately 2.4 m below ground level. The invert level of the stone drainage channel at the southern end of the site (where it is located to the west of the oviform drainage channel) is unknown, but is expected to be consistent with the invert level of the oviform drainage channel.

The Mean High Water Level shown on the Metropolitan Water Sewerage and Drainage Board drawing listed above is 0.5 m AHD (standard mean sea level defined by tide gauge at Fort Denison in 1897 is at 0.055 m AHD). This is consistent with the Mean High Water Mark of 0.554 m AHD supplied by the Manly Hydraulic Laboratory in approximately 2004 (Clerke, 2004). Assuming the High Water Mark datum on the 1878 Sydney Sewerage Works drawing (OCP 267) drawing is 0.5 m AHD, the invert level of the oviform drainage channel is approximately 0.4 m AHD at the location of access chamber AC4, and approximately 0.25 m AHD at the location of the Interception Chamber. The drawing indicates that the gradient of the invert level is approximately 0.5% between the access chamber AC4 and the Interception Chamber, with a fall in invert level of approximately 0.3 m over that distance (consistent with the calculated elevations).

The Lend Lease Plan Drawing Showing Details and Levels for No. 180-182 George Street and No. 19-31 Pitt Street (Drawing Reference 75585 prepared by Rygate & Company Surveying Pty Limited, dated 2 November 2012) shows the manhole cover level of the Tank Stream Interception Chamber at approximately 2.5 m AHD. Assuming the 1878 ground surface level is consistent with the modern ground surface level at that location, the 1878 Sydney Sewerage Works drawing (OCP 267) indicates that the invert level of the Tank Stream at the Interception Chamber is 0.0 m AHD. This elevation is approximately 0.1 m higher than that calculated above using the alternative datum source.

Based on the above assessment, the invert level of the oviform drainage channel in the vicinity of 33-35 Pitt Street is considered to be approximately 0.4 m AHD adjacent to the south eastern corner of the site (interpolated between the elevation at access chamber AC4 and the Interception Chamber) and approximately -0.1 m AHD adjacent to the north eastern corner of the site. However, as the estimation of these levels is based on historical drawings that Sydney Water cannot endorse as correct or up-to-date, there is uncertainty in the estimated levels.

4. Geotechnical Model

Coffey developed a geotechnical model of the site based on available geological information (for an up-to-date version, see Coffey reference GEOTLCOV24730AA-AT, 17 October 2013). This section presents the geotechnical model.

4.1. Geology

The 1:100,000 Sydney Geological Sheet indicates the site is situated in the vicinity of the boundary between fill, estuarine alluvium and Hawkesbury Sandstone, described on the geological sheet as follows:

- Fill: dredged estuarine sand and mud, demolition rubble, industrial and household waste
- Alluvium: silty to peaty quartz sand silt and clay with common shell layers
- Sandstone: medium to coarse grained with minor shale and laminite lenses.

A plan of near vertical structural geological features in the CBD by Pells et al (2004) indicates the site is remote from mapped structural features such as major fault zones or igneous intrusions. The nearest mapped features are:

- The Pittman LIV dyke (a near vertical structure, often weathered to clay), mapped approximately 70 m to the south of the site, trending generally east to west
- The GPO Fault Zone (typically highly weathered sandstone with near vertical parallel shear zones, clay infilled joints, with some seepage), is mapped approximately 250 m east of the site, trending approximately north-north east to south-south west.

Sandstone bedrock within the Sydney CBD typically follows a dominant NNE trending sub-vertical joint set, with a less dominant joint set observed running perpendicular to the dominant joint set.

4.2. Available Geological Information

Coffey developed a geotechnical model of the site based on the following information:

- Coffey's local experience, including the following sites:
    - 190 George Street, 200 George Street and 4 Dalley Street
    - Pitt Street Hotel
    - Electricity Substation at 16 Dalley Street.
- Report by Northrop Consulting Engineers Pty Ltd, Proposed Site Redevelopment, 19-31 Pitt Street, Sydney, Advice on Basement Construction in Relation to Impacts on the Tank Stream, 9 August 2010
- Geotechnical reports for the former development at 33-35 Pitt Street by Jeffery and Katauskas Pty Ltd:
    - *"Foundation Investigation form Proposed Commercial Development"* 33-35 Pitt Street, Sydney. Report Ref: 1836, dated 12 October 1981

- *"Additional Borehole at Column C72 Location"* 33-35 Pitt Street, Sydney. Report Ref 1836, dated 8 February 1982
- A plan and five borehole logs, drilled at 6-8 Underwood Street, Sydney. (No reduced level information is understood to be available for the boreholes drilled at 6-8 Underwood Street. We have estimated a surface level of 2.5 m AHD for all five boreholes at this site, using rock level correlation from the nearby borehole JBH3 and considering that the holes were drilled with a truck mounted rig, so the ground level was likely to be relatively level and somewhat similar to the road pavement level.)
- A drawing provided by Lend Lease for a development at 19 Pitt Street dated 1968 showing borehole logs.

The above investigations indicate the site to be underlain by fill of variable thickness. The fill overlies sandstone bedrock in the western portion of the site. Alluvial deposits overlie sandstone bedrock over the eastern portion of the site.

The sandstone encountered at nearby sites (listed above) generally has sub-horizontal bedding with dips of up to 10˚, with some cross bedding within the sandstone units of about 5˚ to 30˚. Defects in more competent rock (Class II sandstone or better) are typically spaced at 0.3 m to 1.0 m, except where shear zones/crushed zones are present. Clay seams may be encountered but are typically less than 10 mm to 15 mm thick.

Groundwater levels measured in previous investigations vary between -0.4 m AHD and 0.2 m AHD. Groundwater is likely to be encountered within the Unit 1 Fill (that has been placed to raise site levels from what was probably low lying swampy ground) and the Unit 2 Alluvium. Groundwater may also be encountered within the bedrock in joints and bedding partings. Changes in groundwater level due to rainfall are also possible.

Table 2 presents the inferred stratigraphy at the site based on the available information. The units are defined in terms of their origin and rock mass characteristics based on the system by Pells et al (1998).

Table 2: Geotechnical Units

Geotechnical Unit	General Description	Estimated Thickness
1. Fill	• Fill comprised of variable sand, gravel and boulders, clay and construction materials	1.5 m to 5 m
2. Alluvium/Marine Deposits	• Silty and sandy clay • Typically soft to firm • Containing occasional shell beds	1 m to 3 m
3a. Sandstone Class IV and Class III	• Moderately weathered • Medium to high strength but containing clay seams and defects	1 m to 2 m
3b. Sandstone Class II or Stronger	• Slightly weathered to fresh • High strength • Moderately to widely spaced defects	Unproven

Figure 6 shows the interpreted ground surface level and Figure 7 presents the inferred elevation of the base of the Fill. Figure 8 shows the inferred top of Class III/IV Sandstone. The top of Class II Sandstone is assumed to be consistently one metre below that of Class III/IV Sandstone.

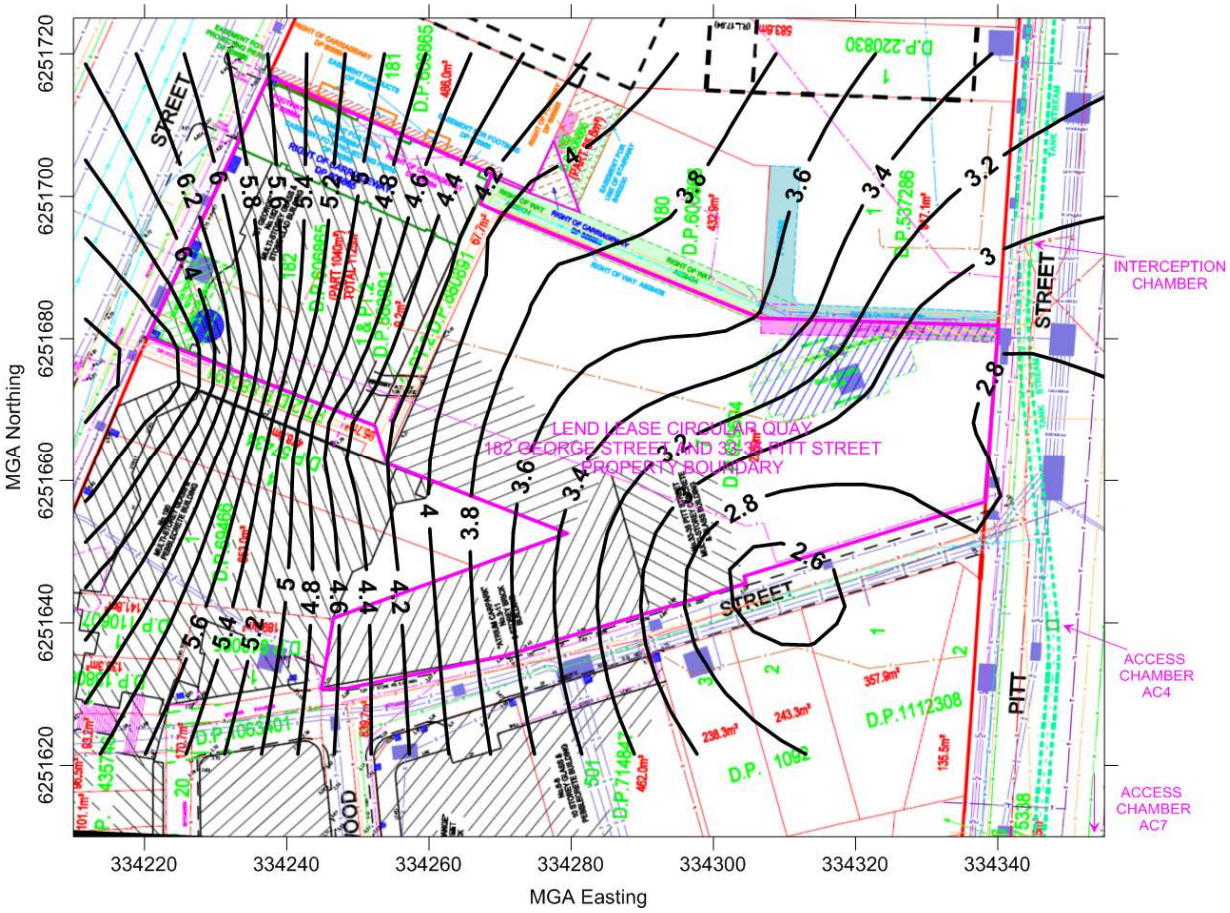

Figure 6: Inferred Elevation of Ground Surface (contours show elevation in metres AHD)

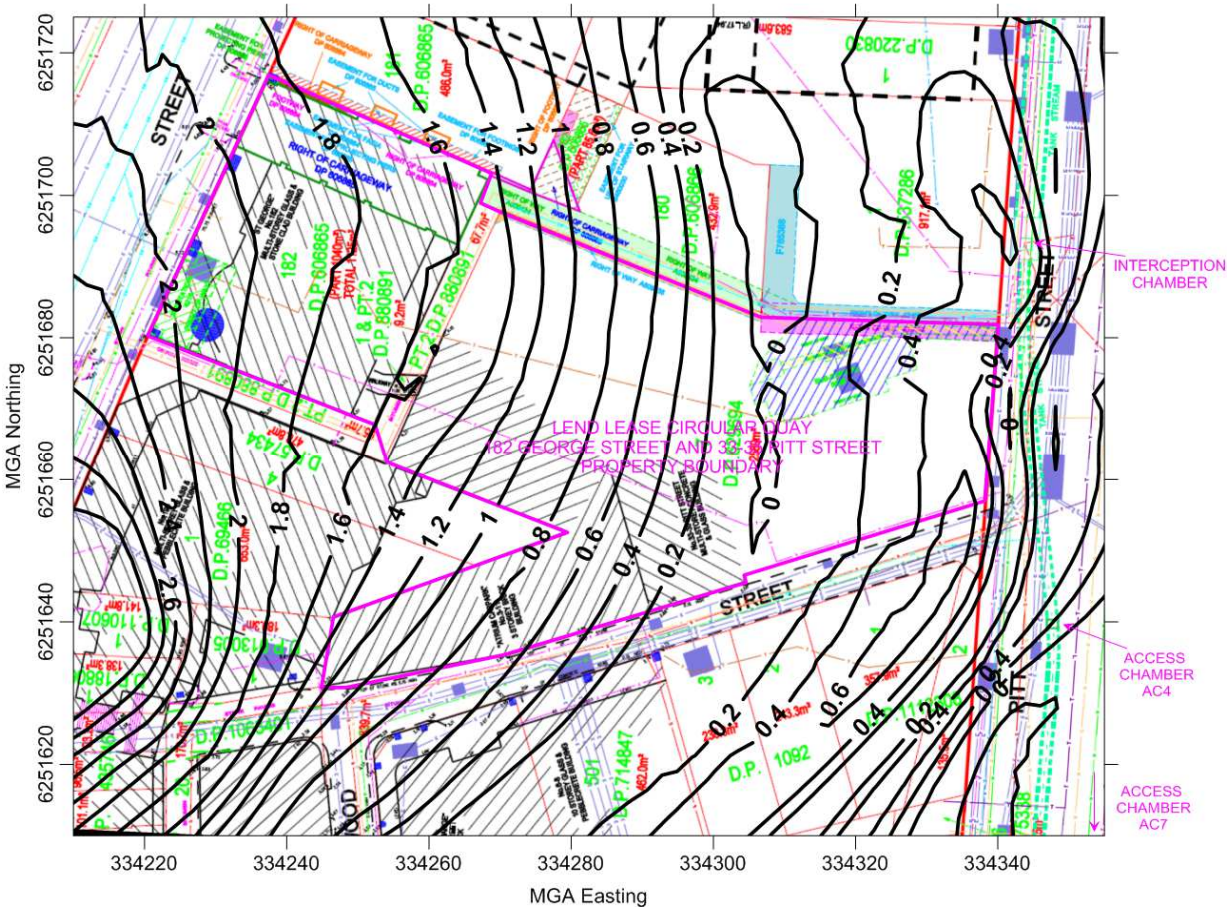

Figure 7: Inferred Elevation of Base of Fill (contours show elevation in metres AHD)

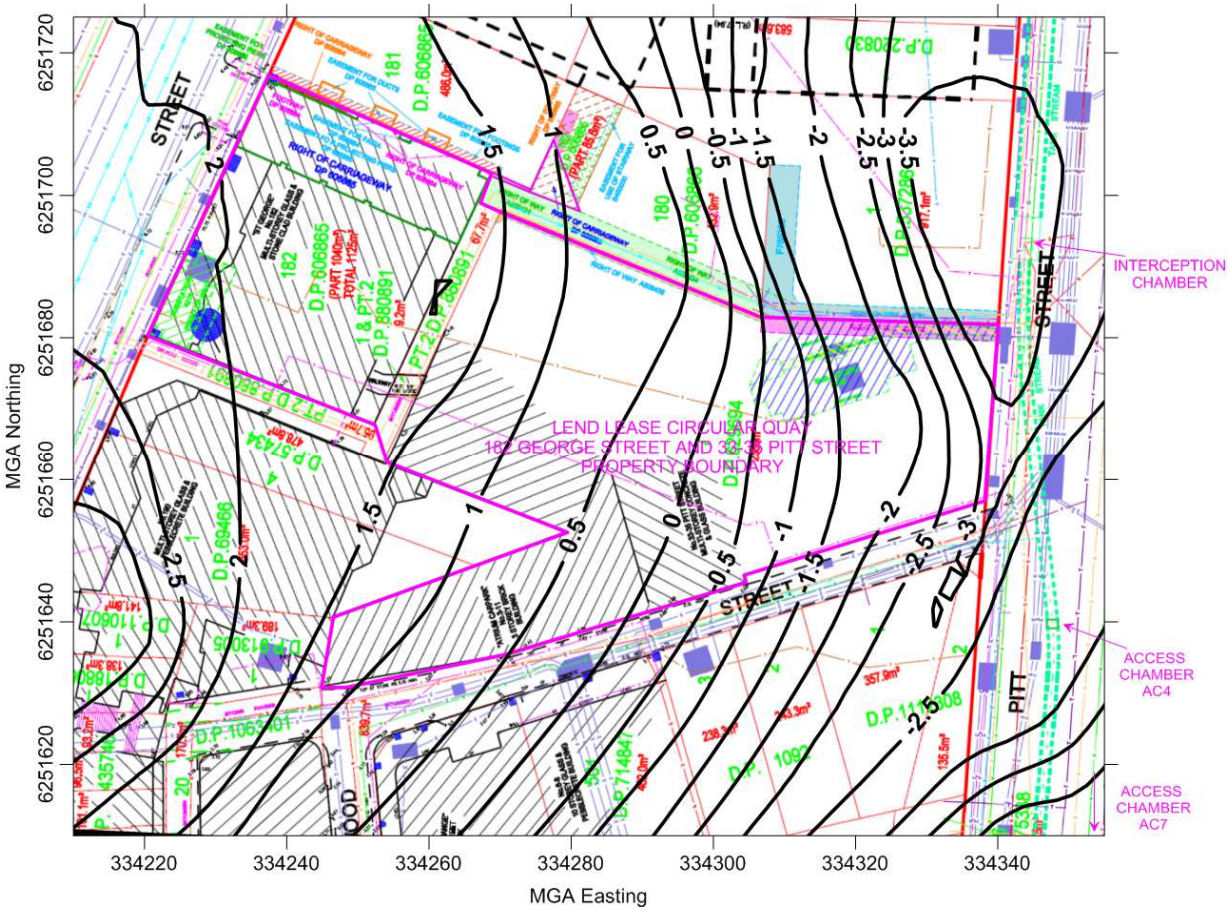

Figure 8: Inferred Elevation of Top of Class III/IV Sandstone (contours show elevation in metres AHD)

Figure 9 shows a plan of the site and the location of the three cross sections shown in Figures 10 and 11, which illustrate the geological profile at the site in the vicinity of the Tank Stream.

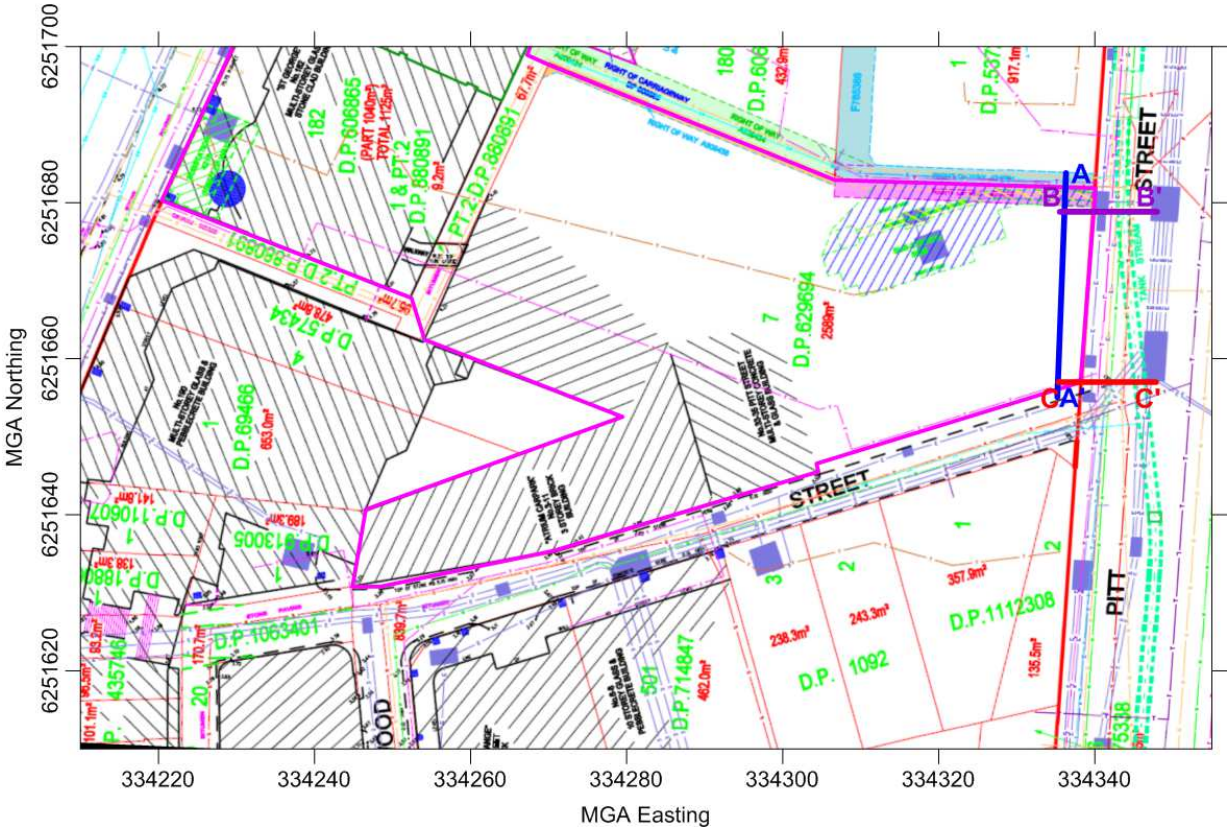

Figure 9: Plan of Site Showing Cross Sections A-A', B-B' and C-C'

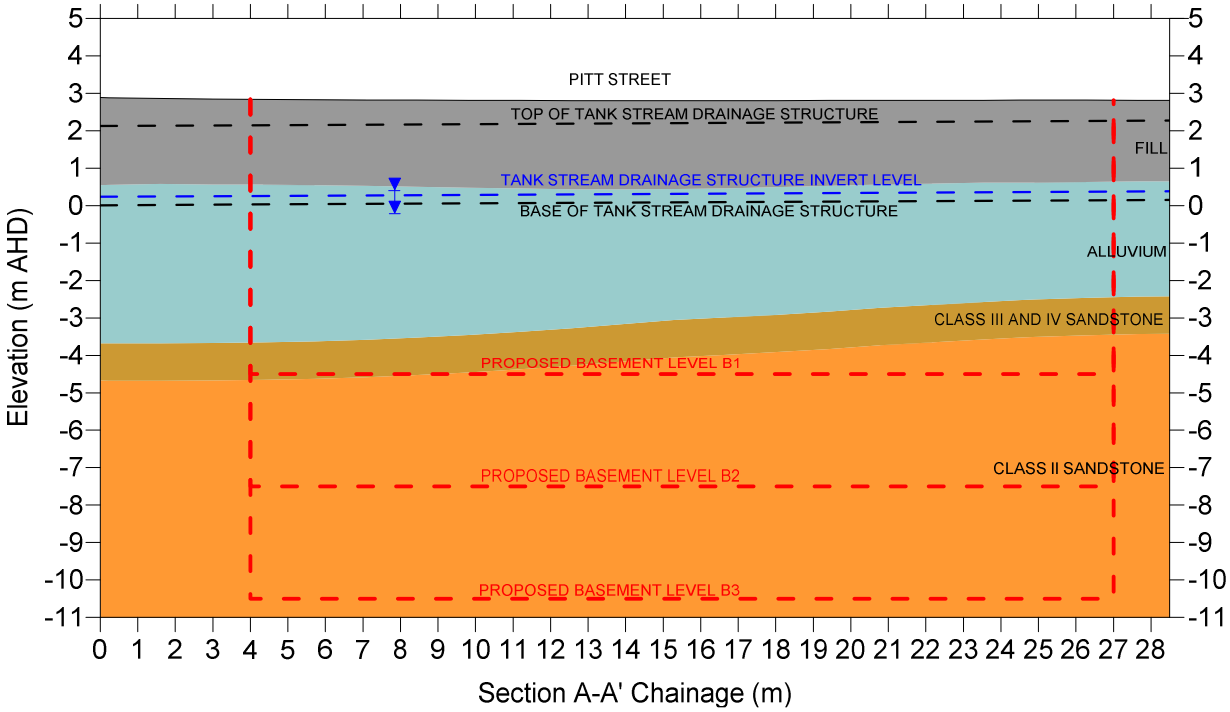

Figure 10: Cross Section A-A' Showing Geological Profile and Tank Stream Adjacent to the Proposed Basement Wall

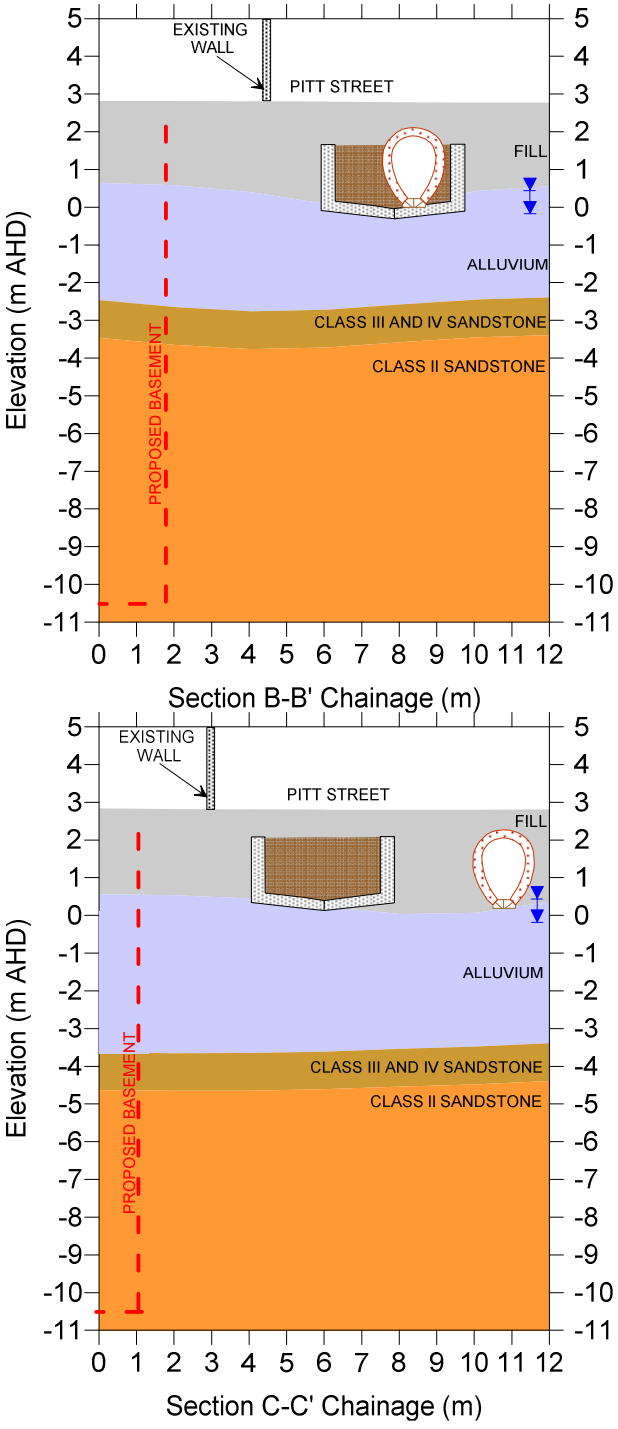

Figure 11: Cross Sections B-B' and C-C' Showing Geological Profile and Tank Stream Through the Proposed Basement Wall Adjacent to Pitt Street

5. Conservation Engineering Criteria

The risk associated with works commensurate with the proposed redevelopment is that it may cause ground vibration and induce ground settlements that may impact on the Tank Stream drainage structure are discussed in this section.

Sydney Water Corporation Limited (2005) does not provide nominated conservation engineering criteria for vibration, deflection, differential settlement, clearance, groundwater fluctuation and other engineering impacts for the Tank Stream.

At the request of Lend Lease, Coffey has developed preliminary thresholds for vibration, deflection, settlement and groundwater fluctuations. These thresholds represent conservation engineering criteria beyond which potential impact to the Tank Stream is possible.

5.1. Vibration

Currently there exists no Australian Standard for assessment of structural building damage caused by vibrational energy. In terms of the most recent relevant vibration damage goals, Australian Standard AS 2187: Part 2- 2006 *'Explosives - Storage and Use - Part 2: Use of Explosives* recommends the frequency-dependent guideline values and assessment methods given in British Standard BS 7385 Part 2: 1993 *Evaluation and Measurement for Vibration in Buildings Part 2* as they "are applicable to Australian conditions".

The British Standard sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimum risk of vibration-induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect. Sources of vibration that are considered in the Standard include demolition, blasting, piling, ground treatments (e.g., compaction), construction equipment, tunnelling, road and rail traffic and industrial machinery.

The British Standard discusses levels at which 'cosmetic', 'minor' and 'major' categories of damage might occur. The suggested limits (guide values) are for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings. The British Standard states that underground structures "are known to sustain higher levels of vibration" than above-ground structures, and are "very resistant to damage unless in very poor condition". The vibration guide values set by the British Standard for above-ground structures are therefore considered reasonable for below-ground structures.

The British Standard recommends that the peak particle velocity (as measured at the base of the structure) be used to quantify vibration. The damage criteria specified for un-reinforced or light framed structures (e.g., residential or light commercial buildings) are as follows:

- 15 mm/s at 4 Hz, increasing to 20 mm/s at 15 Hz
- 20 mm/s at 15 Hz, increasing to 50 mm/s at 40 Hz and above (with maximum displacement of 0.6 mm not to be exceeded).

These values relate to transient vibrations and to low rise buildings. Continuous vibration can give rise to dynamic magnifications due to resonances, and may need to be reduced by up to 50%. Rockbreaking/hammering and sheet piling activities are considered to have the potential to cause dynamic loading in some structures and it may therefore be appropriate to reduce the transient values by 50%.

For most construction activities involving intermittent vibration sources such as rockbreakers, piling rigs, vibratory rollers and excavators, the predominant vibration energy occurs at frequencies greater

than 4 Hz (and usually in the range of 10 Hz to 100 Hz) and may cause dynamic loading. On this basis, a conservative vibration damage screening level of 7.5 mm/s can be adopted based on the British Standard.

The German Standard *DIN 4150 – Part 3 – Structural Vibration in Buildings – Effects on Structures* provides recommended maximum levels of vibration that reduce the likelihood of building damage caused by vibration. This Standard presents recommended maximum limits over a range of frequencies measured in any direction at the foundation or in the plane of the uppermost floor.

In particular, the Standard presents minimum 'safe limits' of vibration (as measured at the foundation) for sensitive structures (such as historical structures with preservation orders) of:

- 3 mm/s at frequencies less than 10 Hz
- Between 3 mm/s and 8 mm/s at frequencies between 10 Hz and 50 Hz
- Between 8 mm/s and 10 mm/s at frequencies between 50 Hz and 100 Hz.

In accordance with the German Standard Group 3 type of structure, a vibration trigger level of 3 mm/s at the heritage structure building is considered appropriate as a trigger level threshold.

Considering both the German Standard and British Standard, a conservative vibration trigger level of 3 mm/s (the lower of the two trigger values) is recommended for the Tank Stream drainage structure. This trigger level represents the threshold below which damage to the Tank Stream is unlikely.

5.2. Strain, Deflection and Differential Settlement/Tilt

Currently there exists no Australian Standard that discusses strain, deflection or settlement criteria below which damage to in-ground masonry structures is unlikely, and the literature is limited in this area.

Burland and Wroth (1975) is widely adopted for the assessment of potential damage to masonry buildings due to excavation-induced movements, and the Australian Standard AS2870-2011 on Residential Slabs and Footings provides similar descriptions of damage and a similar classification system. Burland and Wroth (1975) provides a basis from which protection criteria may be developed for in-ground masonry structures.

Cracking in masonry walls and finished usually results from tensile strain. The classification system developed by Burland and Wroth (1974) nominates that a negligible category of damage constitutes hairline cracks of less than about 0.1 mm thickness. They observed that visible cracking occurred at strains of between 0.05% and 0.1% in a variety of brickwork and blockwork.

Boscardin and Cording (1989) developed an interaction relationship between potential categories of damage and angular distortion and horizontal strain (for hogging deformation with a length to height ratio equal to one). They assigned limiting tensile strains that corresponded to the classification system developed by Burland and Wroth (1974). The nominated limiting tensile strain for the negligible category of damage was between 0% and 0.05%.

Boscardin and Cording (1989) assess that a ratio of horizontal strain to angular distortion of less than a value of 0.44 falls within the negligible category of damage.

Burland et al (2007) classified a deflection ratio (sagging ratio) below approximately 1 in 600 as causing "no damage", based on a collation of observations of structural damage to buildings.

Note that Tank Stream's tolerance levels to strain, deflection and differential settlement are dependent on the condition of the material fabric of the Tank Stream. Sections of the Tank Stream

exhibiting degradation of the material fabric may experience damage at lower thresholds than those provided above.

5.3. 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.

Groundwater levels may have been lower in the past than those noted above. Since ground settlement is induced when drawdown occurs at magnitudes greater than experienced in the past, significant drawdown below existing measured groundwater levels may be required to induce ground settlement beneath the Tank Stream.

Nevertheless, groundwater drawdown greater than 1 m has the potential to induce minor settlement.

5.4. Summary of Conservation Engineering Criteria

A summary of the Coffey-recommended conservation engineering criteria is provided in Table 3.

Table 3: Summary of Conservation Engineering Criteria

Item	Criteria Type	Commensurate LLCQ Redevelopment Works	Relevant Standards/References	Recommended Conservation Criterion* (at the Tank Stream Drainage Structure)
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% 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 1 m

*Threshold above which impacts to the Tank Stream may occur.

5.5. Use of Conservation Criteria

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 survey data for the Tank Stream).

The conservation engineering criteria thresholds provided above have been developed for basement retention concept design and Coffey recommends revision of those criteria as part of detailed design.

6. Retention System Concept Design

The proposed development will involve the removal of existing localised basement slabs, and excavation of fill, soil and rock below existing basement level. 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, such that the nominated conservation engineering criteria can be achieved.

6.1. Demolition

Plant and equipment used in the demolition of existing slabs, footings and piles should not cause vibrations of peak particle velocity greater than 3 mm/s at any location immediately adjacent to the Tank Stream fabric.

Information relating to existing footings and piles at 33-35 Pitt Street are unknown. However, existing foundations are expected to comprise pad footings and reinforced concrete piles. Demolition of existing slabs, footings and piles should be conducted with lateral in-ground support in place. The support should be equal or greater to that provided by the structure being demolished.

Coffey recommends a risk assessment be undertaken by a demolition contractor, and demolition methodologies be adopted to reduce potential impact of demolition works on ground vibration and in-ground structural support such that vibrations of peak particle velocity are less than 3 mm/s within the Tank Stream curtilage. Coffey is satisfied that peak particle velocities can be managed accordingly utilising industry standard demolition techniques.

6.2. Excavation

Bulk excavation of the soil units is unlikely to cause vibration beyond that of vehicle movements. However, where excavation of the sandstone bedrock is required, careful consideration of the excavation methods should be given prior to removal. Bulk excavation of the soils is likely to be undertaken using a track mounted excavator equipped with a toothed bucket.

Archaeologists may remove soils within the site excavation using a dredge bucket at elevations above the Tank Stream invert level.

Excavation of the sandstone bedrock should use methods chosen to limit vibrations. The Tank Stream lies between circa 5 m to 8 m lateral distance from the proposed rock excavation area at the site. Coffey's experience with vibration due to rotary rock grinders and rock hammers (over 500 kg) in Sydney sandstone indicate that a peak particle velocity of 3 mm/s or above can be experienced at significantly greater distances than these (Hackney, 2002).

Coffey recommend the following excavation methods:

- Within 25 m lateral distance of the Tank Stream (i.e., within 22 m of the basement eastern and southern walls) rock hammers over 1000 kg should not be used without vibration monitoring coupled with an automated visual alarm apparent to the machine operator, notifying the machine operator of any breach of vibration acceptance criteria which would trigger an immediate cessation of works
- At lateral distances greater than 10 m of the Tank Stream (i.e., greater than 7 m from the basement eastern wall, and within 7 m of the basement southern wall adjacent to the Tank

Stream tributary in Underwood Street), rock hammers of up to 1000 kg may be used. Rock hammers must only be used in conjunction with vibration monitoring coupled with an automated visual alarm apparent to the machine operator, notifying the machine operator of any breach of vibration acceptance criteria which would trigger an immediate cessation of works

- At lateral distances within 10 m of the Tank Stream (i.e., within 3 m of the basement eastern wall, and within 3 m of the basement southern wall adjacent to the Tank Stream tributary in Underwood Street), rotary rock grinders and the use of rock saws or splitting should instead be adopted.

Coffey is satisfied that the approach outlined above is manageable utilising are industry standard excavation techniques.

6.3. Retention Concept Design

Drawing 1 presents the retention concept design. The proposed retention system can be installed using industry standard techniques and is expected to achieve the conservation engineering criteria listed in Table 3.

6.3.1. Secant Pile Wall

Coffey recommend a retention system that utilises a secant pile wall. The property boundary adjacent to Pitt Street does not possess an existing basement, and the secant pile wall may be installed from existing ground level.

Adoption of a secant pile wall will reduce vibration (relative to adoption of a sheet pile wall) during construction. The secant pile wall will additionally provide groundwater cut-off in the fill/alluvium, thereby reducing the groundwater drawdown in the vicinity of the Tank Stream and hence reducing dewatering-induced ground settlement. Groundwater may seep through the head of the temporary ground anchors in the basement wall, however industry standard measures can be taken to provide a hydro-seal around anchor plates and bolts.

Coffey recommend that a pile capping beam be constructed prior to excavation. This will provide increased rigidity in the retention structure during excavation, potentially reducing ground movement. Coffey recommend (subject to future detailed design) provision of approximately 750 mm-diameter reinforced concrete piles (along the Pitt Street frontage) constructed at 1100 mm centres. The piles would form a secant pile wall along the site property boundary with Pitt Street. The secant pile wall would be supported by up to three rows of temporary ground anchors (subject to future detailed design) during construction and will be propped by the basement floor slabs in the long term. The ground anchors can be co-ordinated to maintain a minimum clearance of approximately 4.5 m from the Tank Stream.

Installation of the secant piles by cased Continuous Flight Auger (CFA) methods will reduce potential ground vibrations during installation. Potential induced ground vibrations should be assessed by the piling contractor and kept below a peak particle velocity of 3 mm/s at a lateral distance of 5 m from the piling location. Piling works should be undertaken in conjunction with vibration monitoring coupled with an automated visual alarm apparent to the machine operator, notifying the machine operator of any breach of vibration acceptance criteria which would trigger an immediate cessation of works.

When assessing the dimensional constraints, allowance needs to be made for both horizontal and vertical construction tolerances. The Australian Piling Code (AS2175) allows a tolerance of 4% in relation to verticality but experienced piling contractors typically can construct piles to lesser values.

Typically, cased CFA piles can be constructed with better control on verticality compared to uncased piles.

6.3.2. Temporary Anchors

We understand that temporary ground anchors can be installed along the property boundary adjacent to Pitt Street. Coffey recommend the installation of temporary anchors to provide basement retention and reduce movement of ground adjacent to the proposed basements.

Anchors should be installed using a sacrificial casing to reduce ground vibrations during installation. Potential induced ground vibrations should be assessed by the contractor and kept below a peak particle velocity of 3 mm/s at a distance of 4.5 m from anchor boreholes. This can be achieved via vibration monitoring coupled with an automated visual alarm apparent to the machine operator, notifying the operator of any breach of vibration acceptance criteria which would trigger an immediate cessation of works.

Locations of anchors along the basement face adjacent to Pitt Street is shown in Section A-A' of Drawing 1 and have been chosen to maintain safe separation distance between anchor holes and the Tank Stream. The anchor configuration is as follows:

- Ten anchors installed in the top row at 2.2 m centres and at an elevation of approximately 2 m AHD
- Ten anchors installed in the middle row at 2.2 m centres and at an elevation of approximately -0.5 m AHD
- Twenty anchors installed in the bottom row at 1.1 m centres and at an elevation of approximately -2.5 m AHD.

A cross section through the proposed basement eastern wall showing the extent of the anchors outside the property is shown in Section B-B' of Drawing 1. The locations and orientations of the anchors maintain a minimum clearance of approximately 4.5 m from the Tank Stream.

Similar configurations will be suitable for conditions over the southern basement wall adjacent to the Tank Stream tributary in Underwood Street.

The anchors should be pre-stressed and be progressively tensioned as excavation progresses. The temporary anchors will need to be installed at an angle of 60˚ from the horizontal, and possess four strands within a 150 mm-diameter grouted hole with a minimum bond length of 4 m into Class II sandstone.

6.3.3. Other Considerations

It is recommended practice that where bulk excavation extends into sandstone rock below the toe of a retention system, a ledge is provided in front of the pile toe to reduce the possibility of localised failure in the rock at the toe of the wall. We recommend that an allowance of 250 mm be made for this ledge. This dimension may be reduced by the installation of rock bolts in the toe area to prevent localised rock failure, though the rock bolt heads themselves may protrude some 150 mm if not countersunk into the rock face. It is likely that rock bolting of the sandstone face below the retention system will also be required and an allowance for rock bolt heads should be made also in these areas of basement, though again these could be countersunk if necessary.

To provide adequate end bearing capacity and resistance to toe kick out during construction, we recommend an allowance be made for the secant pile wall to be socketed at least 1.5 m into the Class III or better sandstone. This embedment requirement may be reduced at detailed design stage

but is unlikely to reduce to less than 1 m. Use of steeply inclined anchors within Underwood Street will result in larger axial forces being generated in the secant piles compared to those generated by the less steeply inclined anchors installed elsewhere around the site perimeter. Given that the secant piles will be socketed into Class III or better sandstone, we consider the use of steeply inclined temporary ground anchors does not pose a significant risk in terms of bearing capacity.

Due to the basement's geometry and its proximity to adjacent properties at the north western basement corner, cross bracing will be required in this corner. Brace lengths are approximately 5 m, and are shown in Drawing 1. Brace length may be increased in the case that the presence of additional steelwork in these basement corners is acceptable during construction.

7. Detailed Retention Design and Construction

7.1. Detailed Retention Design

The above concept design is expected to meet the engineering conservation criteria developed above for the Tank Stream (including the oviform drainage channel and the stone drainage channel). Detailed assessment of ground movements induced by excavation under the proposed retention system should be undertaken to confirm the suitability of the concept design.

In the case that ground movements in the vicinity of the Tank Stream are assessed to be significant, detailed basement retention design may consider further design and construction methods to limit ground deformation, including:

- Performing ground improvement (increasing the ground stiffness by grouting in ground between the Tank Stream and the 33-35 Pitt Street basement)
- Reduced temporary anchor spacing and/or increased pre-stressing and pre-loading of anchors.

7.2. Construction Monitoring

Coffey recommends the development and implementation of an instrumentation and monitoring plan to validate excavation performance during construction, and to provide early warning of ground movements.

Coffey also recommends a dilapidation survey and structural assessment (or review of existing survey information) of the Tank Stream adjacent to 33-35 Pitt Street prior to commencing excavation. Vibration monitoring should be carried out prior to excavation (to assess the existing vibrations experienced by the Tank Stream) and during the proposed development works (to assess vibrations induced by the works).

8. Conclusions

Coffey has reviewed historical research materials relating to the Tank Stream.

Sydney Water Corporation Limited (2005) does not provide nominated conservation engineering criteria for vibration, deflection, differential settlement, clearance, groundwater fluctuation and other engineering impacts for the Tank Stream.

At the request of Lend Lease, Coffey has developed preliminary thresholds for vibration, deflection, settlement and groundwater fluctuations. These thresholds represent conservation engineering criteria beyond which potential impact to the Tank Stream is possible. Coffey is satisfied that, provided the conservation engineering criteria are satisfied during the LLCQ redevelopment works, there will be no detrimental impacts upon the Tank Stream.

Coffey has provided a concept design and discussed construction methods associated with that design. Coffey considers that the developed conservation engineering criteria can be achieved by utilising industry standard design and construction techniques in accordance with the concept design and recommended construction methods provided, such that the Tank Stream does not experience adverse impacts.

9. Limitations

The assessments and recommendations presented in this report are based on limited information, including limited geological data and unverified information in relation to the Tank Stream. Ground conditions and the nature of built structures can vary over relatively short distances, and the conclusions and recommendations of this report are relevant to the specific conditions noted herein. As discussed in Section 5.5, limitations apply to the use of the engineering conservation criteria developed in this report.

The attached document entitled “Important Information about your Coffey Report” provides additional information on the uses and limitations of this report.

10. References

Australian Standard AS 2187 (1993), Explosives-Storage and Use – Part 2: Use of Explosives, Australian Standard code of practice.

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Important information about your **Coffey** Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

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Important information about your **Coffey** Report

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

Data should not be separated from the report*

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way.

Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment.
Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

Rely on Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

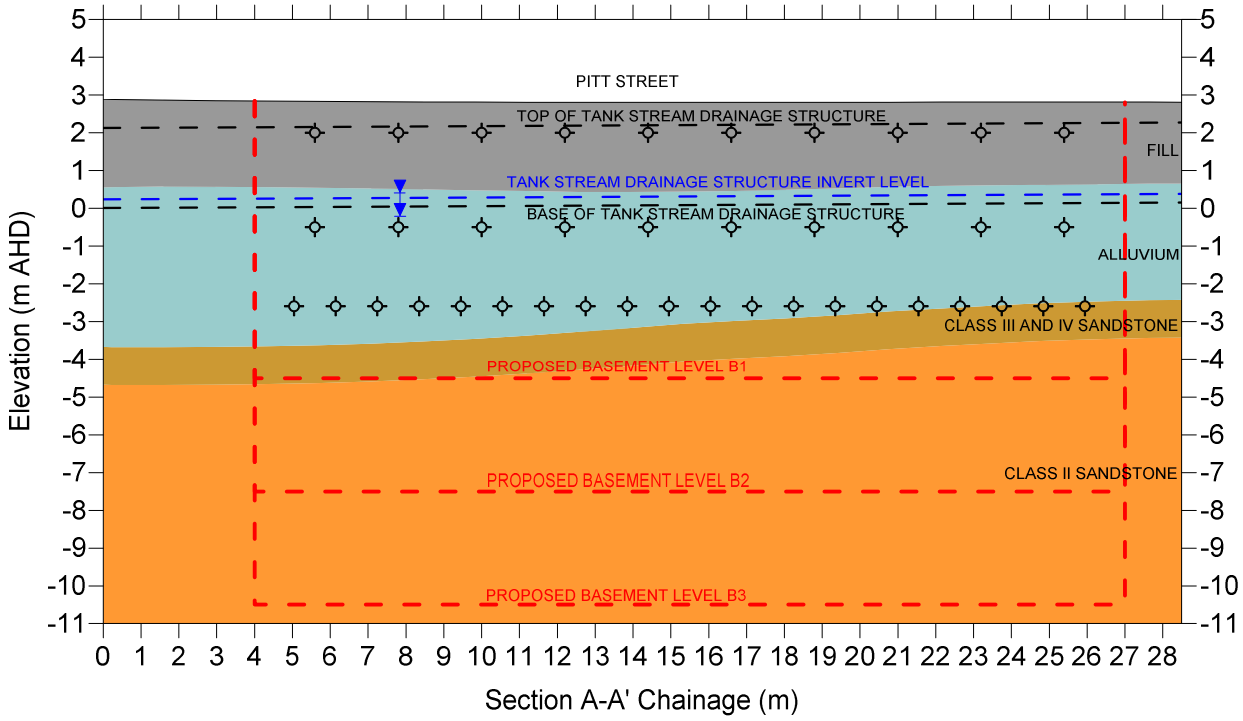
Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

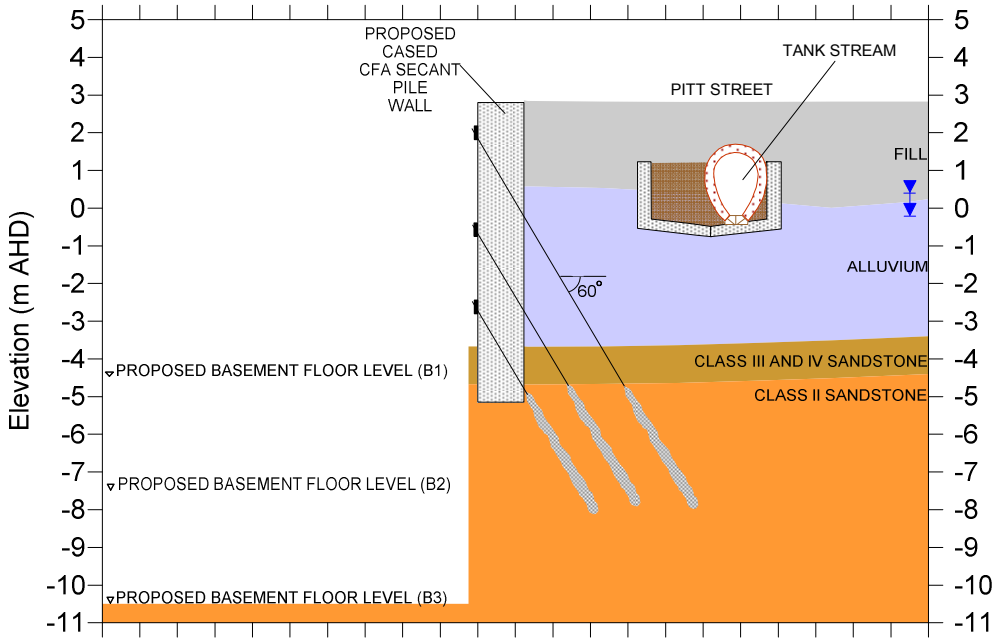
* For further information on this aspect reference should be made to "Guidelines for the Provision of Geotechnical information in Construction Contracts" published by the Institution of Engineers Australia, National headquarters, Canberra, 1987.

Drawings

SECTION A-A'



SECTION B-B'



drawn	BR
approved	FB
date	26 Sep 2013
scale	1:200
original size	A4

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client:	LEND LEASE DEVELOPMENT
project:	TANK STREAM CONSERVATION REPORT LEND LEASE CIRCULAR QUAY
title:	PROPOSED RETENTION CONCEPT DESIGN
project no:	GEOTLCOV24730AA
figure no:	DRAWING 1

Appendix A

Tank Stream Historical Research Information

Godden Mackay Logan
Heritage Consultants

One Alfred Street Redevelopment

Heritage Impact Statement and Archaeological Assessment

Report prepared for Valad Fields Trust
November 2010

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Report Register

The following report register documents the development and issue of the report entitled One Alfred Street Stage 2 Development Application—Heritage Impact Statement and Archaeological Assessment, undertaken by Godden Mackay Logan Pty Ltd in accordance with its quality management system. Godden Mackay Logan operates under a quality management system which has been certified as complying with the Australian/New Zealand Standard for quality management systems AS/NZS ISO 9001:2000.

Job No.	Issue No.	Notes/Description	Issue Date
09-0497	1	Draft Report	8 July 2010
09-0497	2	Final Report	14 October 2010
09-0497	3	Final Report (v2)	19 November 2010

Contents Page

1.0 Introduction

1.1 Background

Godden Mackay Logan (GML) has been engaged by Valad Fields Trust to prepare a Heritage Impact Statement (HIS) for the proposed redevelopment of the site currently occupied by Gold Fields House, Sydney. The HIS assesses the potential heritage impacts of the proposed development on both the built heritage of the site itself and other sites in the vicinity, and on the potential archaeological resource. It incorporates an Archaeological Assessment report.

1.2 The Site

The proposed development is located at 1 Alfred Street, Circular Quay, Sydney (Figure 1.1). The site is bounded by Pitt Street on the east and George Street on the west. Alfred Street (to the site's north, and separated from the site by Herald Square) forms the southern edge of Circular Quay, and comprises part of the boundary of the 'buffer zone' for the World Heritage Listing (WHL) for the Sydney Opera House. The site is therefore located a short distance outside the Sydney Opera House's WHL buffer zone (the implications of this are discussed in detail in Section 3.5; see also Figure 1.3). The south of the site connects with Rugby Place, off Pitt Street, although there is no current through-site connection.

1.3 The Proposed Redevelopment

The proposed redevelopment comprises the demolition of the existing Gold Fields House, and the construction of a 185 metre high tower on the northwest (George Street) corner and a 55 metre high building on the northeast (Pitt Street) corner. The buildings will both provide residential apartments, set on individual single-storey double-height podiums with a mixture of retail and café/bar uses. The space between the two podiums is intended to be activated with pedestrian uses and to ultimately provide a connection to Rugby Place to the south.

The project will not require excavation beyond the footprint of the existing Gold Fields House (a matter relevant to potential impacts on the archaeological resource; see Section 5.0).

1.4 Heritage Items in the Vicinity of Gold Fields House

1.4.1 Built Heritage

The Gold Fields House site is not identified as having heritage value by any heritage agencies or authoritative bodies. Specifically, it is not:

- listed on the State Heritage Register (SHR);
- an identified heritage item in Schedule 8, Part 1, of the *Sydney Local Environmental Plan 2005* (SLEP 2005);
- part of a Heritage Conservation Area identified by the SLEP 2005;
- identified as part of a Heritage Streetscape in the Central Sydney Heritage Streetscape Map;
- listed as an item of Twentieth-Century Heritage Significance by the Australian Institute of Architects;

- listed on the Register of the National Estate, National Heritage List or Commonwealth Heritage List; or
- classified by the National Trust of Australia (NSW).

The site is included in the 'Circular Quay Special Area', in the SLEP 2005 (Special Area 6, Figure 1.4).

The statutory implications of the above are discussed in detail in Section 3.0 below.

Gold Fields House is, however, located in the vicinity of several heritage items listed on one or more of the following:

- The State Heritage Register.
- The Heritage Schedule of the SLEP 2005.
- The Register of the National Estate.
- The National Heritage List.
- The World Heritage List.

Figure 1.2 shows the location of the subject site and the heritage items in its vicinity.

The Tank Stream Fountain at Herald Square is listed as a heritage item in the SLEP 2005 (Schedule 8, Part 3, Item No. 33 CSHI No. 8008). Although only the fountain is listed, it cannot be assessed without a consideration of its wider setting, ie Herald Square. Therefore, this report assesses the potential impacts of the proposed building envelope on the square as a whole, including the fountain.

Other heritage items in the vicinity of the subject site listed by the SLEP 2005 are:

- the facade of the Ship Inn;
- the facade of the Paragon Hotel;
- Customs House;
- AMP Building; and
- Sydney Harbour Bridge (approaches).

Items in the vicinity listed under the Heritage Act (ie on the SHR) are:

- Customs House;
- Circular Quay Railway Station Group (also included on the Railcorp's Heritage and Conservation Register); and
- Sydney Harbour Bridge, Approaches and Viaducts.

The Circular Quay Ferry Wharves are listed as heritage items on the Sydney Harbour Catchment 2005 Regional Environmental Plan and are included in the Heritage and Conservation Register (S170) of the Maritime Services Board.

The Rocks is adjacent to the site, on the northern side of the Cahill Expressway, and is managed by the Sydney Harbour Foreshore Authority. The Rocks Conservation Area is included in the Register of the National Estate as a Registered place.

The space under and near the Cahill Expressway, Customs House and the Ship Inn are also on the Register of the National Estate.

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 implications of these listings are discussed in detail in Section 3.5.

1.4.2 The Potential Archaeological Resource

The Tank Stream (an archaeological feature dating from the earliest days of the city's European settlement) is located below the western pavement of Pitt Street, a short distance from the eastern boundary of the site (see Sections 2.0 and 5.0 below). The Tank Stream is listed on the State Heritage Register (see Appendix C for the citation). The listing notes that:

> *The Tank Stream has a curtilage of 3 metres from all surfaces ...*

The proposed redevelopment will include seven levels of below-ground parking (Gold Fields House currently has two levels of basement parking on the Pitt Street frontage). The existing parking levels extend into the 3 metre heritage curtilage of the Tank Stream, as could any additional demolition and construction works on the Pitt Street frontage. Any works within the heritage curtilage of the Tank Stream would either require the approval of the Heritage Council pursuant to Section 57 of the *Heritage Act 1977* (NSW) (Heritage Act), or an Exemption from the need for approval if the works are minor and will not result in an adverse impact on the Tank Stream.

The Tank Stream is also included on the SLEP 2005 as an archaeological element (Schedule 8, Part 3, Item No. 42; SHI No. 7001), and on the Register of the National Estate as a Registered place.

1.5 Methodology and Terminology

This HIS has regard to the methodology outlined in the *NSW Heritage Manual* guidelines for the preparation of Statements of Heritage Impact (NSW Department of Urban Affairs and Planning and the Heritage Council of NSW, First Edition, 1996). It is also consistent with the relevant principles and guidelines of *The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance*.

This HIS has been prepared based on the drawings prepared by Kerry Hill Architects dated July 2010, being:

- Roof Site Plan
- Lower Ground Plan
- Ground Plan
- Mezzanine Plan
- Level 1 Plan
- Basement 1 Plan

- Basement 7 Plan
- Roof Plan
- Sections
- Building A – Elevations (2)
- Building B Elevations (2)
- Survey Plan

1.6 Limitations

This report includes a desktop assessment of the potential for Aboriginal archaeology at the site. No Aboriginal consultation has been undertaken as a part of this report. The report concludes (Section 5.1) that the construction of Gold Fields House involved excavation through fill layers and deep into natural rock strata, and will have destroyed any Aboriginal archaeological objects within the footprint of the proposed envelope.

1.7 Authorship

This report has been prepared by Peter Romey, Partner, of Godden Mackay Logan. Mark Dunn, Senior Consultant, of Godden Mackay Logan prepared the history in Section 2.0.

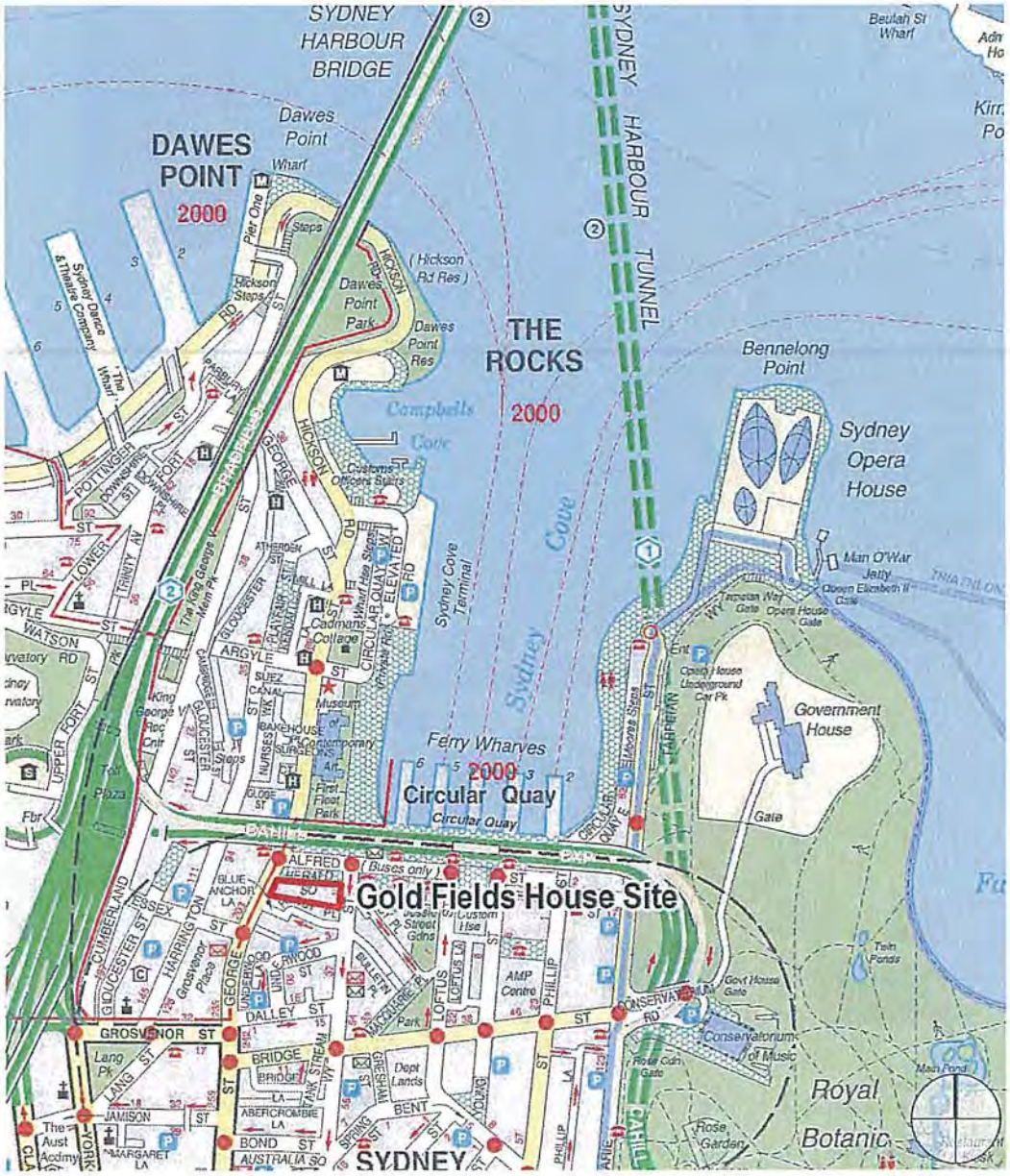
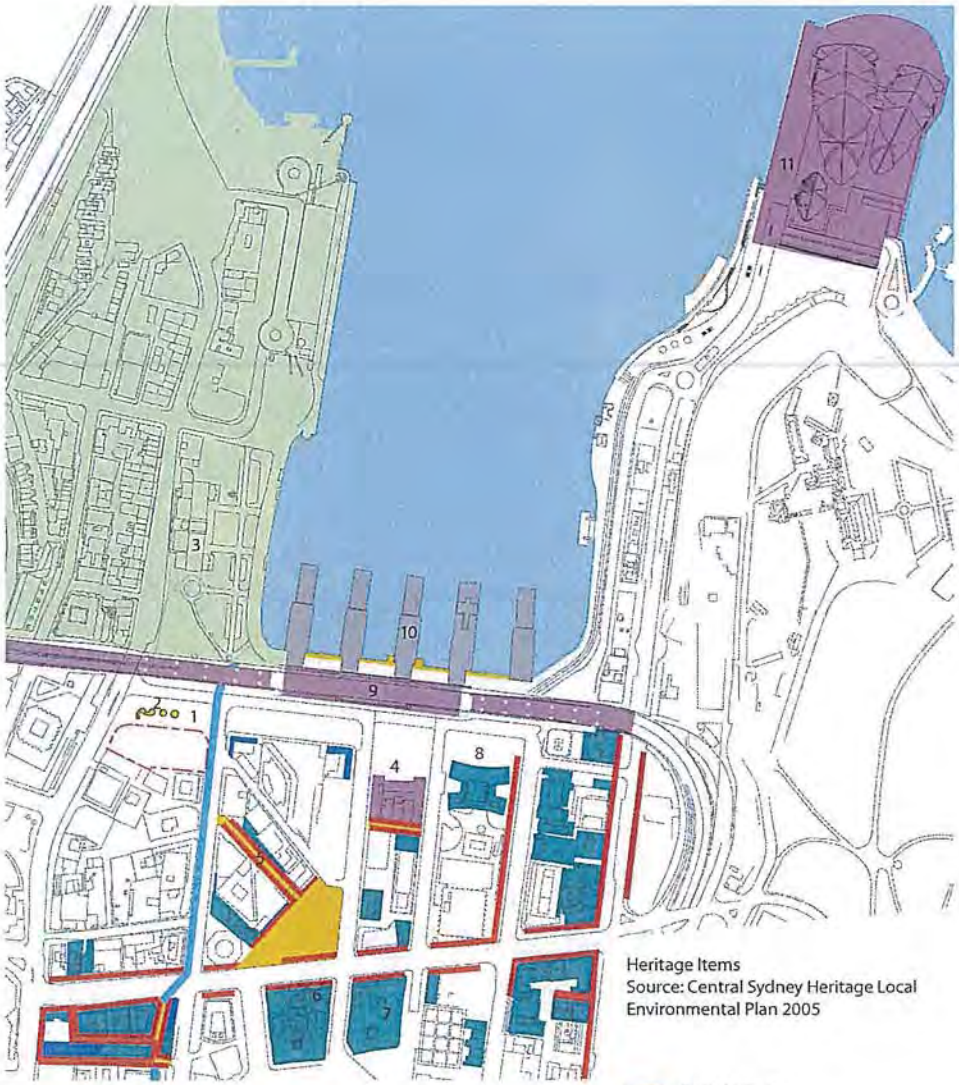


Figure 1.1 Gold Fields House location map.



Heritage Items
Source: Central Sydney Heritage Local Environmental Plan 2005

- Tank Stream
- Heritage Streetscapes
- Schedule 8 Part 1 Heritage Items
- Schedule 8 Part 2 Building Elements
- Schedule 8 Part 3 Archaeology/ Townscape/Landscape Items
- State Heritage Register
- The Rocks Conservation Area

1. Herald Square
2. Tank Stream Fountain
3. MCA
4. Customs House [1]
5. Bulletin Place
6. Department of Lands
7. Education Department Building
8. AMP building
9. Circular Quay Railway Station Group [1]
10. Ferry Wharves [2]
11. Sydney Opera house [1]

1 State Heritage Register
2 Sydney Harbour Catchment 2005, Regional Environment Plan

Figure 1.2 Heritage items in the vicinity of the proposed building envelope.

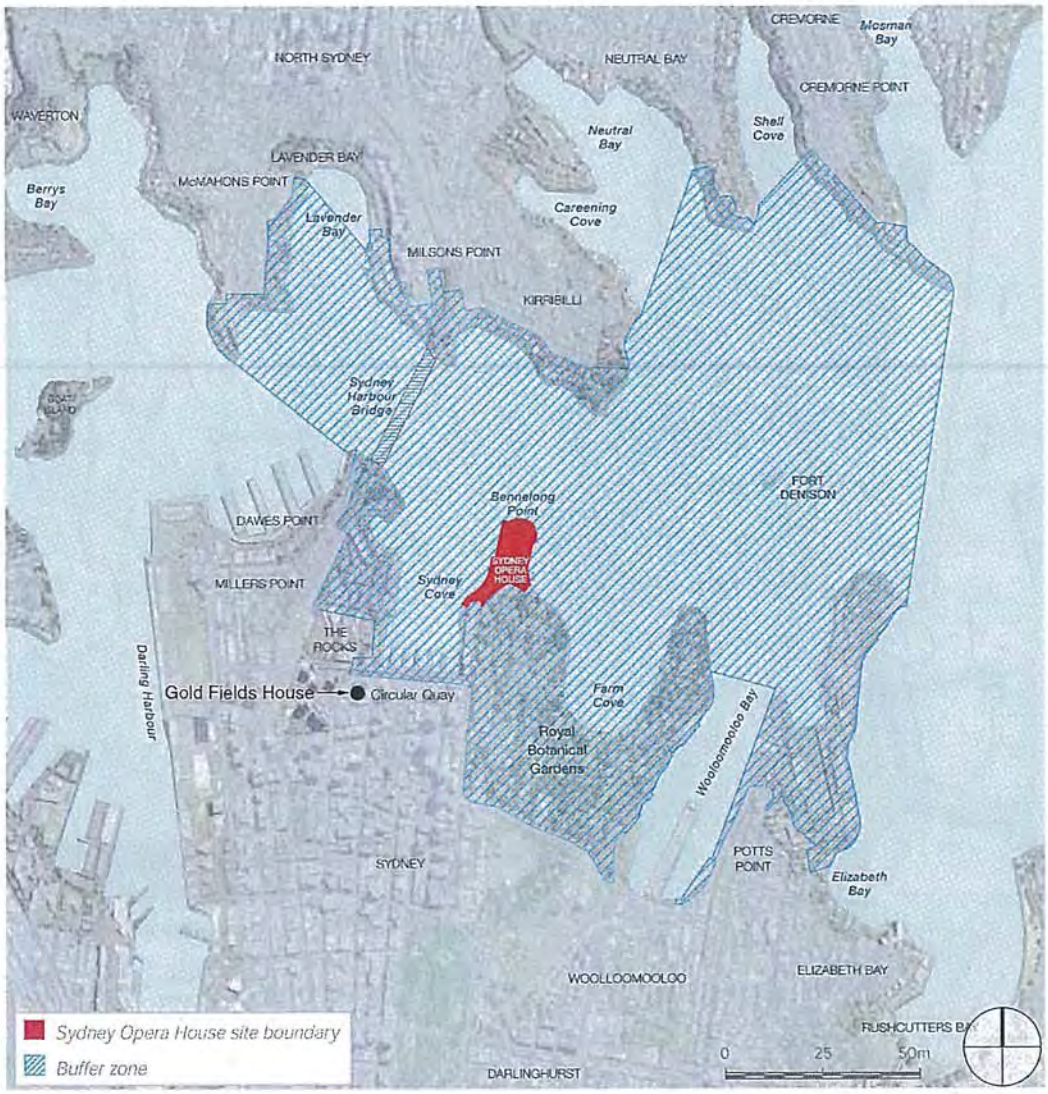


Figure 1.3 Plan showing the buffer zone for the World Heritage Listing of the Sydney Opera House relative to Gold Fields House.

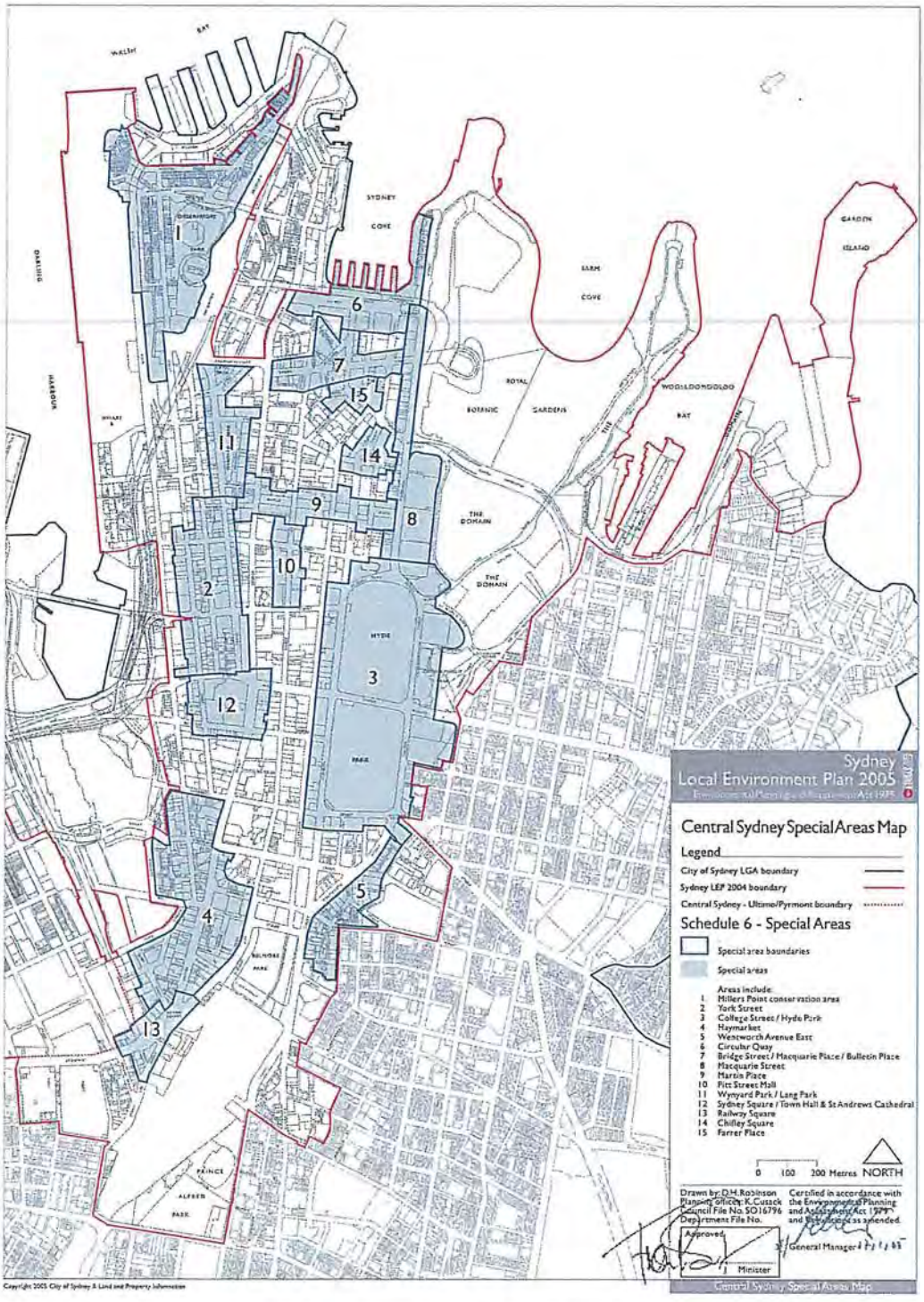


Figure 1.4 Plan showing the location of the Circular Quay Special Area. (Source: City of Sydney)

2.0 Historical Development

2.1 Pre-European Occupation and Landform

Prior to the arrival of Europeans in 1788, the site 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.[1]

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.

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 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.[2] 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.[3]

However, the site of the study area within the tidal zone and on the mud banks of the original stream, particularly on the eastern portion, reduced the likelihood of similar results being produced.

2.2 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 2.1, 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 2.2). 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. The study area lies within the lease of Major George Johnson and those of George Howe and John Gill. Johnson 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.[4] Although Johnson was returned to England and court-martialed 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. His lease site in George Street was occupied in the 1820s by two buildings fronting the street, with one being noted as Chapman's slaughterhouse [5] (see Figure 2.3).

Immediately to the north was the lease of William Blake 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.

A sketch of the site from the George Street frontage in 1848 shows a row of two-storey Georgian shops and merchant houses, including the former Bank of Australia, a tea merchant, Livingstone's wine tavern and the offices of the Sydney Morning Herald. The association of the area with the Herald is remembered in the naming of Herald Square which fronts the study site on Alfred Street (see Figure 2.4). This section of George Street represented the hub of the colonial trade and mercantile scene, with shops, warehouses, taverns and traders all vying for the trade generated by the nearby wharves and the ships that visited them.

2.3 The Tank Stream and Semi Circular Quay

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 sewerage, rubbish and run-off from piggeries and yards, making the water undrinkable and transforming the Tank Stream into an open sewer. This, 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 site), 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.[5]

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 2.5–2.7).

As part of this work the Tank Stream was also enclosed. At the Circular Quay end adjacent to the study site, as this part of Sydney Cove now became known, the Tank Stream was enclosed within a stone semi-circular drain with a separate sewer line running along its eastern side. The drain was approximately 3.5 metres wide, 2 metres high and 3 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 site (see Figure 2.8).

The creation of the extended Pitt Street allowed for new development along the street, including along the eastern portion of the study area. By 1865, the Pitt Street frontage was occupied by two store buildings with associated yards. In 1880, these are identified on Percy Dove's plans as a cement store and Livingstone's Timber Merchant, with attached store and yards. Immediately to the north (still within the study site, including the Herald Square area) was the three-storey Peacock's Jam factory. The area between Pitt and George Street is occupied with yards and workshops, while the George Street frontage contains a row of single-storey shops and commercial premises (see Figure 2.9 and 2.10).

By the turn of the twentieth century both the Pitt Street and George Street frontages had been developed with two-storey shops and taller office chambers. Alfred Street, which ran parallel to Circular Quay, at this stage did not extend west of Pitt Street (see Figure 2.11). The area to the north of the study site was instead occupied by warehouses, shops and offices including the Circular Quay fire station on the corner of George and Barton Streets and the offices of the Sydney Harbour Trust (post 1901) on the corner of Pitt and Barton Street. (Barton Street was removed after the construction of the Cahill Expressway and now lies beneath the Expressway and part of First Fleet Park to the north of the study area.)

2.4 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 2.12 and 2.13).

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 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'.[7] 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 groundbreaking 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 allotment boundary 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-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 (see Figure 2.15). The Tank Stream lay outside the actual building allotment boundary below the Pitt Street footpath (see Figure 2.8), 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.

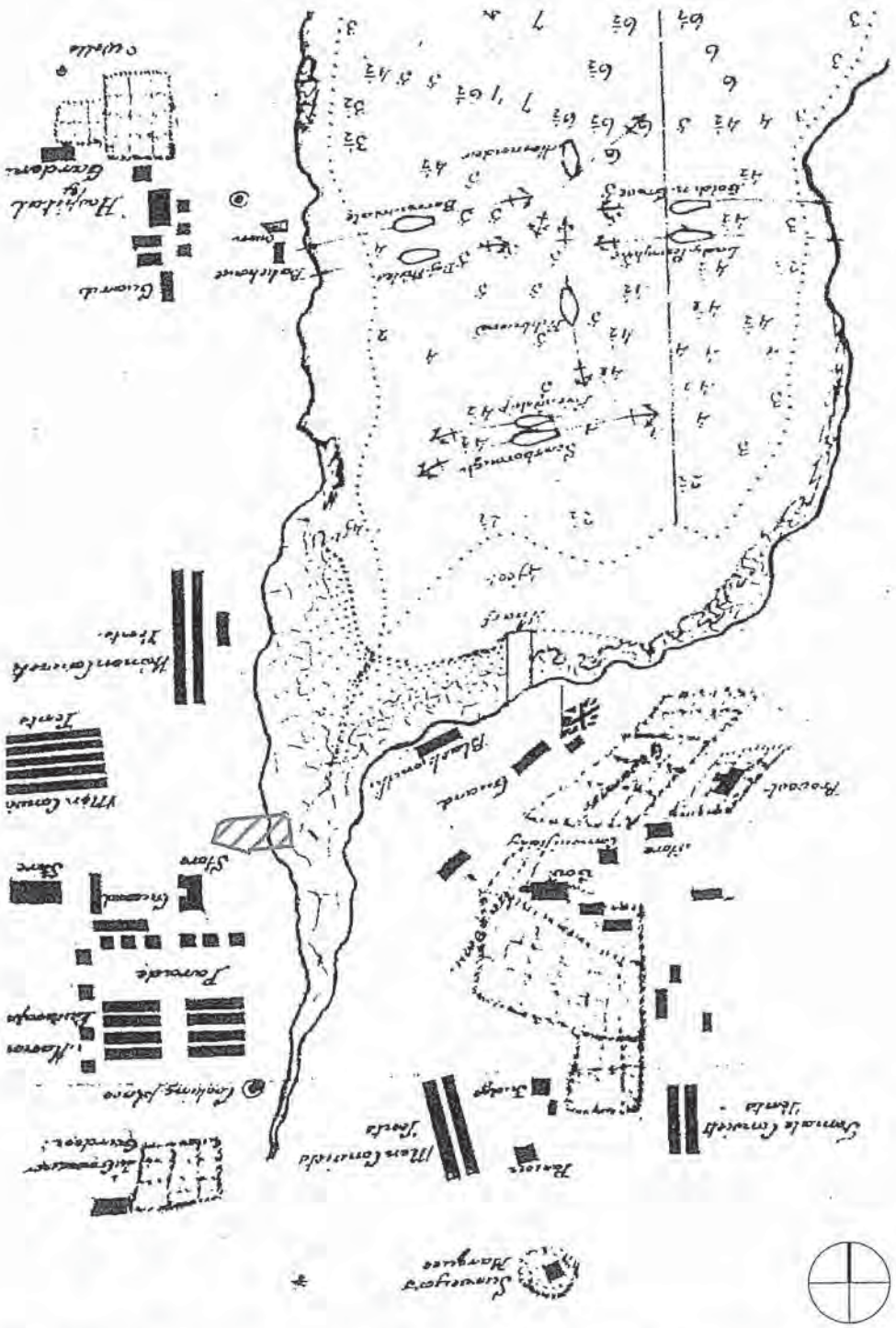


Figure 2.1 March 1788 survey of the Head of Sydney Cove showing the approximate position of the study site. This plan shows the earliest positions of the European settlement on either side of the Tank Stream which can be seen emptying into the harbour. The long tidal zone and mud flats are shown on this plan. (Source: *A Voyage to NSW: The Journal of William Bradley of HMS Sirius 1786-1792*, facsimile edition, 1969)

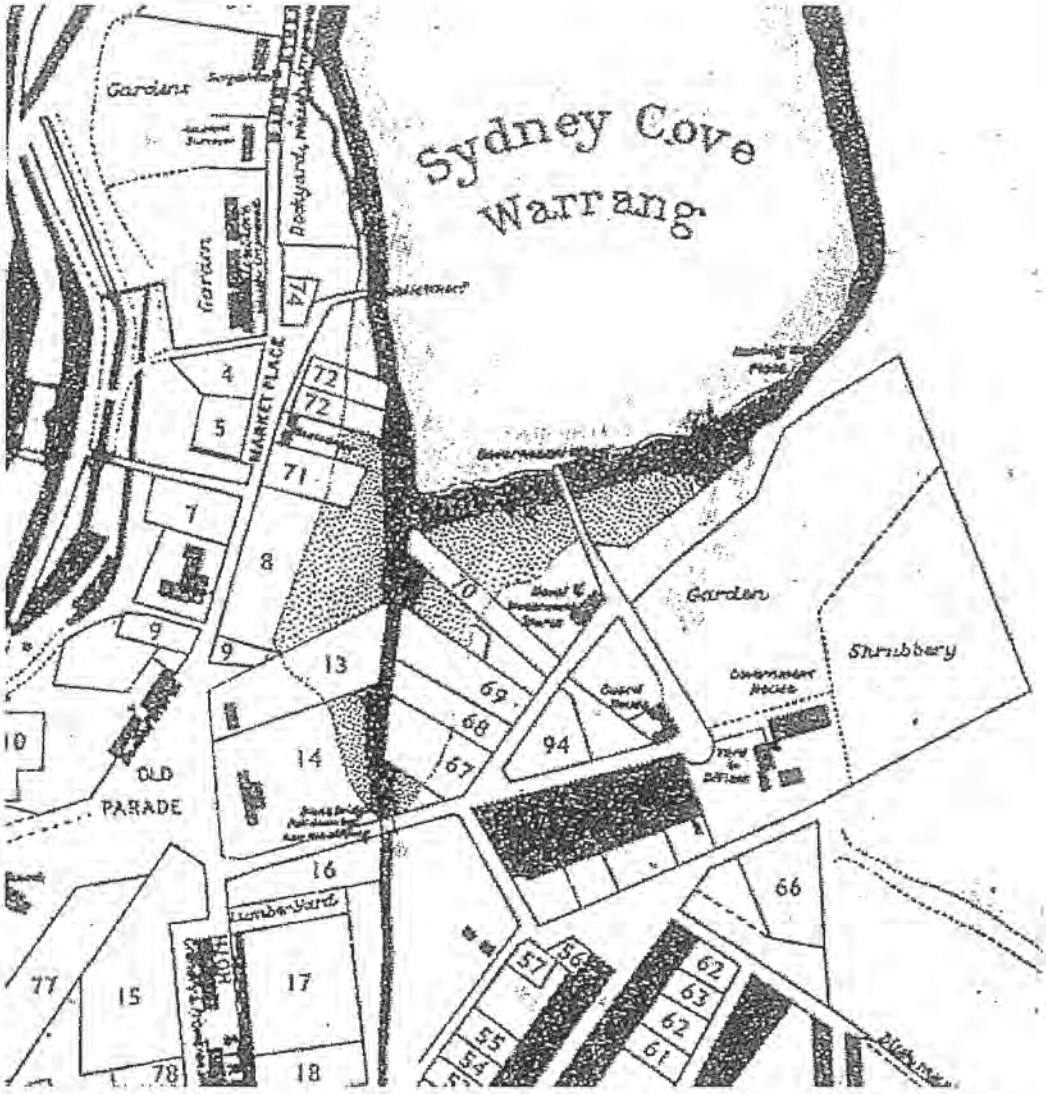


Figure 2.2 1807 Plan of the Town of Sydney by James Meehan. This plan, with the study site indicated, shows the early leases along George Street which extended through the study site. These sites were developed early with shops and stores catering to the nearby wharves. (Source: Ashton, P and D Waterson, 2000, *Sydney Takes Shape*, HEMA, Sydney)

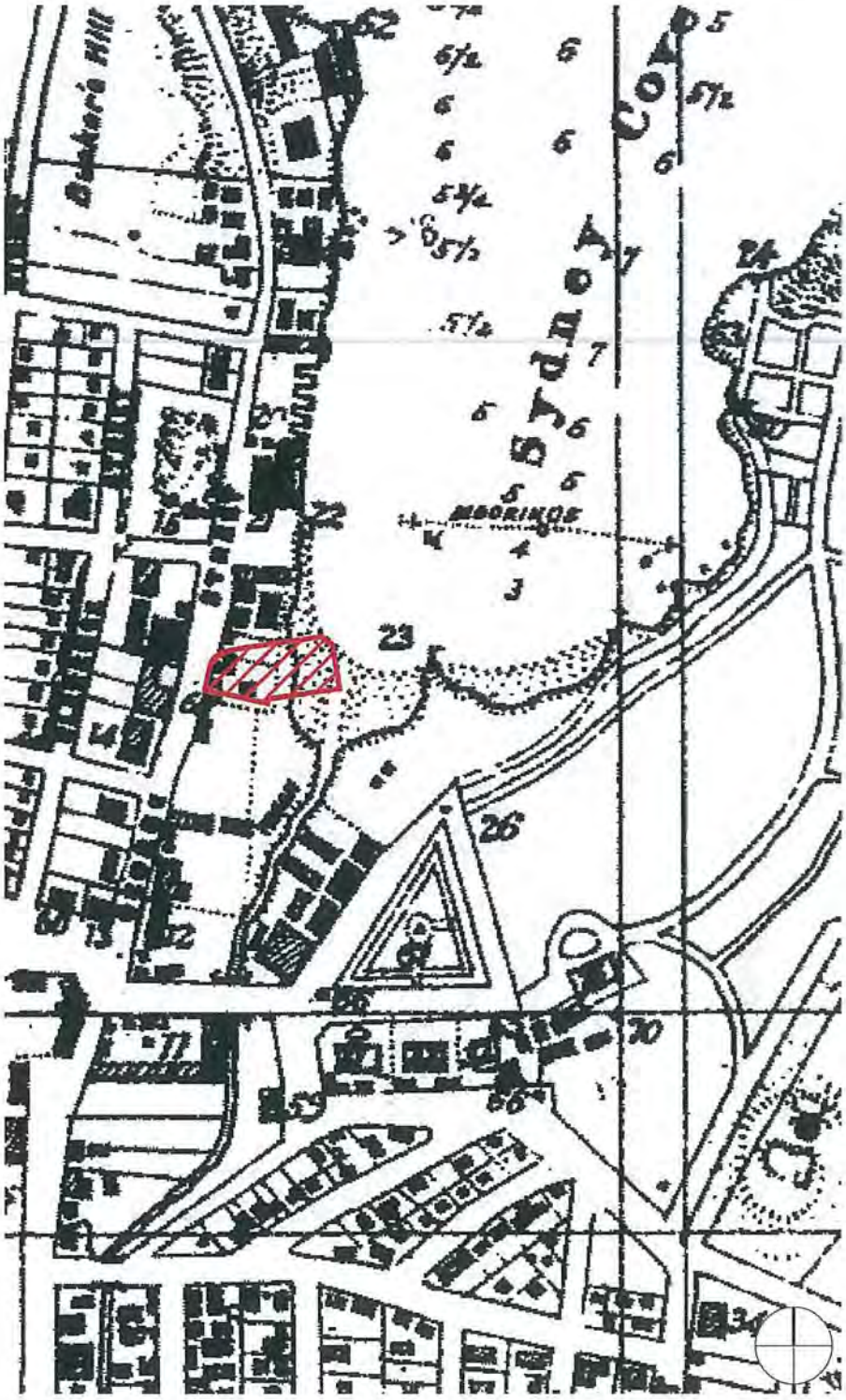


Figure 2.3 1822 Plan of the Town and Suburbs of Sydney. George Street and Bridge Street have been created as has Macquarie Place, all which are beginning to give shape to the area around the study site. The approximate position of the site is shown in relation to the natural Tank Stream flow and the mud flats where it entered the harbour. (Source: Ashton, P and D Waterson, 2000, *Sydney Takes Shape*, HEMA, Sydney)

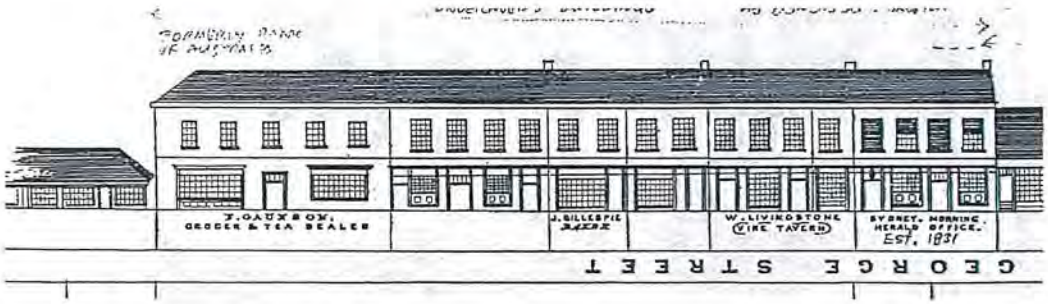


Figure 2.4 Joseph Fowles 1848 sketch of George Street showing the style of commercial development fronting George Street across the study site. Of interest is the office of the Sydney Morning herald, shown on the right, after which herald Square takes it name. (Source: Fowles, J, Sydney in 1848, facsimile edition 1962, Ure Smith)

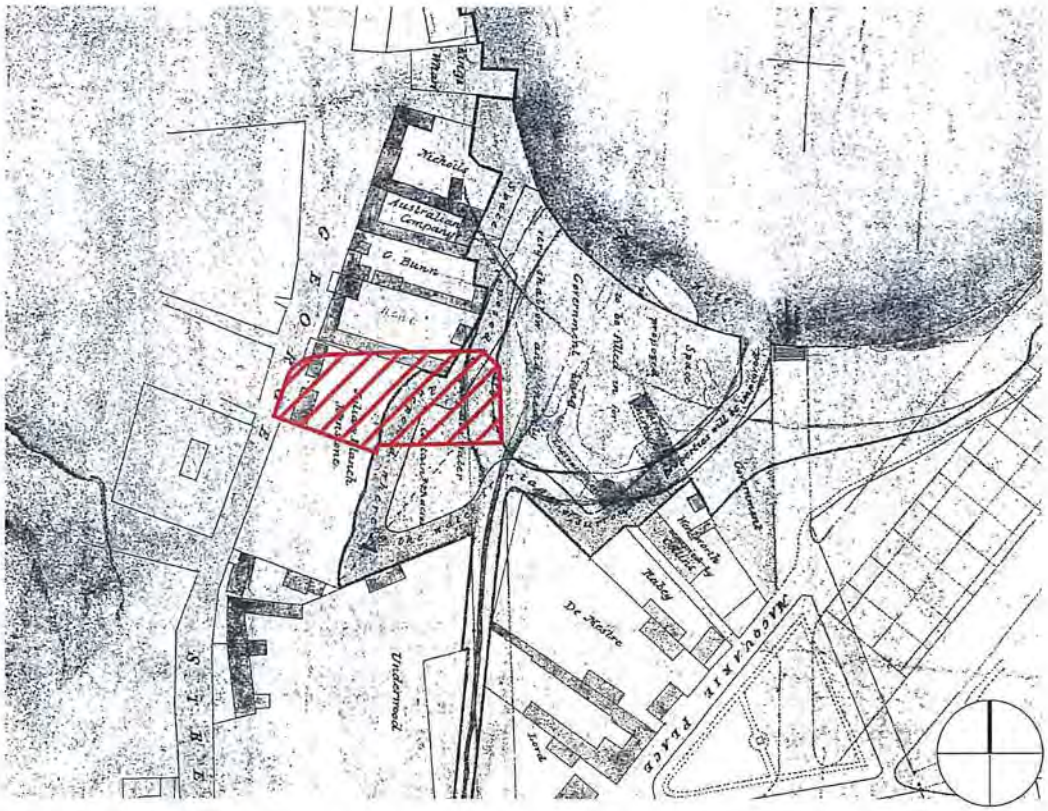


Figure 2.5 c1850 plan showing proposed reclamation with the study site shown. Note that the allotment boundary extends from George Street, with earlier buildings shown on it, to the east across the high water mark and mud flats of the Tank Stream delta. The proposed Quay extension is shown in relation to the earlier development. (Source: State Records NSW AOMAP 5634)

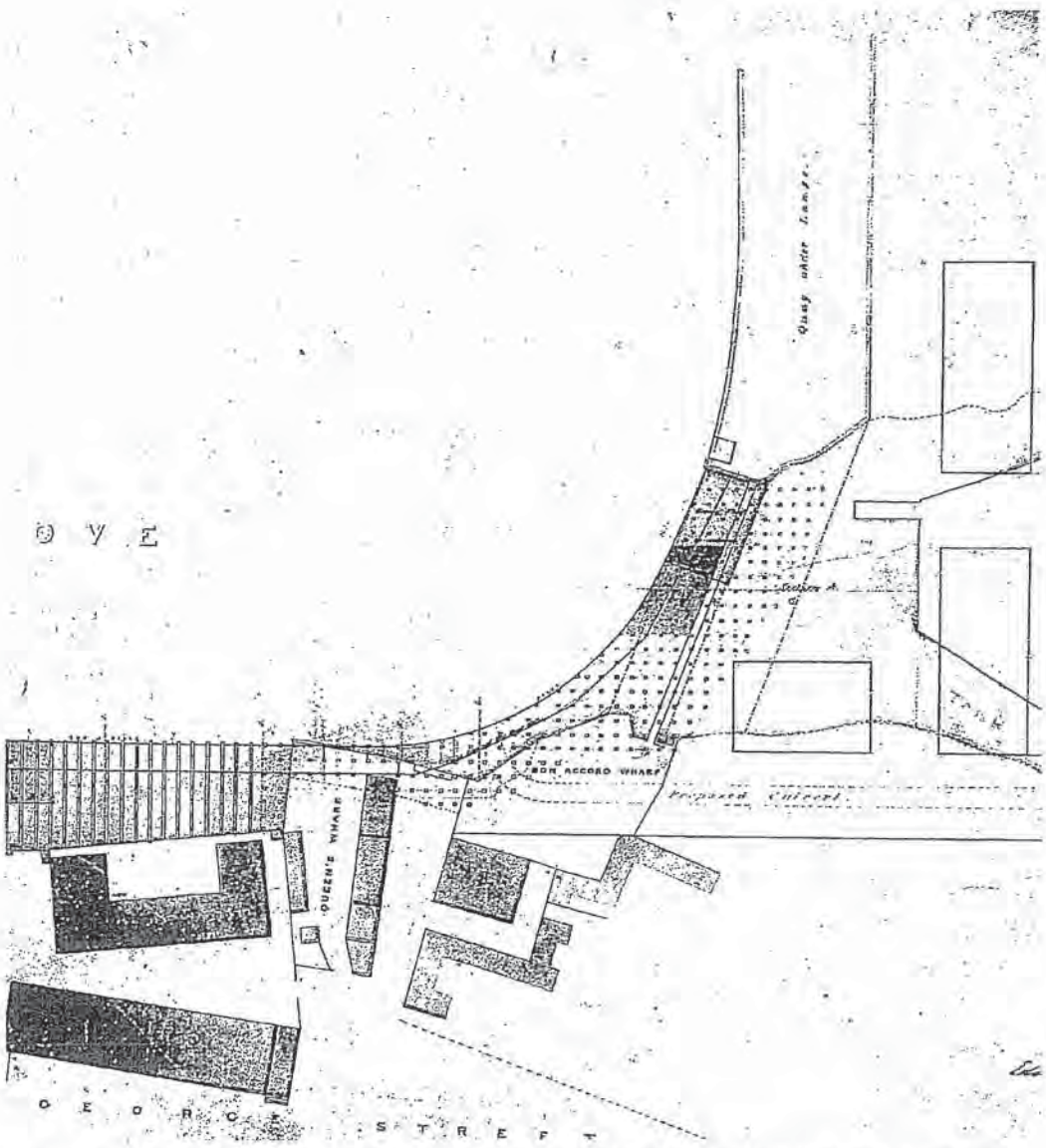


Figure 2.6 Detail of Plan of Extension of Semicircular Quay 1854, showing the plan for the timber piles and decking, as well as the intended Pitt Street extension and the proposed culvert for the Tank Stream. (Source: State Records NSW AO Plan 1282)

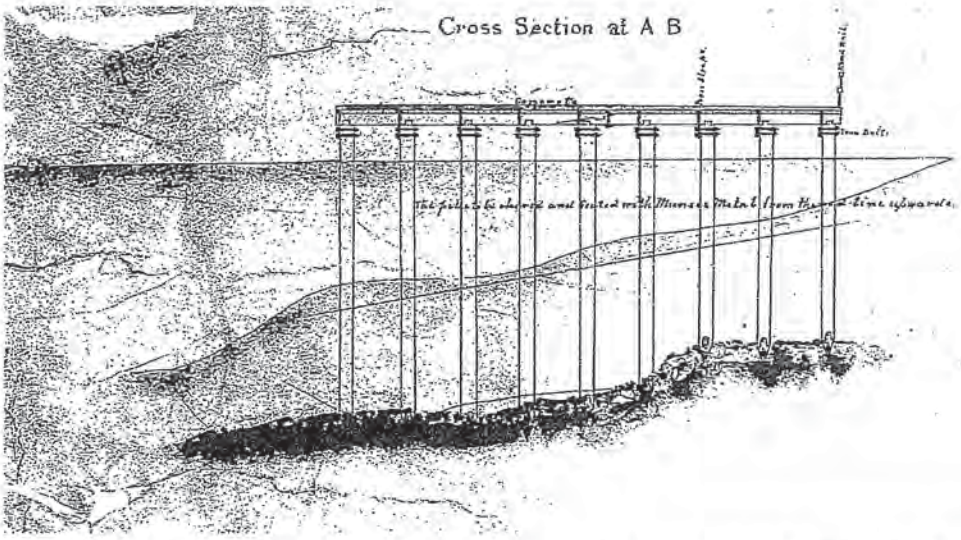


Figure 2.7 1853 Detail of plan for the extension of the semicircular quay showing the plan for piles for the wharf decking. The timber piles were to be positioned at regular intervals in a grid pattern, then topped with cross beams and timber decking. Each was tipped with a metal cap for driving through the stream bed and into the harbour floor. (Source: State Records of NSW AO Plan 5641)

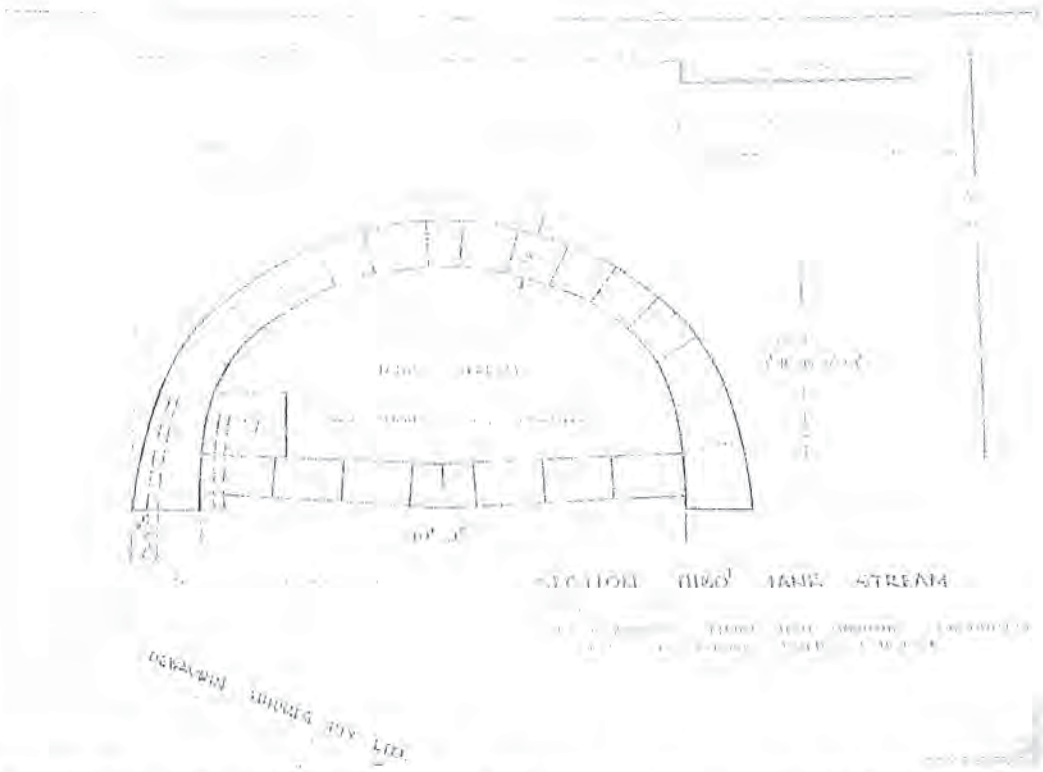


Figure 2.8 1964 detail of Services Plan for the construction of Gold Fields House showing a cross section of the Tank Stream at Pitt Street, its relative depth below the footpath level and its relationship to the site boundary. (Source: City of Sydney Council Archives)

Figure 2.9 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)

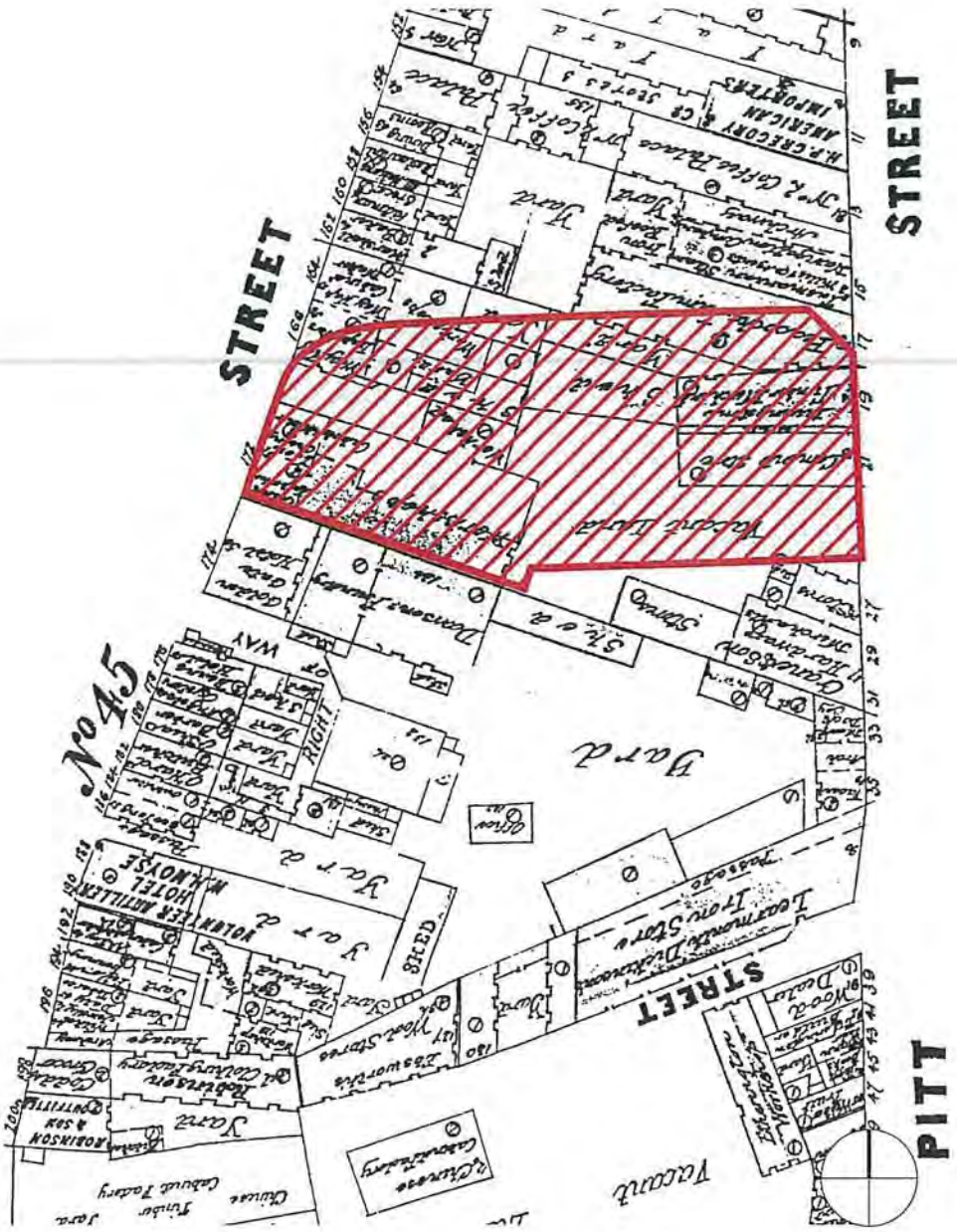


Figure 2.10 1880 Dove plan of Sydney. This shows the high density development on the site and around the George Street and Pitt Street areas. This part of the city was dominated by warehouses, merchants and shops dealing with the bustling maritime trade of Circular Quay and other nearby wharves. (Source: City of Sydney Council Archives)

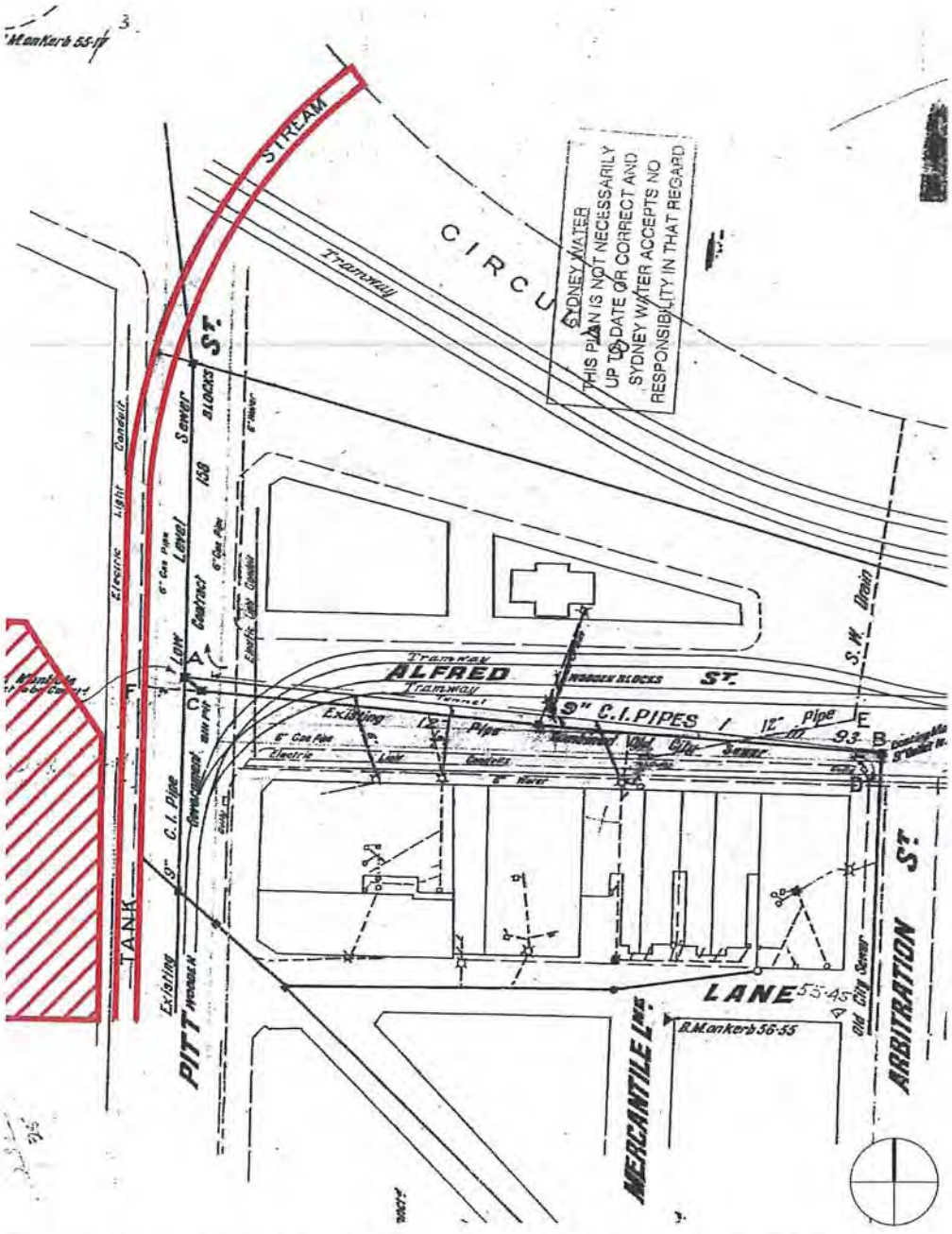


Figure 2.11 1922 Sydney Water board survey for the Northern Sewer branch, showing the position of the Tank Stream drain and its entry point into the harbour. The drains relationship to the site boundary is also shown. (Source: Sydney Water Plans Room)

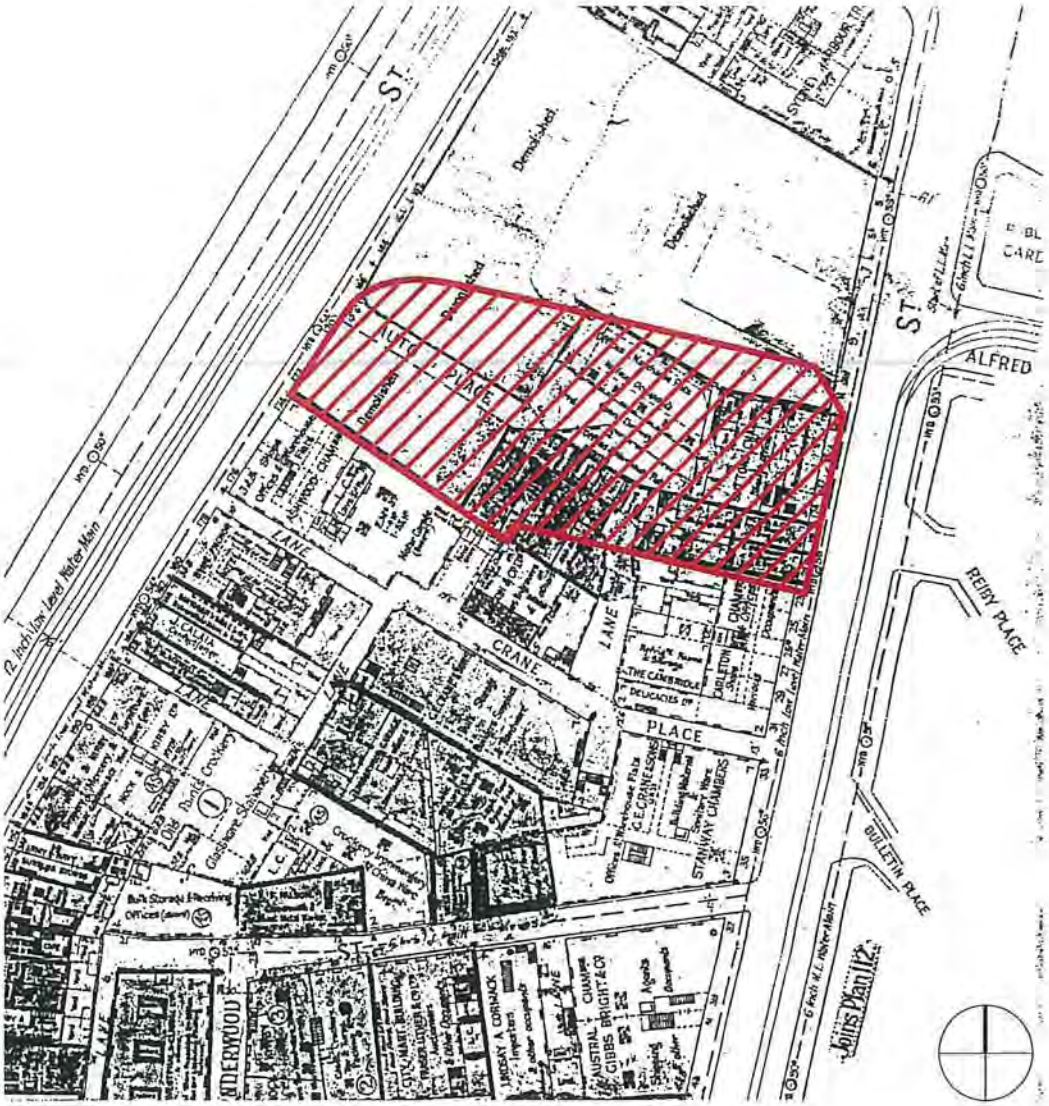


Figure 2.12 Sydney Fire Underwriters Association Plan 1924–1949. These plans were started during the 1920s and updated until the late 1940s. This plan shows the demolition of buildings in preparation for the construction of the Cahill Expressway and remodelling of Circular Quay. The work included the extension of Alfred Street through to meet George Street. (Source: City of Sydney Council Archives)

Figure 2.13 1943 aerial photograph with the current cadastre information shown. The site is arrowed. Note the buildings being demolished (in the future herald Square area) as shown on Plan 10. (Source: Department of Lands)

Figure 2.14 Aerial view west along Alfred Street, showing the site on the corner of Alfred, Pitt and George Streets. The completed Cahill Expressway is on the right. (Source City of Sydney Council Archive)

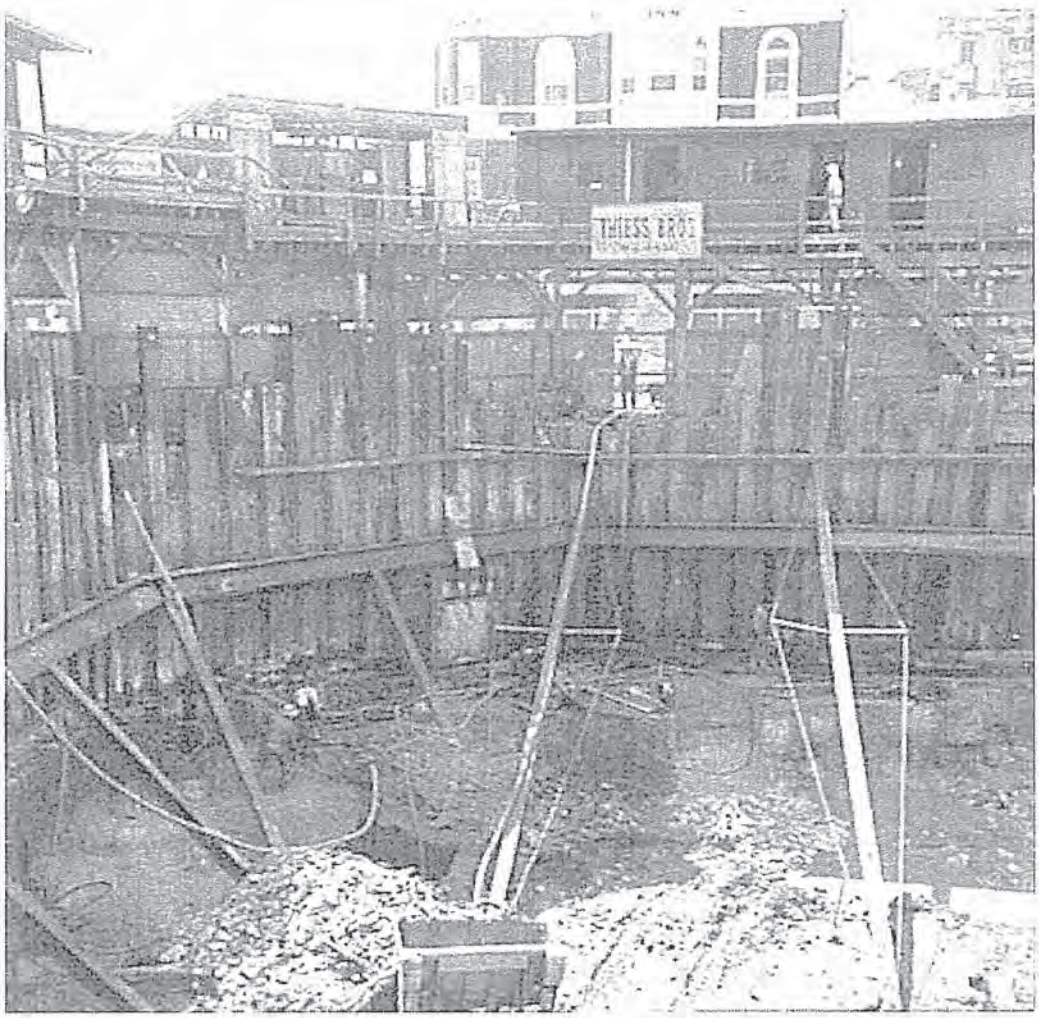


Figure 2.15 1965 image showing the excavation and shoring for the below ground levels of the Gold Fields House development. This view is looking east to Pitt Street, note the bystander on street level (beneath the Theiss sign). The tank stream is in Pitt Street behind the shoring. (Source: City of Sydney Council Archive)

Figure 2.16 Architects model of the Gold Fields House site and its relationship to the AMP building at the opposite end of the Quay. Gold Fields House was designed by Peddle Thorp Walker, the same architects who had previously designed the AMP building. (Source: City of Sydney Council Archive)

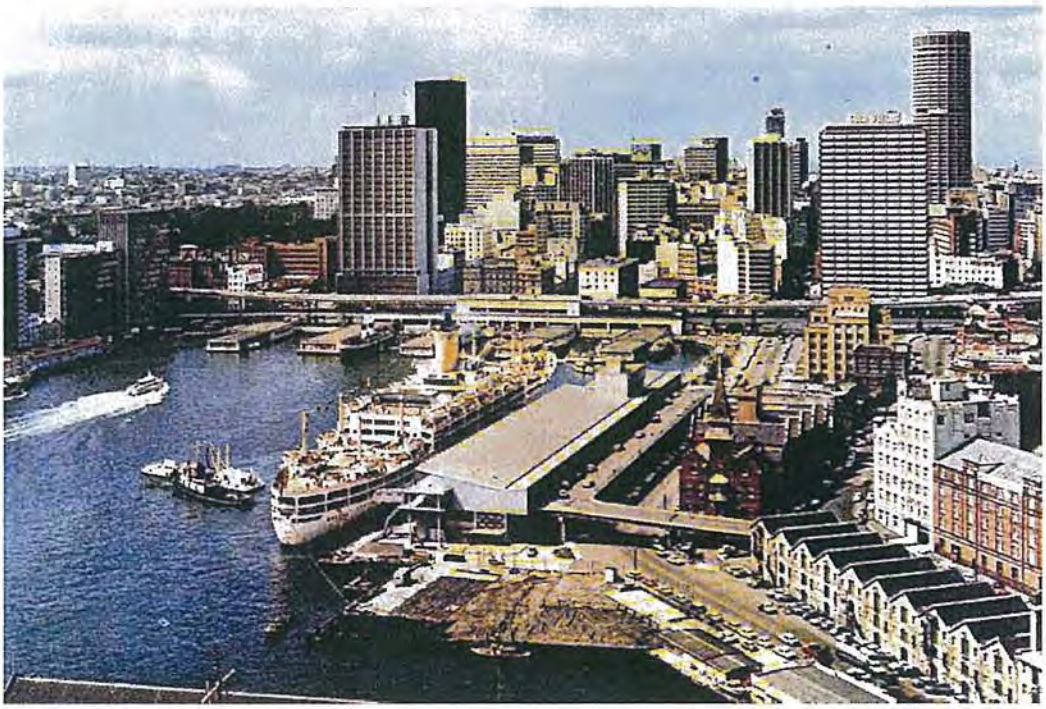


Figure 2.17 View across Circular Quay showing the completed Gold Fields House. (Source: City of Sydney Council Archive)

2.5 Endnotes

[1] Attenbrow, V, 2002, *Sydney's Aboriginal Past*, UNSW Press, Sydney, p3.

[2] Campbell, JF, 'The Valley of the Tank Stream', in Journal of the Royal Australian historical Society, Vol X, Part II, 1924, p69.

[3] Godden Mackay Logan, 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)

[4] A. T. Yarwood, 'Johnston, George (1764 - 1823)', *Australian Dictionary of Biography*, Volume 2, Melbourne University Press, 1967, pp 20-22

[5] Weingarth, J, The Head of Sydney Cove, in the Journal of the Royal Australian Historical Society, Vol X, Part V, 1924, p293.

[6] Andrews. G, 1986, *Port Jackson 200: 1786-1986*, Reed Books, Sydney, p67.

[7] Letter Department of Railways to Cumberland County Council 17 September 1959, Sydney City Council Archives

3.0 Statutory Framework

3.1 The Sydney Local Environmental Plan 2005

3.1.1 Specific Heritage Protections

As noted in Section 1.4.1, Gold Fields House site is not:

- an identified heritage item in Schedule 8, Part 1, of the *Sydney Local Environmental Plan 2005* (SLEP 2005);
- part of a Heritage Conservation Area identified by the SLEP 2005; or
- identified as part of a Heritage Streetscape in the Central Sydney Heritage Streetscape Map.

However, the site is included in the 'Circular Quay Special Area' (see Figure 1.4). Clause 77 of the SLEP 2005 includes a number of objectives for 'special areas' relevant to the potential heritage impacts of the proposed development including:

> *(a) to protect Special Areas from development incompatible with the particular character and significance of each Special Area and to retain and enhance its unique character, and*
>
> *(b) to reinforce the distinctive attributes and qualities of the built form of Special Areas by ensuring that development has regard to the fabric and prevailing character of each Area in scale, proportions, street alignment, materials and finishes, and*
>
> *(c) to conserve and protect heritage items and their settings, and*
>
> *(d) to maintain a high level of daylight access to streets, lanes, parks and other public domain spaces, and*
>
> *(e) to encourage active street frontages to the public domain, and*
>
> *(f) to conserve, maintain and enhance existing views and vistas to buildings and places of historic and aesthetic significance within Special Areas.*

The Character Statement for the Circular Quay Special Area (Schedule 6 of the SLEP 2005) identifies the area's significance as residing in:

> *its position at the head of Sydney Cove, its function as the harbour gateway to the city and as a major celebratory public space.*

The Character Statement notes the significance of Customs House to the character of the area and the importance of the:

> *significant public spaces facilitating unique views to the water, the Harbour Bridge and the Opera House, and also views from the water to the City beyond. These open spaces are enclosed by buildings of different architectural styles and periods, reflecting the history and development of the Quay.*

However, it also notes that the buildings to the south

> *exhibit a notable disparity in building scale, form and architectural treatment, representative of their different periods.*

Part 6 of the SLEP 2005 provides the following objectives for the Circular Quay Special Area:

(a) to recognise Circular Quay as a Special Area with a unique character in Central Sydney where Sydney Harbour meets the City, by a series of significant public spaces,

(b) to reinforce the urban character and scale of Circular Quay by requiring new buildings to be built to the street alignment, and to have a transition of building heights from Circular Quay to the maximum building height of the northern area of Central Sydney,

(c) to ensure that any development associated with the important transport interchange provided at Circular Quay is consistent with enhancement of the public domain of Circular Quay,

(d) to ensure that the important history, symbolic value and significance of the Quay and its maritime uses are interpreted in the design of new spaces and buildings,

(e) to maintain and enhance views to the water, the Harbour Bridge and the Opera House from various spaces of the Quay, and from the water to the Quay and the City beyond,

(f) to maintain and reinforce the image of the area as a major focal point and its function as a celebratory public space.

3.1.2 Sydney Local Environmental Plan 2005—General Heritage Protections

In addition to any specific heritage protections described in Section 3.1.1 above, the site is subject to the general heritage provisions of the SLEP 2005 which include the following provisions:

- Clause 11 of the Sydney LEP 2005 (the Aims of the Plan) includes the aim at paragraph (e):

  to conserve the environmental heritage of the City of Sydney,

- Clause 12 of the SLEP 2005 describes the strategies that will be used to achieve the aims of the plan. They include the strategy at paragraph (j) of the:

  conservation of heritage items and areas,

- Clause 13 specifies a number of principles that will guide Council including (at paragraph (b)):

  acknowledgment of the diversity of Sydney's cultural heritage from pre-European occupation to the current time.

- Clause 67 of the SLEP 2005 provides a number of objectives specific to heritage. It states:

  The objectives of the heritage provisions are:

  (a) to conserve the heritage of Central Sydney, and

  (b) to integrate heritage conservation into the planning and development control processes, and

  (c) to provide for public involvement in heritage conservation, and

  (d) to ensure that any development does not adversely affect the heritage significance of heritage items, and

  (e) to provide greater certainty in the management of the heritage of Central Sydney, and

  (f) to encourage high quality design and the continued use or adaptive re-use of heritage items.

- Clause 68 of the SLEP 2005 states that consent is required for a wide range of development on or in the vicinity of a heritage item. Clause 69 states:

  The consent authority must not grant consent to a development application involving a heritage item unless it has taken into consideration:

(a) the heritage significance of the heritage item concerned, and

(b) the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item and any historic subdivision pattern in the locality, and

(c) the heritage inventory assessment report prepared in relation to the heritage item, and

(d) any conservation management plan or heritage impact statement required by the consent authority, and

(e) any plan of management required by the consent authority, and

(f) the provisions of any relevant development control plan or policy adopted by the Council, and

(g) the heritage significance of the interiors of any heritage item concerned.

- The SLEP 2005 also protects potential and identified archaeological sites. Clause 75 provides:

The consent authority may grant a consent required by this Part for the carrying out of development on a potential archaeological site only if it has considered an archaeological assessment of how the proposed development would affect the conservation of the site and any relic known or reasonably likely to be located at the site.

3.2 City of Sydney Heritage Development Control Plan 2006

In addition to the provisions of the SLEP 2005, the City of Sydney Heritage Development Control Plan 2006 (DCP) contains a number of provisions relevant to the assessment of the potential heritage impacts of the proposed works. They are paraphrased below, although the DCP should be read in its entirety for the full text:

- Clause 1.3—Heritage planning aims to ensure that the significant elements of the past are appropriately managed and respected by new development. Heritage conservation does not preclude change but rather responds to different constraints and opportunities.
- Clause 2.1—The objective of the DCP is to ensure that development in the vicinity of heritage items is designed and sited to protect the heritage significance of the item.
- Clause 2.2 (1)—New development of sites in the vicinity of a heritage item is to be designed to respect and complement the heritage item.
- Clause 2.2 (2)—Development in the vicinity of a heritage item is to minimise the impact on the setting of the item.
- Clause 13.1—Development of heritage items or buildings and sites in heritage conservation areas and heritage streetscapes that impacts upon the public domain should be designed so that street furniture and other public domain items are not intrusive in the heritage conservation area or heritage streetscape; significant public domain features are retained; and development does not have a detrimental impact on the heritage significance of public domain features.

3.3 Heritage Act 1977 (NSW)

3.3.1 The State Heritage Register (SHR)

The State Heritage Register (SHR) is established under the *Heritage Act 1977* (NSW). It is a list of identified heritage items of particular importance to the people of New South Wales. It includes items and places (such as buildings, works, archaeological relics, movable objects or precincts) determined to be of State heritage significance. As previously noted, the proposed building envelope (and any

subsequent works) would fall within the heritage curtilage of the Tank Stream, which is an item listed on the State Heritage Register.

Provisions in the Heritage Act require that before work occurs on an SHR property, or work is undertaken that may disturb or destroy archaeological 'relics' within an SHR boundary, approval must be granted under Section 63 of the Heritage Act, unless those works are 'exempted' under Section 57 of the Act.

Section 57(2) of the Heritage Act provides for a number of Exemptions to Section 57(1) approval requirements. Standard Exemption 4 applies to excavation works (see Appendix D), which are works that would have minor impacts on archaeological relics. It requires the Director General to be satisfied that *'the excavation or disturbance of land will have a minor impact on archaeological relics'*.

This HIS concludes that the proposed redevelopment (and any excavation or other works associated with it) would have no adverse impacts on the Tank Stream, as long as the appropriate construction methodology is utilized to minimize vibration and instability risks to the Tank Stream. In this case therefore, pursuant to the concurrence of the Director General, the excavation and construction work for the new basement car parking levels could be undertaken subject to Standard Exemption 4 as an alternative to an application for approval pursuant to Section 60 of the Heritage Act.

3.3.2 Section 139–146 of the Heritage Act ('Relics Provisions')

For places not listed on the SHR (being the whole of the Gold Fields House site), Section 139 of the Heritage Act requires that:

> *A person must not disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit.*

Relics are defined in the Heritage Act as:

> *any deposit, artefact, object or material evidence that:*
>
> *(a) relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and*
>
> *(b) is of State or local heritage significance.*

This report concludes that there is no potential for relics to exist within the footprint of the proposed building envelope, and a Section 140 Excavation Permit will not be required prior to works commencing.

3.3.3 Section 170 State Agency Heritage Register

Section 170 of the Heritage Act requires that government instrumentalities maintain a Heritage and Conservation Register of items in their ownership or control which (inter alia):

> *could in accordance with guidelines issued from time to time by the Heritage Council, be subject to an interim heritage order or listing on the State Heritage Register.*

The Tank Stream is in the ownership of Sydney Water, and is listed on its Section 170 Heritage and Conservation Register. Any works that would affect the Tank Stream would need to meet the requirements of Sydney Water, including its heritage requirements.

3.4 National Parks and Wildlife Act 1974 (NSW)

The NPW Act provides statutory protection for all Aboriginal 'objects' (consisting of any material evidence of the Indigenous occupation of New South Wales) under Section 90 of the NPW Act, and for 'Aboriginal places' (areas of cultural significance to the Aboriginal community) under Section 84 of the NPW Act. Aboriginal objects and places are afforded automatic statutory protection in New South Wales whereby it is an offence (without the Minister's consent) to:

> *Damage, deface or destroy Aboriginal sites without the prior consent of the Director-General of the National Parks and Wildlife Service (now the Department of Environment and Conservation).*

The NPW Act defines an Aboriginal object as:

> *any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.*

The protection provided to Aboriginal objects and places applies irrespective of the level of their significance or issues of land tenure. Sites of traditional significance that do not necessarily contain material remains may be gazetted as 'Aboriginal Places' and thereby be protected under the NPW Act. However, areas are only gazetted if the Minister is satisfied that sufficient evidence exists to demonstrate that the location was and/or is of special significance to Aboriginal culture.

This report concludes (Section 5.1) that the construction of Gold Fields House involved excavation through fill layers and deep into natural rock strata, which will have destroyed any Aboriginal archaeological objects within the footprint of the proposed envelope.

3.5 World Heritage List and National Heritage List

3.5.1 Introduction

The Sydney Opera House is listed on the National Heritage List. Additionally, the Sydney Opera House was inscribed on the World Heritage List in June 2007.

The Sydney Harbour Bridge, Approaches and Viaducts is listed on the National Heritage List.

The National Heritage Listing for the Sydney Opera House is confined to the site of the Opera House itself. The World Heritage Listing extends beyond the site of the Opera House to include a 'buffer zone' which captures large parts of the Harbour, The Rocks and Circular Quay (see Figure 1.2). Gold Fields House is located immediately adjacent to, but outside, the buffer zone. As Gold Fields House is outside the buffer zone, it appears that the provisions of the Harbour REP do not apply and City of Sydney remains the relevant consent authority.

The World Heritage List nomination documentation states that the buffer zone is 'designed to protect (the Opera House's) World Heritage values in relation to its setting on Sydney Harbour.' It goes on to state that:

> *The buffer zone centres on the inner waters of Sydney Harbour. It includes places around Sydney Harbour within a radius of 2.5 kilometres that have been identified as offering critical views to and from the Sydney Opera House that contribute to its World Heritage significance.*

In other words, Gold Fields House has not been identified as offering critical views to and from the Sydney Opera House.

Notwithstanding the above, because both the Sydney Harbour Bridge and the Sydney Opera House are listed on the NHL (and the WHL in the case of the Opera House), and are in the vicinity of Gold Fields House, the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) could nevertheless apply to any development of the Gold Fields House site (see Section 3.5.2 below).

3.5.2 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act governs (among other things) the management of places listed on the World Heritage List and the National Heritage List.

Although the site is outside the designated buffer zone for the Sydney Opera House World Heritage Listing, and outside the areas of the Sydney Opera House and Sydney Harbour Bridge included on the National Heritage List, the EPBC Act specifies (Sections 12 and 15B) that any action that has, will have or is likely to have a significant impact on a place's National or World Heritage values is prohibited, without the approval of the Minister for the Environment and Water Resources. This provision applies regardless of whether the action would take place within or outside the World Heritage List buffer zone or National Heritage List boundaries.

It is for the proponent of an 'action' to determine whether the action should be referred to the Minister, but heavy penalties apply if an action is not referred that later proves to have a significant adverse impact. This HIS concludes (at Section 4.3.8) that the proposed development would have no adverse impacts on the National Heritage values of either the Sydney Opera House or the Sydney Harbour Bridge, or the World Heritage values of the Opera House, due principally to its physical and visual separation from these structures. A referral to the Minister for the Environment and Water Resources under the EPBC Act will therefore not be required.

3.6 Register of the National Estate

Gold Fields House is not listed on the Register of the National Estate (RNE). However, the Tank Stream is registered, as are a number of places in the immediate vicinity including the Cahill Expressway, Customs House and the Ship Inn.

Inclusion on the RNE provides limited heritage protections, being confined principally to the actions of the Commonwealth, and actions on Commonwealth land. Recent amendments to the EPBC Act have further limited the protections that listing on the RNE affords. The Minister is no longer required to give regard to the listing of a place on the RNE in making decisions under the EPBC Act, and the RNE shall cease to exist as a statutory list in 2012, at which time it will continue as an information source only.

4.0 Description of Proposal and Identification of Heritage Impacts

4.1 Description and Context of the Site

The subject site is located at the western end of Circular Quay. The site is located within the context of the multi-storey commercial buildings that line the northern end of George Street. Directly across George Street to the west is the Four Seasons Hotel. To the north of Gold Fields House, Alfred Street is divided from Circular Quay by the Circular Quay Railway Station and viaduct, topped by the Cahill Expressway overpass. The railway station, viaduct and expressway form a significant visual barrier between Alfred Street and the significant precincts of Circular Quay and The Rocks to the north.

Directly to the north of the subject site, between the site and Alfred Street, is Herald Square and the extensive Tank Stream Fountain (Figure 4.1). Donated to the City by John Fairfax and Sons Ltd and installed in 1981, the cascading fountain with bronze animals is by the Australian sculptor Stephen Walker. Occupying a thin rectangular strip of land between the subject site and Alfred Street, Herald Square forms an extension of the large pedestrianised areas of Alfred Street. Herald Square is informally divided from Gold Fields House and the café seating by a line of trees (Figure 4.2). Herald Square commemorates the 150th anniversary of the publication of the first Sydney Morning Herald. The Sydney Morning Herald was established in 1831 in premises fronting George Street to the south of the current site.

Fronting Alfred Street to the east of Gold Fields House, on the block between Pitt and Loftus Streets, is a combination of modern three and four-storey structures with two retained nineteenth-century elements at the corners: the Ship Inn on the corner of Pitt Street and the Paragon Hotel on the corner of Loftus Street. Above street level and set back from these facades is the glass clad tower of the high rise Gateway Quayside development.

Further east along Albert Street is the much altered 1845 Customs House with its large paved forecourt, and beyond it is the 1962 AMP Building. The latter is a significant example of modern architecture, was designed by Peddle Thorpe and Walker (the same firm that designed Gold Felds House), and at 115m was the first structure in Sydney to exceed the previous 45m height limit. The AMP Building also has an extensive paved forecourt.

The subject site is currently occupied by the multi-story commercial building Gold Fields House with two levels of retail and commercial operations at street level. Due to the slope of the site from west to east (4 metres), commercial areas are at street level on Pitt Street and below street level on the George Street elevation. The main entry to the building is from a flight of stairs at the centre of the north elevation. There is an additional entry off George Street. Vehicular access to the parking levels is from Pitt Street.

Gold Fields House has a height of 110m. The rectangular tower is set back from the Pitt and George Street boundaries above the single-storey podium. The rectangular shape of the existing building, which dates from 1966, is reinforced with strong horizontal bands of white concrete panels. The thinner verticals of the façade are clad in alternating white and grey metal sheets. The lower street levels are clad in polished terrazzo.

Any impacts on significant heritage items or spaces in the vicinity that would result from the proposed development are discussed in Section 4.3 below.

4.2 Prominent Views

The site is located within one of the most important visual catchments within the City of Sydney. The existing building is one of a few high rise buildings directly fronting Circular Quay. It is a prominent element within wider views of Circular Quay, principally those looking south from the harbour towards Circular Quay and those looking southwest from Bennelong Point towards Circular Quay.

The building is also visible from the lower-scale area of The Rocks and First Fleet Park and from George Street to the south, although in both cases these views are restricted.

At street level the Cahill Expressway and the railway viaducts form a visual barrier along the north side of Alfred Street, visually separating the site from Circular Quay, The Rocks and the Sydney Opera House.

Any impacts on views that would result from the proposed development are discussed in Section 4.3 below.

4.3 Identification and Assessment of Impacts

4.3.1 The Tank Stream Fountain and Herald Square

Gold Fields House currently has a poor connection with Herald Square with recessed commercial spaces behind a retaining wall (Figure 4.4). The proposed new building is set further back from Herald Square at ground level and a major portion of this plaza area is at grade, effectively enlarging the public realm along the Alfred Street frontage and providing greater opportunities for outdoor dining, sitting and other pedestrian utilization of the space (refer to Appendix A).

The individual single-storey double-height podiums on which the proposed new buildings are placed will be activated with a mixture of retail and café/bar uses. The space between the two podiums is also intended to be landscaped and activated with pedestrian uses which will connect with the the enlarged Alfred Street frontage to Herald Square, and to ultimately provide a connection to Rugby Place to the south. There is currently no direct pedestrian connection with Rugby Place (Figure 4.5). Although the detailed design of the space will not be finalised until a later stage of the project, the proposal has the potential to complement and enhance the use of Herald Square and public appreciation of the heritage-listed Tank Stream Fountain.

4.3.2 Ship Inn and Paragon Hotel

These two façade elements are listed as heritage items in the SLEP 2005 (Schedule 8, Part 2, Building Elements). Both buildings were substantially demolished and their façades incorporated into the podium of the Gateway Quayside development in the early 1980s.

The Statement of Significance in the State Heritage Inventory for the Ship Inn is as follows:

> *The remaining façades of the Ship Inn, formerly a three storey rendered brick building, are significant as a fine external example of Federation Free Classical style façades 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 façades are a representative example of the small corner hotel in this harbourside 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.

The Statement of Significance for the Paragon Hotel on the State Heritage Inventory is as follows:

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 façades. 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. 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 façades of the building retain aesthetic significance due to their simplified Victorian Regency ornamentation which reflected the social character of the immediate area.

In summary, these two façade structures are listed for their:

- representativeness as former prominent corner hotels;
- social significance as social/recreational venues and connection to the evolving hotel trade; and
- aesthetic significance, although the Ship Inn is described in the citation as being of only moderate local aesthetic significance.

The Paragon Hotel is located some distance from the proposed development. The Ship Inn is much closer to the proposed envelope, being on the opposite corner of Pitt and Alfred Streets. The scale of the proposed redevelopment (at least the 185 metre high tower on the northwest corner) is substantially greater than the existing Gold Fields House. However, due to the degree of separation and the existing density of development in the area the disparity of scale will not have a negative impact upon the setting or individual integrity of either heritage item.

The proposed redevelopment will not impact on views of the Ship Inn or Paragon Hotel from key vantage points, including from within Herald Square. The reduced footprint of the proposed redevelopment at ground level will potentially enhance views of significant heritage items and spaces from the public realm.

4.3.3 The AMP Building

The AMP Building is listed as a heritage item on the SLEP 2005. The State Heritage Inventory summarises its significance as follows:

Historical significance as Sydney's first 'modern' high-rise, setting an important precedent. Of environmental significance as a landmark site at Circular Quay and a good example of its architectural style.

The existing Gold Fields House building has historic and aesthetic connections with the AMP Building, in that it was designed by the same firm of architects and shortly after the AMP Building was completed. It was designed to be similar in height and similar in scale, as a 'book end' with the AMP building, on Circular Quay.

The 'book end' design concept dates to a period when the AMP building was the first to exceed the pre-existing 45m height limit in the city. However, in recent decades later high rise development in Sydney has reduced the clarity of the 'book end' relationship between the two structures. In particular, the

construction of the Gateway building between the AMP Building and Gold Fields House has significantly diminished the relationship between the two buildings. The bulk of the Cahill Expressway has also significantly compromised the connection between the two buildings when viewed from the harbour, although Circular Quay Railway Station was already in existence when both buildings were constructed.

The substantial change in the form and scale of the proposed redevelopment in comparison with Gold Fields House will not significantly impact on the appreciation of the AMP Building, particularly the already compromised 'book ending' of the Alfred Street frontage, its 'modern' high-rise form or its broader setting.

4.3.4 Customs House

The Customs House is listed as a heritage item in the SLEP 2005, the State Heritage Register and the Register of the National Estate. The State Heritage Inventory provides the following summary Statement of Significance:

> *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.*

Primarily due to their physical separation, the proposed redevelopment will have no impacts on the significant fabric or associations of the Customs House. Further, because of the large number, density and variety of built forms that have been constructed in the immediate vicinity of Customs House in the second half of the twentieth century, creating an architecturally mixed visual background, the visual separation between Customs House and proposed redevelopment is substantial. The visual and historical connections between Customs House and Circular Quay to the north (compromised by the Cahill Expressway) would be unaffected by the proposed building.

4.3.5 Circular Quay Railway Station

The Circular Quay Railway Station Group is listed on the State Heritage Register because (according to the citation):

> *The structure has State significance. It is a marker of the transition from interwar functionalist railway architecture and establishes a transition point between rivetting and welding in large steel construction projects. It represents a movement away from the placement of buildings on platforms to their location either above or below the rail lines.*

The proposed building envelope would have no impact on the appreciation of these aspects of the significance of the Circular Quay Railway Station Group. The significant separation to the Herald Square frontage of the proposed redevelopment would be maintained, retaining existing views to the group from the south. When viewed from the north, the group would continue to be read against a cityscape backdrop characterised by a wide variety of built form of considerable density.

4.3.6 The Rocks Conservation Area, Museum of Contemporary Art and Sydney Harbour Bridge

The railway viaducts and the Cahill Expressway form a significant physical and visual barrier between The Rocks and the proposed redevelopment, effectively quarantining The Rocks 'experience' to the north of the Expressway. The historic character of The Rocks, and the aesthetic and historic significance of the area as one of Australia's first places of European settlement, would be unaffected by the proposed development. It would merely substitute a more complex and taller built form for more simple and squat form of Gold Fields House, which comprises part of a cityscape characterized by built forms of considerable density and diversity. The Sydney Harbour Bridge, including its southern viaducts, although partially located within the area covered by the SLEP 2005, is even more remote from the site, and will therefore not be adversely affected.

For the same reasons, the proposed building envelope would not impact significantly on the setting of the Museum of Contemporary Art. The best and most significant appreciation of this building is achieved from the east (from the ferry wharves and east Circular Quay), from the north across First Fleet Park, and from the Cahill Expressway itself.

4.3.7 Cahill Expressway Space

The Register of the National Estate (RNE) includes the space under and near the Cahill Expressway as a registered place. The space is described as:

> *Space bounded by a diagonal from the south-east corner of George and Alfred Streets to the north-east corner of Alfred Street and Circular Quay West, the southern facade and the southern half of the eastern facade of the Maritime Services Building, the western alignment of George Street and George Street itself as far as Grosvenor Street. Also Close Street up to and including the steps of Carrington Street.*

It is described as being significant for the following reasons:

> *This open space under and near the Cahill Expressway makes possible a series of important views in several directions: 1) a progressively enlarging vista, as George Street is descended, of park and harbour culminating in a view of the Opera House; 2) view over the ferry wharves descending Globe Street; 3) view up Globe Street of old stone wall, steps and Long's Lane precinct buildings beyond.*

The registered 'space' is predominantly north of the Cahill Expressway, comprising a similar area to that covered by the discussion above of the impacts on The Rocks Conservation Area and Museum of Contemporary Art. For the same reasons, the proposed building envelope would have no significant impacts on this space.

4.3.8 The Sydney Opera House

As noted in Section 3.0, the inscription of the Sydney Opera House on the World Heritage List includes a buffer zone that:

> *centres on the inner waters of Sydney Harbour. It includes places around Sydney Harbour within a radius of 2.5 kilometres that have been identified as offering critical views to and from the Sydney Opera House that contribute to its World Heritage significance.*

The Gold Fields House site has not been identified as offering critical views to and from the Sydney Opera House, and is not within the buffer zone established for the purpose of protecting these views. Moreover, the proposed building envelope would have no significant impact on the setting of the Sydney Opera House. Although the new structure would be visible from the western loggia of the Sydney Opera

House, and would form a part of long views of the Sydney Opera House from parts of the harbour and the North Shore, it would be a remote part of the existing cityscape characterized by built forms of considerable density and diversity.

4.4 Compatibility with the Heritage Objectives of the 'Circular Quay Special Area'

The proposal is compatible with the Special Area objectives as set out in Section 3.1.1. It respects the significance of the heritage items in the vicinity, encourages an active street frontage to the public domain (including the heritage listed Tank Stream Fountain), and will not significantly impact upon any views and vistas to places of historic and aesthetic significance within the Special Area.

The replacement of the existing building, which is of limited aesthetic value, with a new development has the potential to positively contribute to the qualities identified in the Special Area Character Statement by maintaining and reinforcing the role of the area as a major focal point, and its function as an important public space.

Figure 4.1 Herald Square, with the extensive Stephen Walker sculpture and fountain shown.

Figure 4.2 Existing separation between Herald Square and the commercial operations at the ground floor of Gold Fields House, delineated by a row of trees and light posts.

Figure 4.3 Existing setback of Gold Fields House from George Street.

Figure 4.4 Existing stepped connection with Alfred Street at the George Street end of the subject site.

Figure 4.5 Rugby Place and existing connection with Gold Fields House.

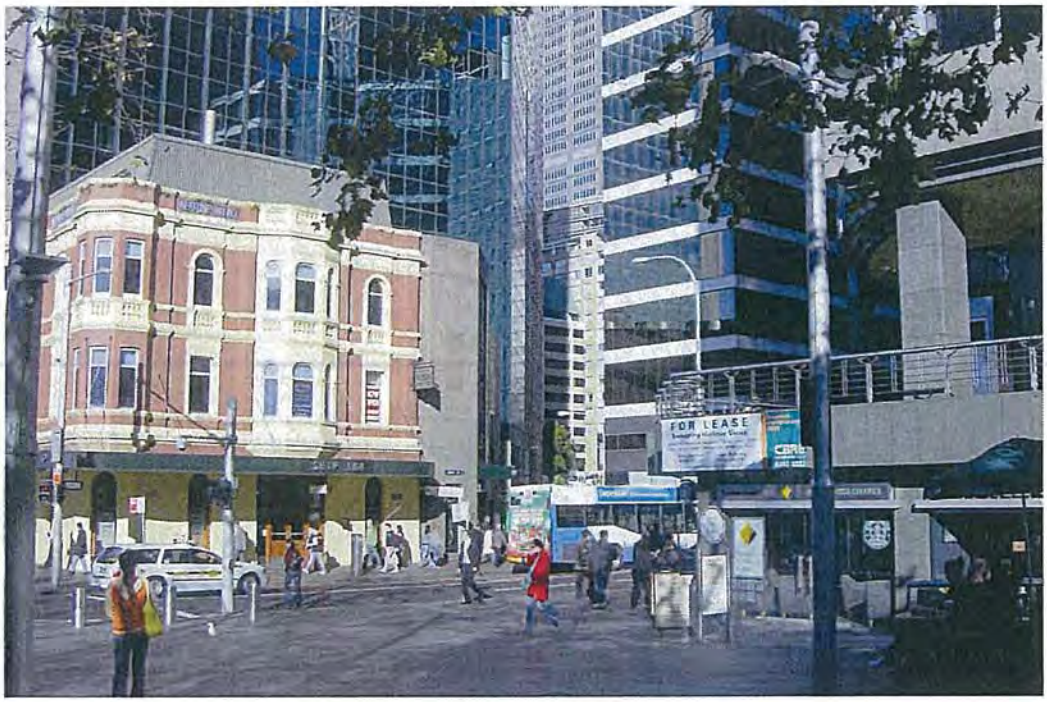


Figure 4.6 Ship Inn at the corner of Pitt and Alfred Streets.

Figure 4.7 George Street looking south from The Rocks.

Figure 4.8 Looking north east from George Street.

Figure 4.9 Gold Fields House as viewed from First Fleet Park. The current proposal will involve a small expansion of the built volume to the east and west when viewed from this area, and additional height.

Figure 4.10 Pitt Street looking south from Alfred Street.

5.0 Archaeological Assessment

5.1 The Potential Aboriginal Archaeological Resource

The historical development of the Tank Stream and the site of Gold Fields House is described in Section 2.0. As noted, the excavation for the construction of Gold Fields House involved excavation through fill layers and deep into natural rock strata, which will have destroyed any Aboriginal archaeological objects within the footprint of the proposed envelope.

Similarly, the excavation will have destroyed any geomorphological and archaeo-botanical evidence of the original Tank Stream on the site.

5.2 The Potential Historical (Non-Aboriginal) Archaeological Resource

As demonstrated by the history presented in Section 2.0:

- The construction of Gold Fields House resulted in the destruction of all archaeological relics within the footprint of the building.
- The Tank Stream is located immediately adjacent to the site on Pitt Street. Its western extremity is located below the footpath c100-175mm east of the site's legal boundary, with an additional 1m offset to the inside wall of the existing basement car park. Its base is 8' 9" (2.44m) below the footpath. The 3m curtilage extends beyond the existing Gold Fields House basement retaining walls. The excavation and construction works involved in the 1965-66 Gold Fields House development do not appear to have adversely affected the Tank Stream, despite its proximity to the site.
- There is the potential for archaeological relics to exist along George Street beyond the footprint of Gold Fields House which would relate to the nineteenth-century development of the precinct.

Figure 2.8 illustrates the likely form of the Tank Stream adjacent to the site. The SHR citation describes the Tank Stream on Pitt Street, at the Tank Stream's northern end, as comprising a sandstone arch with, in places, the original sandstone floor overlaid with concrete, for which the date is unknown.

5.3 The Proposed Scope of Works

The excavation for the additional basement parking levels proposed for the redevelopment will not extend beyond the existing basement of Gold Fields House. Therefore there are no archaeological relics that might be impacted by construction of the proposed building envelope.

The methodology proposed for the excavation of the additional basement parking levels is intended to minimise any disturbance to the Tank Stream and any archaeological relics that may be extant along George Street beyond the footprint of Gold Fields House. In summary, the methodology will involve (refer to Appendix B):

- Retention of the existing reinforced concrete basement retaining wall along the Pitt Street frontage, adjacent to the Tank Stream.
- Installation of temporary restraints to the retaining wall prior to the removal of the existing basement floor slabs. These will comprise soldier piles, with post-tensioned ground anchors fixing the soldier piles in place through the existing walls.

- Rock bolting and shotcreting of the face of the exposed rock for the new excavation below the existing basement level, in the event that local areas of weak or jointed rock are encountered during the works.

5.4 Potential Impacts and Mitigative Measures

The proposed redevelopment will not disturb or destroy any archaeological relics or objects within the site. All such artefacts will have been destroyed when Gold Fields House was constructed in the 1960s. Similarly, the proposed redevelopment (and any subsequent demolition, excavation and building works) will have no direct physical impacts on the Tank Stream, even though a portion of the basement will extend within its 3 metre curtilage (as does the existing basement).

The proposed building envelope will involve physical intervention within the site along the Pitt Street boundary in the immediate vicinity of the Tank Stream, comprising the installation of temporary restraints to the existing basement walls of Gold Fields House, the removal of the existing basement slabs, and new rock excavation below the existing basement level. There is the potential for damage to be caused to the Tank Stream during those works through vibration, subsidence, etc. The work method will need to be designed to minimize vibration and instability risks during the demolition and excavation phases of the redevelopment project.

The proposed redevelopment will have no adverse impacts on the ability to interpret the Tank Stream to the public. Similarly, the ability of archaeologists to investigate the Tank Stream in the future would not be impacted. At present, Gold Fields House incorporates no interpretation in relation to the Tank Stream. The proposed development will present new opportunities for interpretation of not only the Tank Stream but also the early history of the precinct.

6.0 Conclusions and Recommendations

6.1 Built Heritage

6.1.1 Conclusions

As discussed in detail in Section 4.0, the proposed redevelopment will not have any adverse impact on the heritage values of the heritage items in the vicinity of the Gold Fields House site. No significant views would be impacted by the proposed redevelopment.

6.1.2 Recommendations

Although as noted above the proposed new building form will not have any adverse impacts, the design development process should incorporate two main objectives to respond to the historic context of the proposed development:

- The design of the ground level plaza area of the proposed redevelopment should achieve a positive and interactive connection with the adjacent public space of Herald Square, and encourage greater public appreciation of the heritage listed Tank Street Fountain.
- The proposed redevelopment should also include a component of interpretation in fulfillment of the Special Area objectives to facilitate an understanding of both the early history of the precinct and its maritime uses and of the Tank Stream.

6.2 Archaeological Assessment

6.2.1 Conclusions

The proposed redevelopment extends into the 3 metre statutory curtilage established by the NSW Heritage Act for the Tank Stream, an archaeological item listed on the State Heritage Register (and Register of the National Estate). The methodology proposed for the excavation of the additional basement parking levels will comprise the installation of temporary restraints to the existing basement walls of Gold Fields House, the removal of the existing basement slabs, and new rock excavation below the existing basement levels of Gold Fields House. The works will not, however, involve lateral excavation within the Tank Stream curtilage.

Prior to the works commencing, a permit would ordinarily be obtained from the NSW Heritage Council pursuant to Section 60 of the *Heritage Act 1977*. However, on the basis that the methodology proposed for the excavation of the additional basement parking levels is intended to avoid any disturbance to the archaeological resource beyond the site, specifically the Tank Stream, it would be appropriate for those works to proceed upon a successful application being made to the Director General of the Heritage Branch, NSW Department of Planning, for an Exemption pursuant to Standard Exemption 4.

In considering an application for the use of Standard Exemption 4, the Director General is likely to require confirmation that the proposed work method will minimize vibration and instability risks to the Tank Stream during the demolition and excavation phases of the redevelopment project.

The proposal would have no adverse impacts on the ability to interpret or archaeologically investigate the Tank Stream in the future. On the contrary, it provides a number of opportunities for enhanced interpretation.

6.2.2 Recommendations

The proposed redevelopment could proceed without an adverse impact on the Tank Stream provided the proposed methodology for the works will not involve lateral excavation within its 3 metre curtilage, as described in Section 5.3.

Prior to the commencement of any demolition, excavation or building works, an application must be made to the Heritage Branch, NSW Department of Planning, for an Exemption pursuant to Standard Exemption 4: Excavation.

The work method for the demolition, excavation and building works will need to minimize vibration and instability risks to the Tank Stream and any archaeological relics that may be extant along George Street beyond the footprint of Gold Fields House. The work method will need to be submitted to the Heritage Branch as part of the application for the use of Standard Exemption 4.

In the event that the Director General declines the application for the use of Standard Exemption 4, an application to undertake work that may disturb or destroy archaeological 'relics' within an SHR boundary pursuant to Section 60 of the Heritage Act would need to be lodged with the Heritage Council. In this circumstance, approval of the application would need to be obtained before the Sydney Council could determine the development application.

7.0 Appendices

Appendix A

Ground Plan showing interface with Herald Square and Tank Stream Fountain

Appendix B

Sketch showing Pitt Street basement wall construction (Taylor Thomson Whitting, June 2007)

Appendix C

State Heritage Register citation for the Tank Stream

Appendix D

Standard Exemption 4 - Excavation (Revised 2009)

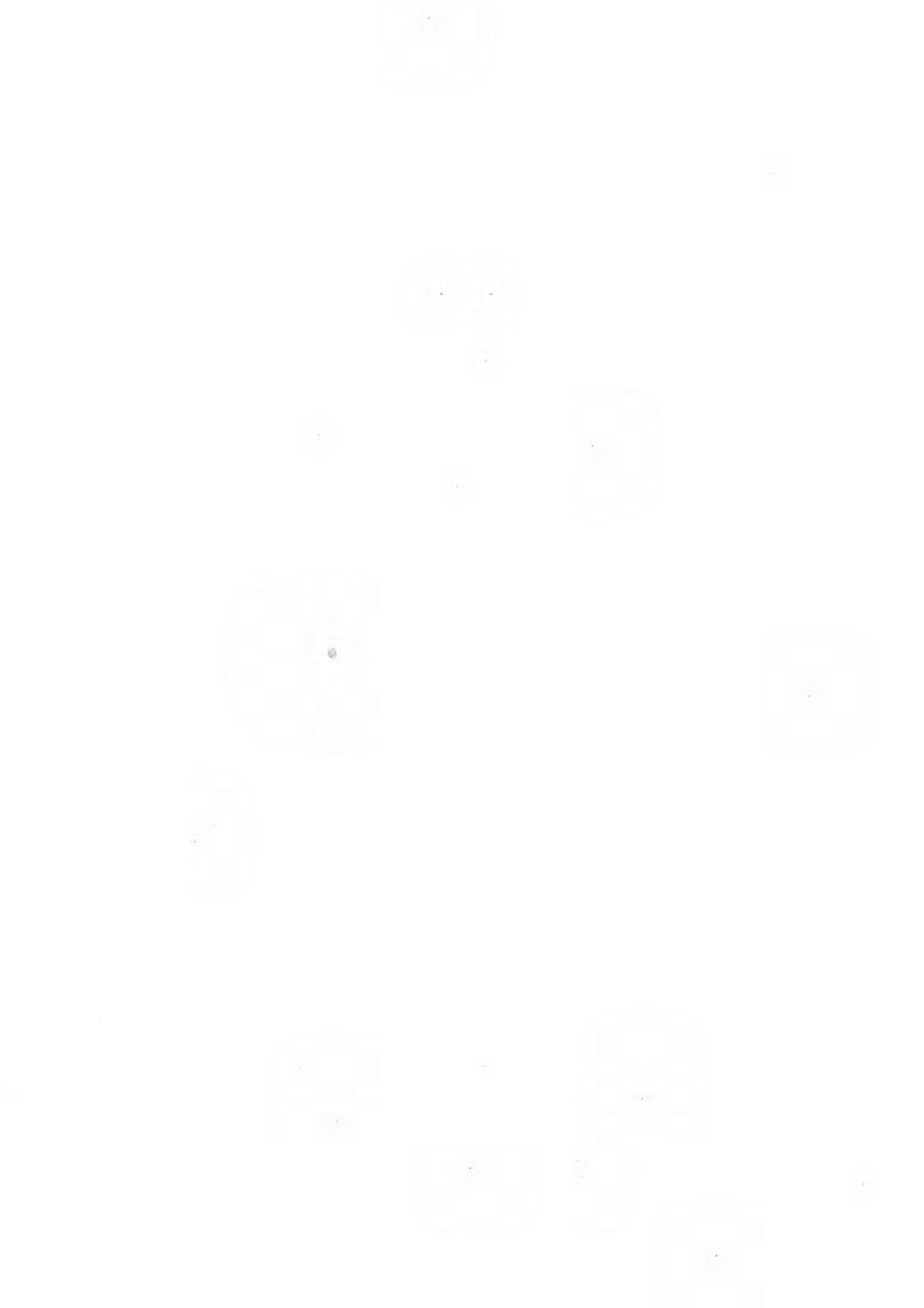
Appendix A

Photo Montage Showing the View from Rugby Place—Facing Northwest


ALFRED STREET
GEORGE STREET
PITT STREET
BUILDING A
BUILDING B

Appendix B

Report of Taylor Thomson Whitting 29 June 2007

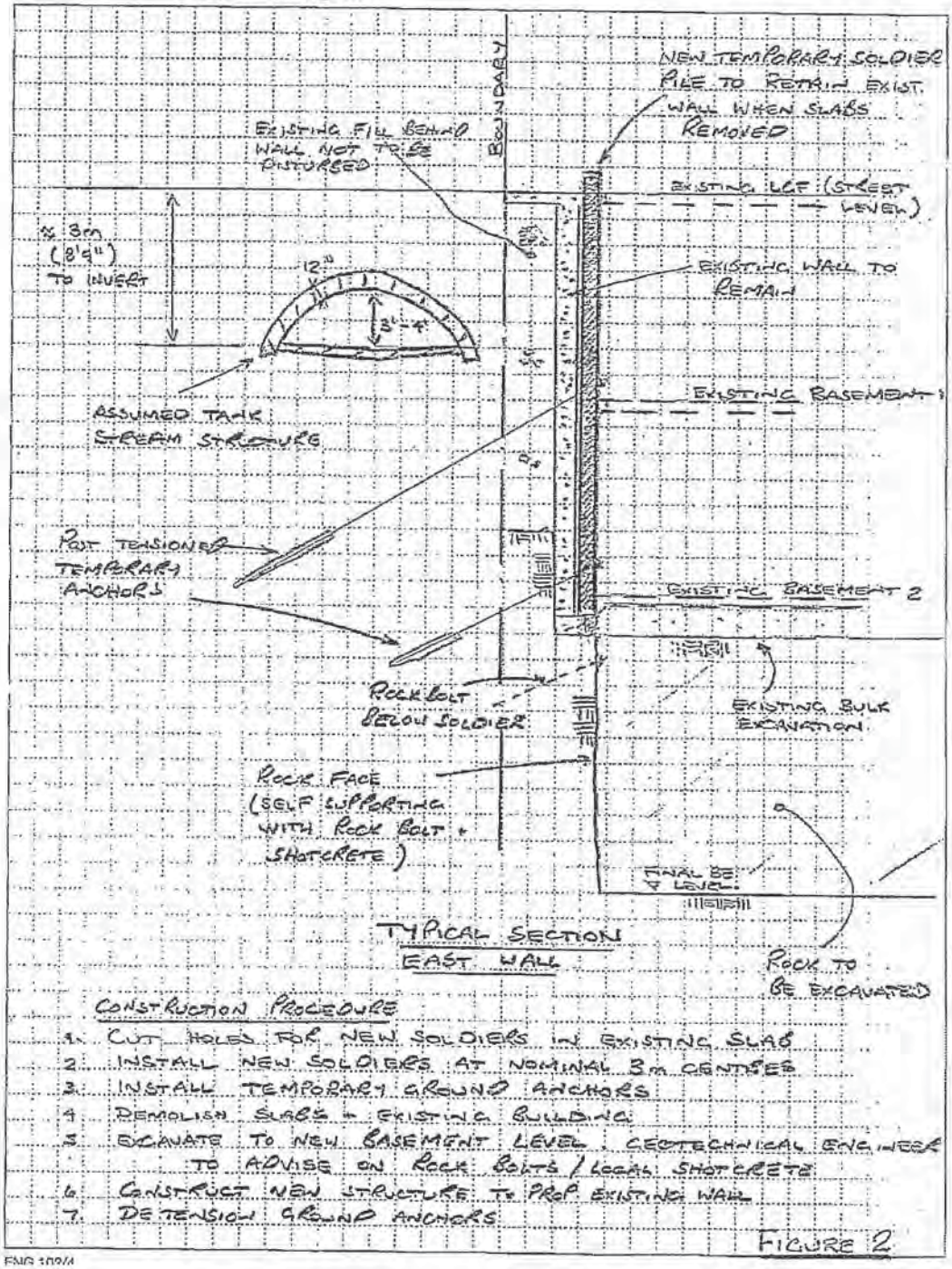


TaylorThomsonWhitting
Consulting Engineers

Structural Civil Traffic Façade
Sydney Melbourne Canberra Jakarta Singapore

Project 1 ALFRED ST | Job No | Page No. 1

Subject TEMP SUPPORT ADJACENT TANK STREAM | By KTW | Date 28/5/07



TYPICAL SECTION
EAST WALL

CONSTRUCTION PROCEDURE

1. CUT HOLES FOR NEW SOLDIERS IN EXISTING SLAB
2. INSTALL NEW SOLDIERS AT NOMINAL 3m CENTRES
3. INSTALL TEMPORARY GROUND ANCHORS
4. DEMOLISH SLABS + EXISTING BUILDING
5. EXCAVATE TO NEW BASEMENT LEVEL. GEOTECHNICAL ENGINEER TO ADVISE ON ROCK BOLTS / LEGAL SHOTCRETE
6. CONSTRUCT NEW STRUCTURE TO PROP EXISTING WALL
7. DETENSION GROUND ANCHORS

FIGURE 2

Appendix C

State Heritage Register citation for the Tank Stream

Tank Stream

Item

Name of Item: Tank Stream
Other Name/s: Tank Stream Fountain Circular Quay
Type of Item: Archaeological-Terrestrial
Group/Collection: Utilities - Water
Category: Spring
Primary Address: Sydney, NSW 2000
Local Govt. Area: Sydney
Property Description:

Lot/Volume Code	Lot/Volume Number	Section Number	Plan/Folio Code	Plan/Folio Number
CROWN LAND	-	-	-	-
LOT	1	-	DP	1003373
LOT	10	-	DP	1027838
LOT	11	-	DP	1027838
LOT	103	-	DP	1044917
LOT	A	-	DP	109825
LOT	B	-	DP	109825
LOT	52	-	DP	1102608
LOT	1	-	DP	113509
VOL	15504	-	FOL	118
LOT	3	-	DP	185472
LOT	1	-	DP	185597
LOT	1	-	DP	185597
LOT	1	-	DP	186488
VOL	15154	-	FOL	214
LOT	1	-	DP	217877
LOT	1	-	DP	217877
LOT	1	-	DP	220830
LOT	1	-	DP	220830
LOT	1	-	DP	221701
LOT	1	-	DP	223087
LOT	2	-	DP	223087
LOT	1	-	DP	225060
LOT	2	-	DP	225060
LOT	1	-	DP	225221
VOL	13767	-	FOL	230

LOT	6	-	DP	2885
LOT	6	-	DP	2885
LOT	7	-	DP	2885
LOT	8	-	DP	2885
-	-	-	CP/SP	50276
LOT	1	-	SP	50276
LOT	10	-	SP	50276
LOT	11	-	SP	50276
LOT	12	-	SP	50276
LOT	13	-	SP	50276
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-	-	-	CP/SP	6119
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LOT	9	-	SP	6119
LOT	1	-	DP	61538
LOT	1	-	DP	61671
LOT	1	-	DP	628553
LOT	1	-	DP	630190
LOT	1	-	DP	63968
LOT	1	-	DP	81535
LOT	2	-	DP	850895
LOT	1	-	DP	857993
LOT	1	-	DP	85863
LOT	1	-	DP	86265
LOT	101	-	DP	872734
LOT	1	-	DP	900148
LOT	2	-	DP	900148
LOT	1	-	DP	926324
LOT	1	-	DP	926326
LOT	1	-	DP	962325

Boundary: The Tank Stream has a curtilage of 3 metres from all surfaces shown as heavy black on plan catalogued H.C. 1665 in the office of the Heritage Council of NSW.

All Addresses

Street Address	Suburb/Town	LGA	Parish	County	Type

	Sydney	Sydney	St James	Cumberland	Primary

Owner/s

Organisation Name	Owner Category	Date Ownership Updated
Sydney Water	State Government	

Statement of Significance

The Tank Stream is significant because it was the reason the First Fleet settlement was established in Sydney Cove, and therefore influenced the future shape of Sydney over two centuries. It is linked in the public mind with the period of first European settlement and retains value as an iconic representation of that period and is interpreted as a metaphor of the period of contact and early urban settlement in Australia.

The Tank Stream itself has retained an identity through the functional changes from being a fresh water supply, through subsequent use as combined sewer and stormwater drain to its current function as a stormwater drain. It is an important survivor of the first period of organised and integrated water management in an Australian city. The stone-cut water tanks, which may survive archaeologically, are important symbols of the reliance upon water in the colony, both in absolute terms and as an indication of the fragility of the European presence in Australia.

The surviving fabric documents mid-nineteenth century sanitation design and construction, and subsequent changes in methods and also the theory of urban wastewater management. This evidence is preserved in the drain enclosing the Tank Stream, in physical evidence of change, and may also be present archaeologically in buried parts of the Tank Stream line.
The archaeological evidence of the Tank Stream has the potential to contain deposits that can contain information about pre-human and pre-urban environments in Sydney, Aboriginal occupation and early non-indigenous occupation of Sydney. The fabric enclosing the watercourse demonstrates one of the most comprehensive collections of hydrological technology in Australia.

The sections of the former Tank Stream south of King Street which survive have potential for retaining evidence of the earliest periods of its human use, although this is likely to have been severely compromised by development. The swampy source of the stream may provide evidence of past environmental conditions. (Tank Stream Conservation Management Plan, Sydney Water Date : June 2003)
Date Significance Updated: 31 May 06
Note: There are incomplete details for a number of items listed in NSW. The Heritage Office intends to develop or upgrade statements of significance and other information for these items as resources become available.

Description

Designer: various

Builder: various

Physical Description: The surviving fabric of the Tank Stream is extant from King Street in the south at a point between Pitt and George Streets to Circular Quay in the north.

The Stream has been blocked at a point just south of King Street and for 13 metres north of this point represents the 1866 open sewer, which was covered in 1876. The dimensions are 810mm broad by 1220mm high. Between King Street and Martin Place (163 metres) there are three phases of construction, beginning with a modern concrete pipe (750mm diameter), the section approaching the GPO is part of the historic oviform sewer (810 by 1220mm) and lastly a stainless steel box-profile pipe (1070 by 750mm). The section between Martin and Angel Places returns to the 1866 brick open drains enclosed

in 1876. This form continues between Angel Place and Hunter Street for 95 metres before being interrupted by a 36 metre section of modern cement lined pipe laid in 1962 and a steel section laid in 1958 and 1978 (both are 1350mm).

From Hunter to Bond Street the Stream is a semi-circular stone arch with a shallow V shaped floor for 35 metres (1500 by 3000mm). The 1790 cut tanks were originally located in this area, but are not thought to have survived. For the following 86 metres, below Australia Square, the original sewer has been replaced with concrete box-profile pipe (1220 by 1830mm), inserted during the construction of the Square in 1962. The Australia Square Tower basement houses the access to Tank Stream for public tours and as an inspection point for Sydney Water.

The boxed concrete section (1220 by 1830mm) continues from Bond Street to Abercrombie Lane, a distance of 60 metres. Tank Stream between Abercrombie Lane and Bridge Street, a length of 40 metres, is of c.1860 semi-circular stone arch (1500 by 3000mm). From Bridge Street Tank Stream diverts to run under Pitt Street to Circular Quay, a length of 185 metres. Beginning with a stone oviform sewer of 810mm by 1220mm, constructed in c.1878, the shape changes to a semi-elliptic stone arch of 3000mm and varying between 1100 and 1400mm.

Modifications and Dates:

1788-1826: Clearing of vegetation within the vicinity of stream, construction of dwellings, grazing and watering of animals. 1790: Cutting of tanks for water storage 1790: Chiselling of stone and inset of additional slabs into base of stream to improve flow in a shallow V profile. 1791: Enclosure within a fence against livestock and trespass. 1792: First bridge crossing. 1810: Cut-off drains along side of Tank Stream channel to reduce inflow of polluted stormwater 1826: Tank Stream disallowed for drinking by Governor Brisbane. Governor Darling arranged for seven wells to be dug in the city. Governor Darling employed people to repair existing sewers. 1832: Construction of sewers seriously discussed. 1833: Water from partly built Busby's Bore used to pipe water to ships. 1842: City Council incorporated. c.1850: Semi Circular Quay was formed which necessitated the extension of the Tank Stream for the area north of Bridge St. 1855: Brickworks at Newtown was purchased, along with vitreous clay pipes and Roman Cement. 1857: Work completed on first part of the Bennelong Sewer to discharge sewage as far out as possible into the harbour. This would service the more elevated areas, whereas the Tank Stream in Hunter St and King St as a bolted cast iron oviform aqueduct. This sewer (and possibly stormwater) network had the effect of draining the swamp area that had previously supplied some water to the Tank Stream, making the Tank stream more polluted by being less 'cleansed'. The section of the Tank Stream from the Sydney Cove to the Interception Chamber in Pitt St was completed, approx. 200m. The section at the mouth (approx. 5m has been strengthened with concrete in the two filleted corners. The next 10 m is sandstone arch. The next 15m section has the original stone floor overlaid with concrete, date unknown. The remaining section up to the Interception Champer (approx. 170m) is sandstone arch. 1858: Independent outfalls also completed at Woolloomooloo, Hay Street and Black Wattle Bay. Over the next 20 years, approx 10 other minor outlets were also opened. 1860: The sandstone arch between Bridge St and Hunter St was constructed. This was done to reduce odours from the previously open sewer/stormwater that up until that time had been more of a slops line. 1866: Section from south of Hunter St to Martin Place was formed as an open stone channel. In late 1870s was converted by roofing with an arch to oviform, whereas more southerly section was oviform invert with a flat roof, where it passes under Challis House. (With northerly section, there were minor alterations in 1878). (The whole of this was replaced by a concrete pipe in 1962 and a steel pipe in 1958). (Other parts were replaced in 2001 as part of the Angel Place project). Two sections were laid as oviform through the future GPO. To the south, two sections were laid as brick oviform and with some amendments in 1878. 1878: The brick oviform section from the Interception Chamber to Bridge St was constructed by contract for the City council. This was built to replace the open section that ran through private property. At the southern end there is a transition section (reducer), which leads to the sandstone arch, which is in Tank Stream Way (formerly Hamilton

St.). 1879: The section from Bridge St to Hunter St, with its sandstone arch roof in place has its floor slabs lifted and re-instated with mortar foundations to water proof the floor for its use as a sewer. In addition a terra cotta 'scouring channel' was cut into the centre of the floor The section immediately upstream of Hunter St was built as oviform. This included a terra cotta flow channel. The next section upstream was also constructed. It was a bottom only oviform, and part of it was built underneath an existing stone arch bridge. (The whole of this section, including the stone arch bridge, seems to have been removed in c.1960). 1880: Brick oviform was constructed for the full width of King St and terminating. 1898: SPS [Sewerage Pumping Station] 16 constructed. the section immediately downstream of the interception chamber, has an interception pipe leading to SPS 16 form the tidal weir. 1940: Section just upstream of Martin Place was replaced with concrete pipe under the GPO in 1940. This replaced 1866 brick oviform. 1951: Stormwater drainages charges were introduced for parts of the City of Sydney from 16/11/1951. 1958: Replacement, at the rear of 105-107 Pitt St. 1962: Replacement, at rear of Commercial Union House [south end of Pitt St.] 1965: Replacement within Australia Square. Construction of Tank Stream visitor access space. 1975: Replacement within basement of New Zealand Insurance Building [North of Bond St.] 2001: Replacement in Former GPO site. 2002: Replacement within Angel Place project. Taken directly from Sydney Water CMP 2005, p.32-33

Current Use: Tunnel, Water course

Former Use: Stream

History

Historical Notes: The history of Tank Stream incorporates aboriginal use of the land; the history of European settlement; the natural forming stream as a water supply; and its later use for waste disposal and as a part of the stormwater system.

The Gadigal (or Cadigal) people were the Aboriginal group most commonly accepted to have lived around the Sydney Cove area prior to European arrival. The catchment area around Tank Stream provided "a range of environments-marine, estuarine, rock platform, creek, open forest, wetland" all located within a short distance and able to provide a range of food and material.

The First Fleet's settlement at Botany Bay was shifted to Port Jackson in 1788 largely because of the presence of a stream (later known as Tank Stream) that appeared to be a constant water source, though it was unable to consistently provide water in dry weather. The stream also played a role in dividing the settlement, with the eastern side being held for government and administrative functions and convicts living on the western side.

In 1790 Tanks were cut into the bedrock of the stream (hence the name), the number of tanks is believed to be three or four, and are thought to have held 20,000 litres and been 5m deep.

As early as 1791 Governor Phillip enclosed Tank Stream with a fence in an attempt to prevent stock muddying the water; and later, trenches were cut alongside the stream in an attempt to catch runoff before it could enter the stream. Yet due the increasing population; number of buildings around the stream and the loss of trees as land was cleared, runoff increased, which included human and animal wastes and domestic products. In 1795 orders were made to prevent the grazing of stock or cutting of trees within a 15m distance of the stream. These measures were ultimately unsuccessful. [Sydney Water, 2003, p. 24-25]

In 1792 a stone arch bridge over Tank Stream was constructed, replacing existing wooden structures. Its foundations may survive within the streambed under modern Bridge Street.

Tank Stream was the main source of fresh water until the completion of Busby's Bore in 1837. [Sydney Water, 2003, p. 24] Other dams were later added within

the catchment area of Lachlan Swamps; now located within Centennial Park. Yet by 1826 Tank Stream had become an unofficial sewer, it became an official sewer in 1857. This (and other) sewers discharged directly into the harbour; a situation that created discontent as social attitudes changed.

The form of the open channels was generally a convict period shallow V profile which assisted in improving the flow of the stream; in the late 1850s work commenced in covering the Bridge Street- Hunter Street section of Tank Stream. This was necessary to reduce smells. The form of the channel was a mixture of stone and brick in the lower half, with a sandstone arch roof. Later sections were also roofed, generally with an arch to oviform.

Prior to 1888 Tank Stream also carried salt water, stored in council reservoirs for the purpose of street cleaning and dust suppression. Salt water was used to minimise the use of fresh water supplies.

Over the past century, Tank Stream has remained a part of the stormwater channel within the Sydney system. Changes to the channel have been largely restricted to replacing sections with modern pipe. This has destroyed a number of sections of the channel and is largely tied to post-World War II redevelopment where little regard was paid to the historic value of the Tank Stream.

Redevelopment of the GPO site allowed further investigation of Tank Stream and has provided information on the building development of Tank Stream over time. Brick drains, possibly dated pre 1820, were found. A further search revealed soil from the original Tank Stream bed. (Sydney Water, 2003)

See Modification Dates for a summary of structural works.

Historic Themes

Australian Theme (abbrev)	New South Wales Theme	Local Theme
2. Peopling - Peopling the continent	Convict - Activities relating to incarceration, transport, reform, accommodation and working during the convict period in NSW (1788-1850) - does not include activities associated with the conviction of persons in NSW that are unrelated to the imperial 'convict system': use the theme of Law & Order for such activities	Working for the Crown -
4. Settlement - Building settlements, towns and cities	Utilities - Activities associated with the provision of services, especially on a communal basis	Providing drinking water -
4. Settlement - Building settlements, towns and cities	Utilities - Activities associated with the provision of services, especially on a communal basis	Providing sewers and stormwater outlets -

Assessment of Significance

SHR Criteria a) [Historical Significance]

The Tank Stream is significant because it was the reason the First Fleet settlement was established in Sydney Cove, and therefore influenced the future shape of Sydney over two centuries. It is linked in the public mind with the period of first European settlement and retains value as an iconic representation of that period and is interpreted as a metaphor of the period of contact and early urban settlement in Australia.

The Tank Stream itself has retained an identity through the functional changes from being a fresh water supply, through subsequent use as combined sewer and stormwater drain to its current function as a stormwater drain. It is an important survivor of the first period of organised and integrated water management in an Australian city. The stone-cut water tanks, which may

	survive archaeologically, are important symbols of the reliance upon water in the colony, both in absolute terms and as an indication of the fragility of the European presence in Australia.
SHR Criteria b) [Associative Significance]	The original watercourse and catchment would have provided a resource for exploitation by the Gadigal people who occupied the southern shore of Sydney Harbour at contact and their ancestors. As a result of the severity of this displacement the Tank Stream has become symbolic of the European settlers immediate appropriation of essential resources and Aboriginal dispossession. The Tank Stream influenced, and has been influenced by, Governor Phillip and subsequent early governors of the Australian colony. The course of the stream determined Phillip's siting of the first camp and this early administrative decision influenced the subsequent urban form of Sydney (Sydney Water 2005:65).
SHR Criteria c) [Aesthetic Significance]	The Tank Stream features fine quality stonemasonry and brickwork from the nineteenth century, houman scale and an intriguing form showing layers of different phases of construction. This includes modifications introduced to improve the operation, e.g. terracotta drains (Sydney Water 2005:65).
SHR Criteria d) [Social Significance]	The Tank Stream is of State significance for its recognition in the community with the placement of Sydney in its current location, as evidenced by the popularity of tours. Community value of the Stream has increased with the growth of heritage consciousness since the 1970s.
SHR Criteria e) [Research Potential]	The sections of the former Tank Stream south of King Street which survive have potential for retaining evidence of the earliest periods of its human use. This includes early construction, brickmaking and waterproofing techniques. The swampy source of the stream may provide evidence of past environmental conditions and potentially of Aboriginal occupation prior to European arrival.
SHR Criteria f) [Rarity]	Tank Stream is of State significance as the only water source available to the First Fleet arrival in their settlement of Sydney. Tank Stream is the only surviving evidence of this early period of water resource development. The fabric of the Tanks Tream and its enclosing stormwater drain contains rare surviving evidence of the eighteenth and nineteenth century water supply and sewerage construction in the one linear site (Sydney Water 2005:69).
SHR Criteria g) [Representitivenes]	The Tank Stream is representative of a significant collection of water and wastewater heritage assets from the mid-nineteenth century onwards. From the operational perspective the Tank Stream competently serves as a stormwater drain, from the historical and social perspective, the Tank Stream serves to represent the system and Sydney Water as a whole, as its most high profile, historic and valued heritage item. The fabric of the Tank Stream and of the enclosing stormwater drain is representative of a range of technologies associated with water reticulation, sewerage and drainage for a period of two centuries (Sydney Water 2005:70).
Assessment Criteria	Items are assessed against the **State Heritage Register (SHR) Criteria** to determine the level of significance. Refer to the Listings below for the level of statutory protection.

Procedures / Exemptions

Section of Act	Description	Title	Comments	Action Date
57(2)	Exemption to allow work	Heritage Act	See File For Schedule Order Under Section 57(2) to exempt the following activities from Section 57(1):	Jun 2 1989

			The Sydney Water Board's operational and maintenance requirements which could involve some modification to inlets, provided that such modifications do not significantly affect the historic fabric or integrity of the Tank Stream. Eradication of noxious plants and animals.	
21(1)(b)	Conservation Plan submitted for endorsement	Tank Stream Conservation Management Plan, prepared by Sydney Water for Sydney Water, hand dated July 2003	Conservation Management Plan endorsed 22 February 2005 for a period of five years	Feb 22 2005
57(2)	Exemption to allow work	Standard Exemptions	SCHEDULE OF STANDARD EXEMPTIONS HERITAGE ACT, 1977 Order Under Section 57(2) of the Heritage Act, 1977 I, the Minister for Planning, pursuant to section 57(2) of the Heritage Act 1977, on the recommendation of the Heritage Council of New South Wales, do by this Order: 1. revoke the Schedule of Exemptions to subsection 57(1) of the Heritage Act made under subsection 57(2) and published in the Government Gazette on 7 March 2003, 18 June 2004 and 8 July 2005; and 2. grant standard exemptions from section 57(1) of the Heritage Act 1977, described in the Schedule below. FRANK SARTOR Minister for Planning Sydney, 25 March 2006 To view the schedule click on the Standard Exemptions for Works Requiring Heritage Council Approval link below.	Mar 25 2006

Standard Exemptions for Works Requiring Heritage Council Approval

Listings

Heritage Listing	Listing Title	Listing Number	Gazette Date	Gazette Number	Gazette Page
Heritage Act - State Heritage Register		00636	02 Apr 99	27	1546
Heritage Act - Permanent Conservation Order - former		00636	02 Jun 89	69	3307

References, Internet links & Images

Type	Author	Year	Title	Internet Links
Tourism	Attraction Homepage	2007	Tank Stream	**Click here**
Written	Sydney Water	2005	Tank Stream: Conservation Management Plan	

Note: Internet links may be to web pages, documents or images.

PLAN
UNDER THE
HERITAGE ACT.
1977

(Click on Thumbnail for Full Size Image and Image Details)

Data Source

The information for this entry comes from the following source:

Name:	Heritage Office
Database Number:	5045604
File Number:	S90/04382

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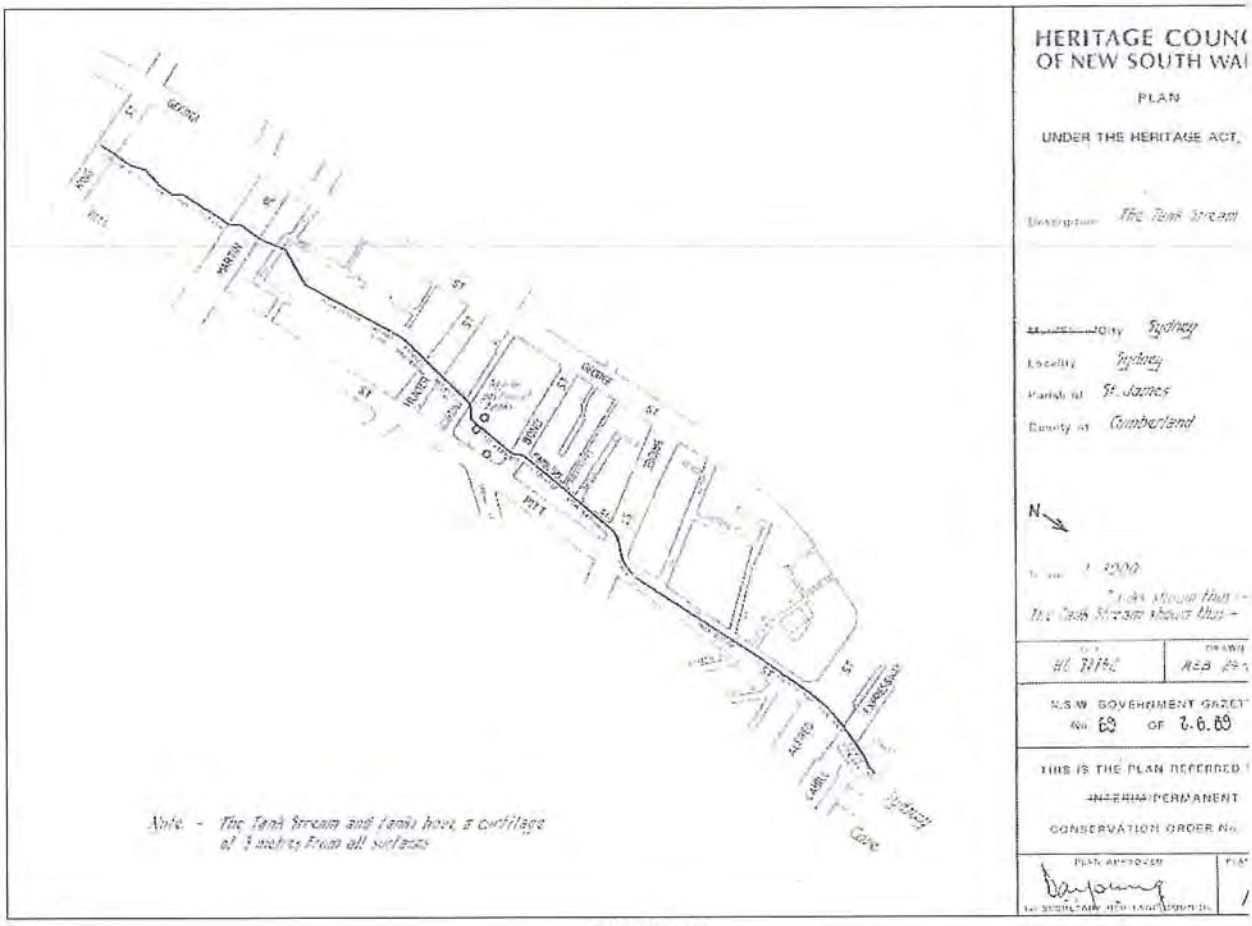
Tank Stream



PCO Plan Number 636

Image Type:	Map / Plan
Image Year:	24 Jan 89
Image By:	Heritage Council of NSW
Image Copyright Owner:	Heritage Council of NSW
Map Scale:	1:3000

Appendix D

Standard Exemption 4—Excavation (Minor Impacts)

STANDARD EXEMPTION 4: EXCAVATION

1. Excavation or disturbance of land of the kind specified below does not require approval under s. 57(1) of the Act, provided that the Director-General is satisfied that the criteria in (a), (b) or (c) have been met and the person proposing to undertake the excavation or disturbance of land has received a notice advising that the Director-General is satisfied:

   (a) where an archaeological assessment has been prepared in accordance with Guidelines published by the Heritage Council of NSW which indicates that any relics in the land are unlikely to have State or local heritage significance; or

   (b) where the excavation or disturbance of land will have a minor impact on archaeological relics; or

   (c) where the excavation or disturbance of land involves only the removal of unstratified fill which has been deposited on the land.

2. A person proposing to excavate or disturb land in the manner described in paragraph 1 must write to the Director-General and describe the proposed excavation or disturbance of land and set out why it satisfies the criteria set out in paragraph 1. If the Director-General is satisfied that the proposed development meets the criteria set out in paragraph (a), (b) or (c) the Director-General shall notify the applicant.

NOTE 1: Any excavation with the potential to affect Aboriginal objects must be referred to the Director-General of the Department of Environment and Conservation.

NOTE 2: If any Aboriginal objects are discovered on the site, excavation or disturbance is to cease and the Department of Environment and Conservation is to be informed in accordance with s. 91 of the National Parks and Wildlife Act, 1974.

NOTE 3: This exemption does not allow the removal of State significant relics.

NOTE 4: Where substantial intact archaeological relics of State or local significance, not identified in the archaeological assessment or statement required by this exemption, are unexpectedly discovered during excavation, work must cease in the affected area and the Heritage Office must be notified in writing in accordance with s. 146 of the Act. Depending on the nature of the discovery, additional assessment and possibly an excavation permit may be required prior to the recommencement of excavation in the affected area.

Guidelines

Excavation or disturbance to which clause 1(c) applies only involves the removal of unstratified fill material of minor heritage significance. Such fill will have been deposited in a single episode.

Godden Mackay Logan
Heritage Consultants

One Alfred Street

Interpretation Strategy
Final Report

Report prepared for Valad Fields Trust
October 2010

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Report Register

The following report register documents the development and issue of the report entitled, One Alfred Street, Interpretation Strategy, undertaken by Godden Mackay Logan Pty Ltd in accordance with its quality management system. Godden Mackay Logan operates under a quality management system which has been certified as complying with the Australian/New Zealand Standard for quality management systems AS/NZS ISO 9001:2008.

Job No.	Issue No.	Notes/Description	Issue Date
10-0238	1	Draft Report	11 August 2010
10-0238	2	Final Report	19 October 2010

Contents Page

1.0 Introduction

1.1 Scope

This Interpretation Strategy (IS) has been prepared for Valad Fields Trust in association with the Development Application for a residential development at 1 Alfred Street, Sydney. This IS will inform Valad Fields Trust, as well as Kerry Hill Architects and other contributing parties, of interpretation opportunities to sustain the significance and understanding of the history of the site and its context in the City of Sydney.

This IS represents Stage 1 of the interpretive planning process. This includes an overview of the site's history with reference to key aspects of cultural significance and historic themes. The primary objective of this strategy is to facilitate the integration of interpretation into the One Alfred Street development. The strategy is intended to inform and guide the initial planning for heritage interpretation. It may also inform the creative process in the development of suitable public artwork.

Subsequent stages of interpretive planning would include:

- client review and endorsement;
- development of select interpretive media and content (Stage 2: Content Development); and
- implementation of select interpretive initiatives (Stage 3: Implementation).

1.2 Subject Site

The subject site is located at 1 Alfred Street, Circular Quay, in the Local Government Area (LGA) administered by the City of Sydney Council. The site is currently occupied by Gold Fields House which is a mid-twentieth-century building.

The site is bounded by Pitt Street on the east and George Street on the west. Alfred Street (to the site's north and separated from the site by Herald Square) forms the southern edge of Circular Quay and comprises part of the boundary of the 'buffer zone' for the World Heritage Listing (WHL) for the Sydney Opera House. In other words, Gold Fields House is located a short distance outside the Sydney Opera House's WHL buffer zone.

The State Heritage Register (SHR) listed Tank Stream is located on the eastern boundary of the site. The listing of the Tank Stream includes a 3m curtilage from its external surfaces. The south of the site connects with Rugby Place, off Pitt Street, although there is no current through-site connection.

In this report, unless otherwise stated, the subject site is referred to as 1 Alfred Street, and the redevelopment is referred to as One Alfred Street.

The subject site and surrounds is depicted in the site plan below (see Figure 1.1). The Gold Fields House site has a total area of 2,686 square metres, and is described as:

- Lot 1 on DP 217877; and
- Lot 1 on DP 220830.

1.3 Approach

Typically, the preparation of integrated, multi-faceted 'interpretation' for a prominent site that has heritage values as part of the historical evolution of the City of Sydney would be carried out as part of a three-stage process, as summarised in Table 1 below. This report addresses Stage 1 of the Interpretation Plan as outlined below.

Table 1 Interpretation methodology.

Interpretation Plan: Stage 1—Interpretation Strategy
Introduction
Context of Report, Study Area, Approach
Application of Interpretation—*Why interpret?*
Interpretation as a Conservation Process Interpretation Principles: Place, Audience, Client, Community Collaboration
History Overview and Significance—*What's the story?*
Research and Analysis of Place and its Context The Significance of the Site Identification of Commonwealth, State and Local Historic Themes and Key Messages for the Place
Site Inventory—*What do we know?*
Description: Buildings and surrounding environmental characteristics Connections to Other Places, Events, Items Connections to Associated People Existing and Target/Potential Visitation Interpretive Resources
Interpretation Policy Development—*Where are we headed?*
Interpretation Opportunities to Sustain the Significance, Character and Authenticity of the Place Identify the Audiences
Draft Interpretation Strategy—*What's proposed?*
Potential Interpretive Media and Locations Development and Implementation Tasks and Responsibilities
Interpretation Plan: Stage 2—Content Development (see below)
Development of Content, Materials and Media
Review Client/Stakeholder/Community Comments on Strategic Overview Integrate Interpretation into Ongoing Conservation Planning Process Develop Interpretive Media

Develop Interpretive Stories
Key Texts and Illustrations (consider copyright and approvals)
Recommendations for Front End Evaluation
Design/Production/Fabrication/Construction Overview
Staged Summary of Activities, Installation Tasks, Timing and Responsibilities
Recommendations for Maintenance
Recommendations for Review

Interpretation Plan: Stage 3—Implementation
Implementation of Interpretation Plan
Review Client/Stakeholder/Community Comments on Content
Detailed Design of Interpretive Media
Evaluation of Interpretive Media
Image Use or Copyright Clearances
Production of Interpretive Media
Installation of Interpretive Media
Finalise Maintenance Plan
Finalise Review Plan

This interpretation strategy report provides specific recommendations on how the cultural heritage significance of 1 Alfred Street, Sydney, might be usefully interpreted as part of the proposed development.

1.4 Listings

Gold Fields House site is *not*:

- an identified heritage item in Schedule 8, Part 1, of the Sydney Local Environmental Plan 2005 (SLEP 2005);
- part of a Heritage Conservation Area identified by the SLEP 2005; or
- identified as part of a Heritage Streetscape in the Central Sydney Heritage Streetscape Map. The heritage streetscapes of Sydney have recently been reviewed as part of the Draft Heritage Streetscapes Study 2006. The site is not identified as a contributory building or part of a significant public domain in the draft study.

The subject site is immediately adjacent to the Tank Stream. The Tank Stream is listed on the State Heritage Register and the Sydney Water Section 170 Heritage and Conservation Register. Included in the listing is a 3 metre curtilage from its external surfaces. The edge of the Tank Stream culvert is located 100-175mm from the eastern boundary of the subject site. Therefore part of the subject site lies within the curtilage of a State heritage item.

1.5 Methodology and Terminology

This interpretation strategy report has been prepared in accordance with the standards set by the Heritage Interpretation Policy and Guidelines, as endorsed by the Heritage Council of NSW, August 2005. It is also in accordance with recommendations contained in *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 1999* (the Burra Charter).

1.6 Report Outline

This report is divided into the following subsections:

- An introduction to the project (Section 1.0).
- Interpretation as a conservation process (Section 2.0).
- Historical Overview (Section 3.0).
- Heritage Values of the Site(Section 4.0).
- Proposed Development (Section 5.0).
- Interpretation Recommendations (Section 6.0).
- Conclusions: Development and Implementation Tasks and Responsibilities (Section 7.0).

1.7 Authorship and Acknowledgements

This interpretation strategy report was prepared by Anna Cartwright, Research Assistant, with assistance and input from Sharon Veale, Senior Associate. Peter Romey, Partner, reviewed the report.

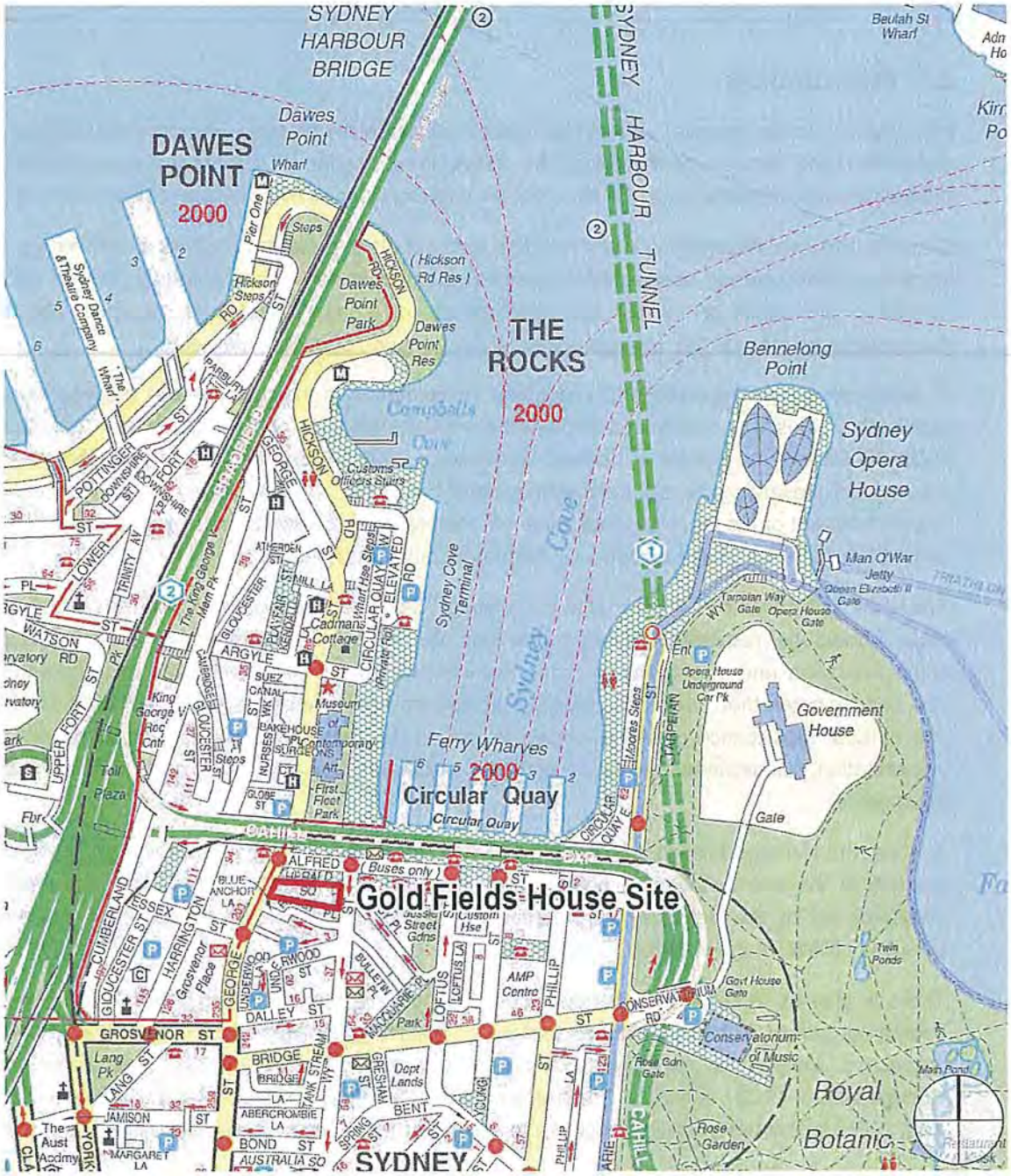

Figure 1.1: Plan of the subject site and surrounding area. (Source: Google maps with GML additions)

2.0 Interpretation as a Conservation Process

2.1 Introduction

Interpretation is an essential part of the heritage conservation process. As important as authentic restoration and regular maintenance, the active interpretation of heritage places supports the recognition and understanding of a site's values and significance by owners and the community.

Conservation and restoration of key heritage elements is a preferred method of retaining a site's significant attributes and associations; however retention is not always possible. Where removal, relocation or adaptation is part of development or conservation work, devices should be incorporated to interpret the heritage values of the removed or altered elements.

In recent years, the importance of integrating interpretation in the conservation process has been highlighted. This was recognised through the 1999 revisions to *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 1999*, which states, 'interpretation means all the ways of presenting the cultural significance of the place'. Interpretation may be a combination of the treatment of the fabric (eg maintenance, restoration, reconstruction), the use of and activities at the place, and the use of introduced explanatory material (Article 1.17).

Article 24.1 of the Burra Charter goes on to state, 'Significant associations between people and a place should be respected, retained and not obscured. Opportunities for the interpretation, commemoration and celebration of these associations should be investigated and implemented.' The charter notes that, 'for many places, associations will be linked to use'. Article 25 continues, 'the cultural significance of many places is not readily apparent, and should be explained by interpretation. Interpretation should enhance understanding and enjoyment and be culturally appropriate'.

In 2004, the Heritage Branch, NSW Department of Planning prepared materials to encourage good practice in the interpretation of heritage items across New South Wales. This IS reflects the standards set by the Heritage Interpretation Policy and Guidelines, as endorsed by the Heritage Council of NSW, August 2005.

There is also an increased awareness about the need to interpret Aboriginal values, culture and country as part of all historic site interpretation. Specific guidelines such as *Ask First: A guide for respecting Indigenous heritage places and values* (published by the Australian Heritage Commission in 2002) and *Best Practice for Interpreting Aboriginal Culture and Country (*working draft 2005) by the Interpretation Australia Association have been prepared to help with this process.

2.2 Interpreting One Alfred Street

Key interpretation principles for One Alfred Street, include the following:

- focus on the history of the site and its significant elements within the context of the City of Sydney to develop site-specific themes and stories;
- involve people with skills and experience in heritage interpretation;
- use documentary research and graphic material, as well as built fabric and landscape elements, to convey and interpret the history and significance of the site;

- ensure all research is thorough and that accumulated materials are publicly deposited, to be available at the completion of the project;
- communicate effectively to the potential audience/s for interpretation;
- ensure that interpretation recommendations and devices have potential to engage and stimulate public interest by evaluating them during and after development;
- ensure that interpretive devices will be accessible, reversible and reflect the significance of the site;
- ensure the interpretive initiatives proposed reflect a collaborative approach to design and are well integrated into the design of the new development; and
- plan for continuing maintenance and regular review of interpretive media.

3.0 Historical Overview

This section provides a brief overview of the historical development of the site.

3.1 Cadigal—The Traditional Owners

The traditional owners of the country within the City of Sydney were the Cadigal. Various explanations of the physical and linguistic boundaries of Cadigal country have been provided since colonisation. But is generally agreed that their country extended from South Head to near what we know today as Petersham.[1]

The Cadigal knew their country intimately and richly endowed it with stories and meanings. Their country was a life force, sustaining them physically and spiritually. They practised a complex system of beliefs, seasonal knowledge and sensitive management associated with their land. Their country provided them with ceremonial sites, hunting grounds, camping places, water, wood, stone and native foods that were hunted and harvested.

Colonisation of Sydney Cove by the British dramatically altered the traditions and customs of the Cadigal people that had evolved over thousands of years. Contact with the pale strangers introduced debilitating diseases such as smallpox that swiftly diminished the local population. Their traditional country was also irrecoverably changed following white settlement. New boundaries were mapped and fenced and the land was cleared, roads were formed, crops were planted and buildings were constructed.

Despite the tumultuous changes wrought by colonisation the people were resilient and survived. They adapted to the changed circumstances and developed viable communities. Today, the people contribute to the cultural life and vitality of Sydney in many ways.

3.2 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 the 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 3.1, 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 3.2). 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. The study area lies within the lease of Major George Johnson and those of George Howe and John Gill. Johnson 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.[2] Although Johnson 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. His lease site in George Street was occupied in the 1820s by two buildings fronting the street, with one being noted as Chapman's slaughterhouse [3] (see Figure 3.3).

Immediately to the north was the lease of William Blake, 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.

A sketch of the site from the George Street frontage in 1848 shows a row of two-storey Georgian shops and merchant houses, including the former Bank of Australia, a tea merchant, Livingstone's wine tavern and the offices of the Sydney Morning Herald. The association of the area with the Herald is remembered in the naming of Herald Square which fronts the study site on Alfred Street (see Figure 3.4). This section of George Street represented the hub of the colonial trade and mercantile scene, with shops, warehouses, taverns and traders all vying for the trade generated by the nearby wharves and the ships that visited them.

3.3 The Tank Stream and Semi Circular Quay

The original settlement around the head of Sydney Cove depended on the Tank Stream for fresh water. Within the first twenty years of settlement the stream had been fouled with sewerage, rubbish and run-off from piggeries and yards, making the water undrinkable and transforming the Tank Stream into an open sewer. This, along with the growing need for wharf space in Sydney Cove, prompted the gradual covering 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 site), 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.[4]

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 a location 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 ft (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 3.5–3.7).

As part of this work the Tank Stream was also enclosed. At the Circular Quay end adjacent to the study site, as this part of Sydney Cove now became known, the Tank Stream was enclosed within a stone semi-circular drain with a separate sewer line running along its eastern side. The drain was approximately 3.5m wide, 2m high and 3m 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 site (see Figure 3.8).

The creation of the extended Pitt Street allowed for new development along the street, including along the eastern portion of the study area. By 1865 the Pitt Street frontage was occupied by two store buildings with associated yards. In 1880, these are identified on Percy Dove's plans as a cement store and Livingstone's Timber Merchant, with attached store and yards. Immediately to the north (still within the study site, including the Herald Square area) was the three-storey Peacock's Jam factory. The area between Pitt and George Street is occupied with yards and workshops, while the George Street frontage contains a row of single-storey shops and commercial premises (see Figure 3.9 and 3.10).

By the turn of the twentieth century both the Pitt Street and George Street frontages had been developed with two-storey shops and taller office chambers. Alfred Street, which ran parallel to Circular Quay, at this stage did not extend west of Pitt Street (see Figure 3.11). The area to the north of the study site was instead occupied by warehouses, shops and offices, including the Circular Quay fire station on the corner of George and Barton Streets, and the offices of the Sydney Harbour Trust (post 1901) on the corner of Pitt and Barton Street. (Barton Street was removed after the construction of the Cahill Expressway and now lies beneath the Expressway and part of First Fleet Park to the north of the study area.)

3.4 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. 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 3.12 and 3.13).

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. It was envisaged that the accepted tender would demolish the existing buildings, which included a three-storey chambers and 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'.[5] 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 ft 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 groundbreaking AMP building. The architects Peddle Thorp & Walker, who had designed the AMP building, were also commissioned to design the Gold Fields House development. Peddle Thorp and Walker was established in 1889 and is now known as PTW.

Work began on site in late 1963, with deep excavation through bedrock for the foundations, underground parking, plant and equipment rooms and the lift well. The excavation was taken to all four edges of the allotment boundary 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-European landform or evidence. The edges of the excavation, which extended below the high-water mark, were lined with steel sheet and then braced to prevent their collapse (see Figures 3.14–3.17).

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 till the present time.

The Tank Stream lay outside the actual building allotment boundary in the Pitt Street footpath. Plans of the services around the Gold Fields House site during construction show the edge of the Tank Stream drain as being hard against the eastern boundary of the site, where it remains to date.

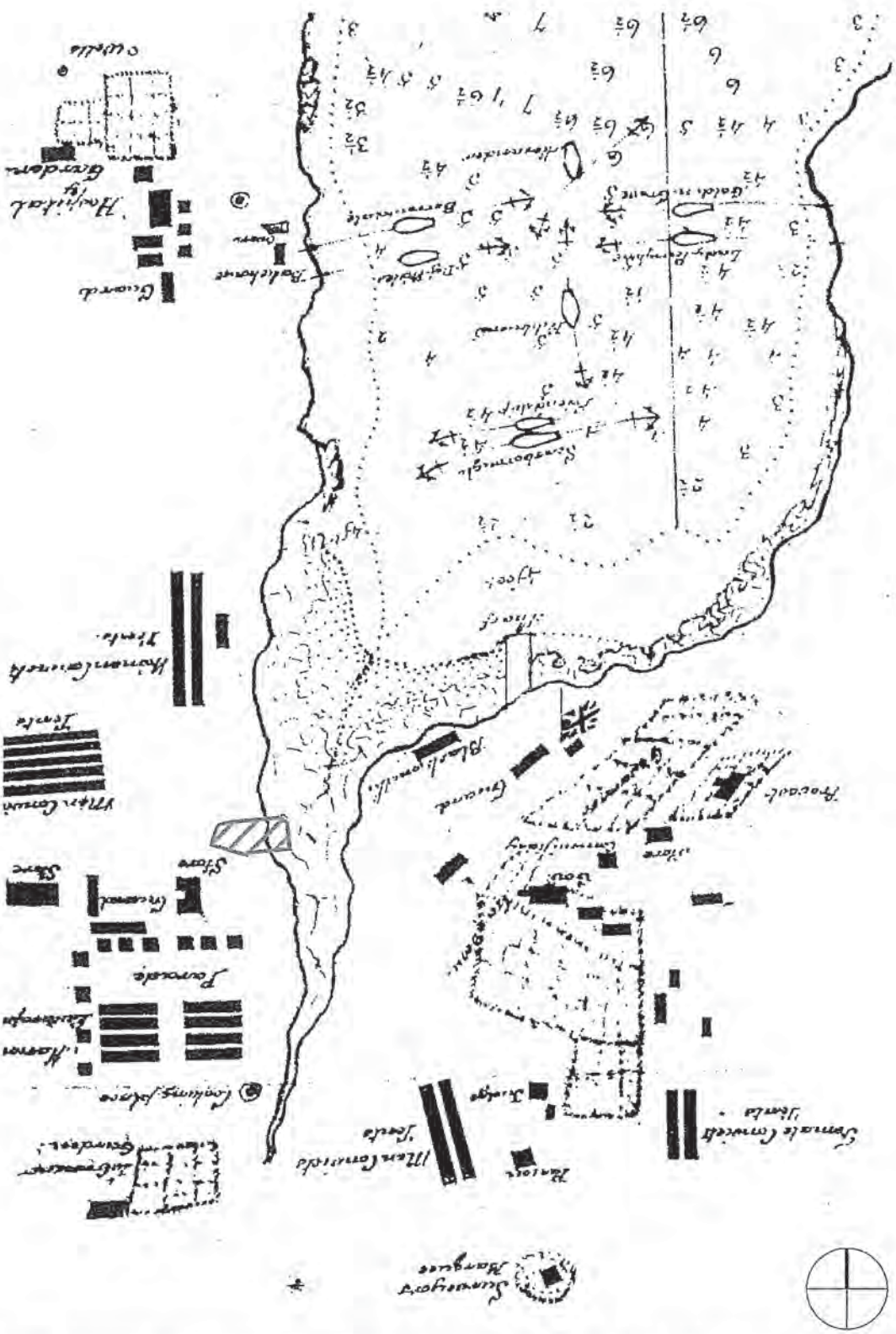

Figure 3.1: March 1788 survey of the Head of Sydney Cove showing the approximate position of the study site. This plan shows the earliest positions of the European settlement on either side of the Tank Stream which can be seen emptying into the harbour. The long tidal zone and mud flats are shown on this plan. (Source: *A Voyage to NSW: The Journal of William Bradley of HMS Sirius 1786-1792*, facsimile edition, 1969, with GML additions)

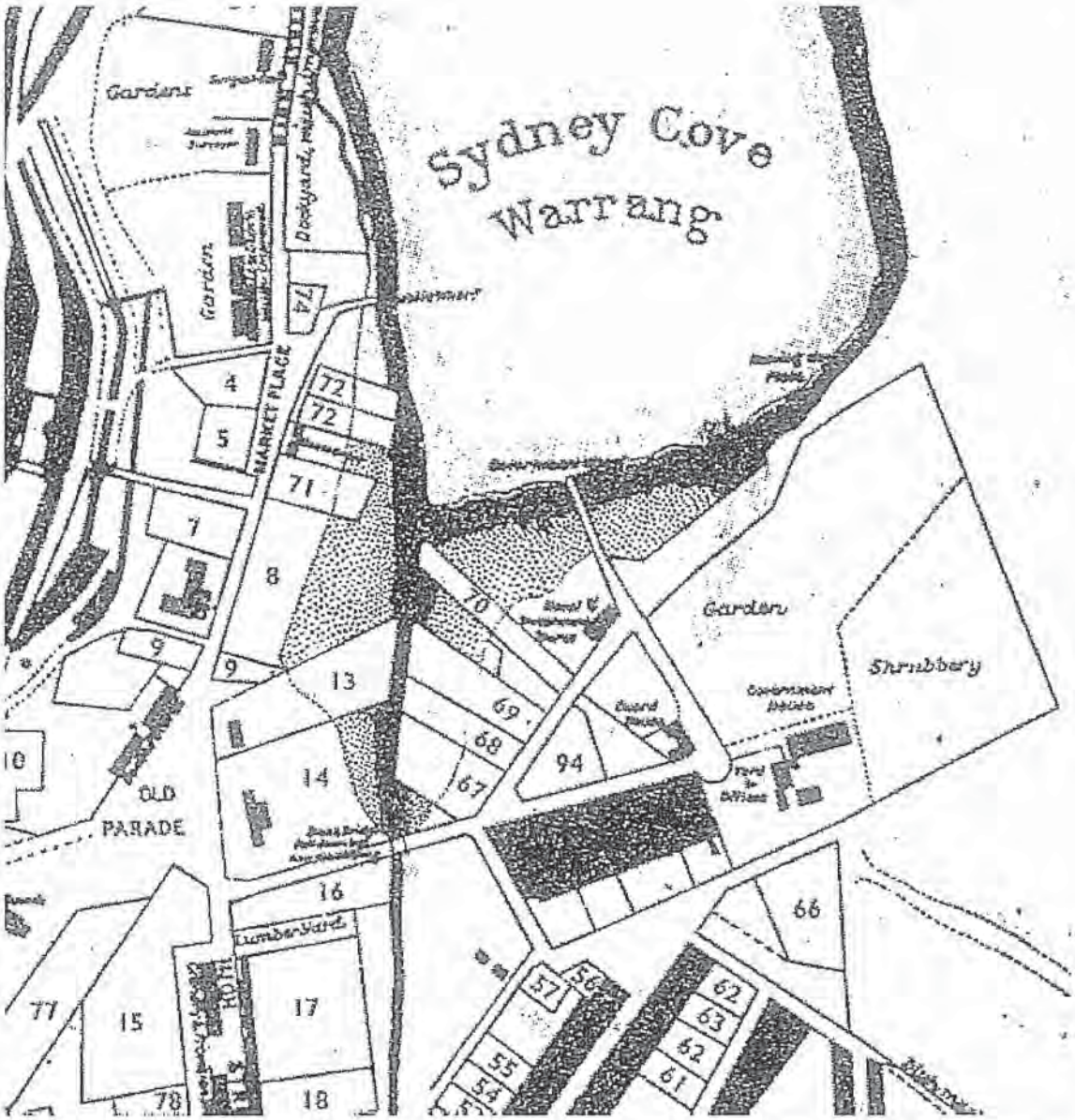

Figure 3.2 1807 Plan of the Town of Sydney by James Meehan. This plan, with the study site indicated, shows the early leases along George Street which extended through the study site. These sites were developed early with shops and stores catering to the nearby wharves. (Source: Ashton, P and D Waterson, 2000, *Sydney Takes Shape*, HEMA, Sydney)

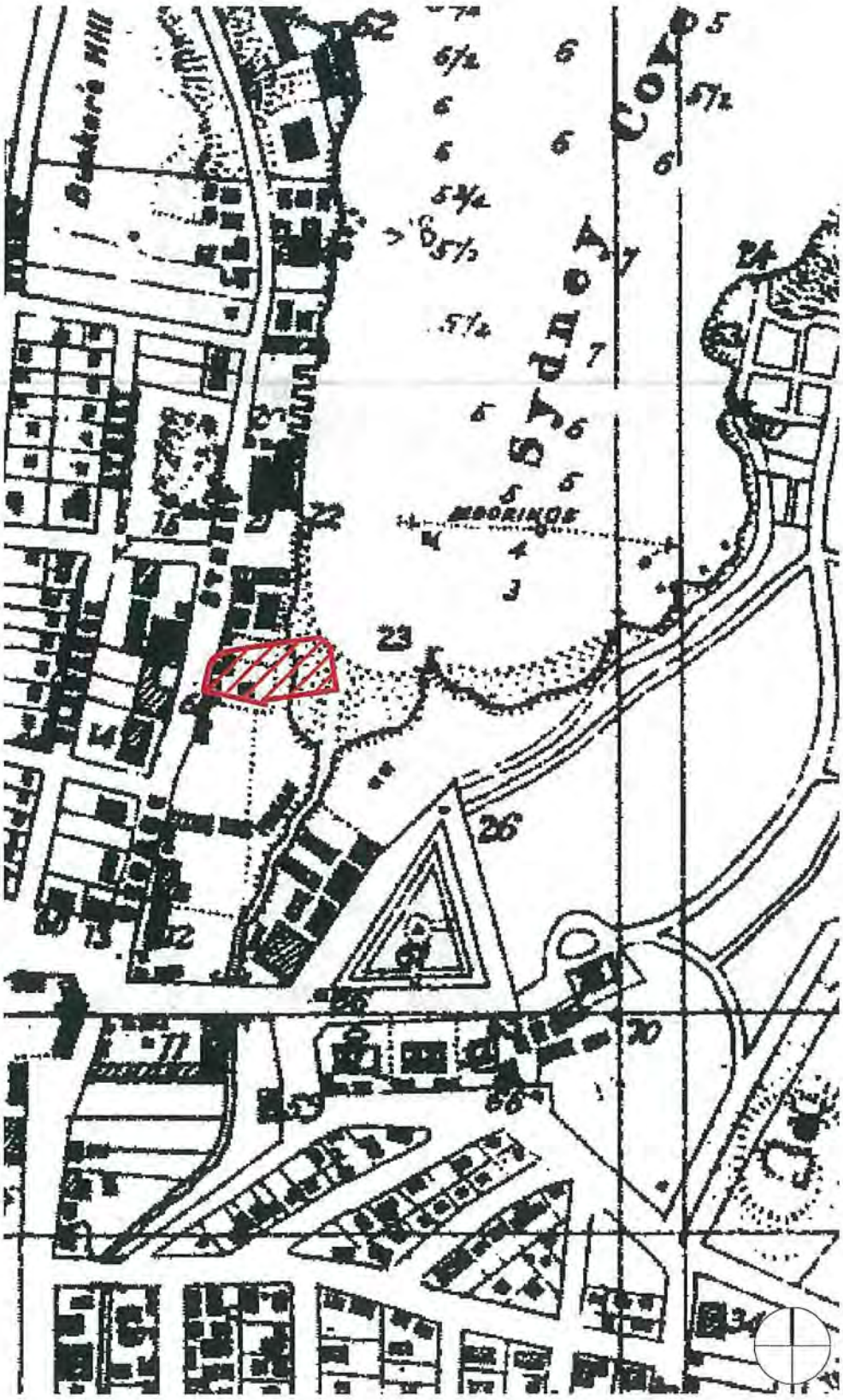

Figure 3.3 1822 Plan of the Town and Suburbs of Sydney. George Street and Bridge Street have been created as has Macquarie Place, all of which are beginning to give shape to the area around the study site. The approximate position of the site is shown in relation to the natural Tank Stream flow and the mud flats where it entered the harbour. (Source: Ashton, P and D Waterson, 2000, *Sydney Takes Shape*, HEMA, Sydney, with GML additions)

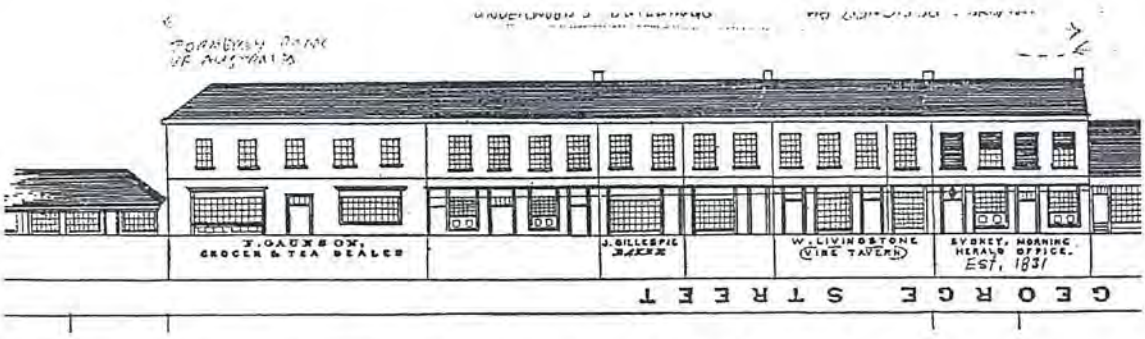

Figure 3.4: Joseph Fowles 1848 sketch of George Street showing the style of commercial development fronting George Street across the study site. Of interest is the office of the Sydney Morning Herald, shown on the right, after which Herald Square takes its name. (Source: Fowles, J, Sydney in 1848, facsimile edition 1962, Ure Smith)

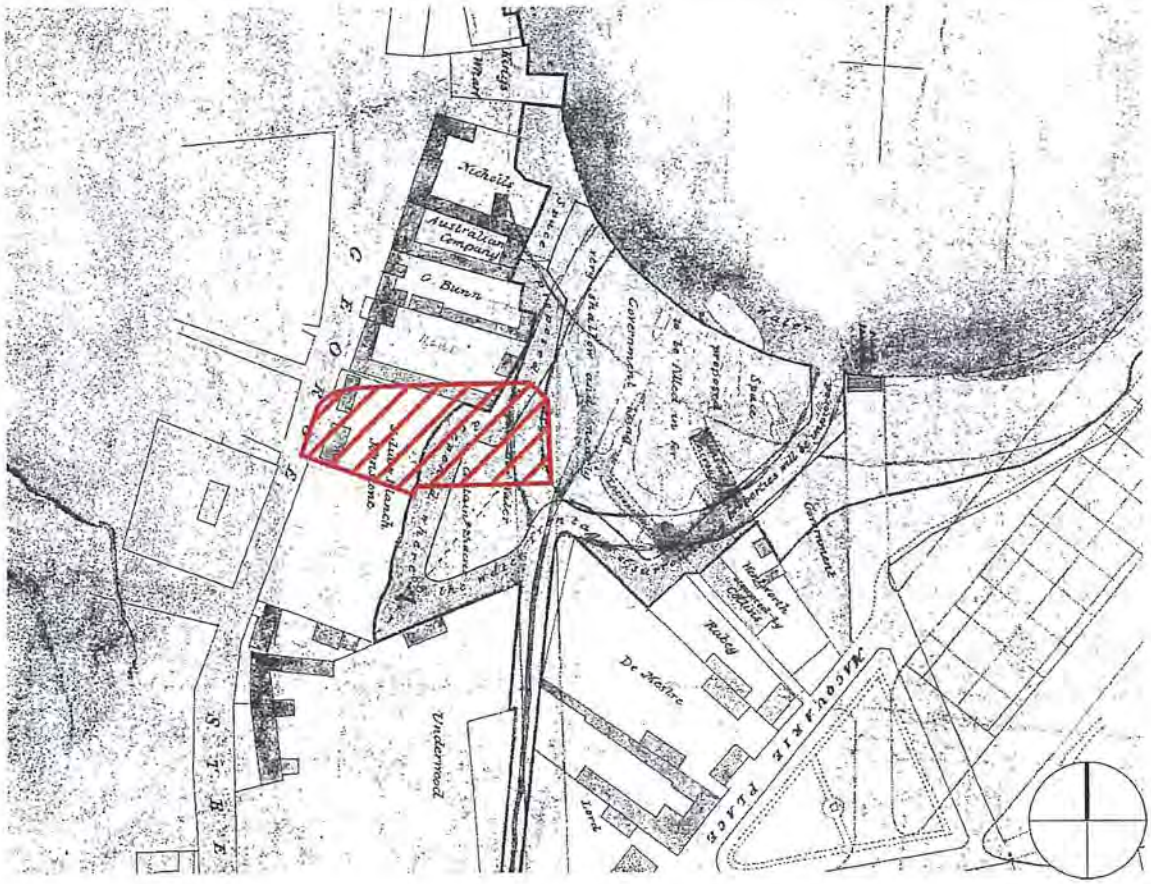

Figure 3.5: c1850 plan showing proposed reclamation with the study site shown. Note that the allotment boundary extends from George Street, with earlier buildings shown on it, to the east across the high-water mark and mud flats of the Tank Stream delta. The proposed Quay extension is shown in relation to the earlier development. (Source: State Records NSW AOMAP 5634 with GML additions)

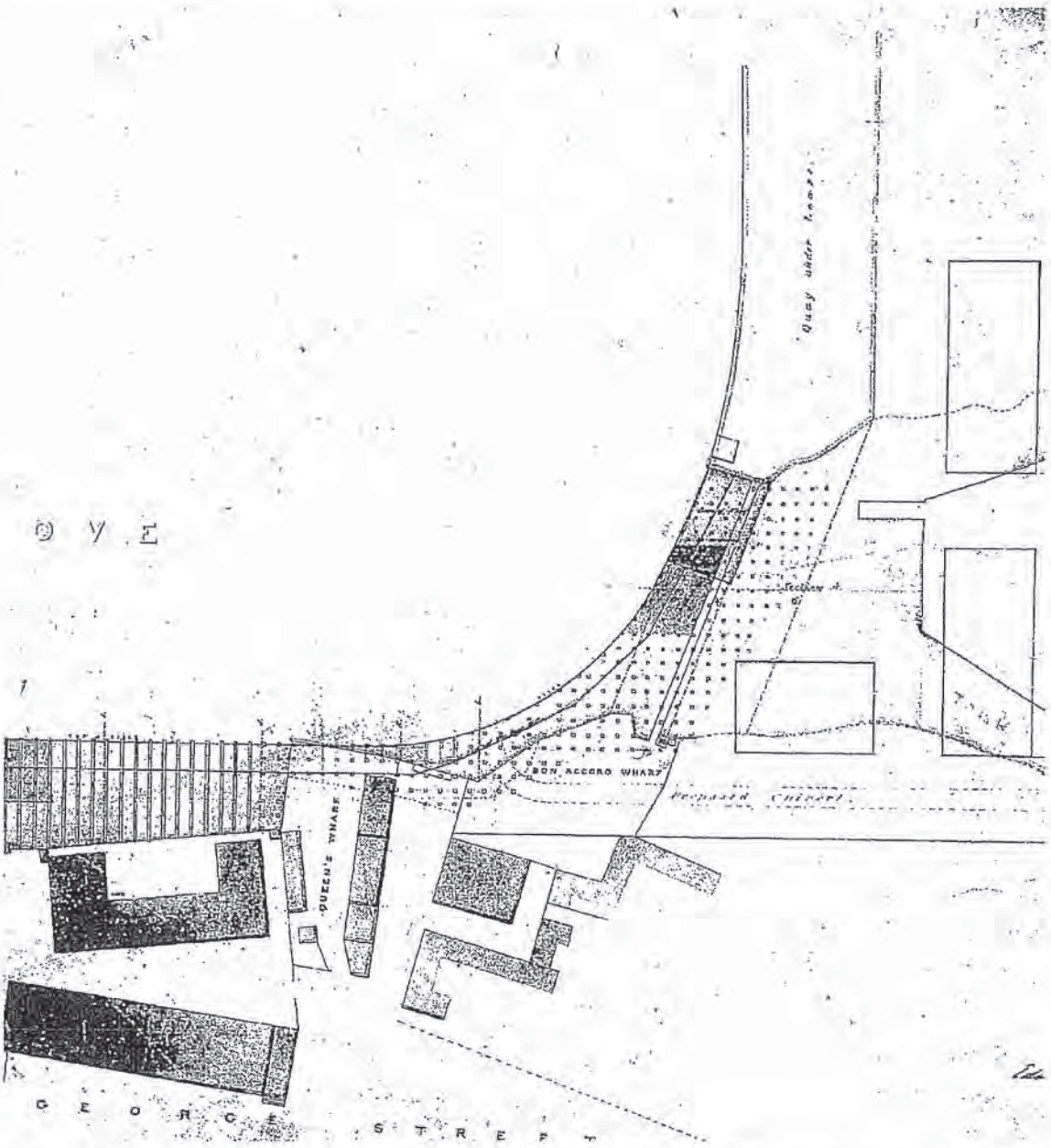

Figure 3.6: Detail of Plan of Extension of Semicircular Quay 1854, showing the plan for the timber piles and decking, as well as the intended Pitt Street extension and the proposed culvert for the Tank Stream. (Source: State Records NSW AO Plan 1282)

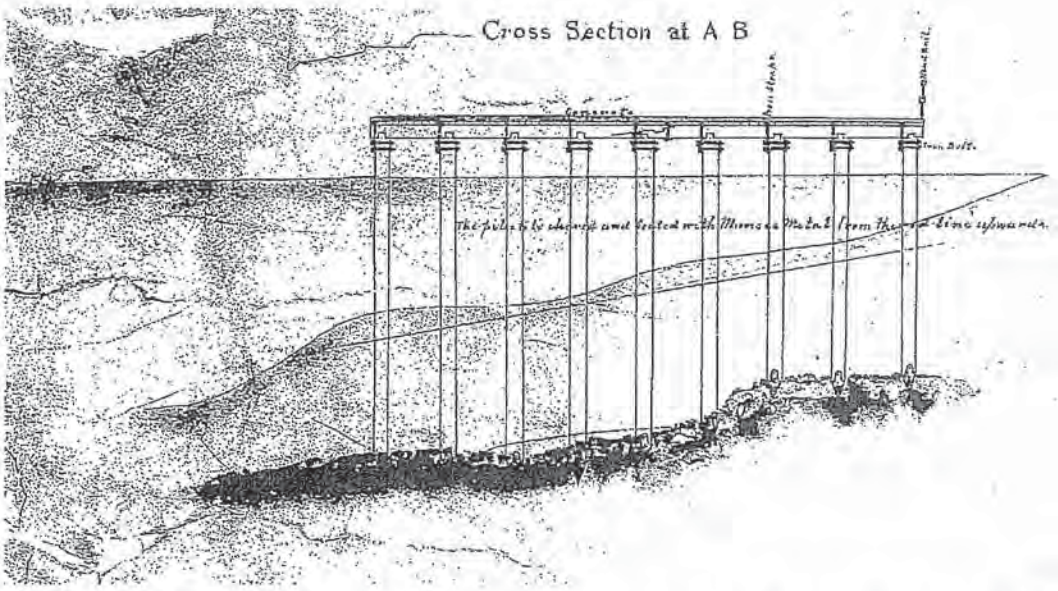

Figure 3.7: 1853 Detail of plan for the extension of the semicircular quay showing the plan for piles for the wharf decking. The timber piles were to be positioned at regular intervals in a grid pattern, then topped with cross beams and timber decking. Each was tipped with a metal cap for driving through the stream bed and into the harbour floor. (Source: State Records of NSW AO Plan 5641)

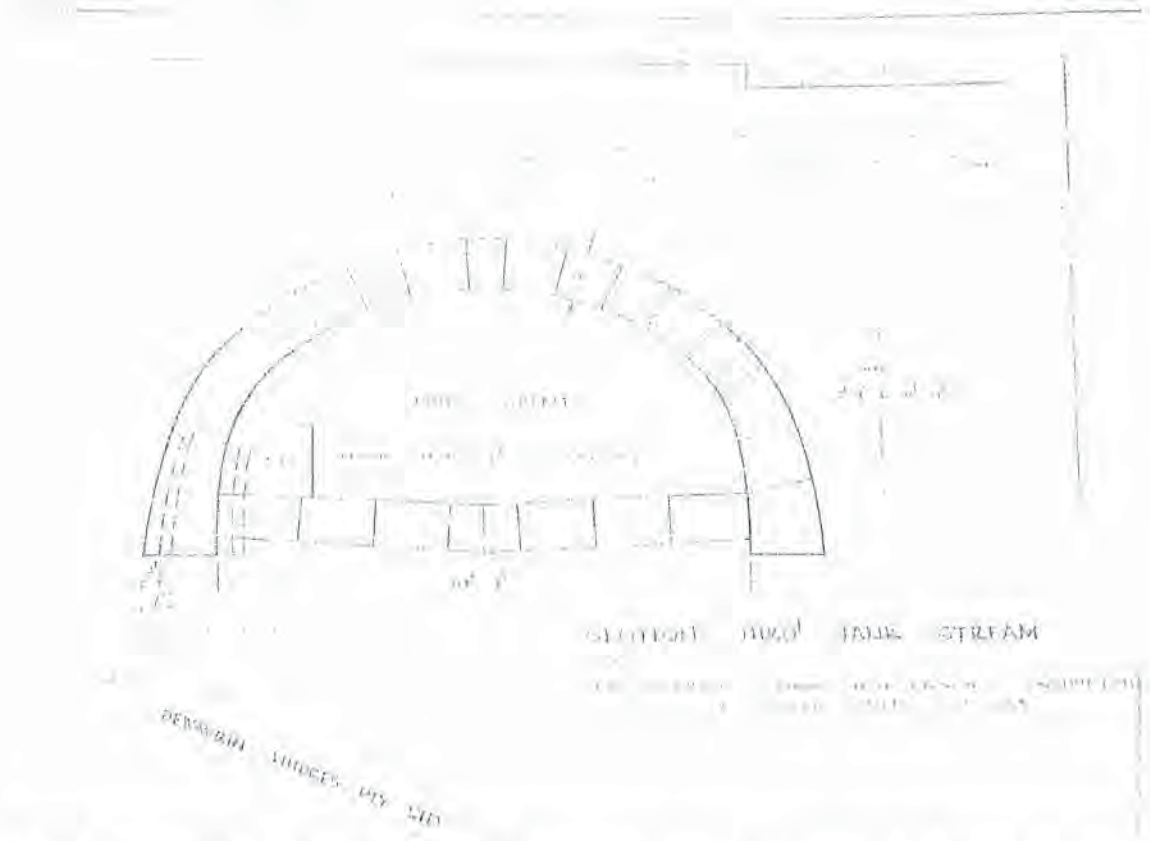

Figure 3.8: 1964 detail of Services Plan for the construction of Gold Fields House showing a cross section of the Tank Stream at Pitt Street, its relative depth below the footpath level and its relationship to the site boundary. (Source: City of Sydney Council Archives)

Figure 3.9: 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 additions)

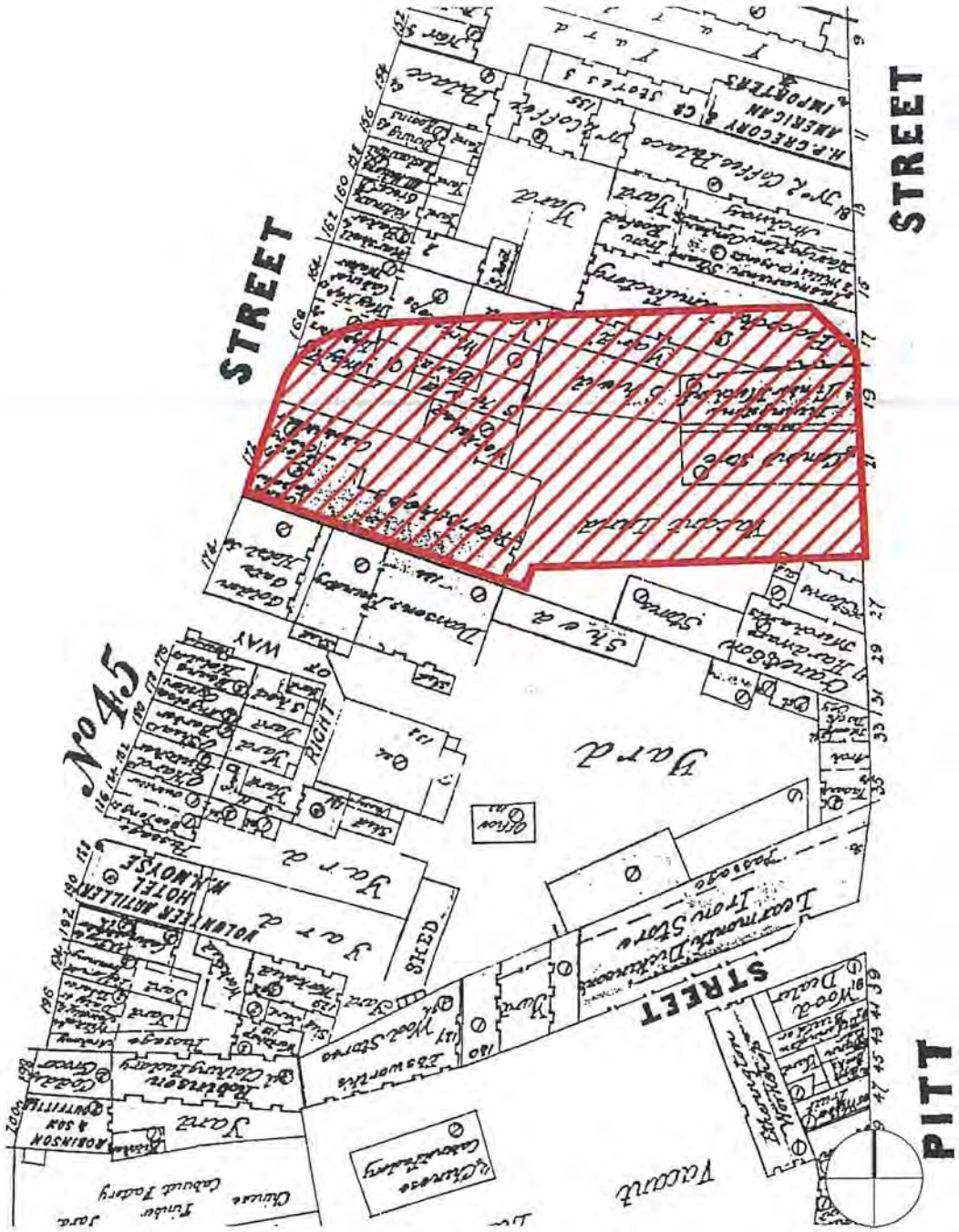

Figure 3.10: 1880 Dove plan of Sydney. This shows the high-density development on the site and around the George Street and Pitt Street areas. This part of the city was dominated by warehouses, merchants and shops dealing with the bustling maritime trade of Circular Quay and other nearby wharves. (Source: City of Sydney Council Archives with GML additions)