

REVISED EXHIBITION DRAFT

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Construction Management Plan

GAP BLUFF PRECINCT

OFFICERS MESS
THE ARMOURY
GAP BLUFF COTTAGE

CAMP COVE PRECINCT

CONSTABLE'S COTTAGE
33 CLIFF STREET
GREEN POINT COTTAGE

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1.0 Introduction

1.1 Purpose

This Construction Management Plan has been prepared to describe how the Project Management team along with the Contractor and all stake holders shall implement and conduct its allocated site management responsibilities during the Construction phase of the “Gap Bluff” Project (the Project).

A fundamental aim of this Plan is to ensure all construction is properly facilitated, integrated and coordinated to minimise the impacts of construction activities on:

- Neighbours
- Nearby residents
- Users of public footpaths and roads
- Parking near the site
- Surrounding streets used to access the

1.2 Site Location

Military Road, Cliff Street and Pacific Street bound the proposed development site. The site is known as “Gap Bluff” (refer Figure 1). For the purposes of this Construction Management Plan, Gap Bluff has been divided into 3 precincts -

1. Gap Bluff
2. Camp Cove North
3. Green Point Reserve



Figure 01 – Site Location

The site area is located adjacent to the HMAS Watson, Camp Cove and Watsons Bay.

1.3 Scope of this Plan

This Construction Management Plan has been prepared by Expertise Building & Construction Pty Ltd (herein referred to as EBC) and Ray Fitz-Gibbon Architects (herein referred to as RFA) to outline key and critical construction issues relevant to the proposed development of the Camp Cove and Gap Bluff precincts.

This document is intended to establish the methodology by which the project management team, the contractor and all parties involved in the construction process will fulfill the fundamental aims of this plan, as stated at 1.1, and undertake the work identified in the project Scope of Works with a view to ensuring:

- a) Safe and convenient access to the site and surrounding public areas
- b) Safety of both site personnel and the public
- c) Security of the site
- d) Safe and convenient materials handling
- e) Control of the site including traffic and pedestrian control
- f) Management of environmental concerns

It is anticipated that further approvals and permits from the various authorities having authority over the proposed works will be required and these will be sought as required

1.4 Proposed Scope Works - General

The proposal is for the adaptation and reuse of six extant buildings at South Head, Sydney Harbour National Park, as well as associated landscaping. Further detail about the works proposed for each building and associated landscaping is set out in detail in the Annexure documents.

1.4.1 Gap Bluff Precinct

Officers' Mess

Removing hipped roof extension to below adjacent parapet height and roof repairs generally
Accessibility measures including constructing an internal passenger lift
New wall openings
Partition removal
Conversion of kitchens and bathrooms
Reinstatement of original detailing and general conservation works

Armoury

New enclosed veranda to level 1
New kitchen and bathrooms
Expansion of building to the North-East
Internal partition removal

Gap Bluff Cottage

Rearrangement of the interior Layout to provide one bedroom, one bathroom, kitchen and living/dining room
Reinstatement of original detailing and general conservation works
Reinstatement of landscaping

1.4.2 Camp Cove Precinct

Constable's Cottage, 32 Cliff Street

Minor Internal changes including a new bathroom
Construction of a new bay window
Reinstatement of original detailing and general conservation works
Landscaping works including boundary fencing and lawn and garden reinstatement

33 Cliff Street

Rationalisation of the interiors planning to a more open – plan layout
Replacing the western wall with glazed bi-fold doors
Excavation of the driveway for a road-level garage and a trafficable terrace above
Landscaping works would comprise replacement of existing plantings with native coastal species to the east of the house, and planting of a fast-growing screening hedge along the property's western boundary.
The existing path and clothesline to the east of the house would be removed and a new lawn established.

1.4.3 Green Point Cottage

Removal of part of the wall between the veranda and the living areas
Conversion of the existing laundry into a bathroom.
Relocation of the building entrance to the south and the current entrance infilled and made good.
The existing enclosed veranda windows would be replaced and the external deck would be extended and raised to be flush with the internal floor level.
Proposed landscaping works comprise establishment of garden beds with low plantings along the southern and western boundaries of the property.

1.5 Proposed Scope of Works - Staging

The proposed works will be staged in accordance with the table below -

OFFICERS MESS

November 2017 – August 2018

Removal of hipped roof, roof repairs, new passenger lift, kitchen and bathroom renovations, partition and wall changes and conservation works

THE ARMOURY

November 2017 – August 2018

New enclosed Level 1 verandah, new kitchen, and bathrooms, building additions and internal partition removal

GAP BLUFF COTTAGE

November 2017 – March 2018

Internal layout changes, general conservation works and landscaping works

CONSTABLE'S COTTAGE

February 2018 – May 2018

New bathroom, new bay window, general conservation works and landscaping works

33 CLIFF STREET

November 2017 – March 2018

Internal Renovations, new glazed bi-fold doors, garage and driveway, new terrace and landscaping works

GREEN POINT COTTAGE

November 2017 – March 2018

Internal renovations, new bathroom, new entrance, new windows and verandah floor level and landscaping works

2.0 Construction Management

2.1 Approach

The major external constraints on the project are:

- a) Maintaining smooth traffic and pedestrians flow with minimal disruptions to the surrounding streets;
- b) Maintaining thoroughfare for pedestrian traffic to Gap Bluff through the National Park lands.
- c) Undertaking works with minimal impact on neighbours; and
- d) Ensuring no interference with HMAS Watson.

Upon commencement, the project team's immediate tasks will be to:

- a) Locate a project office, site accommodation and facilities;
- b) Undertake a survey of the site and complete a dilapidation report of surrounding properties and assets;
- c) Confirm the locations of existing services and obtain all necessary permits and licenses and approvals; and
- d) Arrange for the installation of temporary services – power, water, and sewer to service the site works and the amenities, where necessary.

2.2 Approvals

Approval is required for the works covering the minor excavation and foundation works for The Armoury, Constable's Cottage and 33 Cliff Street.

It is likely that the Approval will contain conditions that certain reports will need to be completed, submitted, and approved before works can commence. Reports needing approval will include:

- a) Construction Management Plan;
- b) Erosion and Sediment Control; and
- c) Earthworks Plan for excavation.
- d) Site Waste Minimisation and Management Plan
- e) Traffic Management Plan
- f) Construction Noise Management and Vibration Plan (CNVMP)

It is not anticipated that sustained disruption to vehicle or pedestrian movement will occur, however prior to commencing temporary modification of traffic arrangements if required, further approvals will be required from National Parks, OEH and Woollahra Council including but not limited to:

- i. Application / Notification to Work on Council Property
- ii. After Hours Application
- iii. Civil Operational Works
- iv. Landscape Operational Works

It is proposed that staged Building Approvals (BA) will be obtained from a qualified Private Certifying Authority (PCA). It is proposed that the BA will be approved in the following sequence:

- i. Demolition and Excavation works
- ii. Structural works
- iii. Services and Internal Fit Out

It is envisaged that Staged occupation will occur in line with the Gap Bluff Development Build Program.

The staging of the BA's will allow works to commence, whilst affording time for those works requiring intense design time such as structural and finishes works. The net effect is an overall reduction in total development construction time.

2.3 Site Security

The site will be secured using appropriate fences and/or hoardings, with access gates manned with qualified security guards/traffic control officers, when required. EBCPL will control site entry of inducted personnel and machinery through a visitor log book. The site will be secured out of hours and patrolled by qualified security guards, if considered necessary.

All visitors to the site will be required to report to the site office, and will be appropriately inducted and registered in a visitor's log book.

2.4 Public / Worker Safety

All site staff and subcontractors will be required to complete a site-specific induction before commencing work on site. The induction will cover aspects relating to safety and amenity; including access, emergency evacuation procedures, location of first aid facilities, location of amenities, site hours, material handling, noise and dust policies and environmental management.

Prior to commencing works on site, all subcontractors will be required to submit a project specific Safety Management Plan.

2.5 Site Facilities

Site Amenities and management offices including mess, change, first aid & toilets will be located initially in the Officers Mess construction zone before relocation to the Camp Cove Precinct as this part of the project comes on line.

The Contractor shall be liable for the supply and erection of sheds, all services to those sheds and other structures which the Contractor may be obliged to provide under the provisions of an Award, Industrial Agreement or otherwise. As a minimum, all sheds and other structures will be: -

- a) weatherproof;
- b) with washable internal linings and clean with functional furniture and equipment; and
- c) of no less standard than that required by the WorkCover NSW Code of Practice for amenities for construction work.
- d) The Contractor shall provide for the connection of all services to site accommodation and amenities.

2.6 Safety Fencing and Hoarding

A system of temporary metal mesh fencing and shade cloth screening will be supplied to all to all accessible site perimeters (refer to appendix 7.2) and will consist of –

- a) Mobile fence panels with grid mesh infill and concrete feet (as illustrated on page 11)
- b) Matching gates with grid mesh infill and will be lockable

Gates of the same height as the adjoining fence will be supplied as required and will be of a width to suit the clear openings required for safe movement of vehicular and pedestrian traffic.

Gates will match the adjoining fencing, with pad locks/chains as required for security. Shade cloth screening will be secured to all fencing and gates for dust control.



Figure 02 – Typical safety fence types

Lockable gates will be used on all access points onto the site.

2.7 Hours of Operation

Operating hours for the site will be:

Monday to Friday: Work to not commence before 7:00am nor extend beyond 5:00pm

Saturday : Work to not commence before 7:00am nor extend beyond 1:00pm

Unless otherwise amended by Council.

Whilst not anticipated, If it is required for work to be undertaken out of hours to shutdown services or to minimize impact on road, infrastructure, or the amenity of the neighboring properties, then the appropriate permits will be sought.

2.8 Overhead Protection

Due to the nature and extent of the works and proximity to public access ways it is not anticipated that overhead protection will be required however this will be fully evaluated prior to commencement of construction

2.9 Existing Services and Assets

Prior to commencing work under the Contract, a dilapidation survey in accordance with Conditions of Consent will be provided. This will include all existing and adjoining properties, services, and assets. Adjoining properties will include all other properties which may be effected by the execution of the Works whether they have a common boundary with the site or not; including existing council pavement and kerbs that adjoin the subject property or may be effected by the works if they do not adjoin the subject property. Existing Buildings include the building, services, and paving existing and on the site.

The location of cables and pipe work at or about the site prior will be determined by the contractor prior to the commencement of any works on the site.

The Contractor shall immediately notify the appropriate authority and the Superintendent in the event of damage to a service on or adjacent to the site and, if responsible for the damage, pay all costs and charges for repairs.

In the event of the Contractor having damaged a service, the Contractor shall comply with the instructions and requirements of any relevant authority having control over that service.

3.0 Construction Methodology

3.1 Demolition and Excavation

The site is part of Sydney Harbour National Park, divided into two precincts –

- Gap Bluff Precinct
- Camp Cove Precinct

Existing services within the site will be located and either capped if redundant or modified if they are to be used as temporary services for the works.

Excavation is presently anticipated in two locations. The first is situated at the rear of The Armoury to allow for the new kitchen extension. An approximate 1.5sqm of bedrock will be removed in the area adjacent to the kitchen extension but not impacting the existing stone wall as depicted in the following plan –

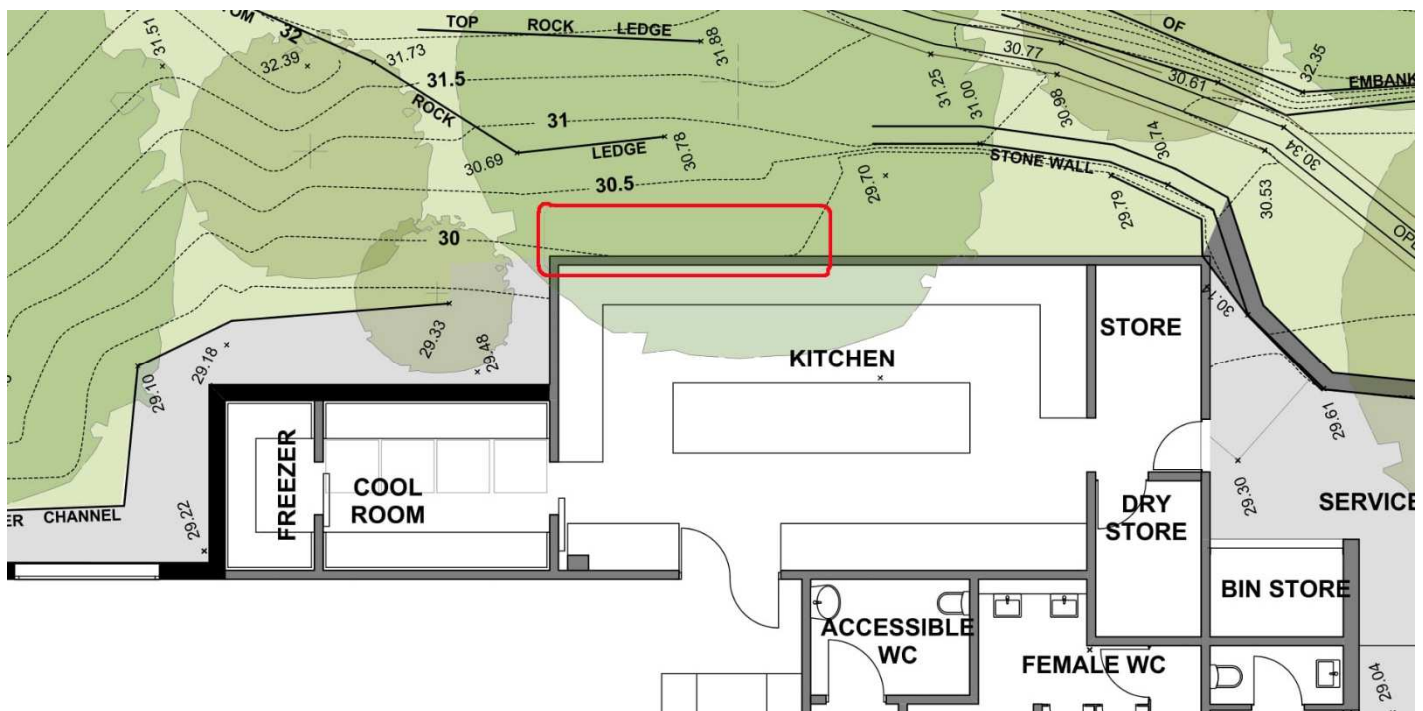


Figure 03 – Armoury excavation

Excavation limited to levelling behind kitchen extension.

The second area of excavation is the levelling of the driveway at 33 Cliff Street to allow for the construction of an external deck with a carport below, as depicted in the following plan –



Figure 04 – 33 Cliff Road excavation
Excavation limited to the driveway and garage areas

3.2 Substructure Works

The proposed Substructure works will consist of structural concrete footings excavated in the natural or filled ground as detailed by the Structural Engineer, as required.

- Excavation to bench and footing excavation and construction to be conducted in strict accordance with the engineer's specification, design, and overview.
- All footing excavated spoil is to be removed from site in accordance with the current EPA guidelines
- Benching and excavation will continue until the final reduced level (RL) is achieved.
- Access relating to the retention and excavation works will be in strict accordance with the Traffic Management Plan.

3.3 Structure

Mobile Cranes will support the structural trades as required for materials handling. Mobile cranes will be set up inside the site boundaries and will be contained wholly within those boundaries. Concrete Placement will be via a mobile line pump operated within the site boundaries and as required.

Scaffold requirements have been considered and will be implemented as required.

3.4 Façade

The facade will be repaired and or installed as soon as practical to commence waterproofing floors so that finishes and fit out can commence.

3.5 Services and Finishes

Services and Finishes will be installed progressively as the Structural building works permit.

3.6 External Works

The works will also include making good any areas that have been affected by the construction of the project.

3.7 Construction Sequence and Planning

The locations and types of plant may vary depending on the results of more detailed planning as the design solidifies and the availability of plant is firmed up.

There will be 3 distinct phases requiring different material handling logic to construct the buildings efficiently and minimise impact on surrounding streets and neighbours. The phases are:

- Phase 1. Site establishment; Demolition; Excavation
- Phase 2. Structure
- Phase 3. Finishes and external works

Each Phase will not happen in isolation. Phase 2 and 3 will happen simultaneously once the structure is sufficiently complete to allow the finishes trades to commence on lower levels.

Additionally, to ensure land disturbance is confined to workable and manageable sizes, works in Phase 1 will be undertaken in the following sequence:

- a) Install sediment control fences or barriers
- b) Construct temporary construction exit
- c) Install temporary sediment traps
- d) Undertake site development works in accordance with engineering plans.

3.8 Material Handling

3.8.1 Mobile Cranes

Mobile cranes will be used for general lifting, materials handling and erection works as required. Mobile cranes will be set up inside the site boundaries and will be contained wholly within those boundaries.

3.8.2 Hoists

Not required.

3.8.3 Concrete Handling

Concrete Placement will be via mobile concrete line pumps set up within the site boundaries.

3.8.4 Rubbish Removal

Rubbish will be removed from site by a licensed waste contractor and taken to a transfer facility for separation. See section 5.6 for more detail

4.0 Traffic Management

4.1 Vehicular Traffic

The principles of the Construction Traffic Management Plan have been addressed as part of the Traffic Impact Assessment Report, prepared for this site by Ason Group (Appendix 7.5, section 7). If required a more detailed Traffic Management Plan will be provided as part of the approval process. The current report:

- a) makes provision for all construction materials to be stored on site, at all times.
- b) Specifies construction truck routes. Truck volumes along the nominated truck routes are to be distributed over the surrounding road network where possible, whilst minimising impacts to residential streets.
- c) Provides for the movement of trucks and deliveries to and from the site.
- d) Ensures temporary truck standing / queuing locations in a public roadway / domain near the site are not permitted unless approved by Council's Public Works.

The attached Traffic Impact Assessment Report, Section 7, Construction Traffic Management, provides high level detail regarding the proposed traffic management methodology, following is a summary of the objectives of the Construction traffic management.

4.1.2 Demolition and Excavation Stage

All access to the site will be in accordance with the Traffic Management Plan. At all times and in all precincts, loading and unloading of materials and equipment will be, as far as is possible, carried out from wholly within the site for the entirety of the demolition and excavation works and always to the requirements of the Traffic Management Plan.

Suitably qualified traffic controllers will be used to direct traffic on and off the site should there be a requirement for any oversized delivery or pick up. All required permits for such traffic movements will also be sought.

4.1.3 Construction Stage

Access to the site will be as per the requirements of the Traffic Management Plan. The Traffic Management Plan will be developed to minimize impact to local traffic, pedestrian traffic, and the public transport system.

At all times and in all precincts, loading and unloading of materials and equipment will be, as far as is possible, carried out from wholly within the site for the entirety of the construction stage of the works and always to the requirements of the Traffic Management Plan. Loading and unloading will take place in those areas designated for that activity in the Traffic Management Plan.

Suitably qualified traffic controllers will be used to direct traffic on and off the site should there be a requirement for any oversized delivery or pick up. All required permits for such traffic movements will also be sought.

4.1.4 Road Closures

It is not anticipated that road closures will be necessary due to the nature and extent of the contemplated works and this will be a requirement reflected in the Traffic Management Plan. If a road closure was required, the contractor will be required to comply with all requirements of the Traffic Management Plan and obtain all required permits for the submission and review of both local council and any authority having authority over the proposed closure.

4.2 Pedestrian Traffic

All existing pedestrian access ways that adjoin the various site precincts will be retained and will be maintained for the duration of the project. Site fencing will be arranged to ensure continued and safe access along the existing Sydney Harbour Foreshore Park access ways. All access and egress points from the sites will have required signage and appropriate traffic control measures in place.

Whilst not anticipated, any detours to pedestrian traffic will be done in concert with the Traffic Management Plan and local council and Sydney Harbour Foreshore Authority consent and requirements.

4.3 Construction Worker Travel

All construction workers on site will be encouraged to utilise the readily available access to both bus and ferry transport to and from the site to minimize any impact upon local vehicle parking and to reduce local traffic impact.

A direct Ferry linking to Circular Quay has suitable ferry departure times throughout the day thus linking directly to the bus, ferry and train terminus at Circular Quay.

Whilst morning ferry services do not arrive at Watsons Bay until mid-morning, there is a direct bus connection from nearby Rose Bay ferry wharf. Buses also run from Town Hall in the city, to Watsons Bay from early in the morning

324, L24 Express and 325 bus routes connect the site to Town Hall in the city in both directions at all hours of the day.

4.4 Parking Facilities

As part of the onsite induction all contractors and sub-contractors will be made aware of the necessity to balance the requirements of the residents and the need to preserve parking for the users of the Sydney Foreshore Park and popular Watsons Bay and Gap tourist area. On street parking, will be discouraged whilst use of the available on site parking and public transport will be encouraged.

In addition to the use of public transport there will be adequate designated onsite parking adjacent the Officers Mess site to cope with the expected parking requirements during construction.

5.0 Construction Methodology

5.1 General

The objective of this section is to identify the proposed methods that will be employed to minimise the impact of noise, vibration and air quality in the vicinity of the development.

5.2 Noise and Vibration Management

An evaluation of the potential acoustic impact and potential mitigation measures during construction was carried out by Marshal Day Acoustics (see Appendix 7.9). Marshall Day formulated a Construction Noise Impact Assessment of the proposed construction works specifically in relation to

- a) excavation, sub structure and structural works to the rear of the existing Armoury,
- b) excavation, sub structure and driveway levelling at 33 Cliff Street,
- c) Structural works to the Officers Mess building and:
- d) internal refurbishment works to Gap Bluff Cottage, Constables Cottage, and Green Point Cottage.

It is intended that a formal Construction Noise Management and Vibration Plan (CNVMP) be developed between the construction team and the Acoustic consultant. The CNVMP will detail construction programming, construction plant and equipment and specific mitigation measures outlined.

Appendix 7.9, Construction Noise Impact Assessment, does outline potential mitigation measures and construction management practices that will be expanded on in the CNVMP.

The normal hours of work will typically be 7.00am to 5.00pm, Monday to Friday and 7.00am to 1.00pm on Saturday and will exclude public holidays. All plant will be regularly maintained and log books kept ensuring that there are no excess noise emissions. Where it is practical, electric machinery will be used in lieu of mechanical devices.

All subcontractors will be responsible for managing noise and vibration in accordance with the CNVMP and their project specific Management Plans.

It is proposed to undertake some after hour's works for specific tasks to minimise impacts to pedestrians, vehicular traffic or in the interest of safety. The works that are proposed to be undertaken outside of normal working hours include the following, if and where required:

- e) Removal of tree's;
- f) Hoarding works;
- g) Crane erection and dismantling; and
- h) Footpath works.

Mitigation measures identified in the Construction Noise Impact Assessment include:

- a) limiting noise levels from work site radios,
- b) breaking rock with low impact sawing and ripping,
- c) adherence to construction hours
- d) temporary screening
- e) Proper management of deliveries to ensure delivery during construction hours, quiet and efficient deliveries due to proper briefing of drivers informing them of access locations and better delivery practices (e.g. switching off engine during delivery)
- f) Use of existing structures and stockpiles as noise barriers
- g) Use of temporary barriers where existing barriers cannot be used.
- h) Encourage use of broadband reversing 'beepers'
- i) Siting of plant away from noise effected vulnerable properties

The Construction Noise Impact Assessment report further identifies the need for noise monitoring at each stage of the construction works.

5.3 Dust Management

Dust control measures will be implemented as required, and will be in accordance with NSW Workplace health and safety regulations and Environmental Protection Act.

Dust Management will be most critical during the demolition phase of the project, with the subcontractors for these trades specifically dealing with dust management within their project specific management plans.

Measures that may be employed include:

- j) Site Perimeter – A 1.8m meshed and shade cloth fence will be provided in all areas where external works are occurring
- k) Demolition – All trucks removing materials from site will be loaded whilst inside the site perimeter, with loads covered before exiting. Damping the site during excavation if dust is likely to be raised.
- l) Excavation – Damping down working surfaces as required. Minimise stock piling of material. Maintaining stabilised access roads and driveway
- m) Construction – Maintain a high level of housekeeping to minimise likelihood of windblown dust
- n) Vegetation – vegetation cover will be retained and minimalization of the site area to be disturbed by the works as far as possible to reduce dust
- o) Stock Piles – Materials and Stockpiles will be covered where possible
- p) Generally – ensuring that vehicles enter and leave the site by the properly designated stabilised site entry points. Inspect and sweep all access roads

5.4 Stormwater and Sediment

It is proposed that a Stormwater and Sediment Control Plan will be prepared by ITM Design Pty Limited in relation to the subject site and will be implemented prior to works commencing. Appendix 7.10 describes some of the potential measures to mitigate stormwater from the development entering adjoining properties, ensuring that all water that enters the council stormwater system does not contain silt or other contaminants and that dust spread from the site is mitigated including damped down run off. The plan will be directed toward minimising the effect of these elements.

The following is a summary of the possible solutions during each phase of construction. These options will be developed further and consolidated in the formal Stormwater and Sedimentation Control Plan. The following should be read in conjunction with Appendix item 7.10

Demolition / Excavation – At the commencement of these works, screens and bunding at the perimeter of the site where stormwater may run off will be installed. Bunding will also be implemented around stormwater drains. Diligent housekeeping will be implemented to minimise risk of dust/debris being washed into pits. All works will be conducted within EPA guidelines.

Construction – The building slab drainage will be progressively installed and connected to council drains. Drainage pits will be bunded or have filter cloth applied to ensure debris and silt does not enter the council's drains.

All mitigation will be conducted in accordance with EPA guidelines, including EPA Publication 275: "Construction Techniques for Sedimentation Control" and EPA Publication 480 "Environmental Guidelines for Major Construction Sites".

A summary of possible mitigation procedures with regard to sedimentation run-off might include:

- a) Grading of the site to fall to within site boundaries,
- b) Possible use of sedimentation tanks and the construction of sumps and trenches which can be pumped into sedimentation tanks.
- c) Monitoring loose material in drainage lines
- d) Use of proprietary silt socks to stormwater discharge points near the excavation works.
- e) Sediment control fences
- f) Straw bale filters
- g) Grass strip filters
- h) Vegetation – vegetation cover will be retained and minimalization of the site area to be disturbed by the works as far as possible to avoid erosion
- i) Stockpiling – Avoid stockpiling large amounts of material at any time and locate stockpiles to avoid erosion.
- j) Regular maintenance of sedimentation control barriers
- k) Inspect and sweep access roads

5.5 Asbestos Management

A Hazardous Building Materials Report has been prepared by Douglas Partners in relation to the subject site (see Appendix 7.6). This report presents the findings of an asbestos and other hazardous building materials survey undertaken by Douglas Partners to enable compliance with current regulations regarding the proposed demolition works on the subject site. ECTL will develop an asbestos and other hazardous building materials management plan as required, through an accredited Consultant in accordance with Safe Work Australia guidelines -



The Asbestos and other hazardous building materials management plan will detail how asbestos, ACM and other hazardous materials are identified at the workplace and will be managed, for example what, when and how it is going to be done.

The Asbestos and other Hazardous Materials Management Plan will include:

- the identification of asbestos, ACM and other hazardous materials, for example via the Hazardous Building Materials Report prepared by Douglas Partners and a reference or link to the asbestos register for the workplace, and the locations of signs and labels
- decisions, and reasons for the decisions, about the management of asbestos at the workplace, for example safe work procedures and control measures
- procedures for detailing accidents, incidents, or emergencies of asbestos at the workplace
- workers carrying out work involving asbestos, for example consultation, information, and training responsibilities.

Other information that may be included in the asbestos management plan:

- an outline of how asbestos risks will be controlled, including consideration of appropriate control measures
- a timetable for managing risks of exposure, for example priorities and dates for any reviews, circumstances and activities that could affect the timing of action
- identification of each person with responsibilities under the asbestos management plan and the person's responsibilities
- procedures, including a timetable for reviewing and, if necessary, revising the asbestos management plan and asbestos register
- air monitoring procedures at the workplace, if required.

5.6 Waste Management – General

EBTL will prepare a Site Waste Minimisation and Management Plan as required in relation to the subject site (see Appendix 7.8, Pro Forma DA Guide – Site Waste Minimisation and Management Plan Woolhara Council). The plan will address:

- a) the on-site sorting and storage of waste products pending reuse or collection including waste products associated with the removal of all existing structures, footings and sub-terrain structures and removal of all redundant service piping, conduit etc. This work includes the on-site sorting and storage of waste products of demolition.
- b) Identifying type and quantifying the volume of the various classifications of waste that will be removed from the site
- c) Identifying type and quantifying the volume of recyclable waste
- d) Nominating the locations for the depositing of waste materials and recyclable materials removed from the site
- e) Formulate the on-going waste management of the site by the end user including weekly waste removal and recycling. Ongoing landscape management and removal/recycling of green waste.

5.6.1 Waste Management – sub contractor's requirements

Subcontractors will be required to indicate their methodology for complying with the Site Waste Minimisation and Management Plan. The methodology prepared by the sub-contractors must define how each subcontractor will meet their legal obligations as well as the obligations of the Waste Management Plan regarding the minimization of waste and the protection of the environment. Items that will be addressed would include methods to ensure-

- a) Keeping all storm water drains free from paint, cement, sand, and chemicals
- b) Equipment cleaning at designated washout points only.
- c) Recycling of materials where possible
- d) Keeping all storm water drains free from paint, cement, sand, and chemicals.
- e) Methods for ensuring chemicals, paint, sand, and cement do not enter the soil or run-off the site.
- f) Outlining appropriate action plans for chemical spills.

5.6.2 Waste Management – legislative requirements

The following key environmental legislation relating to waste management is to be adhered to:

Waste Avoidance and Resource Recovery Act 2001 (WARR Act).

Contaminated Land Management Act 1997 (CLM Act).

Protection of the Environmental Operations Act 1997 (POEO Act).

Protection of the Environment Operations (Waste) Regulation 2005.

Commonwealth Hazardous Wastes (Regulation of Exports and Imports) Act 1989.

Environmentally Hazardous Chemicals Act 1985.

5.6.3 Waste Management – Guidelines and Standards

The following table lists the critical guidelines and standards to be satisfied

Standard	Description
Woollahra Council Site Waste Minimisation Management Plan	Developed to complement the Woollahra Development Control Plan 2014, Chapter E5 - Waste Management. It includes relevant information regarding minimising and managing waste. It requires the waste streams to be identified, volumes to be ascertained at the planning stage and disposal/recycling of waste streams to be nominated. During construction waste streams are to be monitored and volumes and end-receivers to be recorded.
Waste Classification Guidelines 2014 (EPA)	Guidelines on the classification of waste into groups that pose similar risks to the environment and human health.
NSW Government's Waste Reduction and Purchasing Policy (WRAPP)	This policy requires all State agencies to develop and implement a Waste Reduction and Purchasing Plan to minimise waste generation in four areas: paper products, office equipment and components, vegetation and construction and demolition material. It aims to promote ecologically sustainable development within all NSW State Government Agencies and t to reduce the amount of waste to landfill by encouraging the more efficient use of scarce natural resources.
Government Resource Efficiency Policy (GREP)	The GREP includes measures, targets, and minimum standards to drive efficiency in energy and water use and waste and also improving air quality. This policy aims to reduce NSW government agency operating costs by implementing resource efficiency measures. The policy applies to all general government sector agencies and it strongly recommends local government, state-owned corporations, public trading enterprises and public financial enterprises also take action.

5.6.4 Waste Management – Waste Streams

It is envisaged that a number of waste streams will be generated during construction. The NSW EPA Waste Classification Guidelines , Part 1 (see Appendix 7.8) summarise the waste classe streams as follows:

- a) Special waste
- b) liquid waste
- c) hazardous waste
- d) Restricted solid waste
- e) General solid waste (putrescible)
- f) General solid waste (non-putrescible).

Where waste cannot be avoided, reused, or recycled it will be classified and appropriately disposed of. Furthermore, the EPA guideline outlines how to assess waste, waste classification and sets out management options for the disposal of classified waste and is summarized as follows:

The Classification of any waste from the site will involve one or more of the following steps

- 1) Establish if the waste should be classified as special waste.
- 2) If not special waste, establish whether the waste should be classified as liquid waste.
- 3) If not special waste or liquid waste, establish whether the waste is of a type that has already been classified. To

simplify the classification process, the OEH (Environment Protection Authority (EPA) Branch) has 'pre-classified' several commonly generated wastes.

4) If the waste is not special waste, liquid waste or pre-classified, establish if it has certain hazardous characteristics and can therefore be classified as hazardous waste.

5) If the waste does not possess hazardous characteristics, it needs to be chemically assessed to determine what class of waste it is. If the waste is not chemically assessed, you must manage the waste as if it were hazardous waste.

6) If the waste is chemically assessed as general solid waste, a further test is available to determine whether the waste is putrescible or non-putrescible. This test determines whether the waste is capable of significant biological transformation. If you do not wish to undertake this test, you must manage the waste as if it were general solid waste (putrescible).

5.6.5 Waste Management – Reuse, Recycling, and Disposal

Following is a summary table of the typical Waste Stream reuse, recycling, and disposal data to be supplied as part of the Site Waste Minimisation and Management Plan.

DEMOLITION STAGE				
Waste Stream	Reuse Estimated volume (m3) or weight (t)	Recycling Estimated volume (m3) or weight (t)	Disposal Estimated volume (m3) or weight (t)	Suggested Facility
Excavation material				
Timber (specify)				
Concrete				
Brick/pavers				
Tiles				
Metal (specify)				
Glass				
Furniture				
Fixtures and fittings				
Floor coverings				
Packaging (used pallets, pallet wrap)				
Garden organics				
Containers (cans plastic, glass)				
Paper, Cardboard				
Residual Waste				
Hazardous/special waste e.g. asbestos (specify)				
Other				

CONSTRUCTION STAGE				
Waste Stream	Reuse Estimated volume (m3) or weight (t)	Recycling Estimated volume (m3) or weight (t)	Disposal Estimated volume (m3) or weight (t)	Suggested Facility
Timber				
Concrete				
Bricks				
Tiles				
Metal				
Glass				
Plasterboard				
Fixtures and fittings				
Floor coverings				
Excavation material-contaminated				
Packaging (used pallets, Palette wrap)				
Garden Organics				
Containers (cans, plastic, glass)				
Paper/cardboard				
Residual Waste				
Hazardous/special waste e.g. asbestos (specify)				
Other (specify)				

5.7 Vegetation Protection

An arborists report will be commissioned to help identify appropriate vegetation protection measures as required. It is not envisaged that any trees will be removed because of the proposed works.

5.7.1 Vegetation Protection - general

Depending upon the age of the specific tree identified for retention, as well as its species and current health and in conjunction with the duration and extent of possible impact, allow a suitably qualified arborist to determine the extent, if any, that encroachment within the area directly beneath the trees canopy can be made. Minimise soil and root disturbance to all trees to be retained. Unless otherwise stated in a specific assessment, the undisturbed area beneath the canopy should represent at least 80% of the Primary Root Zone and must maintain all the Critical Root Zone.

Prior to the commencement of any demolition, site preparation or construction remove those trees marked for removal ensuring that there is no damage to the root system, canopy of foliage of those trees identified to be retained.

5.7.2 Vegetation Protection - Execution

The Contractor is to construct temporary fencing no closer to any tree marked for retention than the canopy of that tree unless otherwise directed by the arborist.

The contractor is to ensure that during the building works the fenced of area is not disturbed nor used for storage, disposal, or any other activity. No excavation or fill can take place within the fenced of area.

The contractor is to maintain all fences and ensure their integrity throughout the course of the works. Fencing can be temporarily removed to allow for works identified within any specific landscaping plan but must be replaced immediately after completion of such works.

All pruning and cutting back of trees marked for retention, including the removal of deadwood, is to be done in accordance with AS 4373-1996 Pruning of Amenity Trees. All pruning and cutting back is to be undertaken by a qualified arborist.

Excavation for services that has been allowed for within the fenced of area must be undertaken by hand and must be contained to the minimum area required to accommodate the required service and its fall. Tree roots must only be cut where they directly conflict with the direct path of the required service trench under the guidance and direction of a qualified arborist.

Any damage that occurs to a tree or its root system must be reported immediately to the Superintendent and the Arborist and any remedial work is to be carried out by a suitably qualified arborist.

All trees marked for retention must be inspected by a qualified arborist during the building works and at the completion to ensure their health and longevity. Any remedial works deemed necessary must be undertaken within 7days of issue of a site instruction from the arborist

6,0 Occupational Health and Safety

The head contractor will be required to provide a specific Work Health and Safety management plan for the project that clearly outlines policies and procedures, responsibilities, and project risk assessment in relation to health and safety issues.

6.1. Site Induction

It will be a requirement of any Work Health and Safety Plan for the project that, before commencing on site. All personnel be required to attend a site-specific induction conducted by the contractor. Issues to be covered in the induction shall include

- a) Evacuation and assembly points
- b) General safety procedures including equipment tagging and correct clothing and safety equipment
- c) Importance of site safety measures including signage, site cleanliness barricades and railing
- d) Introduction to sanitary requirements and contractor/ sub-contractor amenities
- e) Car park allocation and public transport usage
- f) Hours of operation
- g) Noise abatement
- h) Waste management control
- i) Environmental control

6.2 Site Visitors

All site visitors, other than sub-contractors, shall be required to attend the site office on arrival. Access of such personnel to the works zone will necessitate their induction into the site and they will either be required to hold a valid construction industry induction training red card or they must be accompanied around the site by personnel who hold such a card.

7.0 Appendices

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7.1 Appendix 1 – Detailed description of proposed works

7.2 Appendix 2 – Site Layout: fencing, public thoroughfare, staging and access

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7.2.3 –	Site Layout	The Armoury
7.2.4 –	Site Layout	33 Cliff Street
7.2.5 -	Site Layout	Constable's Cottage
7.2.6 –	Site Layout	Green Point Cottage

7.3 Appendix 3 – Construction Program

7.4 Appendix 4 – Proposed Traffic Routes

7.5 Appendix 5 – Traffic Impact Assessment Report
The Gap Bluff and South Head, Camp Cove & Green Point
Precincts
Prepared by Ason Group - Ref: 0075r02v01 22/02/2017

7.6 Appendix 6 – Hazardous Building Materials Report
Proposed Development The Gap, Watsons Bay
Prepared by Douglas Partners – Project 85743.01
December 2016

7.7 Appendix 7 – DA Guide – Site Waste Minimisation and Management
Plan. Woollahra Council

7.8 Appendix 7 – NSW EPA – Waste Classification Guidelines,
Part 1 Classifying Waste Nov 2014

7.9 Appendix 9 – Gap Bluff Development Construction Noise Assessment,
Marshall Day Acoustics Rp 001 r02 20161667
11 July 2017

7.10 Appendix 10 – Sedimentation Control Details,
ITM Design, H-Sed, 16/184

7.1 Appendix 1 – Detailed description of proposed works

Gap Bluff Precinct

Officers' Mess

The proposed adaptation of the Officers' Mess includes the following works:

- Removal of the c1950s hipped roof and reconstruction of the original flat roofs with parapet.
- Installation of a lift along the eastern wall next to the 1989 addition.
- On the ground floor:
 - opening-up of the current foyer area to create a larger entry space;
 - conversions of the southern store (1989) into a bridal room;
 - conversion of the original ground-floor bathroom into a store, including removal of original terrazzo partitions;
 - conversion of the 1989 kitchen areas into WCs and a lift; and
 - retention of original fixtures and fittings throughout.
- On the first floor:
 - removal of 1989 partitions in the first floor and reinstatement of original billiard room;
 - removal of the first-floor male WC and expansion of the former sitting room over this space;
 - widening of the opening between the current foyer and reception area;
 - conversion of the enclosed balcony into a WC, including bricking-up one of the original doors and converting the original French door into a single door; and
 - retention of original fixtures and fittings throughout.
- Adaptation of the 1989 lecture theatres for a kitchen on the ground floor and a reception room on the first floor and major repairs to the lecture theatre roof.

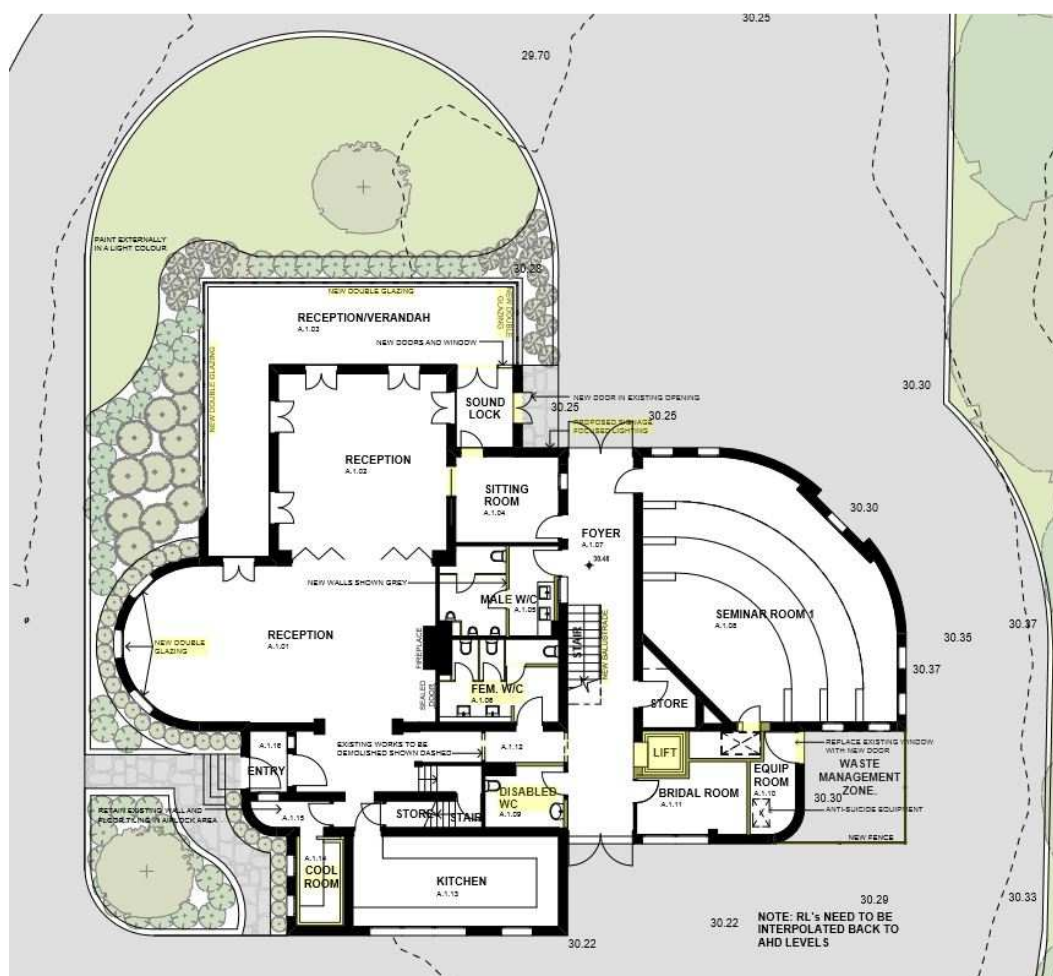


Figure 05 – Officers Mess Proposed Plan – Level 1

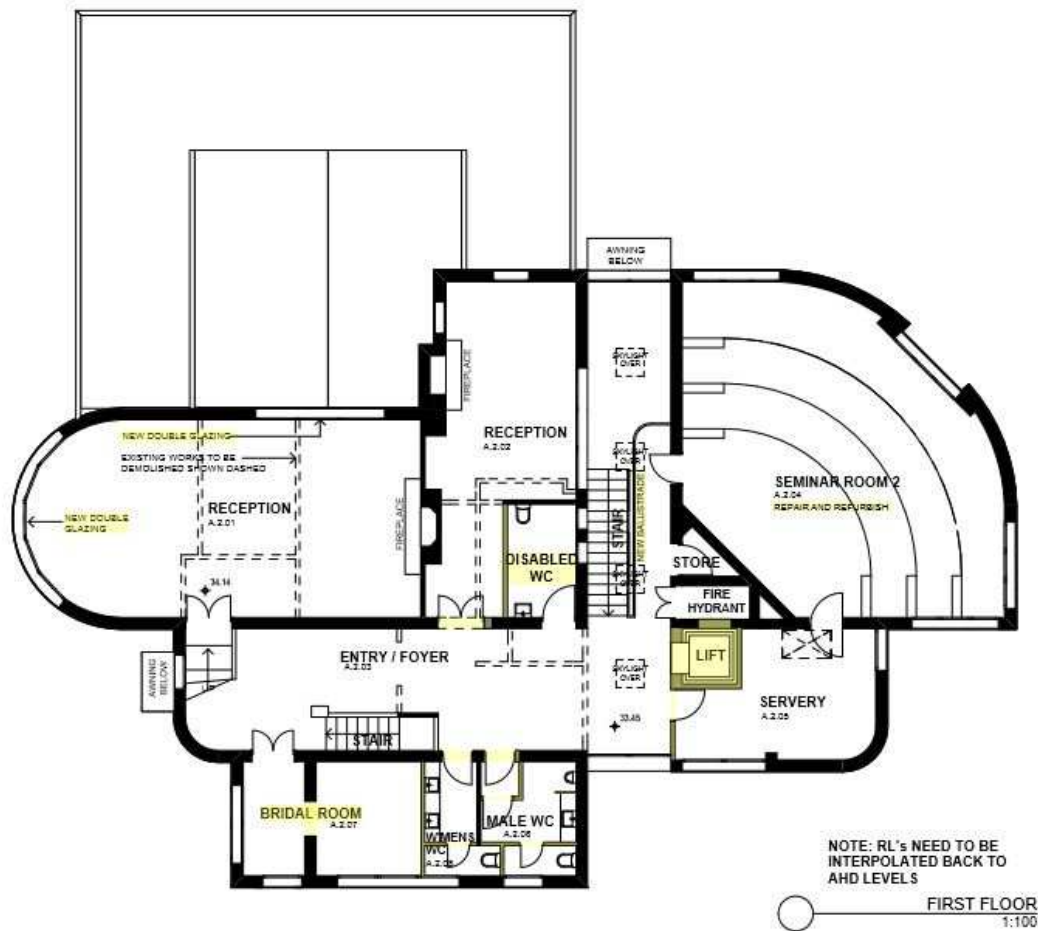


Figure 06 – Officers Mess Proposed Plan – Level 2

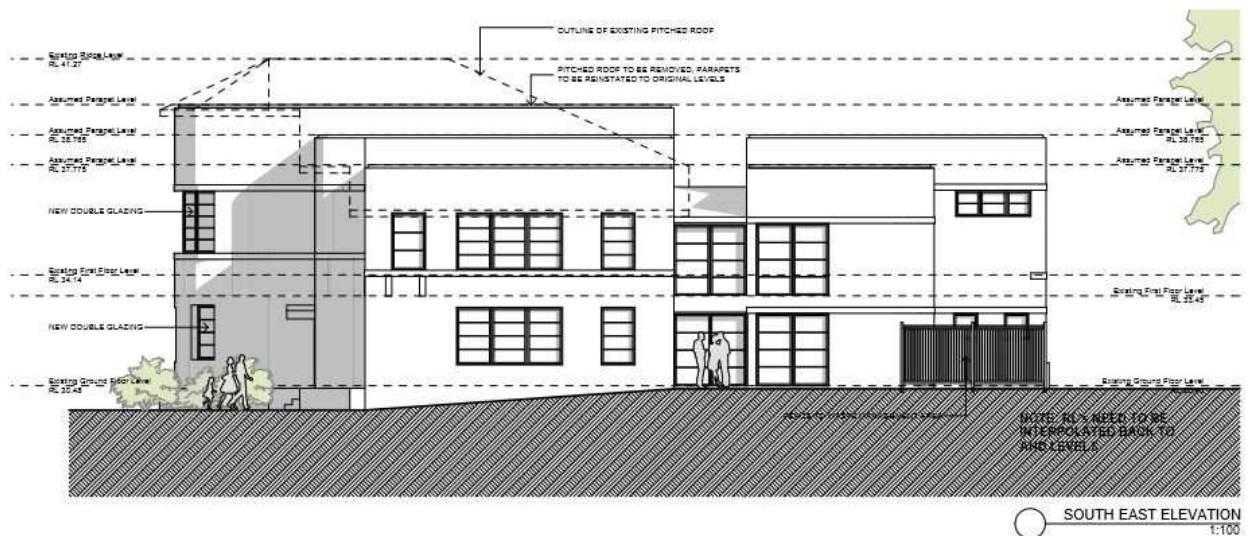


Figure 07 – South West Elevation

Armoury

The proposed adaptation of the Armoury would involve the following works:

- total refurbishment and expansion of the existing building including removal of the hipped roof and expansion of the building footprint to the east to include new WCs, bridal room and entry foyer. This would require removal of the existing eastern wall and would require some excavation for footings;
- replacement of the ground-floor veranda with a new external lounge, which would support a trafficable terrace on the first floor above, and include new stairs at its western end;
- retention of the remaining original rear (northern) walls, including the remaining original timber double-hung sash windows;
- further opening-up of the interior by removal of 1989 partitions; and
- expansion of the service area to the northeast, behind the building.

Proposed landscaping works would comprise establishment of new garden beds with low plantings along the proposed new terrace along the southern wall of the Armoury; a new stone-paved landing at the base of the new southwestern stairs to the terrace, and addition of further native plants to the existing beds to the west. The existing lawns in front of the Armoury would be retained, as would the Norfolk Island pines to the southeast.

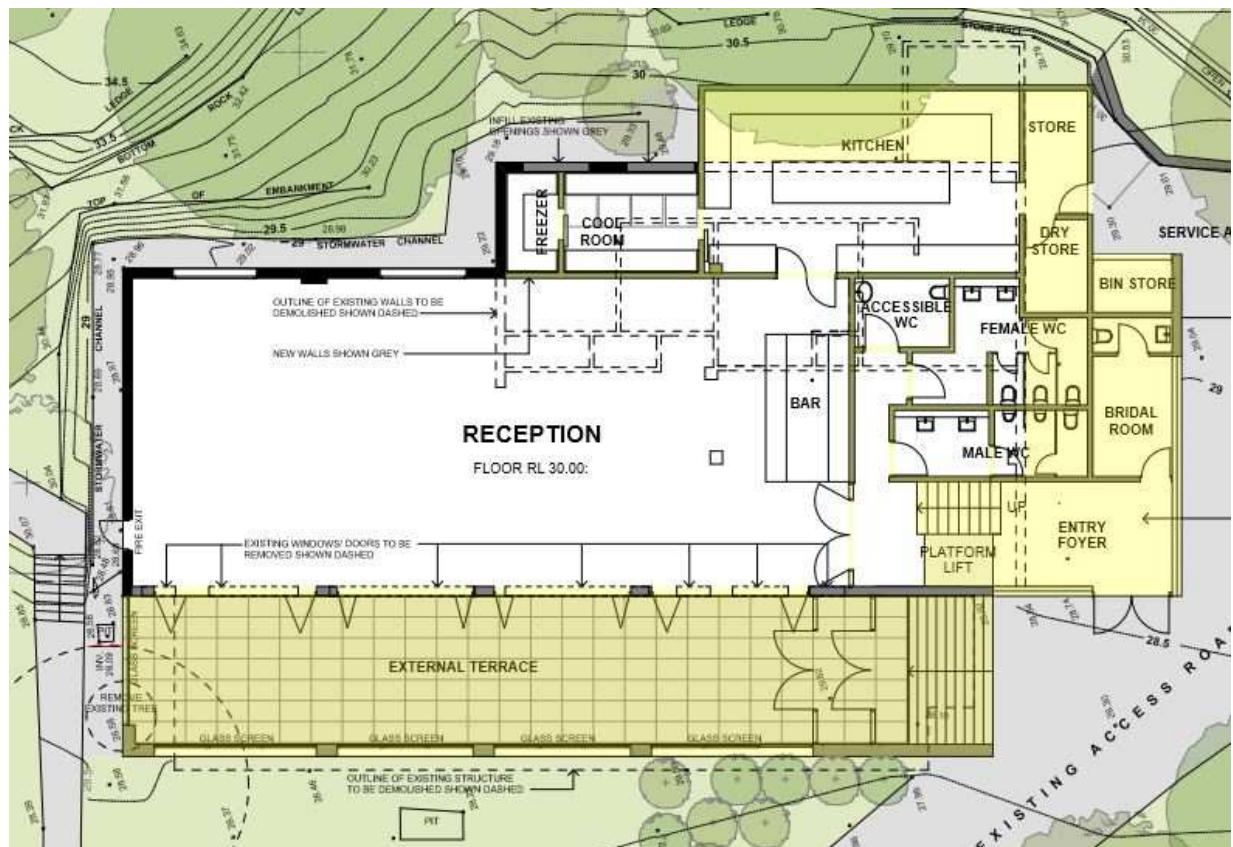


Figure 08 – The Armoury Proposed Plan



Figure 09 – The Armoury – 3D model view

Gap Bluff Cottage

The proposed adaptation of Gap Bluff Cottage would involve rearrangement of the interiors to provide one bedroom and a larger bathroom in the current second bedroom, a kitchen in the current store and a large, single living and dining area; and conservation works as required. The one remaining original window and the external form and appearance of the building would be retained.

The proposed landscaping would comprise retention of existing large shrubs and trees, planting of low hedges inside the western and southern fences, replacement of the concrete path with brick paving, and retention of the lawns in front of the cottage.

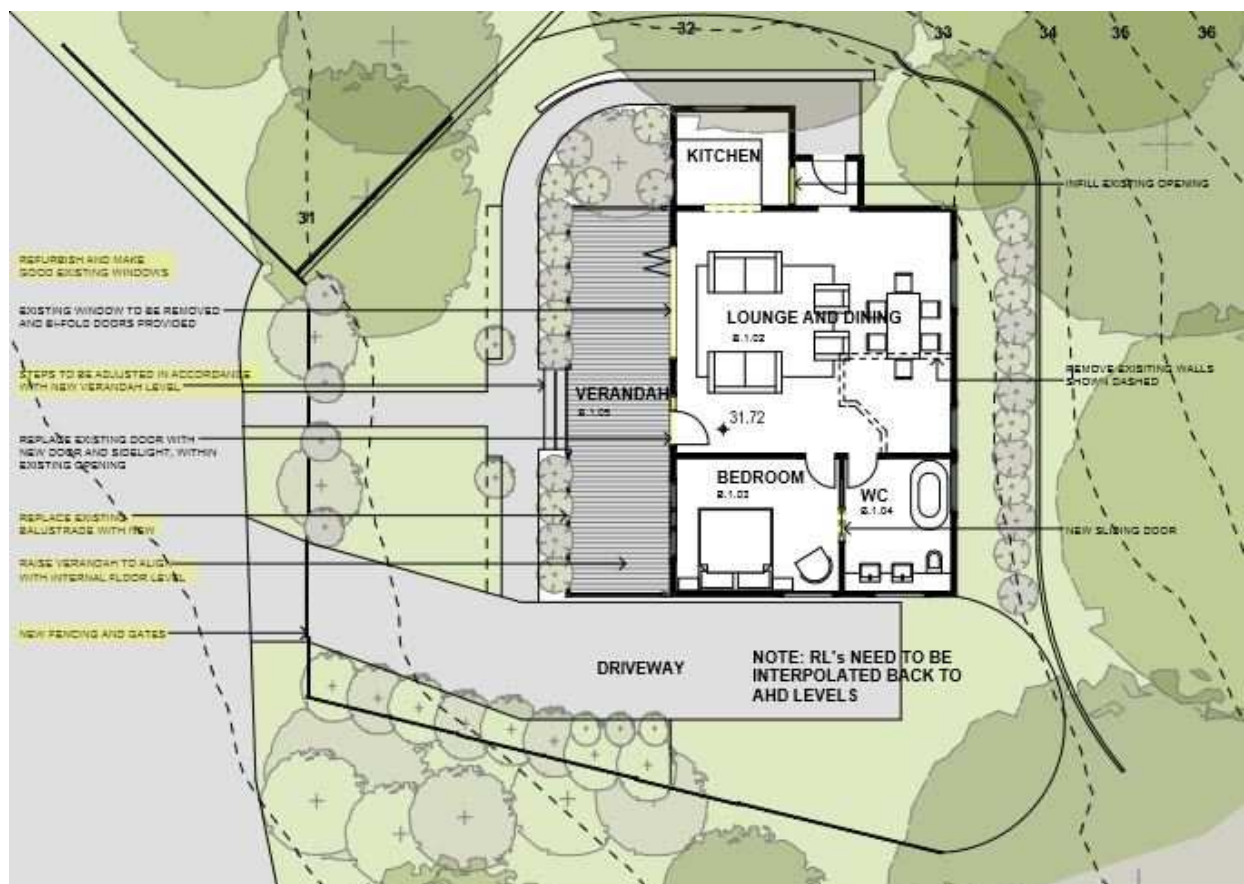


Figure 10 – Gap Bluff Cottage Proposed Floor Plan



Figure 11 – Gap Bluff Cottage Proposed Siting Plan

Camp Cove Precinct

Constable's Cottage, 32 Cliff Street

The proposed adaptation of Constable's Cottage would involve the following works:

- Widening of the c1952 opening between the current dining and lounge rooms, and removal of the reconstructed architraves in this location.
- Creation of a new opening in the walls between the existing lounge room and eastern bedroom—the existing early/original doorway with early/original architraves would be retained in situ.
- Creation of a new opening in the northern wall of the existing lounge to the new corridor beyond.
- Creation of a new, wide opening in the western wall of the existing dining room to the current second bedroom, and a new, wide opening between the current second and main bedrooms.
- Replacement of the existing bay window to the western end of the c1952 addition with glazed bifold doors.
- Construction of an outdoor dining area with pergola along the western side of the building and along the southern facade of the c1952 addition—the dining area would require removal of the c1950s garage in the north-western corner of the site.
- Adaptation of the existing store (former WC) cut into the sandstone rock face into a cool store.
- Construction of an accessible platform lift in the south-eastern corner of the site.
- Retention of early/original doors and windows along the primary (southern) elevation of the building and retention of the existing hipped roof and the verandah.
- Retention of early/original interior joinery including architraves, fireplaces, doors, and timber battens.
- Conservation works generally.

Proposed landscaping works would comprise replacement of the high metal fence and boundary fences with a weathered timber fence and gate, and planting of a mix of Australian native shrubs and cottage garden plants such as rosemary. Areas of lawn would be maintained to the south of the proposed new outdoor dining area. Existing mature trees would be retained.

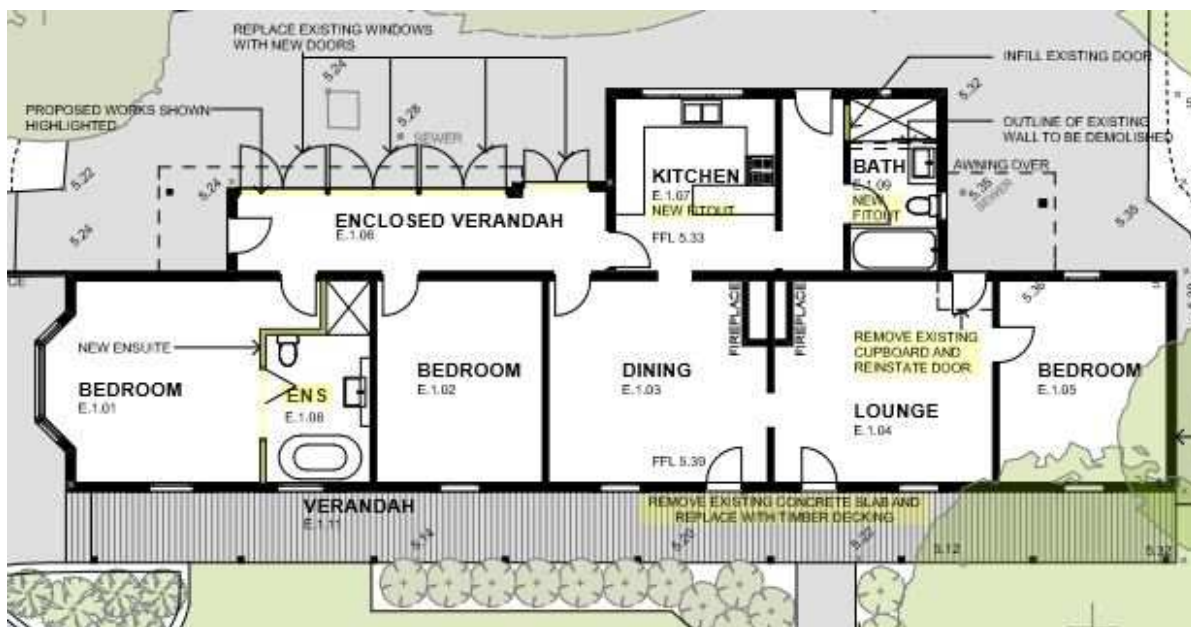


Figure 12 – The Constables Cottage Proposed Floor Plan

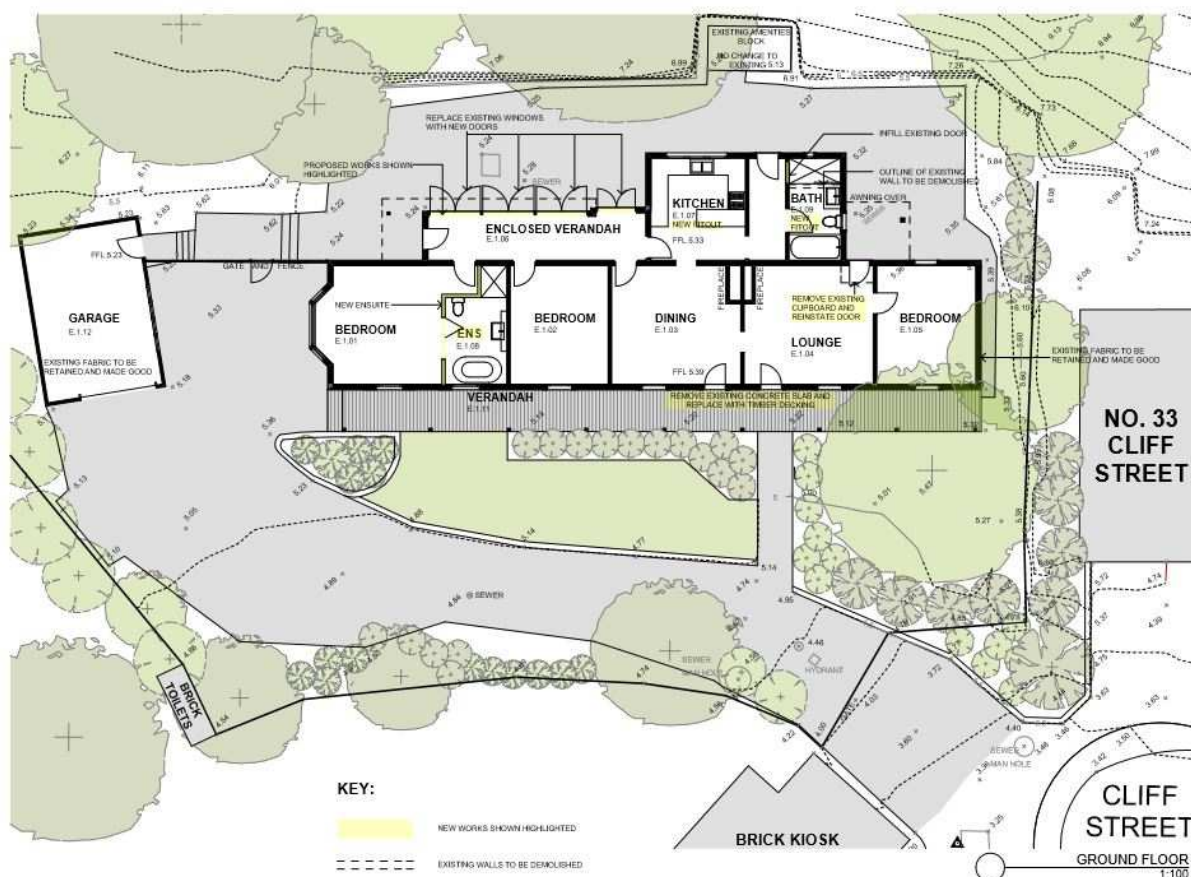


Figure 13 – The Constables Cottage Proposed Siting Plan



Figure 14 – The Constables Cottage 3D Model

33 Cliff Street

The proposed adaptation of the house at 33 Cliff Street would comprise rationalising the interiors to provide open-plan living spaces to the west and bedrooms and bathrooms to the east; replacing the western wall with glazed bi-fold doors; and excavation of the driveway for a road-level garage and a trafficable terrace above (Figure 6.8).

Proposed landscaping works would comprise replacement of existing plantings with native coastal species to the east of the house, and planting of a fast-growing screening hedge along the property's western boundary. The existing path and clothesline to the east of the house would be removed and a new lawn established.

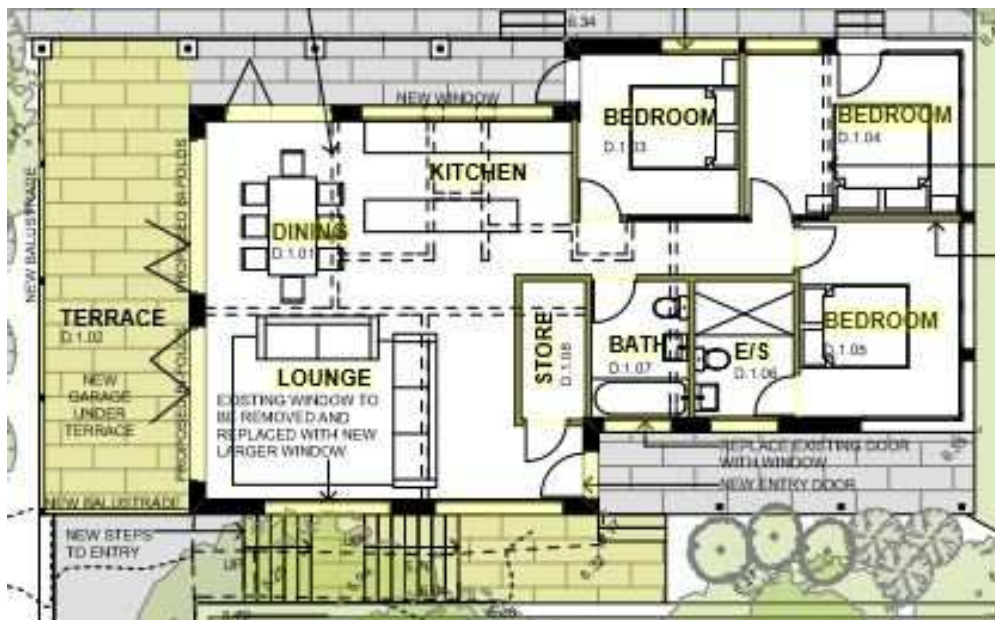


Figure 15 – 33 Cliff Street Proposed Floor Plan



The proposed adaptation of Green Point Cottage comprises rearrangement of the interiors, including removal of most of the wall between the verandah and the living areas to create a large, open-plan space, and conversion of the existing laundry into a bathroom. The current entrance in the eastern wall would be relocated to the south and the current entrance infilled and made good. The existing enclosed verandah windows would be replaced and the external deck would be extended and raised to be flush with the internal floor level. The overall form of the cottage would remain unchanged.

Proposed landscaping works comprise establishment of garden beds with low plantings along the southern and western boundaries of the property. The existing fence along these boundaries would be retained. Mature trees would generally be retained. The existing garage, driveway and chain-wire fence would be retained.

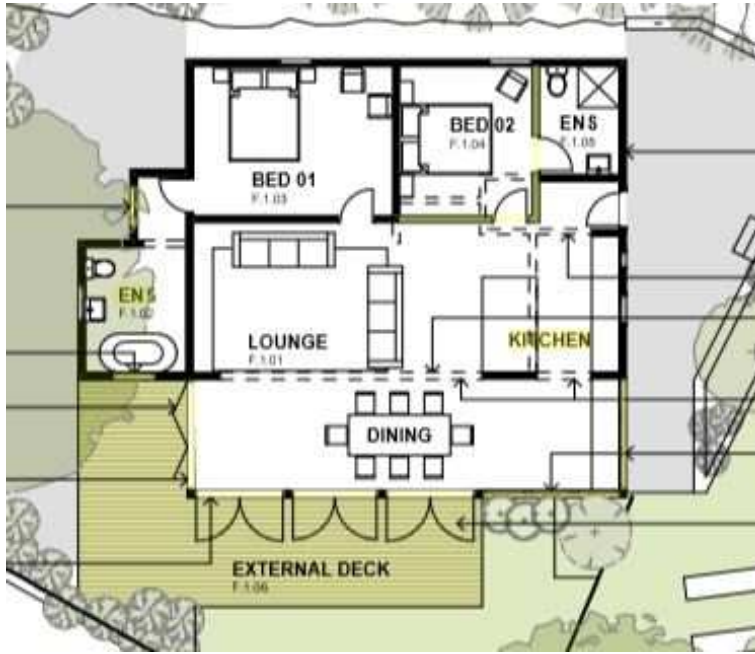


Figure 18 – 33 Green Point Cottage Proposed Floor Plan

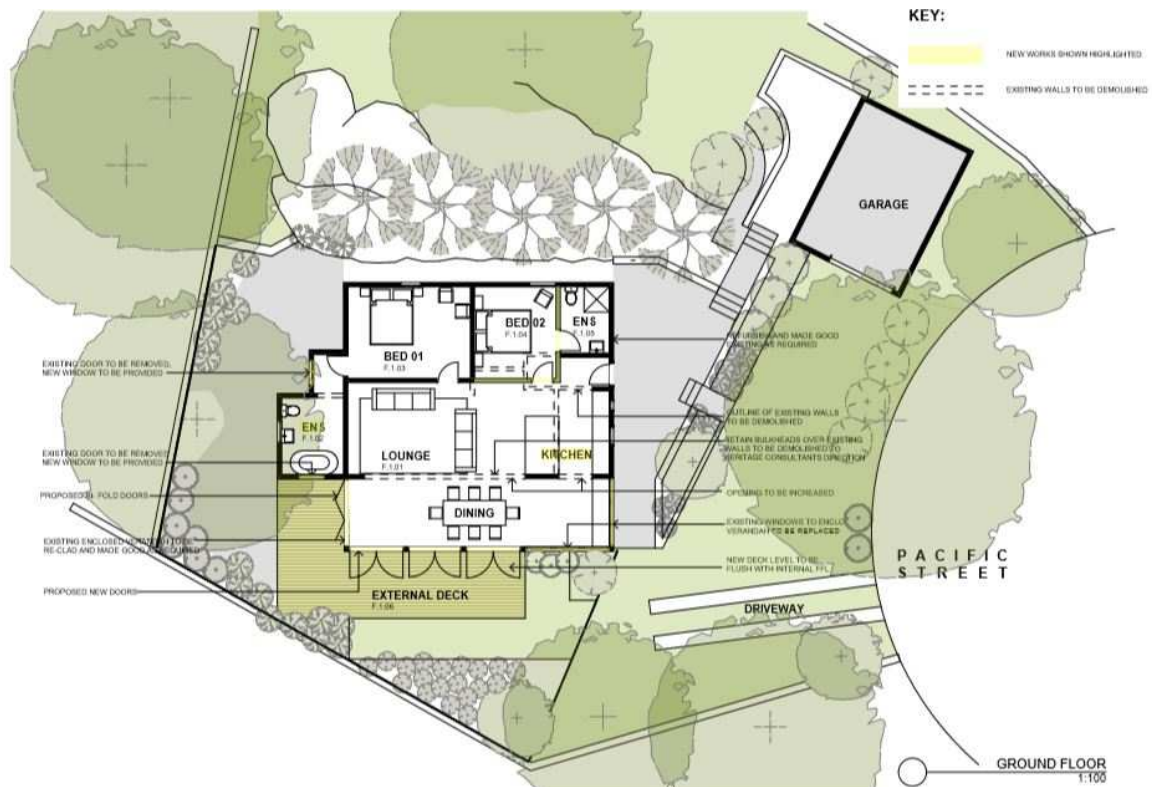


Figure 19 – 33 Green Point Cottage Proposed Site Plan



Figure 20 – 33 Green Point Cottage Proposed South Elevation



Figure 21 – 33 Green Point Cottage Proposed 3D View

7.2 Appendix 2 – Site Layout: fencing, public thoroughfare, staging and access

7.2.1 The Officers Mess

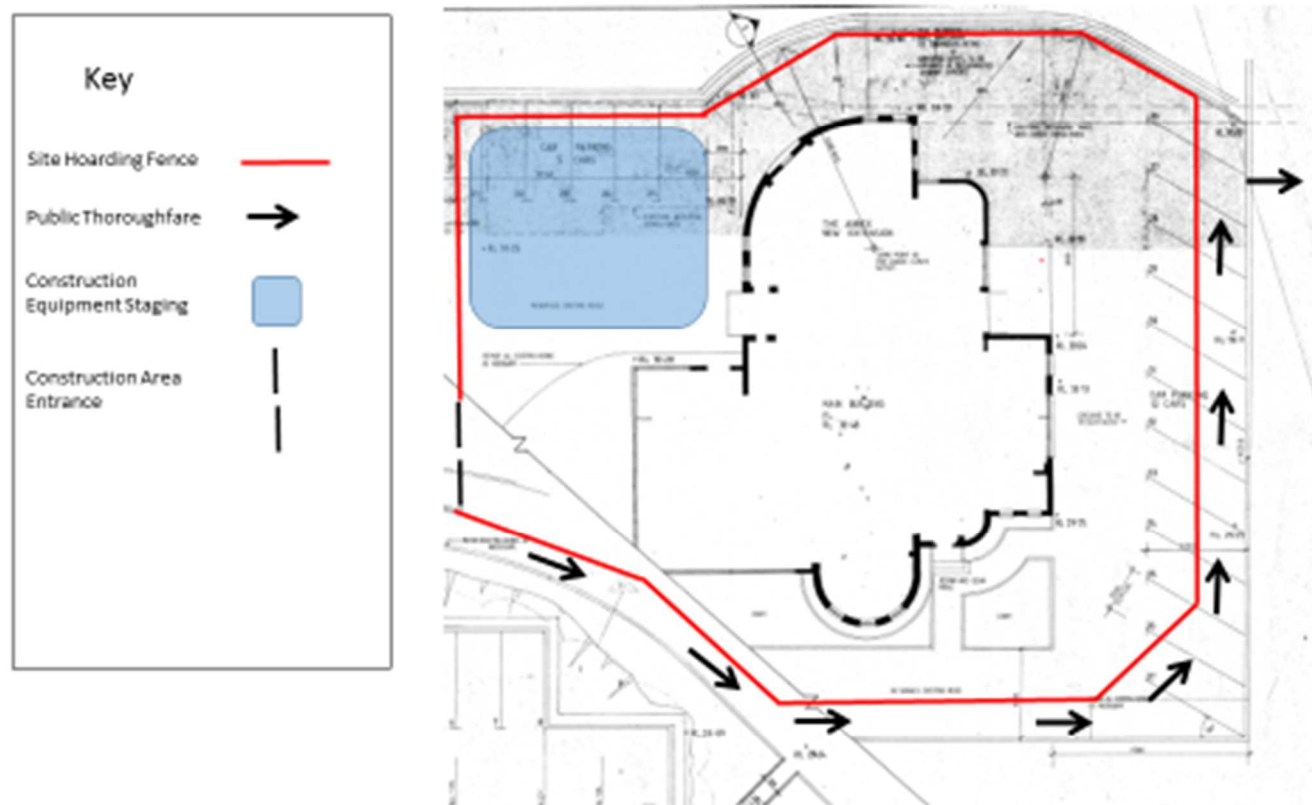


Figure 22 – The Officers Mess

7.2.2 – Gap Bluff Cottage

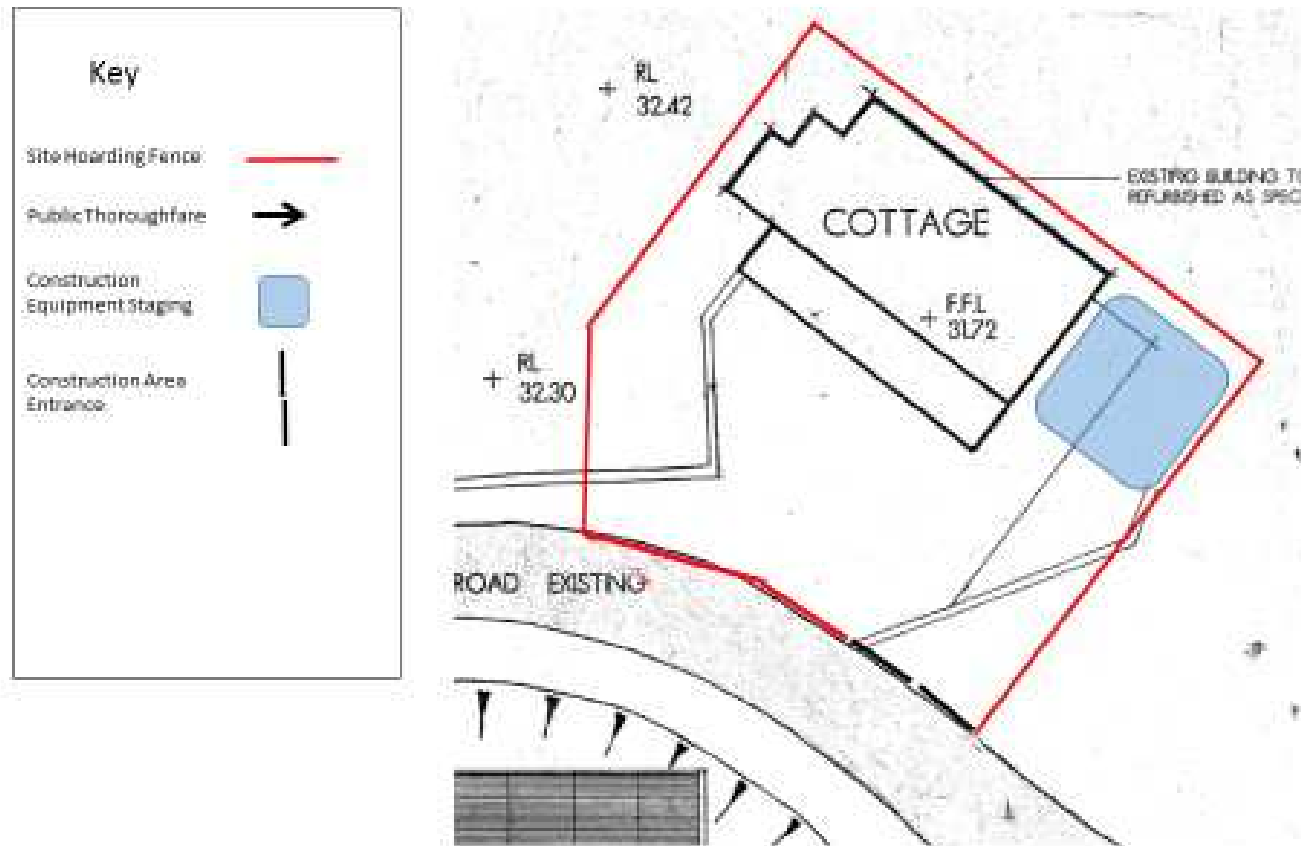


Figure 23 – Gap Bluff Cottage

7.2.3 - The Armoury

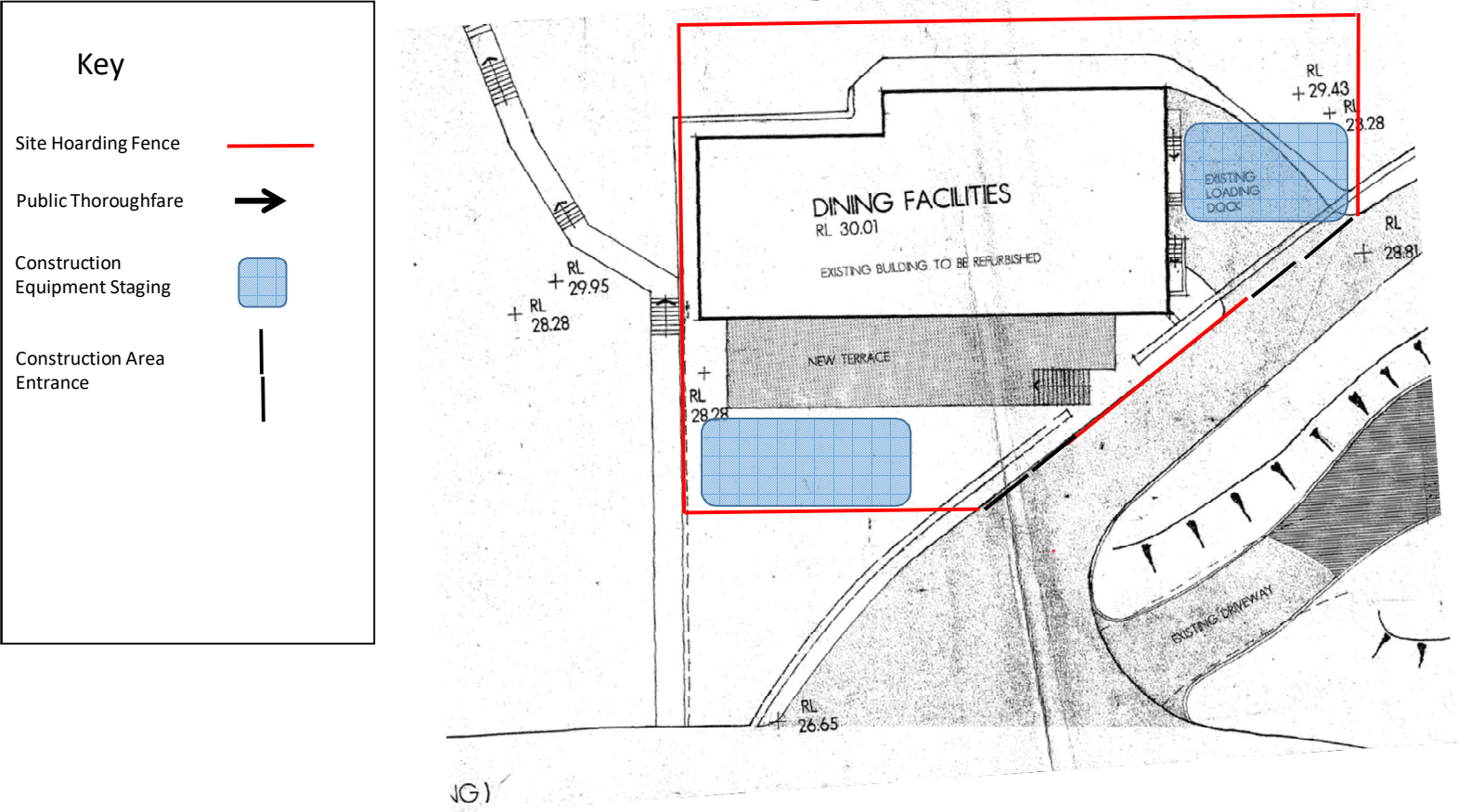


Figure 24 – The Armoury

7.2.4 – 33 Cliff Street

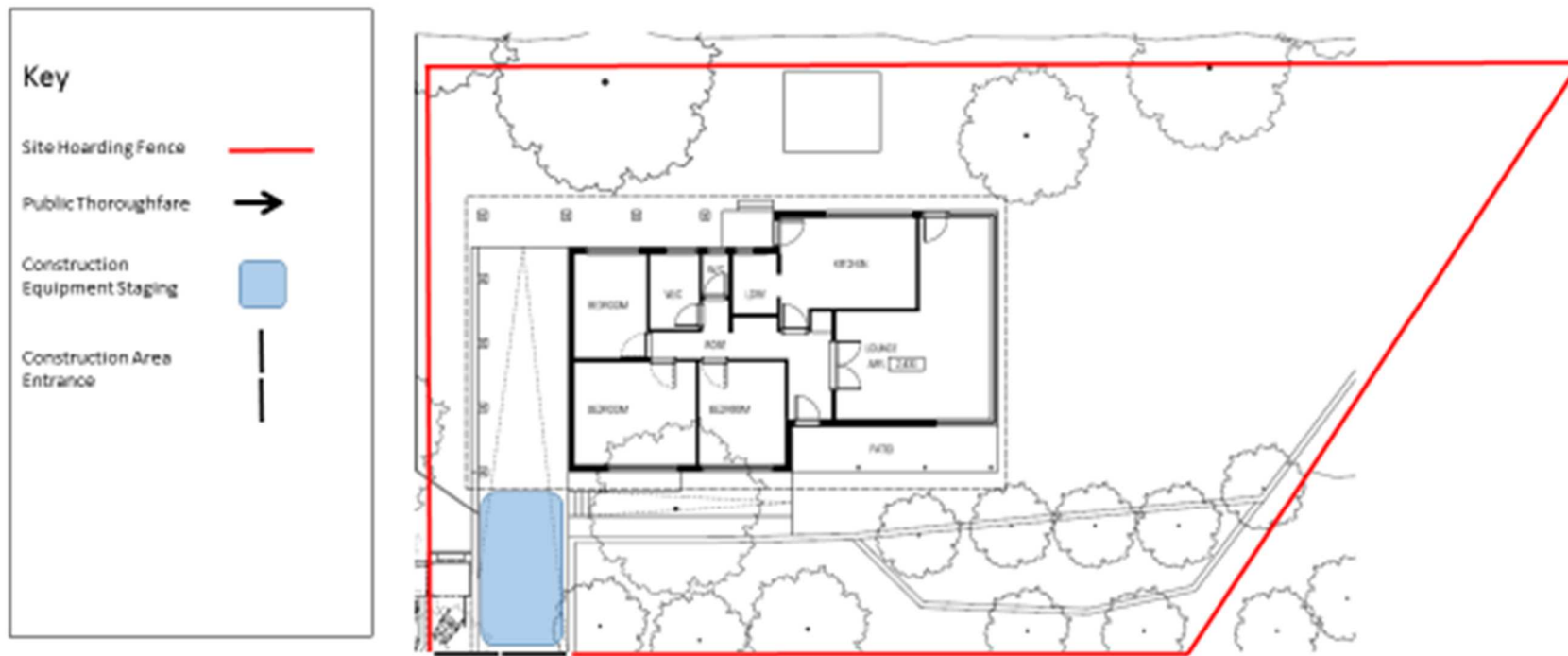


Figure 25 – 33 Cliff Street

7.2.5 – The Constables Cottage

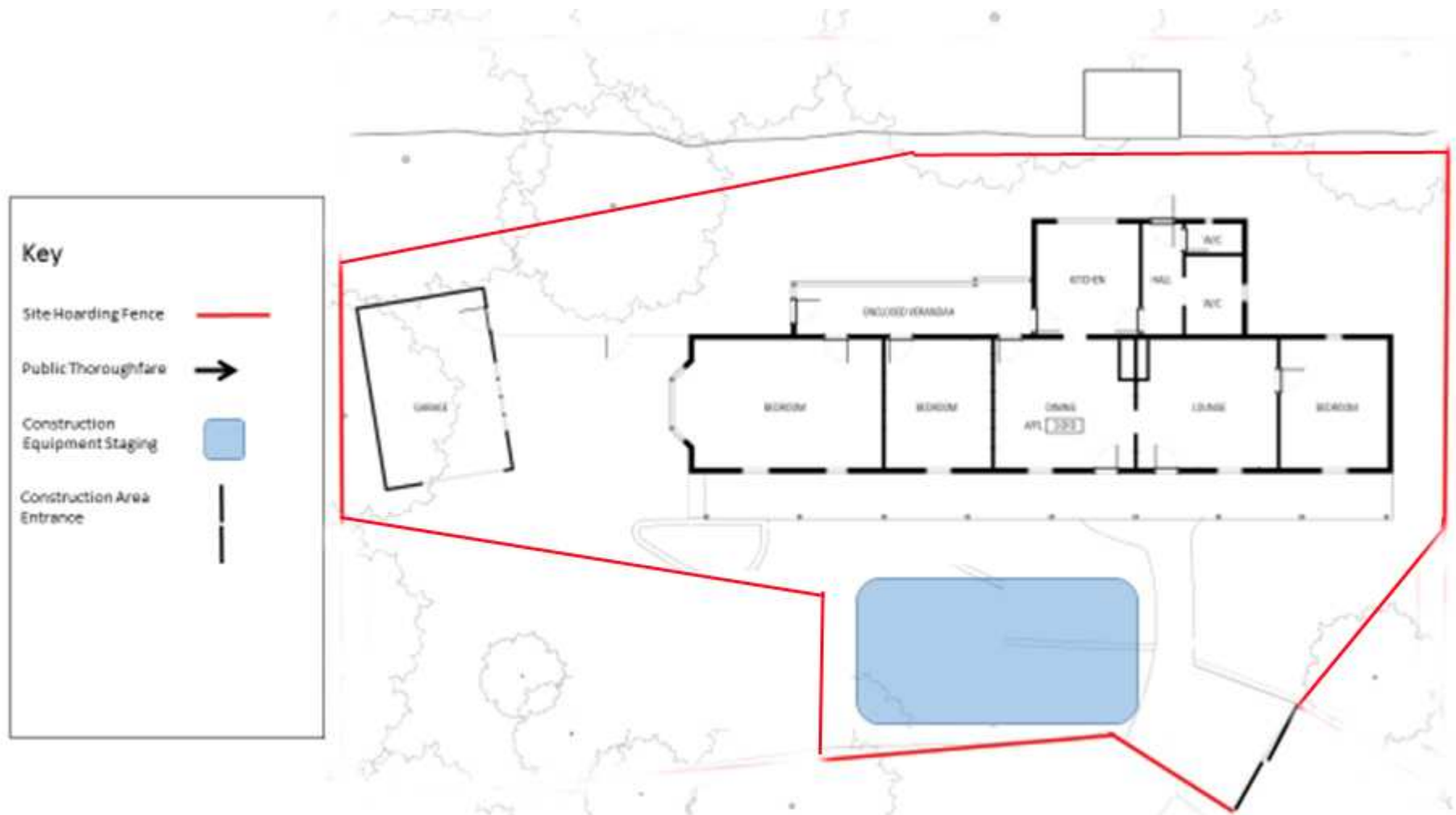


Figure 26 – The Constables Cottage

7.2.6 – Green Point Cottage

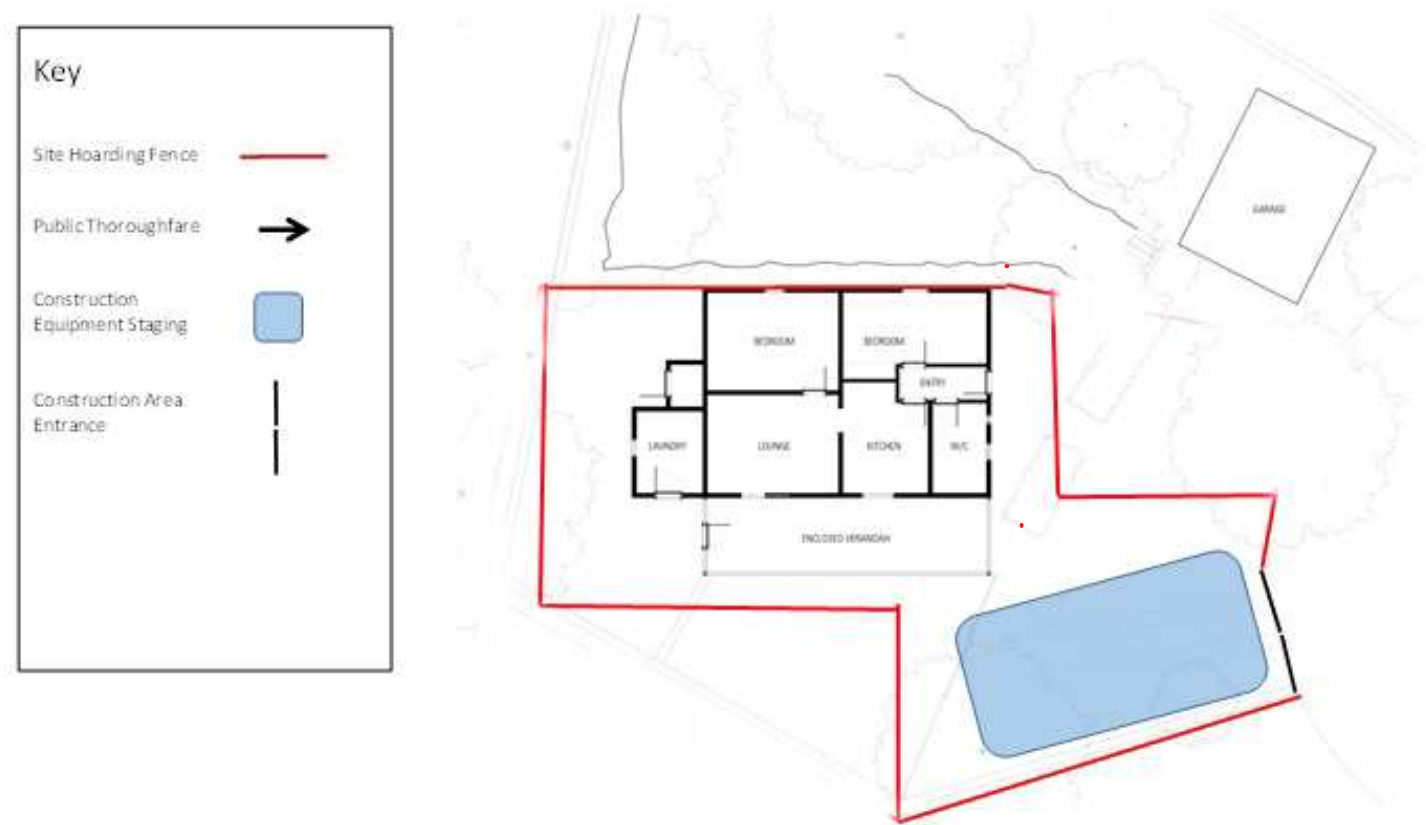


Figure 27 – Green Point Cottage

7.3 Appendix 3 – Construction Program

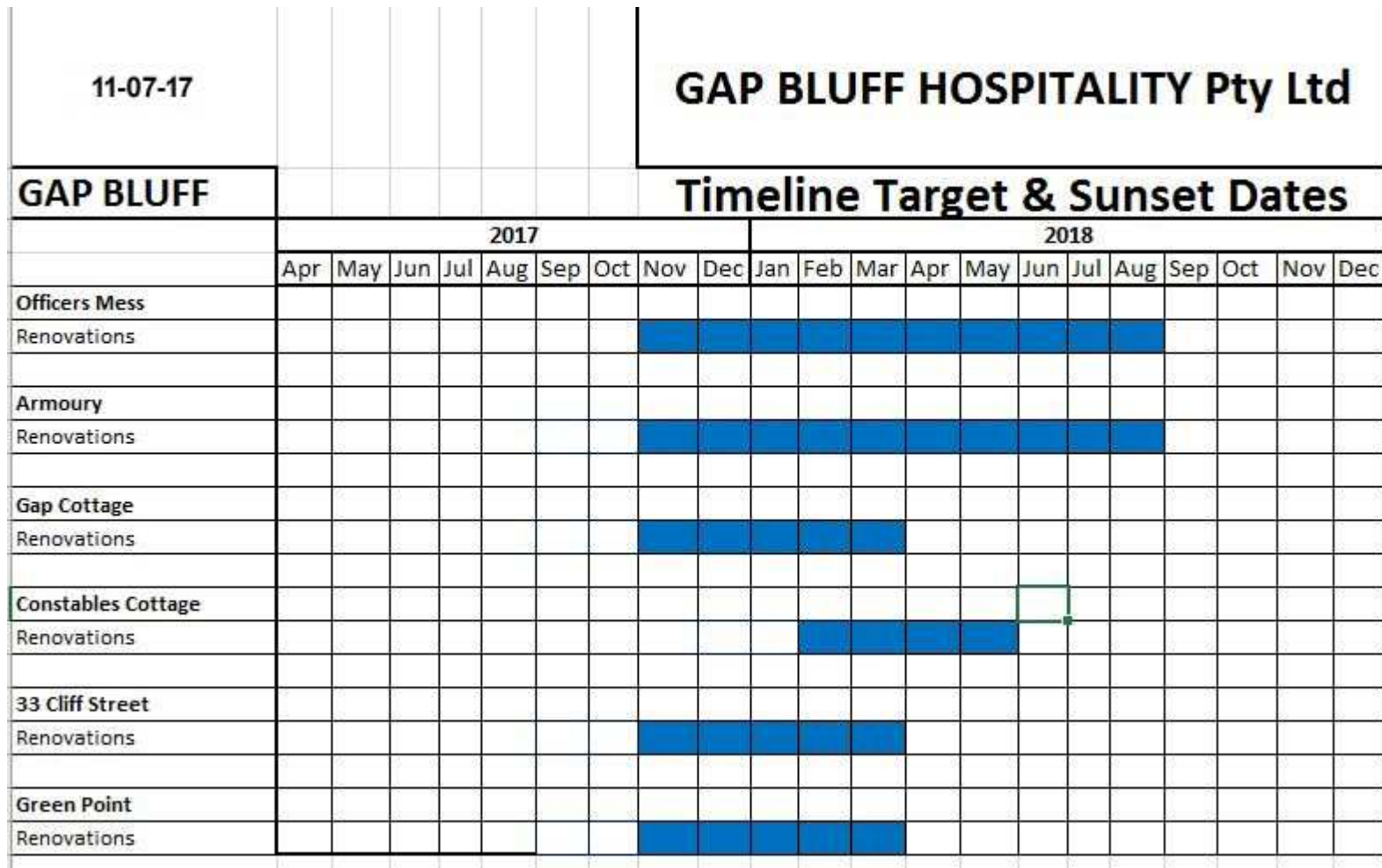


Figure 28 – Construction Program

Key

- Construction Traffic Route
- Construction Traffic Route Direction - two way
- Construction Traffic Route Direction - one way
- Construction Site

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Revised Exhibition Draft

Prepared for
Gap Bluff Hospitality Pty Ltd

Traffic Impact Assessment Report

Proposed Alterations
Gap Bluff and South Head, Camp Cove & Green Point Precincts

Ref: 0075r02
1/09/2017

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1 Introduction

Ason Group has been engaged by Gap Bluff Hospitality Pty Ltd to prepare a Traffic Impact Assessment (TIA) report to support a Review of Environmental Factors (REF) relating to adaptive reuse and renovations to six existing buildings currently owned by the National Parks and Wildlife Service (NPWS). The overall site consists of two precincts: The Gap Bluff Precinct and the South Head, Camp Cove and Green Point Precinct located within the South Head sector of Sydney Harbour National Park, Watsons Bay.

1.1 Planning Context

In June 2015, Ason Group undertook a traffic assessment for the subject site to support the REF submission (the 2015 TIA study). Subsequently, submissions were received from Woollahra Municipal Council, Watsons Bay Association and OEH Regional Operations Group who commissioned an independent report (Peer Review). The key issues of the submissions are summarised in Section 8 of this report and have been appropriately addressed as part of this revised application. In order to provide context between the previous REF and the subject revised application, a comparison of the key traffic generating components is provided below in **Table 1**. The key changes essentially relate to the removal of the proposed first floor function room in the Armoury facility and the removal of the proposed café/restaurant at Constables Cottage. These changes directly reduce the parking demand and traffic generation capabilities of the proposal.

Table 1: Comparison of Previous Application with the Subject Application

Previous Application	Subject Application	Change
Officer's Mess		
Capacity:115 for banquet-type, or 130 for cocktail functions.	Capacity:95 for banquet-type or 110 for cocktail functions.	A reduction in capacity of 20 persons for banquet-type and cocktail functions
Armoury		
Ground Floor – Capacity for 140 persons for banquet-type functions, or 160 for cocktail functions	Ground Floor – Capacity for 140 persons for banquet-type functions, or 160 for cocktail functions.	Removal of first floor function room. Reduction in capacity by 110 persons for banquet-type functions and 120 for cocktail functions
First Floor – 110 persons for banquet-type functions, or 120 for cocktail functions on the First Floor.	First Floor – Removed	

Constable's Cottage

Café / Restaurant	Short-term holiday accommodation as per existing use.	Removal of café / restaurant and continued use as short-term accommodation.
-------------------	---	---

Parking Provision

60 guest spaces	60 guest spaces	Loss of 1 accessible parking space as a result of updated concept parking layout.
10 staff spaces	10 staff spaces	
30 overflow spaces	30 overflow spaces	
3 accessible parking	2 accessible parking spaces	

1.2 Proposed Development

Table 2 summarises the proposed development.

Table 2: Description of Development

PRECINCT	PROPOSED DEVELOPMENT
Gap Bluff Precinct	Officer's Mess <ul style="list-style-type: none">• Its most recent use was as a function/reception centre. This use is proposed to be continued.• Refurbishment, internal alterations, replacement of roof and external landscaping.• Including reception areas, kitchen, office and store, bridal rooms, amenities and a lift for accessible compliance.• Capacity for 95 for banquet-type functions, or 110 for cocktail functions.
	Armoury <ul style="list-style-type: none">• Its most recent use was a function/reception centre. This use is proposed to be continued.• Refurbishment, internal alterations, enclosed balcony and external landscaping.• Including reception area, external terrace, kitchen, storage, amenities, bridal room and a chair lift for accessible compliance.• Capacity for 140 persons for banquet-type functions, or 160 for cocktail functions.
	Gap Bluff Cottage <ul style="list-style-type: none">• Its most recent use was as staff accommodation. This use is proposed to be changed to short-term holiday accommodation.• Refurbishment, minor alterations and reconfiguration, and external landscaping.
	Constable's Cottage <ul style="list-style-type: none">• Its most recent use was as short-term holiday accommodation. This use is proposed to be continued.• Refurbishment, minor internal alterations and reconfiguration, and external landscaping.

33 Cliff Street

- Previously utilised as staff accommodation. New use as short stay accommodation.
- Refurbishment, minor alterations and reconfiguration, including excavation for a new garage, and external landscaping.

Green Point Cottage

- Continued use as short stay accommodation.
 - Refurbishment, minor alterations and reconfiguration, and external landscaping.
-

This report addresses the relevant parking, traffic and access implications of the redevelopment including compliance with relevant State and Local Government controls and impacts on the local Watsons Bay Precinct. A location plan is presented in **Figure 1** which provides an appreciation of the site and its location.

The remainder of this report is structured as follows:

- Section 2 describes the sites and their locations, summarises relevant existing parking and traffic conditions and public transport accessibility.
- Section 3 provides a summary of the proposed redevelopment.
- Section 4 provides an assessment of the parking demands and provision of the proposal.
- Section 5 provides an assessment of the traffic demands the proposal.
- Section 6 introduces the proposed operational measures to manage services such as waste and kitchen services and references the Draft Traffic Management Plan (TMP) provided in Appendix A.
- Section 7 provides an overview of the Construction Traffic Management Plan (CTMP) principles.
- Section 8 summarises and responds to the key submissions.
- Section 9 provides a summary of the key conclusions.

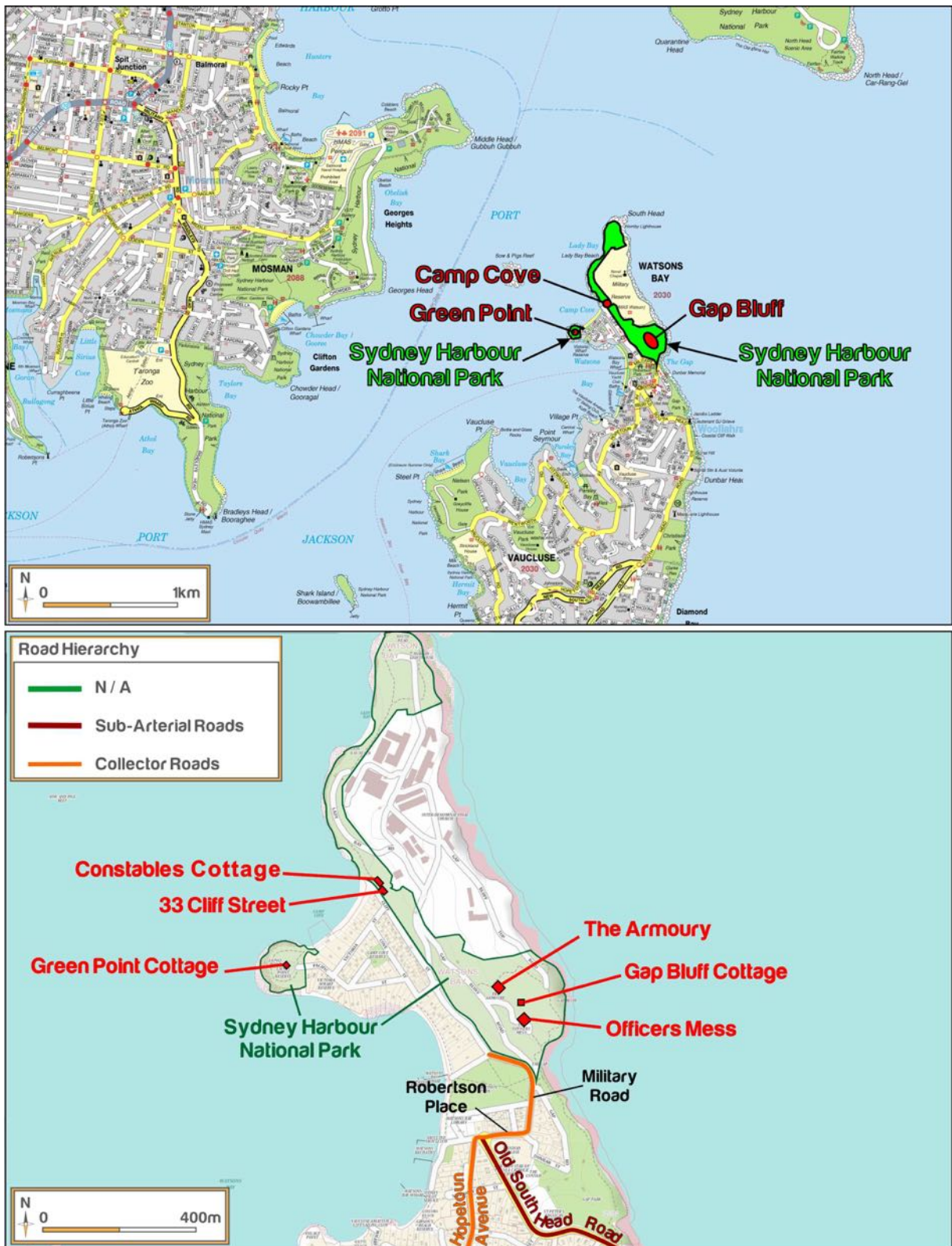


Figure 1: Location Plan

2 Existing Conditions

2.1 Site Location

The overall development site consists of 2 precincts, the Gap Bluff Precinct and the South Head, Camp Cove and Green Point Precinct located within the South Head sector of Sydney Harbour National Park. Both precincts are located within the Watsons Bay Precinct (WBP) in the Woollahra Council Local Government Area, approximately 6.5 kilometres north of Bondi Junction and 7.5 kilometres east of Sydney CBD.

In a more local context, the Gap Bluff precinct is approximately 250 metres northeast of the Watsons Bay wharf. To the immediate north of the precinct is the HMAS Watson naval base. The subject buildings within the South Head, Camp Cove and Green Point precinct are generally located in two areas, towards the northern end of Camp Cove (for the Constable's Cottage and 33 Cliff Road) and at Green Point (for the Green Point Cottage). Both areas are approximately 500 metres to the northwest of the Watsons Bay wharf. Site Plans for the Gap Bluff precinct and the South Head, Camp Cove and Green Point precinct are presented in **Figure 2** and **Figure 3** respectively.

2.2 Existing Road Network

Figure 1 shows the road hierarchy in the vicinity of the site. The key local roads influenced by the proposal include:

- **Military Road:** a local collector road that runs from the main retail strip in the WBP to Watsons Bay Wharf; it is the primary access road connecting all six sites to the wider road network.
- **Cliff Street:** a local road that runs along the south-western boundary of the Sydney Harbour National Park site. It currently operates as a two-way street between Military Road and the roundabout junction with Short Street and a one-way southbound street between Victoria Street and Short Street. The local residential roads in the area form a network of one-way streets and as a result, all traffic that enters the residential area via Short Street and the roundabout must also exit the area via Cliff Street and the roundabout. Cliff Street provides direct access to the Constable's Cottage and No. 33 Cliff Street.
- **Pacific Street:** is a local road that runs one-way westbound in a west-east direction between Cove Street and Victoria Street and continues westwards past Victoria Street, as a two-way street leading into a cul-de-sac. Direct access to the Green Point Cottage site is provided at the cul-de-sac.

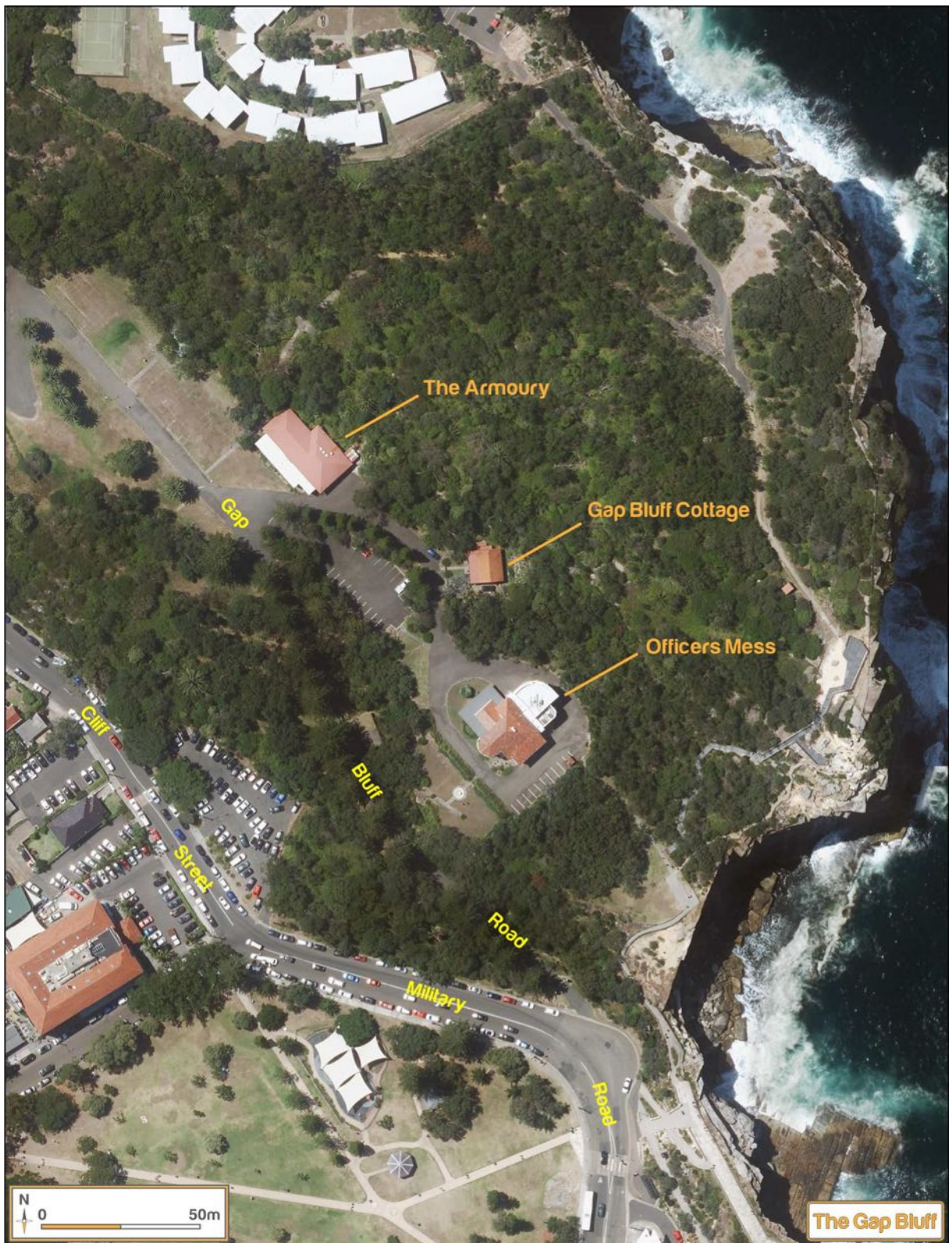


Figure 2: Site Plan – Gap Bluff Precinct



Figure 3: Site Plan – South Head, Camp Cove and Green Point Precinct

- **Victoria Street:** a local road that runs one-way northbound in a southwest-northeast direction between Pacific Street and Cliff Street. All traffic from Pacific Street and Cove Street must enter Victoria Street to exit the local road network.
- **Cove Street:** a local road that runs one-way northbound in a southeast-northwest direction between Short Street and Victoria Street. It runs parallel to Cliff Street and provides the most direct route the Constable's Cottage and No. 33 Cliff Street properties.

2.3 Existing Traffic Volumes

2.3.1 Standard Traffic Conditions

In order to gain an appreciation of existing traffic volumes in the area, the 2015 TIA study undertook a 7-day tube count covering Thursday 9 April to Wednesday 15 April 2015. The 7-day period was considered a suitable candidate week as it was conducted in April, a 'shoulder' month that occurs between the peak summer months of December to February and the off-peak winter months of June to August. It is noteworthy that transport planning best-practice recommends undertaking analysis based on shoulder period demands as these best reflect general – or average – demands throughout the course of a full year. Accordingly, the April 2015 results are adopted for the Standard Test traffic assessment presented in following Section 5.3.1.

The tube counter was located on the two-way section of Cliff Street to the south of the roundabout junction with Short Street, which is a residential collector street. Accordingly, the counter recorded all movements into and out of the local one-way road network to the north of the roundabout, as well as the traffic to/from the naval base.

Figure 4 shows graphically the traffic volumes recorded for the average weekday and the average weekend day, based on the results of the survey. It is noteworthy that the graph presents the combined two-way (northbound and southbound) vehicle movements on this collector street section of Cliff Street. In this regard – and not taking into account the naval base traffic – due to its network of one-way streets, the road network to the north of the count location (i.e. north of the roundabout) would generally carry about half the trips shown in Figure 4, as vehicles that arrive via one street have to depart via another. It is noteworthy that compared to the collector street status of Cliff Street in the location of the tube count, the one-way network of streets to the north are local streets.

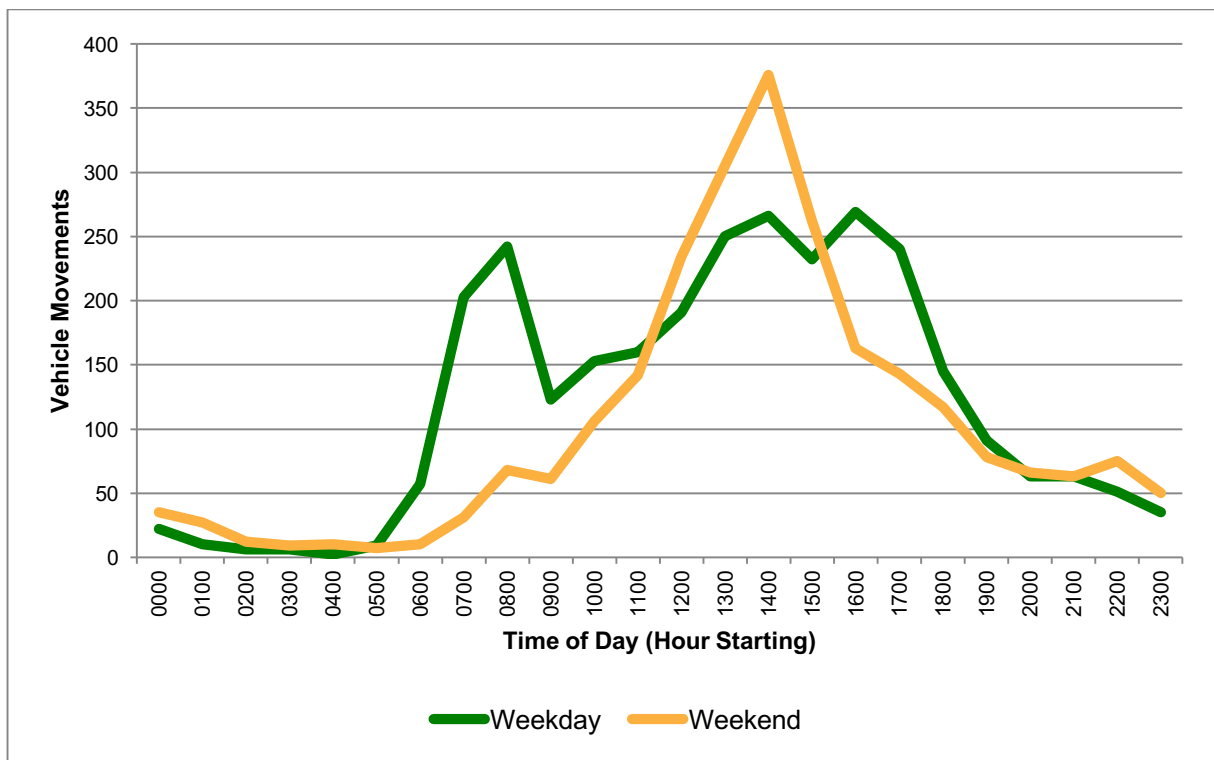


Figure 4: Standard Traffic Volume Survey Results, April 2015

In detail, the results indicate that:

- The weekday morning peak hour occurred between 8.00 – 9.00AM; at that time:
 - 242 two-way movements (on average) were recorded on the Cliff Street two-way collector street at the counter location,
 - It is expected that up to 120 movements (about 50%) would occur on any of the one-way local streets to the north.
- The weekday evening peak hour occurred between 4.00 – 5.00PM; at that time:
 - 269 two-way movements were recorded on the Cliff Street two-way collector street,
 - It is expected that up to 135 movements would occur on any of the one-way local streets.
- The weekend peak hour occurred between 2.00 – 3.00PM; at that time:
 - 376 two-way movements were recorded on Cliff Street two-way collector street,
 - It is expected that up to 185 movements would occur on any of the one-way local streets.
- The 85th-percentile speed (i.e. speed at which 85% of vehicles travelled at) was 39 km/h.

With regard to the environmental performance of residential roads, the following is extracted from the RMS *Guide to Traffic Generating Developments* (October 2002):

Table 4.6
Environmental capacity performance standards on residential streets

Road class	Road type	Maximum Speed (km/hr)	Maximum peak hour volume (veh/hr)
Local	Access way	25	100
	Street	40	200 environmental goal
			300 maximum
Collector	Street	50	300 environmental goal
			500 maximum

Note: Maximum speed relates to the appropriate design maximum speeds in new residential developments. In existing areas maximum speed relates to 85th percentile speed.

As mentioned, Cliff Street in the location of the tube counter is a residential collector street, whereas the streets to the north are generally local streets. A review of the tube count results against the standards above indicates that:

- On weekdays, all streets operate at levels within their respective environmental goal thresholds.
- On weekends:
 - the one-way street network to the north operates within the environmental goal threshold of 200 peak hour vehicle movements,
 - Cliff Street exceeds the goal threshold of 300 movements; however, it operates well within the maximum threshold of 500 peak hour movements and could accommodate a further 124 movements before exceeding the guide's maximum threshold.

It is noteworthy that the RMS Guide states that the environmental capacity of a street "*can be increased through a reduction in speed*". Therefore, noting that the standards above for a collector street are based on an 85th-percentile speed of 50 km/h, the surveyed 85th-percentile speed of 39 km/h suggests that the collector street section of Cliff Street would most likely have a maximum threshold traffic volume in excess of the 500 movements stipulated in the RMS Guide.

2.3.2 Peak Traffic Conditions

This revised TIA study maintains the position that any potential impacts of the Proposal should be considered against baseline traffic conditions that represent standard or 'average' conditions throughout the year. Therefore, the April 2015 results are adopted for the Standard Test traffic assessment presented in following Section 5.3.1.

However, in response to comments raised in the submissions, a survey of peak conditions has been undertaken as part of this revised TIA study. The 7-day period surveyed was from Friday 1 October to Thursday 7 October 2016 and importantly it covered the Labour Day public holiday of Monday 4 October. The tube counter was positioned in the same location on the two-way section of Cliff Street to the south of the roundabout junction with Short Street.

Figure 5 shows graphically the 'peak' traffic volumes recorded for the average weekday (excluding Labour Day Monday) and the average weekend day (including Labour Day Monday), based on the results of the October 2016 survey. For comparison, Figure 5 also includes the standard traffic volumes recorded during the April 2015 survey.

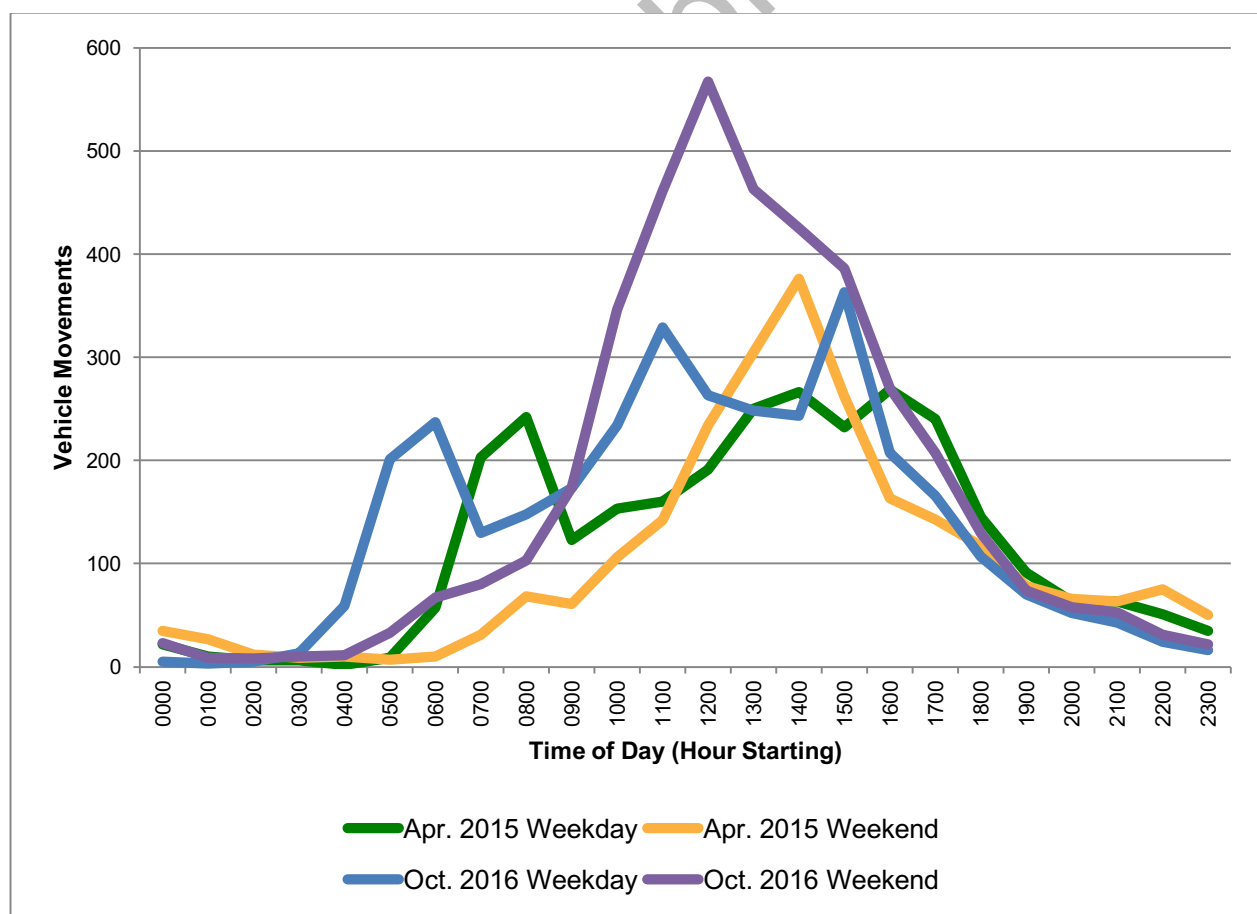


Figure 5: Peak Traffic Volume Survey Results, October (Labour Day) 2016

In detail, the results indicate that:

- The weekday morning peak hour occurred between 6.00 – 7.00AM; at that time:
 - 237 two-way movements (on average) were recorded on the Cliff Street two-way collector street at the counter location,
 - It is expected that up to 120 movements (about 50%) would occur on any of the one-way local streets to the north.
- The weekday afternoon/evening peak hour occurred between 3.00 – 4.00PM; at that time:
 - 363 two-way movements were recorded on the Cliff Street two-way collector street,
 - It is expected that up to 180 movements would occur on any of the one-way local streets.
- The weekend peak hour occurred between 12.00 – 1.00PM; at that time:
 - 567 two-way movements were recorded on Cliff Street two-way collector street,
 - It is expected that up to 285 movements would occur on any of the one-way local streets.

With regard to the environmental performance of residential roads, review of the peak traffic tube count results against the RMS standards presented earlier indicates that:

- On weekdays:
 - the one-way street network to the north operates within the environmental goal threshold of 200 peak hour vehicle movements,
 - Cliff Street exceeds the goal threshold of 300 movements; however, it operates well within the maximum threshold of 500 peak hour movements and could accommodate a further 137 movements before exceeding the RMS Guide's maximum threshold.
- On weekends:
 - the one-way street network to the north exceeds the goal threshold of 200 movements; however, it operates within the maximum threshold of 300 peak hour movements,
 - Cliff Street exceeds the goal threshold of 300 movements and the maximum threshold of 500 movements.

In summary, the results indicate that in terms of weekday operations, traffic conditions were generally similar across both survey periods. However, the recorded traffic volumes for the peak conditions of the October 2016 Labour Day 'long weekend' were significantly higher than the volumes recorded for

the standard April 2015 conditions. This peak October 2016 survey data has been adopted for the Sensitivity Test traffic assessment presented in following Section 5.3.2.

2.4 Public Transport Accessibility

Figure 6 shows that the site is well located to take advantage of public transport services in the area, in particular ferry services at the Watson Bay wharf and bus services at the Military Road bus terminus.

With regard to ferry services, the Integrated Public Transport Service Planning Guidelines, Sydney Metropolitan Area (Transport for NSW, December 2013), states that ferry services influence the travel mode choices of areas within 800 metres walk (approximately 10 minutes) of a ferry wharf. It is therefore noteworthy that all the subject sites are located within 800 metres of the Watsons Bay ferry wharf, with the:

- Gap Bluff precinct buildings approximately 500 metres walk via the dedicated pedestrian routes through Robertson Park and the Gap Cliff coastal walk,
- Camp Cove buildings approximately 600 metres walk via the Watsons Bay promenade, and
- Green Point Cottage also approximately 600 metres walk via the Watsons Bay promenade.

With regard to bus travel, the Transport for NSW guideline states that bus services influence the travel mode choices of sites within 400 metres walk (approximately 5 minutes) of a bus stop. With reference to Figure 6, the Gap Bluff precinct buildings are located approximately 300 metres walk from the Military Road bus terminus, via the Gap Cliff coastal walk.

In summary, all of the subject sites are favourably located to take advantage of the public transport facilities that serve the Watsons Bay area. It is anticipated that a number of patrons of the function centres would use public transport to access the site, particularly for inbound (arrival) journeys. Some outbound (departure) journeys would also use public transport; however, it is more likely that patrons will use a combination of inbound public transport travel and outbound taxi travel to access the sites. Importantly, the availability of public transport will be of significance for future staff of the function centres.

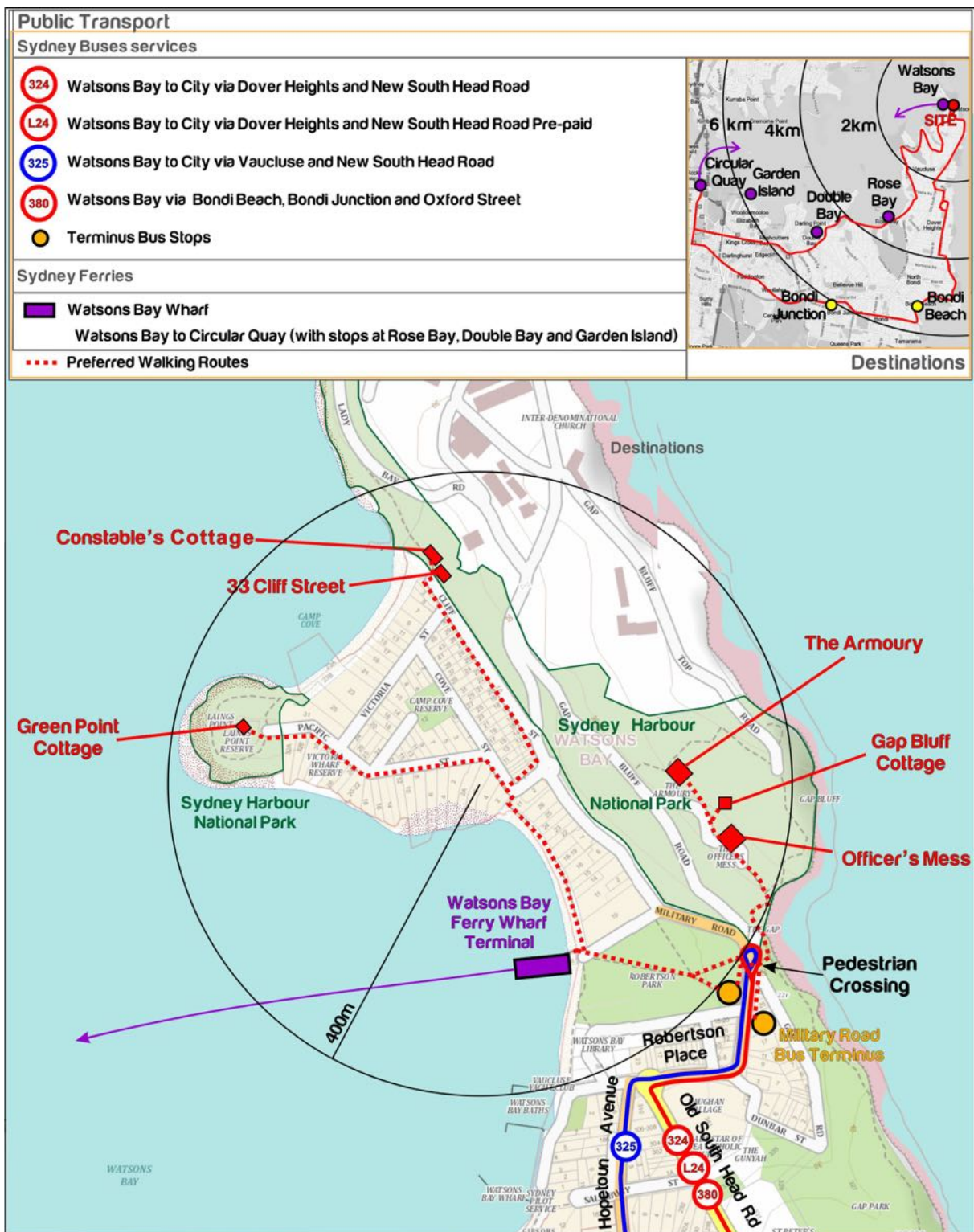


Figure 6: Public Transport Accessibility

3 Overview of Proposed Development

3.1 Development Characteristics

The following summarises the proposed development outcomes that are the objective of the alterations and additions. The details are summarised in terms that have car parking and/or traffic relevance. For the proposed Armoury and Officer's Mess function centres, these details include forecast patron numbers and floor areas where patrons will be served, as well as staffing levels.

The Armoury Function Centre

- Continued use of the Armoury building as a function / reception centre.
- Refurbishment and internal alterations to provide a single function centre with a total of 477.9m² of floor area.
- Capacity for up to:
 - 140 guests for a Banquet style function (patrons generally seated, such as weddings), or
 - 160 guests for a Cocktail style function (patrons generally standing).
 - A total of 10 staff including 7 floor staff, and 3 kitchen staff.

Officer's Mess Function Centre

- Continued use of the Officer's Mess building as a function / reception centre.
- 39.1m² of administration/office area.
- 410 m² of dining related area, consisting of:
 - 54.9 m² of ground floor reception / veranda
 - 71.2 m² of ground floor dining room (A1.01)
 - 47 m² of ground floor dining room (A1.02)
 - 82.8 m² of ground floor seminar room
 - 71.2 m² of first floor dining room (A2.01)
 - 82.8 m² of first floor seminar room (2.04)

- Capacity for up to:
 - 95 guests for a banquet style function or
 - 110 guests for a cocktail style function.
- 9 staff, consisting of 6 floor staff, and 3 kitchen staff.

Constable's Cottage, 33 Cliff Street, Gap Bluff Cottage and Green Point Cottage

- Only minor refurbishment works are proposed, with the intensity of use remaining the same. Parking provision will be unchanged and the properties will continue to have accommodation for the Gap Bluff Centre. The minor works include:
 - Constables Cottage is to retain its previous use as Short Term Accommodation with 3 bedrooms
 - Gap Bluff Cottage will change from a two-bedroom cottage to a single bedroom cottage.
 - 33 Cliff Street will remain a three-bedroom house, with the provision of an actual garage in place of the existing car-port.
 - Green Point Cottage will continue to have two bedrooms.

With regard to car parking at the function centre, one of the objectives of the Gap Bluff Precinct development is to conserve the existing character of the sites and avoid the construction of additional car parking that would potentially degrade the site aesthetically, and in any event would be used infrequently during non-standard peak periods (i.e. separate functions at all function centres operating at full capacity). As a result, the approach adopted for parking at the Gap Bluff is to both:

- Maximise the car parking the site can currently accommodate without any unnecessary works,
- Provide a 'constrained' parking provision that discourages car driving and encourages the use of alternative transport modes, in particular public transport and taxi services (including private driver services such as Uber).

With regard to the 4 accommodation developments, the refurbishments represent very minor works – essentially renovations – that will not change the operation of these buildings in terms of parking and traffic. Accordingly, the following sections focus of the parking and traffic implications arising from the 2 main development proposal.

3.2 Operational Plan of Management

As part of the REF, an Operational Plan of Management (OPM) has been prepared for the developments. With regard to the hours of operation for the function centres. The OPM provides the following:

The Armoury and Officer's Mess Function Centres

- The premises will trade 08.30AM to 12AM (midnight), Monday to Sunday.
- General Principles are:
 - Last drinks served at 11.30PM.
 - Patrons to vacate the venue by midnight.
 - Service Staff to depart by 12.30AM.

4 Parking Assessment

4.1 Adopted 'Standard-Busy' Operation for Gap Bluff

It is understood that for 85-90% of function days throughout the year (generally Fridays and weekends only), the busiest the Gap Bluff function centres would consist of both function centres in use. In addition, whilst both function centres have the ability to accommodate cocktail style functions (resulting in a slightly higher population), the vast majority of functions would be banquet style seated functions, in particular weddings. A review of Council's most appropriate DCP parking control has been undertaken however as is standard practice for a function centre, a first principle assessment has also been prepared. In order to assess the parking demands from first principles, two scenarios have been adopted:

Scenario 1: A 'standard-busy' operation at the two Gap Bluff function centres:

- 235 guests, consisting of:
 - 140 guests for a banquet style function at The Armoury Ground Floor function centre,
 - 95 guests for a banquet style function at the Officer's Mess function centre
- 15 staff, consisting of:
 - 9 staff at The Armoury Ground Floor function centre,
 - 6 staff at the Officer's Mess function centre.

Scenario 2: A 'worst case' assessment and maximum parking demand operation consisting of:

- 270 guests, consisting of:
 - 160 guests for a cocktail style function at The Armoury Ground Floor function centre,
 - 110 guests for a cocktail style function at the Officer's Mess function centre
- 19 staff, consisting of:
 - 10 staff at The Armoury Ground Floor function centre,
 - 9 staff at the Officer's Mess function centre.

4.2 DCP Parking Controls

Woollahra Council's DCP 2015 at Chapter E1, Parking and Access, provides no specific parking rate for a function centre. However, it does provide the following parking rate under Retail premises and (specifically) Food and drink premises:

- 7 spaces per 100 m² of Gross Floor Area (GFA)

Note: the calculation of 'gross floor area' includes any outdoor seating areas, court yards and any other locations where patrons will be served, but excludes footpath dining areas provided the proposal complies with Council's policy for footway premises.

In the following parking analysis, the above rate has been adopted for the function centre.

4.3 Function Centre, Use Specific Parking Rate

4.3.1 Survey of Existing Function Centre

Recognising the varied nature of operations for function centre developments, the Client has provided parking demand information obtained from surveys of the Orso Bayside Reception facility at 79 Parriwi Road, Mosman. The surveys were conducted over three separate reception events and the results are presented in **Table 3**.

Table 3: Existing Parking Survey, Orso Bayside Reception, Mosman

	27 March 2015		28 March 2015		2 April 2015	
	Number of Guests	Parked Vehicles	Number of Guests	Parked Vehicles	Number of Guests	Parked Vehicles
Parking						
Private Car Pool	38	9	76	19	36	9
Private Car Couples	36	18	38	19	24	12
Other Modes						
Bridal Car	9	-	13	-	10	-
Taxi	0	-	0	-	51	-
Water Taxi	7	-	0	-	0	-
Total	90	27	127	38	121	21

The survey data indicates that across the three separate functions:

- The facility entertained a total of 338 guests and had a total parking demand of 86 private cars, which equates to a parking demand of 1 parking space per 4 guests.
- Of these guests, 248 arrived via the 86 private cars, which equates to a car occupancy of 3 guests per car.

In addition, the following mode split of travel choices by patrons can be determined:

- 73% by car, consisting of:
 - Car – As Driver = 25%
 - Car – As Passenger = 48%
- 27% by alternative modes, consisting of:
 - Bridal Cars = 10%
 - Taxi (inc. Water Taxi) = 17%
 - Public Transport = 0%

4.3.2 Forecast Mode Split for The Gap Bluff Precinct

Having consideration for the site's favourable location with regard to public transport – it is anticipated that the Gap Bluff function centres would have a marginally improved mode share by alternative modes of 30%, as opposed to the 27% derived from the surveys of the Orso Bayside function centre. Accordingly, it is anticipated that 70% of guest would arrive by private car (as drivers or passengers), which is marginally lower than the 73% derived from the Orso Bayside surveys.

4.4 Parking Requirements

Table 4 presents the parking requirements based on Council's DCP and – for the function centre uses – based on the use specific car occupancy rate of 3 guest per car and forecast 70% - 30% modal split.

Table 4: Parking Requirement

Facility	DCP PARKING REQUIREMENT			USE SPECIFIC PARKING REQUIREMENT			
	Dining Floor Area (m ²)	Parking Rate	Parking Requirement (spaces)	Capacity (Guests)	70% Guests arriving by Car	Car Occupancy	Parking Requirement (spaces)
Armoury Function Centre	477.9	7 spaces per 100 m ²	32	140	98	3 guests per car	33
Officer's Mess Function Centre	410		29	95	67		23

The analysis presented in Table 4 indicates that under the adopted 'standard assessment' (Scenario 1) operational conditions, the proposed Gap Bluff Function Centres require between 56 - 61 parking spaces.

4.5 The Gap Bluff Function Centres

The analysis presented in Table 4 indicates that the Gap Bluff Precinct – under 'standard-busy' operating conditions – requires 56 to 61 parking spaces, consisting of:

- 32 – 33 parking spaces for the Armoury function centres.
- 23 – 29 parking spaces for the Officer's Mess function centre.

With reference to the Gap Bluff Precinct Parking Plan at **Figure 7**, the area can currently provide a total of 72 parking spaces comprising 62 spaces for guests (including accessible parking) and 10 spaces reserved for staff, consisting of:

Standard Parking Area

- 60 spaces for guests (excluding accessible parking) within the primary parking area
 - 20 formally line-marked spaces to the west of the Gap Bluff Cottage,
 - 15 kerb side parking spaces adjacent to the lawn to the west of the Armoury building,
 - 10 kerb side parking spaces on the ingress and egress to the Officer's Mess building, and
 - 15 informal parking spaces in the irregular shaped hardstand area to the northwest of the Armoury building.

Staff Parking

- 10 parking formally line-marked spaces to the southeast of the Officer's Mess building (to be reserved for staff).

Accessible Parking

- 2 Accessible spaces (1 located at Armoury building and 1 to be located at the Officer's Mess Building).

Overflow Car Parking

- An overflow car park can also have accommodated approximately 30 spaces located which brings the total parking capacity on site to approximately 102 parking spaces.

The analysis above demonstrates that the Gap Bluff site can provide 102 parking spaces for up to 66 private cars (56 visitors and 10 employee spaces) that are expected under standard-busy operations; that is, the parking demand that is expected on 85-90% of function days.

Furthermore, a first principle assessment of the worst-case assessment (Scenario 2), full capacity for both centres operating at the same time and cocktail style functions, this would result in an overall visitor parking requirement for 63 spaces and a total parking requirement of 73 spaces (including staff). In response, the 'overflow' kerb side parking can be provided on the access road to the north of the hardstand area, which heads northwards towards the access road to the naval base. This access road is approximately 190 metres in length, 6.0 metres wide and has a footpath along its western frontage. Therefore, during peak periods of operation, the road could provide overflow parking for about 30 additional cars in an area that is visually shielded from the main function areas. The overflow capacity is more than capable of accommodating the demand for an additional space and the maximum parking demand associated with the function centre.

In summary, the Gap Bluff precinct provides 102 parking spaces that consists of 60 parking spaces for guests, 2 accessible spaces to be provided and designed for disabled users, 10 parking spaces for staff and 30 overflow parking spaces. This parking capacity would accommodate 100% of parking demands generated by the site. Accordingly, the Gap Bluff precinct provides sufficient parking to accommodate 100% of the anticipated parking demands generated by both function centres, without placing any demand on on-street parking within the wider Watsons Bay area and accommodates a high margin of safety as demonstrated by the estimated spare capacity.

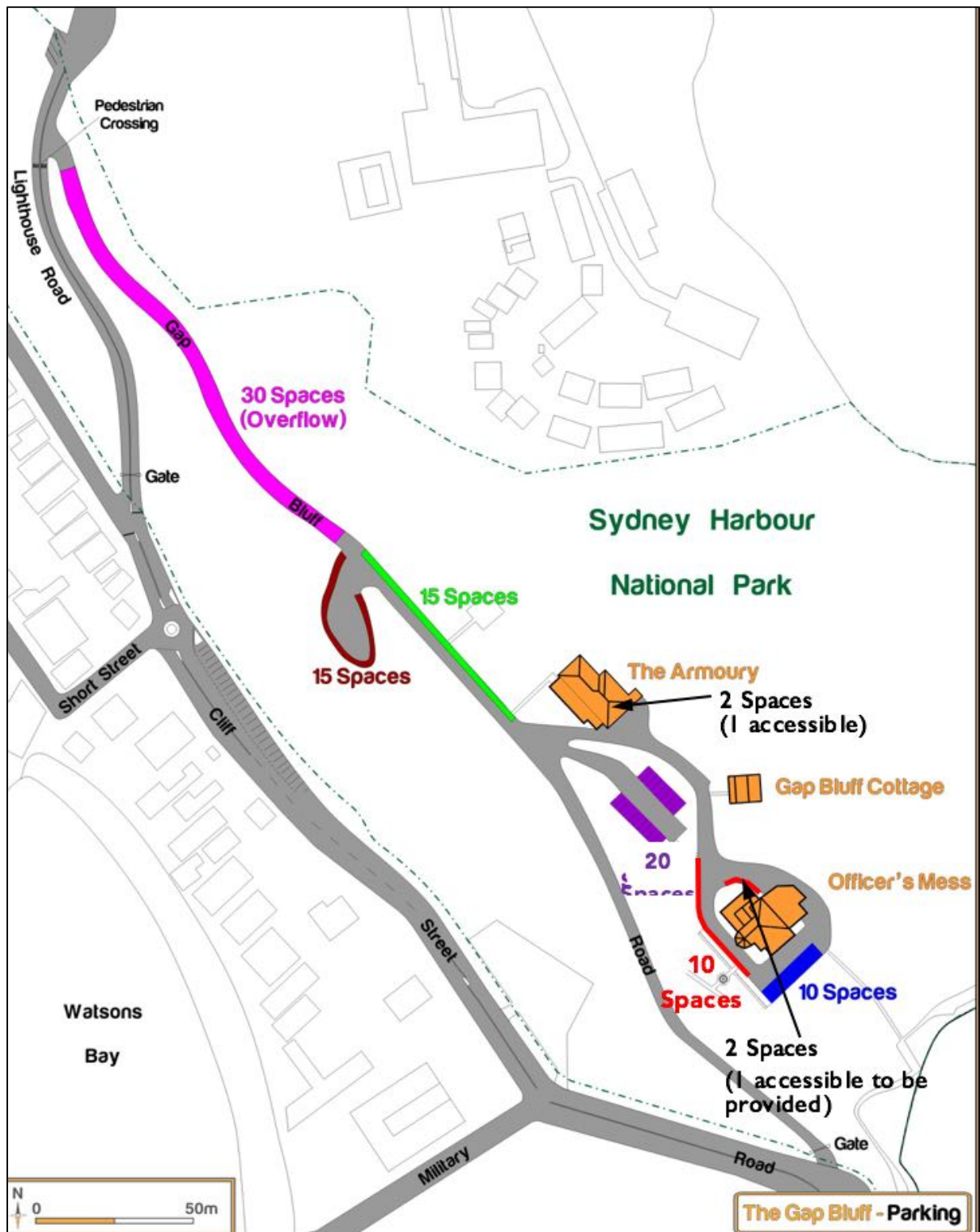


Figure 7: The Gap Bluff Precinct Parking Plan

4.6 Accessible Parking

With reference to Figure 7, the Gap Bluff Precinct provides 2 accessible parking spaces, consisting of:

- 1 spaces adjacent to the southeast face of the Armoury Building, and
- 1 space adjacent to the entrance to the Officer's Mess Building.

These 3 spaces would accommodate that anticipated demand for accessible spaces for the Gap Bluff function centre.

5 Traffic Analysis

5.1 Assessment Objective

The objective of the following traffic analysis is to determine the potential residential amenity impacts of the Proposal on the local residential roads in the area, namely:

- The two-way collector street section of Cliff Street south of the roundabout junction with Short Street to its termination at the intersection with Military Road.
- The one-way network of local streets to the north of the Short Street / Cliff Street roundabout.

In this regard – and with reference to the existing traffic volume analysis in Section 2.3 – it is noteworthy that the ‘critical’ traffic period for the area occurs at midday on a weekend. At this time, the standard existing baseline traffic volumes on the local road network consist of:

- 376 vehicle movements on the two-way section of Cliff Street, which is 124 movements below the environmental capacity threshold of 500 movements for a residential collector street.
- 185 vehicle movements on the one-way network, which is 115 movements below the environmental capacity threshold of 300 movements for a residential local street.

It is noted that for the 2015 TIA study, the key traffic generating components of the Proposal consisted of the 3 Gap Bluff function centres and the Constable’s Cottage restaurant. For this revised TIA study – and as a result of the modifications to the Proposal, – the traffic generating components of the current Proposal consist solely of the 2 Gap Bluff function centres. The changes include the retention of the Constable’s Cottage for short term accommodation and reduction of capacity by one level of the Armoury and Private Dining Room at the Officers Mess. The traffic generation reduced impact of the revised development yield is documented in Section 5.2.

5.2 Traffic Generation

The RMS Guide does not provide trip rate advice for function centres. Accordingly, the following trip generation analysis has been derived on a first principles basis using anticipated guest numbers expected under standard-busy operations of 235 guests.

With reference to the modal split analysis provided earlier, it is anticipated that 70% (165 guests) would arrive via private cars and 30% (71 guests) would arrive via a combination of taxis (or private drop-offs / pick-ups) and ‘mass transit’, that is public transport (ferries or buses in this instance) or

private mass transit (i.e. privately arranged shuttle buses or coaches). Notwithstanding the above, it is assumed that all 71 guests that use alternative transport arrive by taxis or private drop-offs / pick-ups. This assumption provides a worst-case assessment of the traffic impacts.

Application of the car occupancy rate of 3 guests per car (refer to Section 4.3) indicates that under standard-busy operations with 2 function centres in use at the same time, the Gap Bluff precinct would 'attract' the following number of cars.

- 165 guests in private cars @ 3 guests per car = 55 cars
- 71 guests dropped-off / picked-up @ 3 guests per car = 24 cars

In terms of traffic movements, it is noteworthy that the private cars equate to 1 pre-function vehicle movement (arrival trip) and 1 post-function vehicle movement (departure trip). However, the drop-off / pick-up movements generate 2 pre-function vehicle movements (an arrival and departure trip) and 2 post-function vehicle movements. On this basis, the following pre-function and post-function traffic generation analysis can be determined:

- 103 pre-function trips (79 arrival, 24 departure)
- 103 post-function trips (24 arrival, 79 departure)

In this regard, it is noteworthy that all arrival trips will be via the Lighthouse Road access. Furthermore, the departure traffic will exit via the Military Road access. Recognising that pre-function arrival traffic is generally more concentrated – as the majority of guests tend to arrive just prior to a set time – compared with post-function departure traffic – which tends to depart over a wider time period – it is preferred that the pre-function traffic is managed to enter via the northern secondary access road to avoid potential congestion on the main access road at Military Road. This is considered best practice and a preferred recommendation as Lighthouse Road is a lower order road and would limit the impact to Military Road (right turning vehicles into the site). This access arrangement is outlined in the draft Traffic Management Plan covered in Section 6 and provided in **Appendix A**.

Finally, as advised by BEAUCON Pty Ltd, it is particularly relevant that the Proposal is comparable to the historical traffic characteristics of the former function centres within the site as the capacities are equivalent to the historical use and this established Function Centres use is therefore pertinent. It is understood that the historical use of the function centres permitted capacity for 370 stand-up style functions and 250 sit-down (or banquet) functions compared to 270 stand-up or 235 sit-down functions that are now proposed. This therefore indicates that the historical use at its peak capacity resulted in higher traffic generating demand.

5.3 Traffic Impacts

5.3.1 Standard Test Assessment

Based on the traffic generation analysis above against the adopted standard existing baseline traffic of the April 2015 survey data, the following table summarises the environmental capacity implications of the potential traffic generation during the critical weekend midday period.

Table 5: Residential Amenity, Standard Test Traffic Assessment

Subject Road Section	Two-Way Cliff Street	One-Way Network
<i>Classification</i>	<i>Residential Collector Street</i>	<i>Residential Local Streets</i>
Environmental Threshold	500 movements	300 movements
Background traffic	376 movements	185 movements
Function Centres' traffic	(+) 79 movements	n/a
Forecast (future) traffic	455 movements	185 movements
Reserve	45 movements	115 movements

The analysis shows that:

- The two-way collector street section of Cliff Street could be subject to 79 additional movements from the proposed function centres. However, the forecast traffic volume of 455 movements is still 45 movements below the environmental capacity threshold of 500 movements for a residential collector street.
- The one-way network of local streets would not be subject to any additional movements and have no material impact on the performance of the local road network and as can be seen in Table 5, the existing volume of 185 movements is well below the environmental capacity threshold of 300 movements for a residential local street.

It is recognised that the impacts above focus on the weekend midday period, which corresponds to the peak traffic period for the area. However, local resident concerns often relate to post-function evening traffic, particularly traffic related noise. It is therefore noteworthy that the all of the evening traffic would depart via Military Road, thereby avoiding the residential streets north of the Military Road access, and Cliff Street.

It should also be noted that the above analysis is based on the total future traffic generation of the Site, not the additional (or net) traffic generation. As such, the analysis treats the development traffic

to be wholly new traffic on the local road network, despite the fact that the Gap Bluff buildings already have a function centre use and greater capacities over and above the Proposal. The above analysis does not account for this permitted level of traffic and therefore the analysis can be considered conservatively robust in the conclusions it has drawn.

In summary, the Standard Test traffic analysis demonstrates that the additional development traffic volumes would have only moderate impacts on the surrounding sensitive streets and the future traffic volumes would remain below relevant environmental capacity standards for collector and local residential streets.

5.3.2 Sensitivity Test Assessment

In response to comments raised in submissions, the following Sensitivity Test traffic analysis assesses the implication of the function centres operating on busy peak periods. Based on the traffic generation analysis above against the adopted peak existing baseline traffic of the October 2016 (Labour Day) survey data, the following table summarises the environmental capacity implications of the potential traffic generation during the critical weekend midday period.

Table 6: Residential Amenity, Sensitivity Test Traffic Assessment

Subject Road Section	Two-Way Cliff Street
Classification	Residential Collector Street
Environmental Threshold	500 movements
Background traffic	547 movements
Function Centres' traffic	(+) 79 movements
Forecast (future) traffic	626 movements
Reserve	(-) 126 movements

The analysis shows that the two-way collector street section of Cliff Street currently exceeds goal and maximum environmental thresholds during peak weekend conditions and would be subject to 79 additional movements due to the proposed function centres. However, due to the relatively infrequent nature of these peak periods (generally limited to public holiday weekends and peak summer time weekends), the acceptability of the Proposal should be assessed against the Standard Test traffic assessment in Section 5.3.1, which indicates that the Proposal is acceptable as it would not result in traffic volumes on the local road network exceeding RMS Guide environmental performance thresholds.

Whilst the above is accurate for the peak period of 12-1pm, Gap Bluff Hospitality has advised that the majority of events would commence at 6pm with peak arrivals occurring from 5-6pm. In this regard, traffic count surveys confirmed that the peak demands in the area occurred from 11- 4pm. As an example, the average weekend demand surveyed on the 1st and 2nd of October 2016 demonstrated that the peak occurred at 12-1pm with 567 veh/hr (bidirectional) however, between 5-6pm; 204 veh/hr were recorded. With this, it is evident that the majority of events commencing in the evening would not overlap with the midday peak periods and the above analysis is a worst-case scenario.

Revised Exhibition Draft

6 Operational Management Measures

A Draft Traffic Management Plan has been prepared and is provided in **Appendix A**. The Draft TMP outlines the key operational management principles that will be further developed in response to Woollahra Municipal Council's requested condition of consent for a detailed TMP.

Revised Exhibition Draft

7 Construction Traffic Management

7.1 Introduction

Woollahra Municipal Council reviewed the previous REF for the subject site and requested that a Construction Management Plan (CMP) form a Condition of Consent should the development be approved. A Draft CMP report has been prepared by Expertise Building & Construction Pty Ltd and is submitted separately. In addition to the CMP, traffic management is required and for the purpose of this REF an overview of the Construction Traffic Management Plan (CTMP) principles has been prepared for the development. The purpose of this report is to detail a traffic management plan principles for the construction of the development which seeks to minimise the impact on public amenity and safety.

This CTMP contains the following:

- Makes provision for all construction materials to be stored on site, at all times.
- Specifies construction truck routes. Truck volumes along the nominated truck routes are to be distributed over the surrounding road network where possible, whilst minimising impacts to residential streets.
- Provides for the movement of trucks and deliveries to and from the site. Temporary truck standing / queuing locations in a public roadway / domain in the vicinity of the site are not permitted unless approved by Council's Public Works.

It is expected that this plan will be updated should any necessary changes to the currently proposed arrangements arise in the future. Any special events (if required) would be subject to a separate request for a specific permit not covered by this plan.

7.2 Construction Vehicle Access Routes

7.2.1 Movement on External Roads

It is proposed that construction vehicles enter and exit the Site via the Military Road Access Driveway (for access to the Gap Bluff Precinct). This is considered the most suitable access point to the precinct given coach/bus vehicles currently utilise the access and internal road system. A copy of the truck routes shall be provided to all drivers prior to attending the Site.

The above routes are to be utilised by all construction vehicles associated with the Site and represents the shortest route between the local and regional road network – hence minimising the impacts of the

construction process on local roads. Access to the Site during all work phases will be monitored through vehicle gates on the Site boundary at Military Road.

At no stage are trucks to queue on local roads. Two-way radios will be used to coordinate trucks arrivals.

7.2.2 Internal Truck Movements

The key processes in place for internal truck movements are as follows:

- Vehicles will enter the Site via Military Road and travel to their designated Loading Zones, where they would undertake their relevant construction activity.
- All vehicles that leave the Site are to do so in a forward direction.
- Any on-site reversing movements are to occur under supervision.

7.3 Work Zones

No Work Zones will be required within the public footpath or roadway. All loading and unloading is to occur on-site at all times.

7.4 Traffic Control

No traffic control measures would be required on public roadways as the main access gate is within the Site boundary and sufficiently offset from any public roads or footpaths.

Notwithstanding the above, it is anticipated that accredited Traffic Controllers will be on-site to safely supervise traffic and pedestrian movements where on-site vehicle reversing movements are to occur. Traffic control may also be required where two-way flow is restricted over any length of the internal roadway, depending on the truck length and number of vehicular movements required. Nevertheless, these are on-site management matters and activity specific plans can be prepared if and when required.

7.5 Fencing and Site Security

A combination of timber and chain wire fencing along the remaining site boundaries will be maintained for the duration of the construction program. The fencing is to ensure unauthorised persons are kept out of the Site at all times. Site access gates will be provided which will control authorised access between the work site and Military Road.

7.6 Materials Handling

It is proposed that all materials loading and unloading will occur within the site boundary. No loading or unloading is proposed to occur outside of the site boundary. Should materials handling be required from the public roadway (other than the approved areas) then prior approval shall be sought and obtained from Council.

7.7 Contractor Parking

A small amount of on-site parking for key contractors and staff will be provided throughout the construction works. The number and location of this temporary on-site car parking will change throughout the various construction phases, depending on the surplus area available not required for truck loading and turning areas. Notwithstanding, contractors and other site staff will be encouraged to use public transport or to car-pool when accessing the Site at all times with the intent to minimise, as far as practicable, the use of private vehicles.

7.8 Emergency Vehicle Access

Emergency vehicle access to and from the site will be available at all times. This process would be implemented through emergency protocols on the site, which would include a requirement for site personnel to assist with emergency access, as required.

7.9 Public Transport

The construction activities will have no material impact on the existing public transport services within the vicinity of the Site, with all bus services to continue to operate as currently occurs.

7.10 Conclusion

This Construction Traffic Management Plan principles outlined above has been prepared as part of the overall construction works for the proposed development. It seeks to minimise the impact of construction activities on the surrounding community, in terms of vehicle traffic, public transport and pedestrian amenity adjacent to the site. The detailed CTMP report would be prepared in response to a suitable condition of consent as recommended by Woollahra Municipal Council and at that time in liaison with Council's Traffic Engineer.

8 Response to Submissions

In response to the 2015 REF, submissions were received from Woollahra Municipal Council, Walsh Bay Association and the independent report commissioned by the OEH Regional Operations Group (Peer Review). The key comments outlined in Council's response are summarised in **Table 7**. The Peer Review undertook an assessment of the Ason Group traffic report titled *Traffic Impact Assessment report – Proposed Alterations & Additions, Bap Bluff and South Head, Camp Cove & Green Point Precincts* dated 12 June 2015. These recommendations outlined in the Peer Review have been summarised in **Table 8** with a response to the raised issues. **Table 9** provides an overview of the WBA key issues raised.

A response is provided for each item raised noting that some issues are no longer relevant as a result of the revised application.

Table 7: Response to Submissions – Woollahra Municipal Council

Issue	Council Comment	Response
Parking (Armoury & Officers Mess)	Based on surveys of existing similar developments, a parking provision of 126 spaces (97 spaces for guests and 29 spaces for staff) is required.	<p>Council's Assessment was based on the operation of all 3 function centres with a maximum capacity of 410 people. With a 70% private vehicle usage and vehicle occupancy of 3 people per car, this results in a 97-space demand.</p> <p>This is no longer applicable with a maximum demand of 63 spaces (2 function centres) for visitors which can readily be accommodated on site.</p> <p>Council also highlighted that 38 staff members would be present on site (equating to roughly a 1 employee per 10 visitor's ratio). The known operational requirements for the development have been provided by the applicant with a maximum total of 19 staff proposed. 10 spaces are provided for use by staff on site resulting in a 50% provision of parking for staff.</p>
Parking (3 Cliff St, Constables Cottage and Green Point Cottage)	There is a shortfall of 14 spaces. Reduction in scale of development is recommended.	N/A, Constables Cottage restaurant is no longer proposed.
Staff parking	75% of staff require parking.	1 space per 2 employees is the adopted rate. Nevertheless, the development can satisfy the 75% demand noting that there is extensive overflow parking available if necessary. As discussed in the TMP provided in Appendix A however, it is proposed to prepare a Travel Access Guide for

		patrons and employees (Workplace Travel Plan) in order to promote alternate modes of transport and discourage private vehicle use.
Public Transport Accessibility	Concern was raised regard that the no. of patrons likely to take public transport, general information on public transport timetables and services and information on the transport mode split of patrons/staff of the proposed developments.	The applicant is committed to promoting alternate modes of transport and it is proposed to prepare a Transport Access Guide to be made available to all function centre attendees (via email) and employees. Up to date transport information will be provided (timetables and routes from major centres) to encourage public transport use.

Table 8: Response to Submissions – Peer Review

Issue	Recommendation	Response
Vehicle Occupancy	Undertake a survey of nearby function centres to confirm a vehicle occupancy rate of 3 people per vehicles.	Surveys were undertaken of the Orso Bayside function centre which identified a vehicle occupancy of 3 persons per vehicle. The adoption of this rate is considered reasonable for the subject function centre. Even in the absence of any surveys, application of 3.0 person per vehicle rate would be applied. An additional survey is not considered necessary for this subject assessment.
Parking Demand	Review the peak demand based on the scenario of all three function centres having banquet-style functions (365 guests) which represents 87% maximum capacity.	The revised application now proposes two function centres for which the maximum parking capacities can be accommodated on site.
Parking Demand	The peak parking demand is likely to be longer than the 12-2pm peak. It is recommended that the peak parking demand of 14 cars be applied to the full afternoon period between 12-6pm (for theoretical purposes).	This comment applies to Constable Cottage restaurant component which is no longer proposed and is therefore N/A.
Car Park Supply	Consideration should be given to providing a minimum of two dedicated car spaces for staff either off-street at Constable's Cottage or within the cliff street car park.	As above.
Car Park Supply	Formalise the overflow car parking supply along the Gap bluff access road to permanent car spaces. Investigate the merits of providing parking on one side of the road with passing bay opportunities.	It is clear from the revised assessment that the reliance upon the overflow parking 30 spaces is not required during a standard function centre operation. A maximum demand/usage of 1 space within the overflow car park may be required. It is therefore clear that formalisation of the overflow parking is unnecessary when in a worst-case scenario, less than 1% of the available overflow parking would be required. It is considered reasonable that the overflow parking would be just that, and used only in circumstances where it is necessary, on rare occasions.
Car Park Supply	Investigate providing more than 15 car spaces in the informal car park located to the north to maximise the number of parking spaces in the precinct.	No longer applicable – as above.

Vehicle Access Sight Distance	– Review sight distances at the intersections of Gap Bluff Access Road with Lighthouse Road and Military Road.	<p>The Lighthouse Road access will now accommodate entry movements only when the function centres are in operation.</p> <p>Sight distance has been reviewed at the Military Road/Gap Bluff access road driveway. The assessment indicates that satisfactory sight distances are provided. Exiting vehicles are in fact provided with a direct benefit being located to the bus lay bay (hatched yellow road markings). The provision of this lay-by, improves sight distance to general vehicular traffic. A vehicle positioned at the edge of the nearside lane (yellow hatching) is provided with almost 100 metre sight distance to oncoming traffic.</p>
Vehicle Access Swept Path	– Undertake swept path analysis of a bus (shuttle bus, bus, coach) at the intersections of Gap Bluff Access Road and Lighthouse Road.	<p>As outlined in the TMP, Swept Path Analysis has been undertaken for a 6.4m SRV in order to demonstrate the ability for a mini bus (Toyota Coaster) can enter via the Lighthouse Road access. It is acknowledged that a mini bus would usually acquire a 7m length however it is clear that the 6.4m design vehicle is fully capable of entering the Lighthouse access providing confidence that mini buses would also be able to utilise.</p> <p>Access to the Gap Bluff precinct will continue as currently occurs for coaches. In this regard, coaches enter via the southern primary access with Military Road, unload passengers in front of the Armoury building and turn within the hardstand area adjacent to the Armoury building to exit via the main access.</p>
Intersection Capacity	– Review the intersection of Military Road and Gap Bluff Access Road in terms of capacity.	<p>The premise of this recommendation related to the previous scheme where the primary entry to the site was proposed via the Military Road Access Driveway. All vehicles (except for the rare occasions when coach/buses are used) will now exit at this location.</p>
Gap Bluff Access Road and Military Road Intersection	– Investigate the merits of a Shared zone on the Gap Bluff Access Road. The shared zone would result in a reduction in speed limit from 25km/hr to 10km/hr.	<p>A shared zone relates to public roadways and requires RMS approval/ownership. The Gap Bluff Access Road is a private road and will remain for private use as part of this application. Nevertheless, the internal road system currently adopts similar attributes to a shared zone such as low speed signage and speed humps to</p>

	<p>enforce reduced vehicle speed. As outlined in the TMP, low speed signage and cautionary/advisory signage highlighting pedestrian right of way is now proposed to complement to existing environment.</p> <p>(10km/hr signage will replace the existing 25km/hr)</p>
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Emergency Access	<p>Further consideration is to be given by GBH to any impact of the proposal on emergency access. This has not been considered by Ason Group.</p>	<p>Emergency Access to the site will not be impeded as a result of the proposal. The parking plans does not propose obstruction of traffic flow.</p>
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Table 9: Response to Submissions – Watson Bay Association

Issue	WBA Traffic Comment	Response
Parking	<p>General summary of existing conditions on the external public road system and notes limited parking at the present time.</p> <p>Intense parking congestion</p>	<p>Whilst it is acknowledged that the on-street parking in the area is highly utilised, the amended development yield has been reduced in intensity with the removal of a function room and restaurant. The parking assessment that has been undertaken for the revised application demonstrates that all private vehicles can be readily accommodated on site with no reliance upon on street parking capacities.</p>
Public Transport Facts	<p>An important consideration is that most function guests do not take buses, "walking uphill to the function centre or taking lengthy late night bus trips is simply not likely.</p>	<p>The opinion raised that most function guests do not take buses is a valid observation and consistent with the function centre survey/data presented in Section 4.3.1 of this report which highlighted that 0% of patrons attending the Orso Bayside Reception facility (at 79 Parriwi Road, Mosman) used public transport. The previous Ason Group traffic report adopted an assumption that due to the general availability of public transport services, 3% of patrons may use public transport as an 'alternative mode' which also includes bridal vehicles and taxis. (Alternative modes consisted of 30% of the mode split). To put this into context, if the maximum capacity was reached for both function centres at any one time (270 people) this would equate to 8-9 persons using public transport. This is by no means an over estimate and considered a negligible volume.</p> <p>In addition to the above Staff are to be encouraged to use public transport. And in order to promote the use of the ferry or bus for patrons, a shuttle bus service is a proposed management measure so that patrons are not required to walk uphill.</p> <p>Nonetheless, the traffic and parking assessment has adopted (based on surveys) a 70% private vehicle mode share with 30% relating to taxi, bridal car and public transport use (3%).</p>
Road Safety	<p>Poor sight distance for southbound traffic on Cliff Street to the pedestrian stairs between Lighthouse Road & Cliff Street.</p>	<p>The stairs between Cliff Street and Lighthouse Road is a pre-existing issue for southbound traffic noting that the proposed development does not increase the intensity of traffic at this point. That is to say, traffic will approach from the external road network to the south and all entering traffic will be northbound traffic on Cliff street. Irrespective, the RSA that was prepared by SMEC consultants raises a valid pre-existing issue for the precinct in general. This poor sight distance issue could be addressed with the removal of a on street parking space providing improved intervisibility between car drivers and pedestrians.</p>

Road Safety	Obstructions to sight distance for the pedestrian crossing at the intersection of Military Road & Cliff Street	<p>In the absence of the SMEC report and access only to WBA summary, it has been assumed that the “pedestrian crossing” relates to the north/south informal cross from the Watsons Bay park to the Watson Bay Hotel car park area. As per the above road safety issue, this is a pre-existing issue that could potentially be ameliorated with the removal of on street parking</p> <p>The traffic assessment that has been undertaken generally encompasses the assumption that vehicles would be used to access the site with all traffic traversing northbound along Military Road and Cliff Street to enter the development and as per the above item, the development will not directly impact this aspect from a vehicle driver perspective (no general patron vehicles will turn left at this location).</p> <p>As part of the TMP measures to be implemented, the development shuttle bus will assist in servicing any pedestrian demand from Military Road to the west (from the ferry).</p> <p>In summary, the existing sight distance issue could be addressed by removing parking on street to directly improve intervisibility between drivers and pedestrians. There would be no major intensification associated with pedestrians at this intersection attending the function centre.</p>
Road Safety	Parked cars and buses obstructing the informal crossing for pedestrians accessing Gap Bluff Road from the footpath on Military Road	<p>It is proposed to further improve the internal private access roads by implementing shared zone speed traffic management.</p> <p>The intensification and use of this access point to the site (Military Road) has been reduced through the implementation of the one-way system (entering via Lighthouse Road and exiting via Military Road access).</p> <p>In order to manage any increase in pedestrians at this location, a gap bluff employee (as part of the traffic management solution) can be located at the access point to assist with pedestrian movements and ensure the one-way system for general vehicles is adhered to.</p>
Emergency Vehicles	The WBA review summarises existing issues	<p>Emergency Access to the site will not be impeded as a result of the proposal. The traffic management plan does not propose obstruction of traffic flow on Lighthouse Road. Any emergency access necessary to the function centre area, would seek direct access via the Military Road access driveway. Noting that as part of the TMP, the internal road is proposed to accommodate one-way exit movements only, there should be no impediment to access the site on the basis that the internal road can accommodate two-way flow.</p>

9 Conclusions

The key findings of this Traffic Impact Assessment are:

- Ason Group has been engaged by Gap Bluff Hospitality Pty Ltd to prepare a Traffic Impact Assessment report to support a Review of Environmental Factors relating to alterations and additions to six existing buildings currently owned by the National Parks and Wildlife. The overall site consists of two precincts: the Gap Bluff Precinct and the South Head, Camp Cove and Green Point Precinct located within the South Head sector of Sydney Harbour National Park, Watsons Bay.
- Tube count surveys indicate that under standard traffic conditions, the traffic volumes in the local area currently comply with the RMS environmental capacity standards. However, during peak period weekends (such as public holiday weekends), existing traffic volumes exceed environmental capacity standards. It is pertinent that the above survey analysis and traffic generation assessment has been treated as a increase over and above the existing traffic conditions. This is considered a worst-case assessment. Of particular importance and relevant to the subject application, is the historical use of the site. It has been advised that the historical site functions centres accommodated peak demands which exceed the current refurbished Proposal capacities as discussed in Section 5.2. In this regard, the Proposal is consistent with the former use on site and would generate traffic consistent with the previous peak demands.
- The subject sites are favourably located to take advantage of the public transport facilities that serve the Watsons Bay area. It is anticipated that some patrons of the proposed function centres would use public transport to access the site, potentially in combination with taxi services.
- The Gap Bluff precinct can provide 102 parking spaces that would be the maximum parking demands generated by the site. Accordingly, the Gap Bluff precinct provides sufficient parking to accommodate 100% of the anticipated parking demands generated by 2 function centres, without placing any demand on on-street parking within the wider Watsons Bay area. Accessible parking for the Gap Bluff function centres is also proposed to be design in accordance with AS 2890.6.
- The Standard Test traffic analysis demonstrates that the additional development traffic volumes would have only moderate impacts on the surrounding sensitive streets and the future traffic volumes would remain below relevant environmental capacity standards for collector and local residential streets.
- The Sensitivity Test traffic analysis demonstrates that existing peak weekend traffic volumes exceed goal and maximum environmental thresholds and would be subject to 79 additional movements due to the proposed function centres. Due to the relatively infrequent nature of these peak periods (generally limited to public holiday weekends and peak summer time weekends),

the acceptability of the Proposal should be assessed against the Standard Test traffic assessment, which indicates that the Proposal is acceptable. With this, it should be acknowledged that the historical function centre use on-site exceeded the current Proposal (person capacity) and the traffic generation should in fact decrease based on the comparison of the peak capacities (Section 5.2).

- With regard to the 4 accommodation developments of 33 Cliff Street, Gap Bluff Cottage, Constables Cottage and Green Point Cottage, the refurbishments represent very minor works – essentially renovations – that will not change the operation of these buildings in terms of parking and traffic.
- A DRAFT Traffic Management Plan report has been prepared and is appended to this report. It outlines the key traffic management principles to be adopted by the proposed function centres. This TMP will be detailed and finalised in close liaison with Woollahra Municipal Council officers.
- The Construction Traffic Management Plan principles have been outlined in section 7 of this report. The detailed CTMP will be finalised in accordance with RMS Guidelines and again in close liaison with Woollahra Municipal Council officers

The analysis undertaken to inform this report concludes that the developments will operate satisfactorily, would not have any adverse parking, traffic and/or environmental impacts during standard operating conditions and the developments are therefore supportable on traffic planning grounds.

Appendix A

Draft Traffic Management Plan

Revised Exhibition Draft

Revised Exhibition Draft

Prepared for
Gap Bluff Hospitality Pty Ltd

Draft Traffic Management Plan

Gap Bluff Function Centre

Ref: 0075r03
1/09/2017

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This report has been prepared for the sole use of Gap Bluff Hospitality (the Client) and for specific purpose, each as expressly stated in the document. Ason Group cannot accept any responsibility for any use of or reliance on the contents on this report by any third party. This document has been prepared based on the Client's description of its requirements, information provided by the Client and other third parties to prepare this document.

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Appendices

Appendix A: Public transport Information

Appendix B: Indicative Parking Plan

Appendix C: NSW Office of Environment & Heritage

Appendix D: Driver Code of Conduct (Employee and Visitor)

1 Introduction

1.1 Purpose

Ason Group has been engaged by Gap Bluff Hospitality to prepare an Draft Traffic Management Plan (TMP to support the Review of Environmental Factors (REF) relating to adaptive reuse and renovations to six existing buildings currently owned by the National Parks and Wildlife Service (NPWS).

The purpose of this TMP is to provide guidance in relation to the traffic management arrangements for the Site, in particular the management of traffic in relation to the proposed Function Centres. The overall objective is to ensure safe and efficient movement of vehicles, visitors and employees. In particular, this plan details the following:

- A vehicle access plan;
- Measures for safe movement of pedestrians between designated carpark to the office areas; and
- Details on the governance and administration of the plan.

2 Site Details

2.1 Function Centre Overview

The overall development site consists of 2 precincts, the Gap Bluff Precinct and the South Head, Camp Cove and Green Point Precinct located within the South Head sector of Sydney Harbour National Park. Both precincts are located within the Watsons Bay Precinct (WBP) in the Woollahra Council Local Government Area, approximately 6.5 kilometres north of Bondi Junction and 7.5 kilometres east of Sydney CBD. In a more local context, the Gap Bluff precinct is approximately 250 metres northeast of the Watsons Bay wharf. A Site Plan for the Gap Bluff precinct is presented in **Figure 1** below. The Gap Bluff Precinct will accommodate the proposed two function centres which are located within the 'Officer's Mess' building and the 'Armoury' building. The proposed function centre population (maximum capacity) and the employees as advised by Gap Bluff Hospitality is summarised below.

- 270 guests, consisting of:
 - 160 guests for a cocktail style function at The Armoury Ground Floor function centre,
 - 110 guests for a cocktail style function at the Officer's Mess function centre
- 19 staff, consisting of:
 - 10 staff at The Armoury Ground Floor function centre,
 - 9 staff at the Officer's Mess function centre.

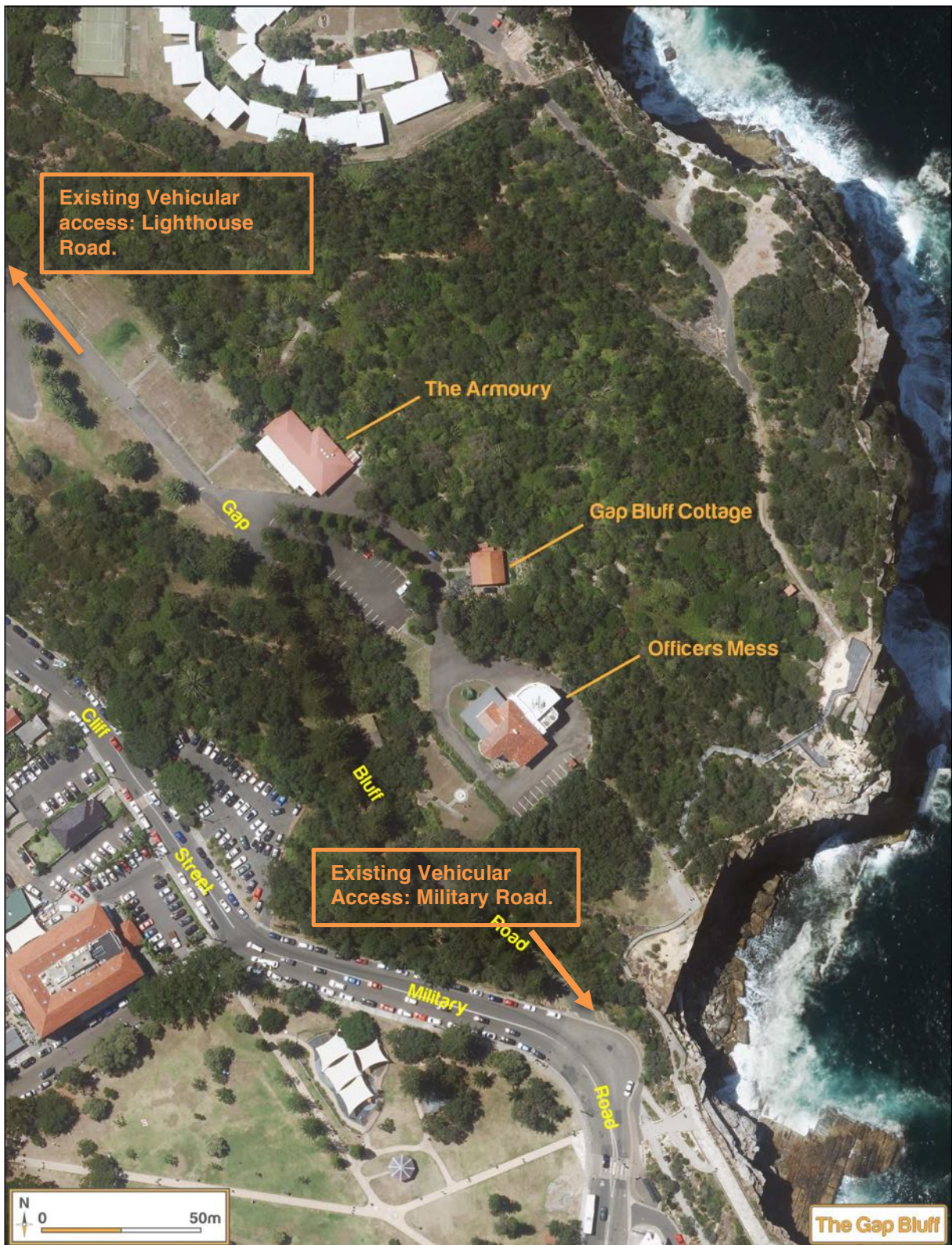


Figure 1: Site Plan – Gap Bluff Precinct

2.2 Public Transport

Figure 2 shows that the site is well located to take advantage of public transport services in the area, in particular ferry services at the Watson Bay wharf and bus services at the Military Road bus terminus.

With regard to ferry services, the Integrated Public Transport Service Planning Guidelines, Sydney Metropolitan Area (Transport for NSW, December 2013), states that ferry services influence the travel mode choices of areas within 800 metres walk (approximately 10 minutes) of a ferry wharf. It is therefore noteworthy that all the subject sites are located within 800 metres of the Watsons Bay ferry wharf, with the:

- Gap Bluff precinct buildings approximately 500 metres walk via the dedicated pedestrian routes through Robertson Park and the Gap Cliff coastal walk,

With regard to bus travel, the Transport for NSW guideline states that bus services influence the travel mode choices of sites within 400 metres walk (approximately 5 minutes) of a bus stop. With reference to Figure 2, the Gap Bluff precinct buildings are located approximately 300 metres walk from the Military Road bus terminus, via the Gap Cliff coastal walk.

In summary, the subject sites are favourably located to take advantage of the public transport facilities that serve the Watsons Bay area. It is anticipated that a significant number of patrons of the proposed restaurant and function centres would use public transport to access the site, particularly for inbound (arrival) journeys. Some outbound (departure) journeys could also use public transport; however, it is more likely that patrons will use a combination of inbound public transport travel and outbound taxi travel to access the sites.

Table 1: Existing Public Transport Services

Mode of Transport	Service No.	Route	Approximate Service Frequency
Ferry	F7 Eastern Suburbs	Circular Quay to Watsons Bay	Weekday: 30 mins from 10.35PM – 4.45PM Last Service: 4.45PM
			Weekend: 30 mins from 10.00AM – 6.30PM & 1 hour from 6.30PM – 9.30PM Last Service: 9.30PM
Bus	324	Watsons Bay to City via Dover Heights and New South Head Road	Weekday: 30 mins from 4.40AM – 6.30PM & 1 hour from 6.30PM – 11.30PM Last Service: 11.15AM
	L24	Watsons Bay to City via Dover Heights and New South Head Road	Weekend: 30 mins from 4.30AM – 3.00PM & 20 minutes from 3.00PM – 11.50PM Last Service: 2.10AM
	325	Watsons Bay to City via Vaucluse and New South Head Road	Weekday: 20 mins from 7.20AM – 7.40AM Last Service: 7.40AM
	380	Watsons Bay to City via Bondi Beach, Bondi Junction and Oxford Street	Weekday: 20 mins from 6.20AM – 8.20AM & 30 mins from 8.20AM – 6.45PM & 1 hour from 6.45PM – 10.45PM Last Service: 10.45PM
			Weekend: 30 mins from 7.20AM – 8.40PM & 1 hour from 8.40PM – 10.00PM Last Service: 10.40PM
			Weekday: 20 mins from 9.40AM – 6.00PM Last Service: 6.00PM
			Weekend: 20 mins from 10.30AM – 5.00PM & 10 mins from 5.00PM – 6.45PM Last Service: 6.45PM

Timetables for all bus services and ferry services in the vicinity of the site is provided in **Appendix A**.

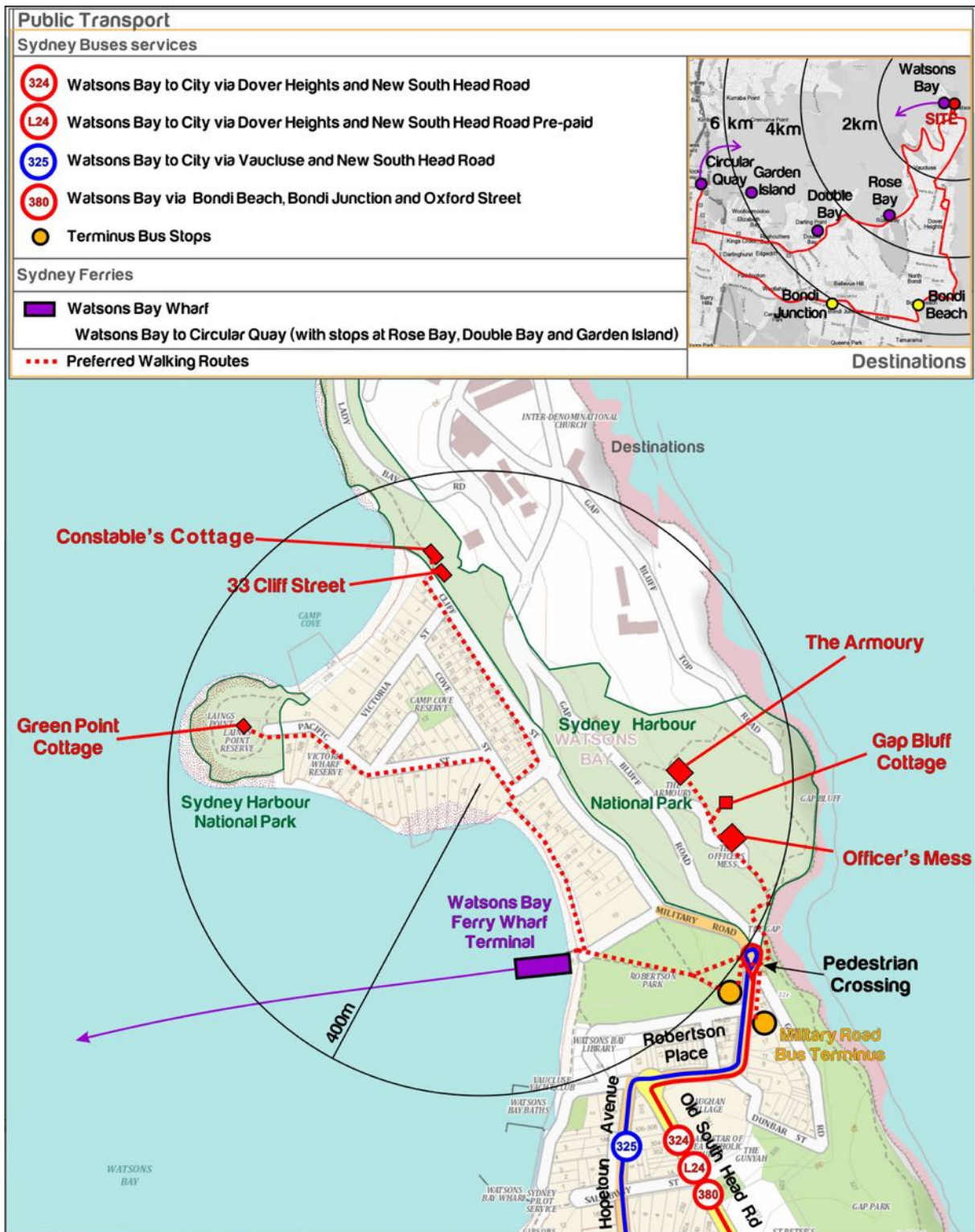


Figure 2: Public Transport Accessibility

2.3 On Site Parking Provision

A conceptual assessment of the parking that could be accommodated on site was previously undertaken as part of the Traffic Impact Assessment report.

A further assessment of the primary parking area has been undertaken using aerial photography which is provided in **Appendix B**. This assessment indicates that the primary parking area could in fact accommodate 72 parking spaces within the primary parking area (excluding the overflow car park). With reference to the Gap Bluff Precinct Parking Plan at **Figure 3**, this has been updated to reflect the layout shown in Appendix B. In total, the development can indicatively accommodate a total of 102 parking spaces comprising:

Standard Parking Area

- 60 spaces for guests (excluding accessible parking) within the primary parking area
 - 20 formally line-marked spaces to the west of the Gap Bluff Cottage,
 - 15 kerb side parking spaces adjacent to the lawn to the west of the Armoury building,
 - 10 kerb side parking spaces on the ingress and egress to the Officer's Mess building, and
 - 15 informal parking spaces in the irregular shaped hardstand area to the northwest of the Armoury building.

Staff Parking

- 10 parking formally line-marked spaces to the southeast of the Officer's Mess building (to be reserved for staff).

Accessible Parking

- 2 Accessible spaces adjacent The Armoury building.

Overflow Car Parking

- 30 spaces located within the overflow parking area.

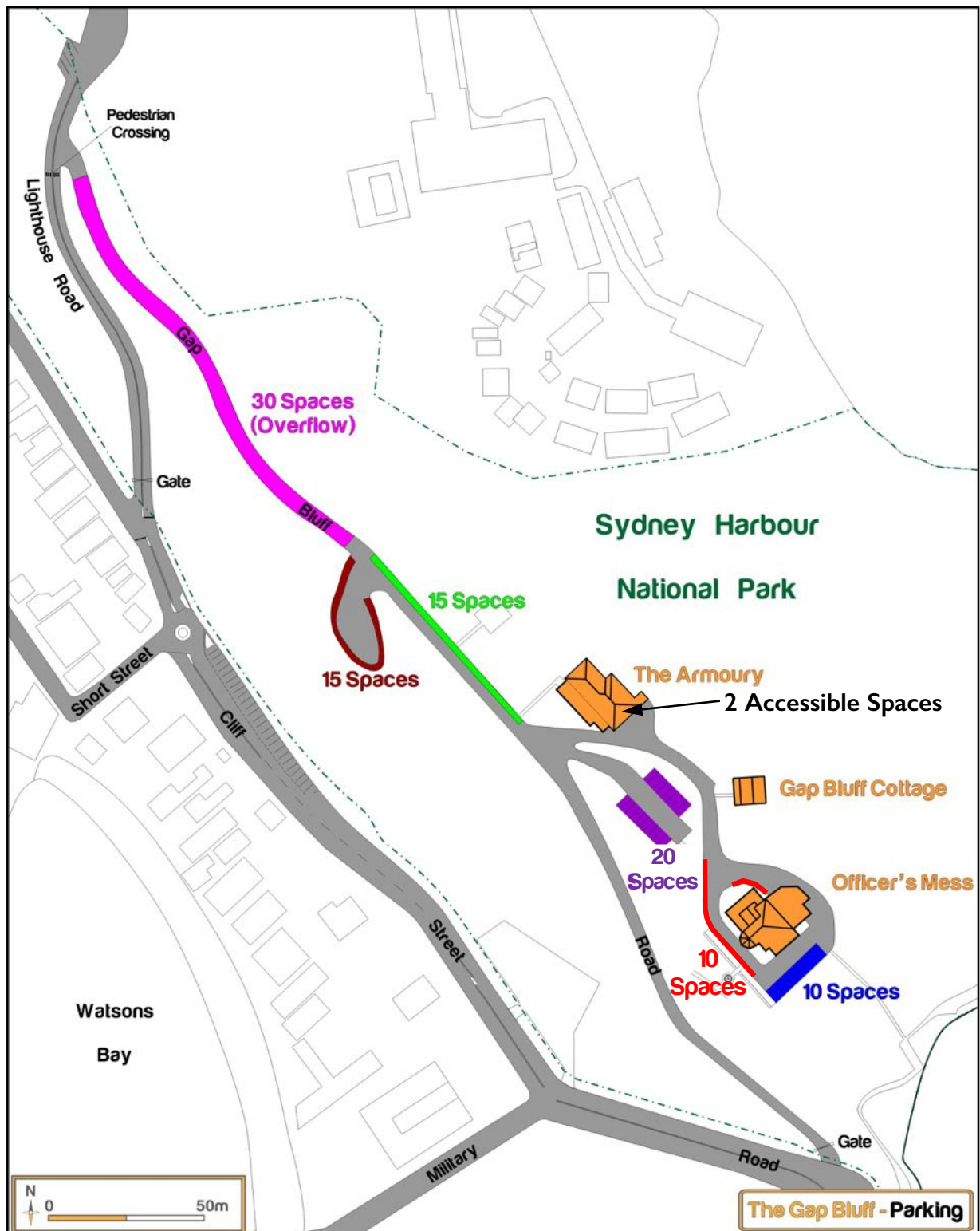


Figure 3: The Gap Bluff Precinct Parking Plan (update)

3 Operational Management Measures

3.1 Plan of Management

Having regard for the future land uses, the following management measures are proposed to minimise the impacts of the development on the existing amenity of residents and visitors to the Watsons Bay precinct.

3.1.1 Plan Maintenance

This Plan shall be subject to ongoing review and will be updated as necessary in response to changing requirements. It is recommended that the plan be reviewed every 6 months.

3.1.2 Key responsibilities of Management

Management shall:

- Ensure all staff are provided with sufficient training to undertake the required tasks. This includes responsibility for measures to ensure that all staff and visitors are familiar with site specific rules through appropriate site induction procedures.
- Be familiar with and address their respective duty of care requirements in accordance with the applicable state Work Health and Safety legislation.
- Ensure WHS Incident logbooks are maintained and undertake necessary action(s) in relation to any reported issues.

3.2 Traffic Management Plan

A draft Traffic Management Plan schematic has been prepared which outlines the key principles associated with access to the site and the measures/ procedures to be implemented in order to assist with efficient operation. The TMP is shown in **Figure 4**.

The Gap Bluff Access Road is a private road and will remain for private use as part of this application. Nevertheless, the internal road system currently adopts similar attributes to a shared zone such as low speed signage (25km/hr) and speed humps to enforce reduced vehicle speed. As outlined in **Table 2**, low speed signage (10km/hr) and cautionary/advisory signage highlighting pedestrian right of way is now proposed to complement to existing environment.



Figure 4: Traffic Management Plan

Table 2: Proposed Additional Signage

R4-4 SHARED ZONE

To be provided at each entrance. All existing 25km/hr to be replaced with 10km/hr signage)



R4-5 END SHARED ZONE

To be provided prior to each vehicular exit.)



R2-10 GIVE WAY TO PEDESTRIANS

To be provided intermittently every 30 metres within the site access roads.



3.2.1 Hours of Operations

The proposed hours of operation are 8:30 AM to 12:00 AM (Midnight) from Monday to Sunday. Patrons are to vacate the premises by 12:00 AM (Midnight) and staff are to depart by 12:30 AM.

3.2.2 Lighthouse Road Entry - Gap Bluff Employee Responsibility

In addition to their responsibilities as an employee, the employee located at the lighthouse road entry point is responsible for:

- controlling the site access via the 'sign-in' operations.
- checking and verifying persons entering the Gap Bluff Facility.
- communicating with other supervisors with regards to the traffic wanting to enter the parking zone.
- Observing and monitoring queues along Lighthouse Road permitting a secondary check-in location within the site if necessary.

3.2.3 Vehicle Management

Table 3 below provides a succinct summary of the vehicle types that require access to the Gap Bluff access road. All vehicles should adhere to the following access management measures.

Table 3: Vehicle Management

Vehicle Type	Access Management
General Patrons of Function Centre	Entry via Lighthouse Road Access, Exit via Military Road. It is noted that staff would manage and observe queue lengths and in the event that queues are problematic, sign-in could be completed within the site by another staff member.
Taxis	Entry via Lighthouse Road Access, Exit via Military Road.
Bridal Vehicles	Entry via Light House Road Access, Exit via Military Road. A space will be dedicated to accommodate the vehicle.
Coach/Bus	Entry and Exit via Military Road as per existing arrangements. The vehicle turn around area is shown in Table 4 . It should be noted, this vehicle attendance on site will be arranged upon special request and will require the temporary removal of 2 spaces on site to accommodate a 3 point turn.
Mini Bus (Toyota Coaster or similar)	Entry via Light House Road Access, Exit via Military Road. Swept path analysis undertaken demonstrating satisfactory operation for the entry movement.
Service Vehicle Access	Military Road for entry and exit (outside of function operation, off –peak)
Unauthorised Vehicles	Ability for unauthorised vehicles to turn around (within the Lighthouse road entry as shown in Table 4).

Table 4: Vehicle Management – Swept Path Analysis

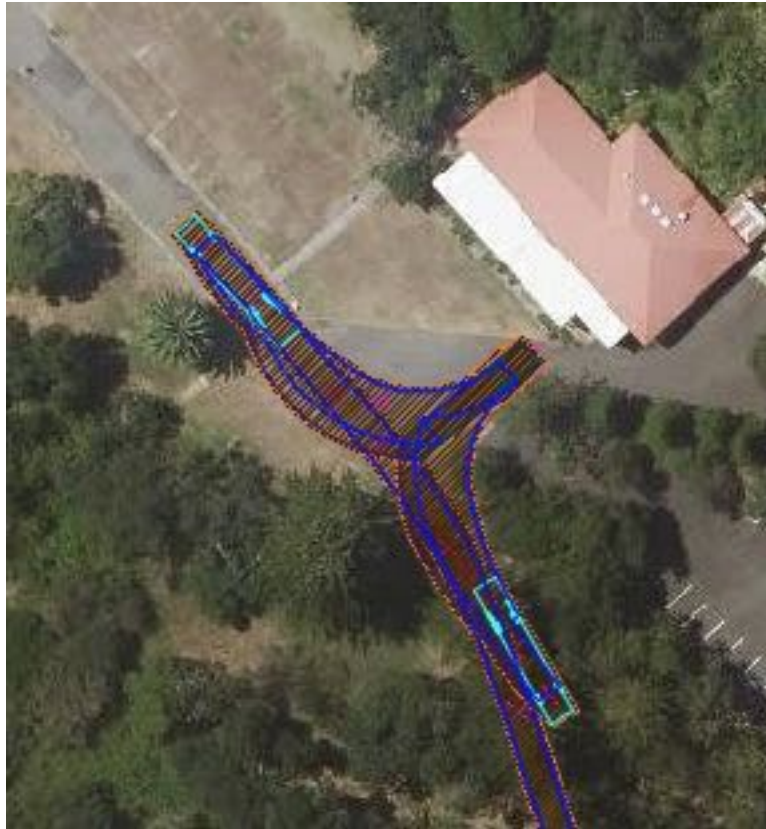
**Unauthorised
Vehicle (3-point
turn to exit in a
forward direction)**



**Entering Mini Bus
(6.4m SRV similar
characteristics to a
Toyota Coaster)**



**14.5m Bus/coach
(65 Seater) –
Turnaround Spatial
Requirements**



3.2.4 Coach and Bus Access

Access to the Gap Bluff precinct will continue as currently occurs. In this regard, coaches enter via the southern primary access with Military Road, unload passengers in front of the Armoury building and turn within the hardstand area adjacent to the Armoury building to exit via the main access.

It is anticipated that the future operator of the function centres would provide a service whereby they would arrange with a coach/bus operator to service a function or event. The service could be provided at the request of a client, or the operators may offer it pro-actively in response to an anticipated peak use of the Gap Bluff precinct.

A shuttle bus service is proposed for staff departing the site.

3.2.5 Servicing

All major deliveries relating to the function centres will be transported directly to each venue. A private contractor making use of the existing site access to Military Road will undertake waste collection for the Gap Bluff precinct.

3.2.6 Trail Proposals

The NSW Office of Environment & Heritage has prepared several concept options (separate to the subject proposal) for a trail alignment between Gap Park and Cliff Street. All options are provided in **Appendix C**.

Stage 1 trail alignment includes the provision for a raised pedestrian crossing with blisters to allow safe and direct crossing to adjacent footpath on Lighthouse Road and Cliff Street. This concept is supported on pedestrian amenity and safety grounds. It is understood that this is the preferred option proposed, with Stage 2 options to only be considered upon review of Stage 1 implementation. Ason Group has reviewed all options and Stage 1 works is the preferred option. In terms of pedestrian amenity, it provides a direct route to Gap Park and would limit pedestrian interaction with vehicular traffic along Gap Bluff Road. The implementation of the Stage 1 concept would not affect implementation of the Function Centre TMP.

In summary, the NSW Office of Environment & Heritage Concept Trail Alignment plans have been reviewed and the preferred Stage 1 works are supported. Upon completion of the detailed TMP at a later stage, these would be incorporated into the overall site management for the subject site assuming the Stage 1 option is adopted for development.

3.2.7 Overflow Parking

By nature of all patrons arriving via Lighthouse road and departing by Military road, all traffic will flow in a single clockwise direction. The only exception will be large bus/coaches on infrequent occasions. As mentioned, overflow kerb side parking can be provided on the access road to the north of the Gap Bluff precinct. Due to the 6.0 metre width of this road, on occasions that it is used for overflow parking, it is recommended that the road is managed to be temporarily one-way southbound to optimise traffic flow in accordance with the proposed TMP. The use of the overflow car would however occur in rare occasions (if any) based on the analysis undertaken and provides confidence that the all parking can be readily accommodated on site without impact to the external parking network capacity.

3.2.8 Driver Code of Conduct

All employees are to operate in a manner consistent with the requirements of applicable Work Health and Safety (WHS) legislation and other business specific policies. A sample Driver Code of Conduct is outlined in **Appendix D**.

3.2.9 Sustainable Transport Initiative

It is proposed to prepare a Travel Access Guide (TAG) for both Function Centres. This report/plan is intended to develop a package of site specific measures to promote and maximise the use of sustainable travel modes, including public transport and car sharing. In this regard, the plan will set out objectives and strategies to assist in achieving the goal to reduce reliance on private vehicle usage.

The primary objectives of this TAG are to:

- Promote the use of 'active transport' modes such walking and cycling, particularly for short-medium distance journeys
- Reduce reliance on the use of private vehicles for all journeys, up to date public transport information will be issued to all employees and function centre attendees via email.

This Plan adopts the following movement hierarchy with priority given to 'active transport' followed by mass public transport and lastly the use of cars and other private vehicles.

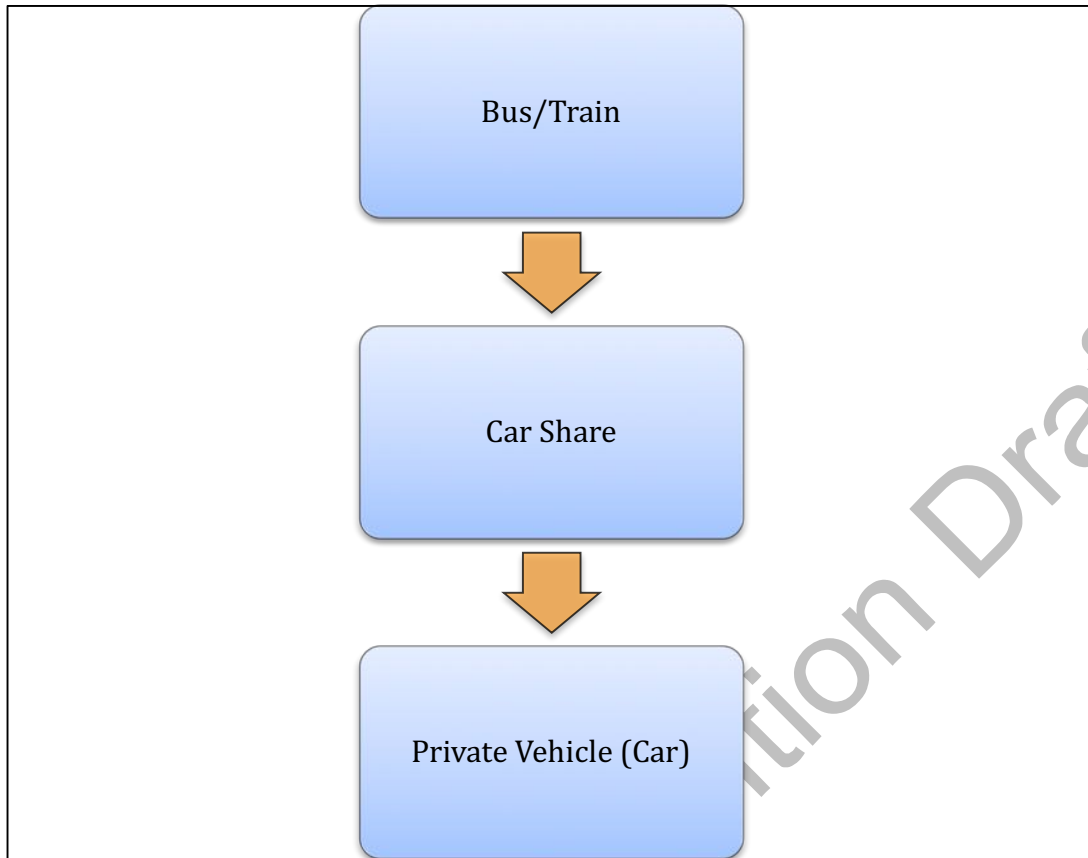


Figure 8: Movement Hierarchy

Appendix A:

Public Transport Information

Revised Exhibition Draft

Description of routes in this timetable

Route 333

North Bondi to City - Circular Quay LIMITED STOPS (PrePay-only)

via Bondi Beach, Bondi Junction, Paddington and Darlinghurst.

Service operates daily.

Route 380

North Bondi to City - Circular Quay

via Bondi Beach, Bondi Junction, Paddington and Darlinghurst.

Selected daytime and evening services extend to Dover Heights and Watsons Bay.

Service operates daily.

Routes 381 and 382

North Bondi to Bondi Junction

via Bondi Beach.

Service operates daily.

Route X84

North Bondi to Bondi Junction EXPRESS (PrePay-only)

via Bondi Beach.

Service operates Monday to Friday morning peak hours.

STA No: 175117 - v4.0

Watsons Bay & North Bondi to City

Bus Timetable

333

380

381

382

X84



Includes accessible services

Effective from 4 October 2015



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What’s inside

Your Bus timetable	2
Ticketing	2
Accessible services	2
How to use this timetable	3
Other general information	3
Bus contacts	3

Timetables

From North Bondi towards City - PrePay-only

Monday to Friday	4
Saturday	4
Sunday & Public Holidays	5

From City towards North Bondi - PrePay-only

Monday to Friday	6
Saturday	6
Sunday & Public Holidays	7

From Watsons Bay & North Bondi towards City

Monday to Friday	8
Saturday	13
Sunday & Public Holidays	16

From City towards North Bondi & Watsons Bay

Monday to Friday	20
Saturday	25
Sunday & Public Holidays	29
Explanation of definitions and symbols	34
Bus route map	36

Your Bus timetable

Bus services take you around Sydney and outer Sydney metropolitan areas, including Newcastle, the Lower Hunter, the Central Coast, the Blue Mountains, Lithgow and the Illawarra. If you have any questions about getting around on buses, just ask. Staff are here for you.

Ticketing

Opal

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For more information about ticketing please visit **transportnsw.info** or call **131 500**.

Accessible services

All new buses are wheelchair-accessible with low-level floors and space for wheelchairs, prams or strollers. Look for the symbol  in this timetable. Some older buses may not have all the features you need. There will be more accessible services as older buses are replaced.

We try to make sure accessible buses run as intended. If an accessible bus is not available for a scheduled route, we apologise in advance for the inconvenience.

How to use this timetable

- Go to the route map at the back of this timetable and find the two timing points your bus stop is located between.
- Then find these two timing points on the timetable.
- Your bus is scheduled to arrive between the times shown for these points.

For example

If your bus stop is located between timing points A and B on the route map, then your bus is scheduled to arrive between the times shown for A and B in the timetable. Please arrive at your bus stop around 5 minutes before your bus is scheduled.

This timetable is expressed in 24-hour time.

12 midnight to 12 midday	12 midday to 12 midnight
00:00 to 11:59	12:00 to 23:59
12.00 am = 00:00	12.00 pm = 12:00
1.00 am = 01:00	1.00 pm = 13:00
2.00 am = 02:00	2.00 pm = 14:00
3.00 am = 03:00	3.00 pm = 15:00
4.00 am = 04:00	4.00 pm = 16:00
5.00 am = 05:00	5.00 pm = 17:00
6.00 am = 06:00	6.00 pm = 18:00
7.00 am = 07:00	7.00 pm = 19:00
8.00 am = 08:00	8.00 pm = 20:00
9.00 am = 09:00	9.00 pm = 21:00
10.00 am = 10:00	10.00 pm = 22:00
11.00 am = 11:00	11.00 pm = 23:00

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- Where your train, bus, ferry or light rail service is right now
 - Estimated arrival times
 - Service updates
 - Closest stations, stops, wharves and routes
 - Accessibility details.

Who is providing my bus services?

The bus services shown in this timetable are run by State Transit.

Is this timetable current?

We try to make sure services depart at the specified times. However, timetables may change and services may be delayed, cancelled or diverted due to circumstances beyond our control.

If you have not travelled with us for a while, you can confirm this timetable is still current by visiting **transportnsw.info** or calling **131 500**.

Over Christmas and the New Year, a reduced timetable may operate. If you're travelling during this time, plan your trip at **transportnsw.info** or call **131 500**.

Bus etiquette

Eating, drinking, smoking or playing loud music on the bus is not allowed. By law, smoking is not allowed at any bus stop, or at train stations, ferry wharves or light rail stops.

Helpful contacts

- To plan your trip, get service information and make general enquiries:
- Visit **transportnsw.info**
 - Call **131 500** TTY **1800 637 500**
 - Lost property offices**
 - Visit **transportnsw.info** or call **131 500** TTY **1800 637 500** to contact the operator of your service. If you still have your bus ticket, it will help identify the bus you travelled on.

Emergencies
Call Triple Zero (000)

Crime Stoppers
To give information that may help stop, solve or prevent criminal activity
Call **1800 333 000**

Police Assistance Line
To report thefts or other non-life threatening matters
Call **131 444**

Disclaimer: Information in this timetable is based on the latest details at the time of printing, and is subject to change without notice.

Monday to Friday														
map ref	Route Number	380	380	380	381	380	381	380	380	381	380	380	381	380
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	...	...	...	...	05:29	...	05:54	06:14	...	...	06:45	...	...
C	North Bondi Military Rd	04:25	04:49	05:07	05:22	05:37	...	06:02	06:22	...	06:41	06:53	...	...
D	Bondi Beach Campbell Pde	04:28	04:52	05:10	05:25	05:40	05:54	06:05	06:25	06:31	06:44	06:56	...	...
E	Bondi Fletcher St	...	...	...	05:31	...	06:00	...	...	06:37	...	...	07:00	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	04:36	05:02	05:20	05:40	05:50	06:09	06:18	06:38	06:46	06:57	p07:09	07:09	...
H	Darlinghurst Taylor Square	04:46	05:13	05:31	...	06:01	...	06:31	06:51	...	n07:10	p07:22	...	o07:38
J	City - Circular Quay Young St	04:58	05:25	05:43	...	06:13	...	06:43	07:05	...	...	07:38	...	...

Monday to Friday (cont...)														
map ref	Route Number	380	380	381	X84	381	381	380	381	380	X84	381	380	380
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	07:03	...	...	...	...	...	07:20	...	...	...	...	...	07:29
C	North Bondi Military Rd	07:11	07:19	...	p07:20	...	...	07:28	...	07:33	p07:35	...	...	07:39
D	Bondi Beach Campbell Pde	07:14	07:22	...	...	07:22	07:27	07:31	07:32	07:37	...	07:37	...	07:43
E	Bondi Fletcher St	...	...	07:21	...	07:28	07:33	...	07:38	...	...	07:43	...	...
F	Bondi Curlewis St	...	...	...	p07:25	...	...	...	...	...	p07:40	...	...	...
G	Bondi Jn Interchange Stand N	p07:27	p07:38	07:30	p07:36	07:41	07:46	p07:49	07:51	p07:55	p07:51	07:56	...	p08:01
H	Darlinghurst Taylor Square	p07:43	p07:54	...	...	...	...	p08:05	...	n08:11	...	...	o08:14	p08:17
J	City - Circular Quay Young St	07:59	08:11	...	...	...	...	08:23	...	...	...	...	...	08:35

Monday to Friday (cont...)															
map ref	Route Number	X84	381	380	381	380	381	380	382	381	380	X84	381	380	
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...
C	North Bondi Military Rd	p07:45	...	07:42	...	07:46	...	07:51	...	...	07:57	p08:01	...	08:04
D	Bondi Beach Campbell Pde	...	07:43	07:46	07:48	07:50	07:53	07:55	07:58	07:58	08:01	...	08:03	08:08	
E	Bondi Fletcher St	...	07:49	...	07:54	...	07:59	...	...	08:04	...	...	08:09	...
F	Bondi Curlewis St	p07:50	...	...	...	...	...	...	...	...	...	p08:06	...	...
G	Bondi Jn Interchange Stand N	p08:01	08:02	p08:04	08:07	p08:08	08:12	p08:13	08:15	08:17	p08:19	p08:17	08:22	p08:26	
H	Darlinghurst Taylor Square	...	...	n08:20	...	p08:24	...	p08:29	...	...	p08:35	...	...	p08:42
J	City - Circular Quay Young St	...	...	...	...	08:42	...	08:47	...	...	08:53	...	...	09:00

Monday to Friday (cont...)														
map ref	Route Number	X84	381	381	380			381	381			381	381	
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	...	...	...	...	08:05	...	...	...	08:15	...	...	...	...
C	North Bondi Military Rd	p08:11	...	...	...	08:15	...	...	...	08:25	...	p08:36	...	...
D	Bondi Beach Campbell Pde	...	08:09	08:14	...	08:19	08:19	08:24	...	08:29	08:29	...	08:34	08:38
E	Bondi Fletcher St	...	08:15	08:20	...	...	08:25	08:30	...	...	08:35	...	08:40	08:44
F	Bondi Curlewis St	p08:16	...	...	...	...	...	...	...	...	...	p08:41	...	...
G	Bondi Jn Interchange Stand N	p08:27	08:28	08:33	...	p08:37	08:38	08:43	...	p08:47	08:48	p08:52	08:53	08:57
H	Darlinghurst Taylor Square	...	...	...	o08:47	p08:53	...	...	q08:59	p09:03	...	...	...	...
J	City - Circular Quay Young St	...	...	...	...	09:07	...	...	09:11	09:15	...	...	...	...

Monday to Friday (cont...)														
map ref	Route Number	380	381	380	381							381	380	
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	...	...	08:35	...	...	08:55	...	...	...	...	09:23	...	...
C	North Bondi Military Rd	08:36	...	08:45	...	08:55	09:05	...	09:15	...	09:24	09:33	...	09:44
D	Bondi Beach Campbell Pde	08:40	08:46	08:49	08:55	08:59	09:09	09:10	09:19	09:25	09:28	09:37	09:39	09:48
E	Bondi Fletcher St	...	08:52	...	09:01	...	...	09:16	...	09:31	...	...	09:45	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	p08:58	09:05	p09:07	09:14	p09:17	p09:27	09:29	p09:37	09:44	p09:46	p09:55	09:58	p10:04
H	Darlinghurst Taylor Square	p09:14	...	p09:23	...	p09:33	p09:43	...	p09:53	...	p10:02	p10:12	...	p10:21
J	City - Circular Quay Young St	09:26	...	09:35	...	09:45	09:55	...	10:05	...	10:15	10:25	...	10:34

Monday to Friday (cont...)														
map ref	Route Number	381		380		381		380		381		380		
A	Watsons Bay Military Rd	...	09:38	...	...	09:58	...	...	...	10:17	...	...	10:37	...
B	Dover Heights Military Rd	...	09:46	...	...	10:06	...	...	...	10:25	...	...	10:45	...
C	North Bondi Military Rd	...	09:56	...	10:06	10:16	...	10:25	...	10:35	10:45	...	10:55	...
D	Bondi Beach Campbell Pde	09:55	10:00	10:08	10:09	10:19	10:23	10:28	10:37	10:38	10:48	10:55	10:58	11:07
E	Bondi Fletcher St	10:01	...	10:14	...	...	10:29	...	10:43	...	...	11:01	...	11:13
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	10:11	p10:14	10:24	p10:23	p10:33	10:39	p10:42	10:53	p10:52	p11:02	11:11	p11:12	11:23
H	Darlinghurst Taylor Square	...	p10:31	...	p10:40	p10:50	...	p10:59	...	p11:09	p11:19	...	p11:29	...
J	City - Circular Quay Young St	...	10:44	...	10:53	11:03	...	11:12	...	11:22	11:32	...	11:42	...



Monday to Friday

Watsons Bay & North Bondi to City

Monday to Friday (cont...)														
map ref	Route Number	380	380	381	380	381	380	380	381	380	381	380	380	381
A	Watsons Bay Military Rd	...	10:57	...	...	...	11:17	...	...	11:37	...	...	11:57	...
B	Dover Heights Military Rd	...	11:05	...	...	...	11:25	...	...	11:45	...	...	12:05	...
C	North Bondi Military Rd	11:05	11:15	...	11:25	...	11:35	11:45	...	11:55	...	12:05	12:15	...
D	Bondi Beach Campbell Pde	11:08	11:18	11:25	11:28	11:37	11:38	11:48	11:55	11:58	12:07	12:08	12:18	12:23
E	Bondi Fletcher St	...	...	11:31	...	11:43	...	...	12:01	...	12:13	...	...	12:29
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	p11:22	p11:32	11:41	p11:42	11:53	p11:52	p12:02	12:11	p12:12	12:23	p12:22	p12:32	12:39
H	Darlinghurst Taylor Square	p11:39	p11:49	...	p11:59	...	p12:09	p12:19	...	p12:29	...	p12:39	p12:49	...
J	City - Circular Quay Young St	11:52	12:02	...	12:12	...	12:22	12:32	...	12:42	...	12:52	13:02	...

Monday to Friday (cont...)														
map ref	Route Number	380	381	380	380	381	380	381	380	380	381	380	381	380
A	Watsons Bay Military Rd	...	...	12:17	...	...	12:37	...	...	12:57	...	...	...	13:17
B	Dover Heights Military Rd	...	...	12:25	...	...	12:45	...	...	13:05	...	...	...	13:25
C	North Bondi Military Rd	12:25	...	12:35	12:45	...	12:55	...	13:05	13:15	...	13:25	...	13:35
D	Bondi Beach Campbell Pde	12:28	12:37	12:38	12:48	12:55	12:58	13:07	13:08	13:18	13:23	13:28	13:37	13:38
E	Bondi Fletcher St	...	12:43	...	...	13:01	...	13:13	...	...	13:29	...	13:43	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	p12:42	12:53	p12:52	p13:02	13:11	p13:12	13:23	p13:22	p13:32	13:39	p13:42	13:53	p13:52
H	Darlinghurst Taylor Square	p12:59	...	p13:09	p13:19	...	p13:29	...	p13:39	p13:49	...	p13:59	...	p14:09
J	City - Circular Quay Young St	13:12	...	13:22	13:32	...	13:42	...	13:52	14:02	...	14:12	...	14:22

Monday to Friday (cont...)														
map ref	Route Number	380	381	380	381	380	380	381	380	381	380	380	381	380
A	Watsons Bay Military Rd	...	...	13:37	...	...	13:57	...	...	...	14:20	...	...	14:40
B	Dover Heights Military Rd	...	...	13:45	...	...	14:05	...	...	...	14:28	...	...	14:48
C	North Bondi Military Rd	13:45	...	13:55	...	14:05	14:15	...	14:28	...	14:38	14:48	...	14:58
D	Bondi Beach Campbell Pde	13:48	13:52	13:58	14:07	14:08	14:18	14:23	14:31	14:37	14:41	14:51	14:54	15:01
E	Bondi Fletcher St	...	13:58	...	14:13	...	...	14:29	...	14:43	...	...	15:00	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	p14:02	14:08	p14:12	14:23	p14:22	p14:32	14:39	p14:45	14:53	p14:55	p15:06	15:12	p15:17
H	Darlinghurst Taylor Square	p14:19	...	p14:29	...	p14:39	p14:49	...	p15:02	...	p15:10	p15:21	...	p15:32
J	City - Circular Quay Young St	14:32	...	14:42	...	14:52	15:02	...	15:15	...	15:23	15:34	...	15:45

Monday to Friday (cont...)													
map ref	Route Number	380	381	380	380	381	380	380	381	380	380	381	380
A	Watsons Bay Military Rd	...	...	14:59	...	...	15:18	...	15:40	...	...	15:59	...
B	Dover Heights Military Rd	...	...	15:07	...	...	15:26	...	15:48	...	...	16:07	...
C	North Bondi Military Rd	15:08	...	15:17	15:28	...	15:36	15:48	15:58	...	16:08	16:17	16:20
D	Bondi Beach Campbell Pde	15:11	15:13	15:20	15:31	15:33	15:39	15:51	16:01	16:03	16:11	16:20	16:23
E	Bondi Fletcher St	...	15:19	...	...	15:39	...	...	...	16:09	...	...	16:29
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	p15:27	15:31	p15:36	p15:47	15:51	p15:55	p16:07	p16:17	16:21	p16:27	p16:36	16:41
H	Darlinghurst Taylor Square	p15:42	...	p15:51	p16:02	...	p16:10	p16:22	p16:32	...	p16:42	p16:51	...
J	City - Circular Quay Young St	15:55	...	16:05	16:17	...	16:25	16:37	16:47	...	16:57	17:05	...

Monday to Friday (cont...)														
map ref	Route Number	380	381	380	380	380	380	381	380	381	380	381	380	381
A	Watsons Bay Military Rd	16:18	...	...	16:38	...	...	...	16:58	...	17:20	...	17:35	...
B	Dover Heights Military Rd	16:26	...	...	16:46	...	...	...	17:06	...	17:28	...	17:43	...
C	North Bondi Military Rd	16:36	16:40	16:48	16:56	...	17:08	17:10	17:16	17:25	17:38	17:40	17:53	17:55
D	Bondi Beach Campbell Pde	16:39	16:43	16:51	16:59	17:07	17:11	17:13	17:19	17:28	17:41	17:43	17:56	17:58
E	Bondi Fletcher St	...	16:49	...	...	...	...	17:19	...	17:34	...	17:49	...	18:04
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	p16:55	17:01	p17:07	p17:15	p17:23	p17:27	17:31	p17:35	17:46	p17:57	18:01	p18:12	18:16
H	Darlinghurst Taylor Square	p17:10	...	p17:22	p17:30	p17:38	p17:42	...	p17:50	...	p18:12	...	p18:27	...
J	City - Circular Quay Young St	17:25	...	17:37	17:45	17:53	17:57	...	18:05	...	18:25	...	18:40	...

Monday to Friday (cont...)														
map ref	Route Number	380	381	381	380	381	380	380	380	380	380	382	382	380
A	Watsons Bay Military Rd	17:50	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	17:58	...	...	18:18	...	18:38	18:56	19:21	19:42	20:05	...	...	20:22
C	North Bondi Military Rd	18:08	18:10	18:25	18:28	18:40	18:48	19:06	19:31	19:51	20:14	...	...	20:31
D	Bondi Beach Campbell Pde	18:11	18:13	18:28	18:31	18:43	18:51	19:09	19:34	19:54	20:17	f 20:22	f 20:29	20:34
E	Bondi Fletcher St	...	18:19	18:34	...	18:49	...	...	...	...	...	...	...	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	p 18:27	18:31	18:46	p 18:47	19:01	19:07	19:25	19:45	20:05	20:28	f 20:33	f 20:40	20:45
H	Darlinghurst Taylor Square	p 18:42	...	...	19:02	...	19:22	19:39	19:59	20:19	20:42	...	...	20:59
J	City - Circular Quay Young St	18:55	...	...	19:15	...	19:35	19:52	20:12	20:32	20:55	...	...	21:09



Monday to Friday (cont...)														
map ref	Route Number	380	382	380	382	382	380	382	380	380	380	380	380	380
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	20:44	...	21:05	...	...	21:25	...	21:45	22:05	22:25	22:45	23:05	...
C	North Bondi Military Rd	20:53	...	21:13	...	...	21:33	...	21:53	22:13	22:33	22:53	23:13	23:27
D	Bondi Beach Campbell Pde	20:56	f21:01	21:16	f21:21	f21:31	21:36	f21:46	21:56	22:16	22:36	22:56	23:16	23:30
E	Bondi Fletcher St	...	...	...	...	...	...	...	...	...	...	...	...	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	21:06	f21:10	21:25	f21:30	f21:40	21:45	f21:55	22:05	22:25	22:45	23:05	23:25	23:39
H	Darlinghurst Taylor Square	21:18	...	21:37	...	...	21:57	...	22:17	22:37	22:57	23:17	23:37	23:51
J	City - Circular Quay Young St	21:28	...	21:47	...	...	22:07	...	22:27	22:47	23:07	23:27	23:47	00:01

Monday to Friday (cont...)														
map ref	Route Number	380	380	382	380	380	380	380	380	380	380	380	380	380
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	...	23:44	...	...	...	...	...	...	...	...	...	...	...
C	North Bondi Military Rd	23:40	23:52	...	00:05	00:13	00:23	f00:37	00:57	f01:12	01:25	f01:40	01:55	02:25
D	Bondi Beach Campbell Pde	23:43	23:55	f00:01	00:08	00:16	00:26	f00:40	01:00	f01:15	01:28	f01:43	01:58	02:28
E	Bondi Fletcher St	...	...	...	...	...	...	...	...	...	...	...	...	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	23:52	00:04	f00:10	00:17	00:25	00:35	f00:49	01:08	f01:23	01:36	f01:51	02:06	02:36
H	Darlinghurst Taylor Square	00:04	00:16	...	00:29	00:37	00:47	f01:01	01:18	f01:33	01:46	f02:01	02:16	02:46
J	City - Circular Quay Young St	00:14	00:26	...	00:39	00:47	00:57	f01:10	01:27	f01:42	01:55	f02:10	02:25	02:55

Monday to Friday (cont...)				
map ref	Route Number	380	380	380
A	Watsons Bay Military Rd	...	...	...
B	Dover Heights Military Rd	...	...	...
C	North Bondi Military Rd	02:55	03:25	03:55
D	Bondi Beach Campbell Pde	02:58	03:28	03:58
E	Bondi Fletcher St	...	...	...
F	Bondi Curlewis St	...	...	...
G	Bondi Jn Interchange Stand N	03:06	03:36	04:06
H	Darlinghurst Taylor Square	03:16	03:46	04:16
J	City - Circular Quay Young St	03:25	03:55	04:25

Saturday															
map ref	Route Number	380	380	380	381	380	381	380	380	381	380	381	380	381	380
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	...	...	...	...	...	...	06:31	07:06	...	07:31	...	07:56	...	...
C	North Bondi Military Rd	04:25	04:49	05:17	05:30	05:54	06:14	06:39	07:14	07:18	07:39	07:45	08:04	08:07	08:14
D	Bondi Beach Campbell Pde	04:28	04:52	05:20	05:33	05:57	06:17	06:42	07:17	07:21	07:42	07:48	08:07	08:10	08:17
E	Bondi Fletcher St	...	...	...	05:39	...	06:23	...	...	07:27	...	07:54	...	08:16	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	04:36	05:02	05:32	05:47	06:09	06:31	06:54	07:29	07:35	07:54	08:02	08:19	08:24	08:29
H	Darlinghurst Taylor Square	04:46	05:13	05:45	...	06:22	...	07:07	07:42	...	08:07	...	08:32	...	08:42
J	City - Circular Quay Young St	04:58	05:25	05:57	...	06:34	...	07:19	07:54	...	08:19	...	08:44	...	08:54

Saturday (continued...)															
map ref	Route Number	380	381	380	380	381	380	381	380	381	380	381	380	380	380
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	08:23	...	...	08:50	...	09:02	...	...	...	09:29	...	...	09:45	...
C	North Bondi Military Rd	08:31	08:34	08:45	08:58	09:00	09:12	09:16	09:25	09:33	09:39	09:42	09:47	09:55	...
D	Bondi Beach Campbell Pde	08:34	08:37	08:48	09:01	09:03	09:15	09:19	09:28	09:36	09:42	09:45	09:50	09:58	...
E	Bondi Fletcher St	...	08:43	...	...	09:09	...	09:25	...	09:42	...	09:51	...	...	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	08:46	08:51	09:00	09:16	09:20	09:30	09:36	09:43	09:53	09:57	10:03	10:07	10:17	...
H	Darlinghurst Taylor Square	08:59	...	09:16	09:32	...	09:46	...	09:59	...	10:18	...	10:28	10:38	r10:42
J	City - Circular Quay Young St	09:11	...	09:28	09:44	...	09:58	...	10:11	...	10:30	...	10:40	10:50	10:54

Saturday (continued...)															
map ref	Route Number	380	381	380	380	380	380	381	380	380	380	380	381	380	380
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	10:27	...	...	10:47	...	...	...
B	Dover Heights Military Rd	...	...	...	10:15	...	...	...	10:35	...	...	10:55	...	...	...
C	North Bondi Military Rd	10:05	10:07	10:15	10:25	...	10:35	10:36	10:45	...	10:55	11:05	11:06	...	11:15
D	Bondi Beach Campbell Pde	10:08	10:10	10:18	10:28	...	10:38	10:39	10:48	...	10:58	11:08	11:09	...	11:18
E	Bondi Fletcher St	...	10:17	...	...	...	...	10:46	...	...	...	...	11:16	...	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	10:27	10:31	10:37	10:47	...	10:57	11:00	11:07	...	11:17	11:27	11:30	...	11:37
H	Darlinghurst Taylor Square	10:48	...	10:58	11:08	r11:12	11:18	...	11:28	r11:32	11:38	11:48	...	r11:52	11:58
J	City - Circular Quay Young St	11:00	...	11:10	11:20	11:24	11:30	...	11:40	11:44	11:50	12:00	...	12:04	12:10

Saturday (continued...)															
map ref	Route Number	380	380	380	381	380	380	380	381	380	380	380	380	380	381
A	Watsons Bay Military Rd	11:07	...	...	...	11:27	...	11:47	...	...	...	12:07	...	...	...
B	Dover Heights Military Rd	11:15	...	...	...	11:35	...	11:55	...	...	...	12:15	...	...	...
C	North Bondi Military Rd	11:25	...	11:35	11:36	11:45	...	12:05	12:06	...	12:15	12:25	...	12:35	12:36
D	Bondi Beach Campbell Pde	11:28	...	11:38	11:39	11:48	...	12:08	12:09	...	12:18	12:28	...	12:38	12:39
E	Bondi Fletcher St	...	...	...	11:46	...	...	...	12:16	...	...	...	...	...	12:46
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	11:47	...	11:57	12:00	12:07	...	12:27	12:30	...	12:37	12:47	...	12:57	13:00
H	Darlinghurst Taylor Square	12:08	r12:12	12:18	...	12:28	r12:38	12:48	...	r12:52	12:58	13:08	r13:12	13:18	...
J	City - Circular Quay Young St	12:20	12:24	12:30	...	12:40	12:50	13:00	...	13:04	13:10	13:20	13:24	13:30	...

Saturday (continued...)															
map ref	Route Number	380	380	380	380	381	380	380	380	380	380	381	380	380	380
A	Watsons Bay Military Rd	12:27	...	...	12:47	...	...	...	13:07	...	...	...	13:27	...	13:47
B	Dover Heights Military Rd	12:35	...	...	12:55	...	...	...	13:15	...	...	...	13:35	...	13:55
C	North Bondi Military Rd	12:45	...	12:55	13:05	13:06	...	13:15	13:25	...	13:35	13:36	13:45	13:55	14:05
D	Bondi Beach Campbell Pde	12:48	...	12:58	13:08	13:09	...	13:18	13:28	...	13:38	13:39	13:48	13:58	14:08
E	Bondi Fletcher St	...	...	...	...	13:16	...	...	...	...	...	13:46	...	...	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	13:07	...	13:17	13:27	13:30	...	13:37	13:47	...	13:57	14:00	14:07	14:17	14:27
H	Darlinghurst Taylor Square	13:28	r13:32	13:38	13:48	...	r13:52	13:58	14:08	r14:12	14:18	...	14:28	14:38	14:48
J	City - Circular Quay Young St	13:40	13:44	13:50	14:00	...	14:04	14:10	14:20	14:24	14:30	...	14:40	14:50	15:00

Saturday (continued...)															
map ref	Route Number	381	380	380	380	381	380	381	381	380	380	381	380	380	381
A	Watsons Bay Military Rd	...	...	14:07	...	...	14:27	...	...	...	14:47	...	...	15:07	...
B	Dover Heights Military Rd	...	...	14:15	...	...	14:35	...	...	...	14:55	...	...	15:15	...
C	North Bondi Military Rd	14:06	14:15	14:25	14:35	14:36	14:45	...	14:51	14:55	15:05	15:06	15:15	15:25	...
D	Bondi Beach Campbell Pde	14:09	14:18	14:28	14:38	14:39	14:48	...	14:54	14:58	15:08	15:09	15:18	15:28	...
E	Bondi Fletcher St	14:16	...	...	...	14:46	...	14:58	15:01	...	...	15:16	...	...	15:28
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	14:30	14:37	14:47	14:57	15:00	15:07	15:12	15:15	15:17	15:27	15:30	15:37	15:47	15:42
H	Darlinghurst Taylor Square	...	14:58	15:08	15:18	...	15:28	...	...	15:38	15:48	...	15:58	16:08	...
J	City - Circular Quay Young St	...	15:10	15:20	15:30	...	15:40	...	...	15:50	16:00	...	16:10	16:20	...

Saturday (continued...)															
map ref	Route Number	380	381	380	380	381	381	380	380	381	381	380	381	380	380
A	Watsons Bay Military Rd	...	...	15:27	...	...	...	15:47	...	...	...	16:09	...	16:23	...
B	Dover Heights Military Rd	...	...	15:35	...	...	...	15:55	...	...	...	16:17	...	16:31	...
C	North Bondi Military Rd	15:35	15:36	15:45	15:55	...	15:59	16:05	16:16	...	16:19	16:27	16:36	16:41	16:52
D	Bondi Beach Campbell Pde	15:38	15:39	15:48	15:58	...	16:02	16:08	16:19	...	16:22	16:30	16:39	16:44	16:55
E	Bondi Fletcher St	...	15:46	...	...	15:58	16:09	...	...	16:28	16:29	...	16:46	...	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	15:57	16:00	16:07	16:17	16:12	16:23	16:27	16:38	16:42	16:43	16:49	17:00	17:03	17:13
H	Darlinghurst Taylor Square	16:18	...	16:28	16:38	...	...	16:48	16:59	...	...	17:07	...	17:20	17:30
J	City - Circular Quay Young St	16:30	...	16:40	16:50	...	...	17:00	17:11	...	...	17:19	...	17:32	17:42

Saturday (continued...)															
map ref	Route Number	381	381	380	381	381	381	380	381	380	381	381	381	380	381
A	Watsons Bay Military Rd	...	...	16:45	...	...	...	17:10	...	17:32	...	...	...	17:54	...
B	Dover Heights Military Rd	...	...	16:53	...	...	...	17:18	...	17:40	...	...	...	18:02	...
C	North Bondi Military Rd	...	16:54	17:03	17:16	...	17:27	17:28	17:38	17:50	...	17:56	18:00	18:11	18:16
D	Bondi Beach Campbell Pde	...	16:57	17:06	17:19	...	17:30	17:31	17:41	17:53	...	17:59	18:03	18:14	18:19
E	Bondi Fletcher St	16:58	17:03	...	17:25	17:28	17:36	...	17:47	...	17:54	18:04	18:08	...	18:24
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	17:11	17:16	17:23	17:38	17:41	17:49	17:48	18:00	18:09	18:06	18:16	18:20	18:29	18:36
H	Darlinghurst Taylor Square	...	...	17:40	...	...	...	18:05	...	18:26	...	...	...	18:46	...
J	City - Circular Quay Young St	...	...	17:52	...	...	...	18:17	...	18:38	...	...	...	18:58	...

Saturday (continued...)															
map ref	Route Number	381	381	380	381	381	381	380	381	381	380	381	380	381	380
A	Watsons Bay Military Rd	...	...	18:14	...	...	...	18:34	...	...	...	...	...	...	...
B	Dover Heights Military Rd	...	...	18:22	...	...	...	18:42	...	...	...	...	19:22	...	19:45
C	North Bondi Military Rd	...	18:28	18:31	18:40	...	18:48	18:51	19:01	19:08	19:11	19:20	19:31	19:37	19:54
D	Bondi Beach Campbell Pde	...	18:31	18:34	18:43	...	18:51	18:54	19:04	19:11	19:14	19:23	19:34	19:40	19:57
E	Bondi Fletcher St	18:24	18:36	...	18:48	18:54	18:56	...	19:09	19:16	...	19:28	...	19:45	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	18:36	18:48	18:49	19:00	19:06	19:08	19:09	19:21	19:28	19:29	19:40	19:49	19:57	20:09
H	Darlinghurst Taylor Square	...	...	19:06	...	...	...	19:26	...	...	19:46	...	20:04	...	20:22
J	City - Circular Quay Young St	...	...	19:18	...	...	...	19:38	...	...	19:58	...	20:15	...	20:33

Saturday (continued...)															
map ref	Route Number	381	380	380	380	380	380	380	380	380	380	380	380	380	380
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	...	20:05	...	20:47	21:08	...	21:48	22:08	...	22:49	23:09	...	...	23:41
C	North Bondi Military Rd	20:00	20:14	20:34	20:56	21:16	21:36	21:56	22:16	22:36	22:57	23:17	23:27	23:38	23:49
D	Bondi Beach Campbell Pde	20:03	20:17	20:37	20:59	21:19	21:39	21:59	22:19	22:39	23:00	23:20	23:30	23:41	23:52
E	Bondi Fletcher St	20:08	...	...	...	...	...	...	...	...	...	...	...	...	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	20:17	20:29	20:49	21:08	21:28	21:48	22:08	22:28	22:48	23:09	23:29	23:39	23:50	00:01
H	Darlinghurst Taylor Square	...	20:42	21:02	21:21	21:41	22:01	22:21	22:41	23:01	23:22	23:42	23:52	00:03	00:14
J	City - Circular Quay Young St	...	20:53	21:13	21:32	21:52	22:12	22:32	22:52	23:12	23:33	23:53	00:03	00:14	00:25















Saturday (continued...)														
map ref	Route Number	380	380	380	380	380	380	380	380	380	380	380	380	380
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...
C	North Bondi Military Rd	00:00	00:12	00:25	00:40	00:55	01:10	01:25	01:40	01:55	02:25	02:55	03:25	03:55
D	Bondi Beach Campbell Pde	00:03	00:15	00:28	00:43	00:58	01:13	01:28	01:43	01:58	02:28	02:58	03:28	03:58
E	Bondi Fletcher St	...	...	...	...	...	...	...	...	...	...	...	...	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	00:12	00:24	00:37	00:52	01:07	01:21	01:36	01:51	02:06	02:36	03:06	03:36	04:06
H	Darlinghurst Taylor Square	00:25	00:37	00:50	01:04	01:17	01:31	01:46	02:01	02:16	02:46	03:16	03:46	04:16
J	City - Circular Quay Young St	00:36	00:48	01:01	01:13	01:26	01:40	01:55	02:10	02:25	02:55	03:25	03:55	04:25















Sunday & Public Holidays														
map ref	Route Number	380	380	380	381	380	381	380	381	380	381	380	381	380
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	...	...	...	...	...	...	...	...	06:47	...	...	...	07:31
C	North Bondi Military Rd	04:25	04:49	05:17	05:30	05:54	06:10	06:25	06:40	06:55	07:05	07:15	07:32	07:39
D	Bondi Beach Campbell Pde	04:28	04:52	05:20	05:33	05:57	06:13	06:28	06:43	06:58	07:08	07:18	07:35	07:42
E	Bondi Fletcher St	...	...	...	05:39	...	06:19	...	06:49	...	07:14	...	07:41	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	04:36	05:02	05:30	05:45	06:07	06:25	06:38	06:55	07:08	07:20	07:28	07:47	07:52
H	Darlinghurst Taylor Square	04:46	05:13	05:43	...	06:20	...	06:51	...	07:21	...	07:41	...	08:05
J	City - Circular Quay Young St	04:56	05:23	05:54	...	06:31	...	07:02	...	07:32	...	07:52	...	08:16















Sunday & Pub Hols (cont...)															
map ref	Route Number	380	380	380	380	380	380	380	381	380	381	380	381	380	381
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	08:01	...	08:38	...	09:03	...	09:33	...	...	...	09:57	...	10:12	...
C	North Bondi Military Rd	08:09	08:31	08:46	08:58	09:13	09:30	09:43	...	09:53	...	10:07	...	10:22	...
D	Bondi Beach Campbell Pde	08:12	08:34	08:49	09:01	09:16	09:33	09:46	09:51	09:56	10:04	10:10	10:19	10:25	10:34
E	Bondi Fletcher St	...	...	...	...	...	...	...	09:57	...	10:11	...	10:26	...	10:41
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	08:22	08:44	08:59	09:14	09:29	09:46	09:59	10:10	10:14	10:25	10:29	10:40	10:44	10:55
H	Darlinghurst Taylor Square	08:35	08:57	09:15	09:30	09:45	10:03	10:20	...	10:35	...	10:50	...	11:05	...
J	City - Circular Quay Young St	08:46	09:09	09:27	09:42	09:57	10:15	10:32	...	10:47	...	11:02	...	11:17	...

Sunday & Pub Hols (cont...)															
map ref	Route Number	380	381	381	380	381	380	381	381	380	381	380	381	381	380
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	11:19	...	...	11:34
B	Dover Heights Military Rd	10:27	...	...	10:42	...	10:57	...	...	11:12	...	11:27	...	...	11:42
C	North Bondi Military Rd	10:37	...	...	10:52	...	11:07	...	...	11:22	...	11:37	...	...	11:52
D	Bondi Beach Campbell Pde	10:40	10:44	10:54	10:55	11:04	11:10	11:14	11:24	11:25	11:34	11:40	11:44	11:54	11:55
E	Bondi Fletcher St	...	10:51	11:01	...	11:11	...	11:21	11:31	...	11:41	...	11:51	12:01	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	10:59	11:05	11:15	11:14	11:25	11:29	11:35	11:45	11:44	11:55	11:59	12:05	12:15	12:14
H	Darlinghurst Taylor Square	11:20	...	...	11:35	...	11:50	...	...	12:05	...	12:20	...	...	12:35
J	City - Circular Quay Young St	11:32	...	...	11:47	...	12:02	...	...	12:17	...	12:32	...	...	12:47

Sunday & Pub Hols (cont...)															
map ref	Route Number	381	380	381	381	380	381	380	381	381	380	381	380	381	381
A	Watsons Bay Military Rd	...	11:49	...	...	12:04	...	12:19	...	...	12:34	...	12:49	...	...
B	Dover Heights Military Rd	...	11:57	...	...	12:12	...	12:27	...	...	12:42	...	12:57	...	...
C	North Bondi Military Rd	...	12:07	...	...	12:22	...	12:37	...	...	12:52	...	13:07	...	...
D	Bondi Beach Campbell Pde	12:04	12:10	12:14	12:24	12:25	12:34	12:40	12:44	12:54	12:55	13:04	13:10	13:14	13:24
E	Bondi Fletcher St	12:11	...	12:21	12:31	...	12:41	...	12:51	13:01	...	13:11	...	13:21	13:31
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	12:25	12:29	12:35	12:45	12:44	12:55	12:59	13:05	13:15	13:14	13:25	13:29	13:35	13:45
H	Darlinghurst Taylor Square	...	12:50	...	...	13:05	...	13:20	...	...	13:35	...	13:50	...	...
J	City - Circular Quay Young St	...	13:02	...	...	13:17	...	13:32	...	...	13:47	...	14:02	...	...

Sunday & Pub Hols (cont...)															
map ref	Route Number	380	381	380	381	381	380	381	380	381	381	380	381	380	381
A	Watsons Bay Military Rd	13:04	...	13:19	...	...	13:34	...	13:49	...	...	14:04	...	14:18	...
B	Dover Heights Military Rd	13:12	...	13:27	...	...	13:42	...	13:57	...	...	14:12	...	14:26	...
C	North Bondi Military Rd	13:22	...	13:37	13:41	13:51	13:52	14:01	14:07	14:11	14:21	14:22	14:31	14:36	14:41
D	Bondi Beach Campbell Pde	13:25	13:34	13:40	13:44	13:54	13:55	14:04	14:10	14:14	14:24	14:25	14:34	14:39	14:44
E	Bondi Fletcher St	...	13:41	...	13:51	14:01	...	14:11	...	14:21	14:31	...	14:41	...	14:51
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	13:44	13:55	13:59	14:05	14:15	14:14	14:25	14:29	14:35	14:45	14:44	14:55	14:58	15:05
H	Darlinghurst Taylor Square	14:05	...	14:20	...	...	14:35	...	14:50	...	...	15:05	...	15:19	...
J	City - Circular Quay Young St	14:17	...	14:32	...	...	14:47	...	15:02	...	...	15:17	...	15:31	...

Sunday & Pub Hols (cont...)															
map ref	Route Number	381	381	380	381	380	381	380	381	381	380	381	380	381	380
A	Watsons Bay Military Rd	...	...	14:34	...	14:49	...	15:02	...	...	...	...	15:19	...	...
B	Dover Heights Military Rd	...	...	14:42	...	14:57	...	15:10	...	...	...	...	15:27	...	...
C	North Bondi Military Rd	...	14:51	14:52	15:01	15:07	15:11	15:20	...	15:21	15:25	15:31	15:37	15:41	15:50
D	Bondi Beach Campbell Pde	...	14:54	14:55	15:04	15:10	15:14	15:23	...	15:24	15:28	15:34	15:40	15:44	15:53
E	Bondi Fletcher St	14:58	15:01	...	15:11	...	15:21	...	15:28	15:31	...	15:41	...	15:51	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	15:12	15:15	15:14	15:25	15:29	15:35	15:42	15:42	15:45	15:47	15:55	15:59	16:05	16:12
H	Darlinghurst Taylor Square	...	...	15:35	...	15:50	...	16:03	...	...	16:08	...	16:20	...	16:33
J	City - Circular Quay Young St	...	...	15:47	...	16:02	...	16:15	...	...	16:20	...	16:32	...	16:45

Sunday & Pub Hols (cont...)															
map ref	Route Number	381	381	380	381	380	381	380	381	381	380	381	381	380	380
A	Watsons Bay Military Rd	...	...	15:37	...	...	...	16:00	...	...	...	...	...	16:23	...
B	Dover Heights Military Rd	...	...	15:45	...	...	...	16:08	...	...	...	...	...	16:31	...
C	North Bondi Military Rd	...	15:51	15:55	16:01	16:06	16:11	16:18	...	16:21	16:30	16:31	16:40	16:41	16:46
D	Bondi Beach Campbell Pde	...	15:54	15:58	16:04	16:09	16:14	16:21	...	16:24	16:33	16:34	16:43	16:44	16:49
E	Bondi Fletcher St	15:58	16:01	...	16:11	...	16:21	...	16:28	16:31	...	16:41	16:50	...	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	16:12	16:15	16:17	16:25	16:28	16:35	16:40	16:42	16:45	16:52	16:55	17:04	17:03	17:08
H	Darlinghurst Taylor Square	...	...	16:38	...	16:49	...	17:01	...	...	17:13	...	...	17:24	17:29
J	City - Circular Quay Young St	...	...	16:50	...	17:01	...	17:13	...	...	17:25	...	...	17:36	17:41

Sunday & Pub Hols (cont...)															
map ref	Route Number	381	381	380	381	381	380	381	381	381	380	381	380	381	381
A	Watsons Bay Military Rd	...	...	16:40	...	...	16:55	...	...	...	17:10	...	17:25	...	...
B	Dover Heights Military Rd	...	...	16:48	...	...	17:03	...	...	...	17:18	...	17:33	...	...
C	North Bondi Military Rd	...	16:53	16:58	17:01	17:08	17:13	17:16	...	17:23	17:28	17:35	17:43	...	17:58
D	Bondi Beach Campbell Pde	...	16:56	17:01	17:04	17:11	17:16	17:19	...	17:26	17:31	17:38	17:46	...	18:01
E	Bondi Fletcher St	16:58	17:03	...	17:11	17:18	...	17:26	17:28	17:33	...	17:45	...	17:54	18:07
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	17:12	17:17	17:20	17:25	17:32	17:35	17:40	17:42	17:47	17:50	17:59	18:04	18:07	18:19
H	Darlinghurst Taylor Square	...	...	17:41	...	...	17:56	...	...	...	18:08	...	18:21	...	...
J	City - Circular Quay Young St	...	...	17:53	...	...	18:08	...	...	...	18:20	...	18:33	...	...

Sunday & Pub Hols (cont...)															
map ref	Route Number	380	381	381	380	380	381	381	380	381	380	380	380	380	380
A	Watsons Bay Military Rd	17:45	...	...	18:05	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	17:53	...	...	18:13	18:34	...	...	18:58	...	19:19	19:40	20:02	20:22	20:42
C	North Bondi Military Rd	18:03	...	18:18	18:23	18:44	...	18:51	19:07	19:22	19:27	19:48	20:10	20:30	20:50
D	Bondi Beach Campbell Pde	18:06	...	18:21	18:26	18:47	...	18:54	19:10	19:25	19:30	19:51	20:13	20:33	20:53
E	Bondi Fletcher St	...	18:24	18:27	...	...	18:54	19:00	...	19:30	...	...	...	...	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	18:22	18:36	18:39	18:42	19:02	19:04	19:09	19:22	19:39	19:42	20:02	20:22	20:42	21:02
H	Darlinghurst Taylor Square	18:39	...	...	18:59	19:16	...	...	19:36	...	19:56	20:14	20:34	20:54	21:14
J	City - Circular Quay Young St	18:51	...	...	19:11	19:28	...	...	19:48	...	20:07	20:24	20:44	21:04	21:24

Sunday & Pub Hols (cont...)															
map ref	Route Number	380	380	380	380	380	380	380	380	380	380	380	380	380	380
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...	...
B	Dover Heights Military Rd	21:02	21:21	21:47	22:17	22:47	23:17	23:47	...	...	...	...	...	...	...
C	North Bondi Military Rd	21:10	21:29	21:55	22:25	22:55	23:25	23:55	00:25	00:55	01:25	01:55	02:25	02:55	03:25
D	Bondi Beach Campbell Pde	21:13	21:32	21:58	22:28	22:58	23:28	23:58	00:28	00:58	01:28	01:58	02:28	02:58	03:28
E	Bondi Fletcher St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
F	Bondi Curlewis St	...	...	...	...	...	...	...	...	...	...	...	...	...	...
G	Bondi Jn Interchange Stand N	21:22	21:41	22:07	22:37	23:07	23:37	00:07	00:37	01:07	01:36	02:06	02:36	03:06	03:36
H	Darlinghurst Taylor Square	21:34	21:53	22:19	22:49	23:19	23:49	00:19	00:49	01:17	01:46	02:16	02:46	03:16	03:46
J	City - Circular Quay Young St	21:44	22:03	22:29	22:59	23:29	23:59	00:29	00:59	01:26	01:55	02:25	02:55	03:25	03:55

Monday to Friday														
map ref	Route Number	380	380	380	380	380	380	380	380	380	380	380	380	381
J	City - Circular Quay Alfred St	04:09	04:40	05:10	...	05:35	...	05:55	06:30	06:50	p07:10	p07:30	p07:50	...
I	City - Martin Pl Elizabeth St	04:12	04:43	05:13	...	05:38	...	05:58	06:33	06:53	p07:13	p07:34	p07:54	...
H	Darlinghurst Taylor Square	04:18	04:51	05:21	...	05:46	...	06:06	06:41	p07:01	p07:23	p07:46	p08:06	...
G	Bondi Jn Interchange Stand A	04:28	05:02	05:34	e05:48	05:59	06:10	06:19	06:54	p07:14	p07:36	p08:02	p08:22	p08:35
E	Bondi Fletcher St	...	...	...	...	...	...	...	...	...	...	...	...	08:41
D	Bondi Beach Campbell Pde	04:36	05:12	05:44	05:58	06:09	06:20	06:29	07:04	07:24	07:46	08:12	08:32	08:47
C	North Bondi Military Rd	04:39	05:15	05:47	06:01	06:12	06:23	06:32	07:07	07:27	07:49	08:15	08:35	08:50
B	Dover Heights Military Rd	...	...	...	06:09	...	06:31	06:40	07:15	07:36	07:59	08:25	08:45	...
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...

Monday to Friday (cont...)														
map ref	Route Number	380	381	381	380	381	380	381	380	381	380	380	381	380
J	City - Circular Quay Alfred St	p08:10	...	...	p08:37	...	p08:52	...	...	...	p09:17	...	...	p09:37
I	City - Martin Pl Elizabeth St	p08:14	...	...	p08:41	...	p08:56	...	p09:10	...	p09:21	p09:31	...	p09:41
H	Darlinghurst Taylor Square	p08:25	...	...	p08:52	...	p09:06	...	p09:20	...	p09:31	p09:41	...	p09:51
G	Bondi Jn Interchange Stand A	p08:41	p08:50	p09:05	p09:08	p09:18	p09:22	p09:32	p09:36	p09:45	p09:47	p09:57	p10:06	p10:07
E	Bondi Fletcher St	...	08:56	09:11	...	09:24	...	09:38	...	09:51	...	...	10:12	...
D	Bondi Beach Campbell Pde	08:51	09:02	09:17	09:18	09:30	09:32	09:44	09:46	09:57	09:57	10:07	10:18	10:17
C	North Bondi Military Rd	08:54	...	...	09:21	...	09:35	...	09:49	...	10:00	10:10	...	10:20
B	Dover Heights Military Rd	09:04	...	...	09:31	...	09:45	...	...	...	10:10	...	...	10:30
A	Watsons Bay Military Rd	...	...	...	09:39	...	09:53	...	...	...	10:18	...	...	10:38













Monday to Friday (cont...)														
map ref	Route Number	380	381	380	380	381	380	380	381	380	381	380	380	381
J	City - Circular Quay Alfred St	...	...	p09:58	...	...	p10:17	...	...	p10:37	...	...	p10:57	...
I	City - Martin Pl Elizabeth St	p09:51	...	p10:02	p10:11	...	p10:21	p10:31	...	p10:41	...	p10:51	p11:01	...
H	Darlinghurst Taylor Square	p10:01	...	p10:12	p10:21	...	p10:31	p10:41	...	p10:51	...	p11:01	p11:11	...
G	Bondi Jn Interchange Stand A	p10:19	p10:26	p10:30	p10:39	p10:47	p10:49	p10:59	p11:07	p11:09	p11:17	p11:19	p11:29	p11:37
E	Bondi Fletcher St	...	10:32	...	...	10:53	...	...	11:13	...	11:23	...	...	11:43
D	Bondi Beach Campbell Pde	10:29	10:38	10:40	10:49	10:59	10:59	11:09	11:19	11:19	11:29	11:29	11:39	11:49
C	North Bondi Military Rd	10:32	...	10:43	10:52	...	11:02	11:12	...	11:22	...	11:32	11:42	...
B	Dover Heights Military Rd	...	...	10:53	...	...	11:12	...	...	11:32	...	...	11:52	...
A	Watsons Bay Military Rd	...	...	11:01	...	...	11:20	...	...	11:40	...	...	12:00	...

Monday to Friday (cont...)														
map ref	Route Number	380	381	380	380	381	380	381	380	380	381	380	381	380
J	City - Circular Quay Alfred St	...	...	p11:17	...	...	p11:37	...	...	p11:57	...	...	...	p12:17
I	City - Martin Pl Elizabeth St	p11:11	...	p11:21	p11:31	...	p11:41	...	p11:51	p12:01	...	p12:11	...	p12:21
H	Darlinghurst Taylor Square	p11:21	...	p11:31	p11:41	...	p11:51	...	p12:01	p12:11	...	p12:21	...	p12:31
G	Bondi Jn Interchange Stand A	p11:39	p11:47	p11:49	p11:59	p12:06	p12:09	p12:17	p12:19	p12:29	p12:37	p12:39	p12:47	p12:49
E	Bondi Fletcher St	...	11:53	...	...	12:12	...	12:23	...	...	12:43	...	12:53	...
D	Bondi Beach Campbell Pde	11:49	11:59	11:59	12:09	12:18	12:19	12:29	12:29	12:39	12:49	12:49	12:59	12:59
C	North Bondi Military Rd	11:52	...	12:02	12:12	...	12:22	...	12:32	12:42	...	12:52	...	13:02
B	Dover Heights Military Rd	...	...	12:12	...	...	12:32	...	...	12:52	...	...	...	13:12
A	Watsons Bay Military Rd	...	...	12:20	...	...	12:40	...	...	13:00	...	...	...	13:20

Monday to Friday (cont...)														
map ref	Route Number	380	381	380	381	380	380	381	380	381	380	380	381	380
J	City - Circular Quay Alfred St	...	...	p12:37	...	...	p12:57	...	...	...	p13:17	...	...	p13:37
I	City - Martin Pl Elizabeth St	p12:31	...	p12:41	...	p12:51	p13:01	...	p13:11	...	p13:21	p13:31	...	p13:41
H	Darlinghurst Taylor Square	p12:41	...	p12:51	...	p13:01	p13:11	...	p13:21	...	p13:31	p13:41	...	p13:51
G	Bondi Jn Interchange Stand A	p12:59	p13:06	p13:09	p13:18	p13:19	p13:29	p13:35	p13:39	p13:48	p13:49	p13:59	p14:06	p14:09
E	Bondi Fletcher St	...	13:12	...	13:24	...	...	13:41	...	13:54	...	...	14:12	...
D	Bondi Beach Campbell Pde	13:09	13:18	13:19	13:30	13:29	13:39	13:47	13:49	14:00	13:59	14:09	14:18	14:19
C	North Bondi Military Rd	13:12	...	13:22	...	13:32	13:42	...	13:52	...	14:02	14:12	...	14:22
B	Dover Heights Military Rd	...	...	13:32	...	...	13:52	...	...	...	14:12	...	...	14:32
A	Watsons Bay Military Rd	...	...	13:40	...	...	14:00	...	...	...	14:20	...	...	14:40

Monday to Friday (cont...)														
map ref	Route Number	381	380	380	381	380	381	380	380	381	380	381	380	381
J	City - Circular Quay Alfred St	...	...	p13:57	...	...	...	p14:17	...	...	p14:37	...	...	...
I	City - Martin Pl Elizabeth St	...	p13:51	p14:01	...	p14:11	...	p14:21	p14:31	...	p14:41	...	p14:51	...
H	Darlinghurst Taylor Square	...	p14:01	p14:11	...	p14:21	...	p14:31	p14:41	...	p14:51	...	p15:01	...
G	Bondi Jn Interchange Stand A	p14:17	p14:19	p14:29	p14:37	p14:39	p14:47	p14:49	p14:59	p15:07	p15:10	p15:17	p15:20	p15:29
E	Bondi Fletcher St	14:23	...	...	14:43	...	14:53	...	...	15:13	...	15:23	...	15:35
D	Bondi Beach Campbell Pde	14:29	14:29	14:39	14:49	14:49	14:59	14:59	15:09	15:19	15:20	15:29	15:30	15:41
C	North Bondi Military Rd	...	14:32	14:42	...	14:52	...	15:02	15:12	...	15:23	...	15:33	...
B	Dover Heights Military Rd	...	...	14:52	...	...	...	15:12	...	...	15:33	...	...	...
A	Watsons Bay Military Rd	...	...	15:00	...	...	...	15:20	...	...	15:41	...	...	...

Monday to Friday (cont...)															
map ref	Route Number	380	381	380	380	380	381	381	380	380	381	380	381	380	
J	City - Circular Quay Alfred St	p14:57	...	...	...	p15:17	...	...	...	...	...	p15:39	...	...
I	City - Martin Pl Elizabeth St	p15:01	...	p15:14	...	p15:21	...	...	p15:33	...	...	p15:43	...	...
H	Darlinghurst Taylor Square	p15:12	...	p15:25	...	p15:32	...	...	p15:44	...	...	p15:54	...	...
G	Bondi Jn Interchange Stand A	p15:31	p15:38	p15:44	p15:47	p15:51	p15:57	p16:02	p16:03	p16:07	p16:11	p16:13	p16:16	p16:21	
E	Bondi Fletcher St	...	15:44	...	...	...	16:03	16:08	...	...	16:17	...	16:22	...
D	Bondi Beach Campbell Pde	15:41	15:50	15:54	15:57	16:01	16:09	16:14	16:13	16:17	16:23	16:23	16:28	16:31	
C	North Bondi Military Rd	15:44	...	15:57	16:00	16:04	...	16:17	16:16	16:20	16:26	16:26	16:31	16:34	
B	Dover Heights Military Rd	15:54	...	...	16:10	16:14	...	...	16:26	...	...	16:36	...	16:44
A	Watsons Bay Military Rd	16:02	...	...	...	16:22	...	...	...	...	...	16:44	...	...

Monday to Friday (cont...)														
map ref	Route Number	381	380	381	381	380	381	381	380	380	381	380	381	380
J	City - Circular Quay Alfred St	...	...	...	...	p15:58	...	...	...	...	...	p16:13	...	...
I	City - Martin Pl Elizabeth St	...	p15:56	...	...	p16:03	...	...	p16:12	p16:15	...	p16:19	...	p16:27
H	Darlinghurst Taylor Square	...	p16:08	...	...	p16:16	...	...	p16:25	p16:28	...	p16:32	...	p16:40
G	Bondi Jn Interchange Stand A	p16:25	p16:27	p16:30	p16:33	p16:35	p16:38	p16:43	p16:44	p16:47	p16:49	p16:51	p16:57	p16:59
E	Bondi Fletcher St	16:31	...	16:36	16:39	...	16:44	16:49	...	...	16:55	...	17:03	...
D	Bondi Beach Campbell Pde	16:37	16:37	16:42	16:45	16:45	16:50	16:55	16:54	16:57	17:01	17:01	17:09	17:09
C	North Bondi Military Rd	16:40	16:40	16:45	16:48	16:48	16:53	16:58	16:57	...	17:04	17:04	17:12	17:12
B	Dover Heights Military Rd	...	16:50	...	...	16:58	...	...	17:07	...	...	17:14	...	17:22
A	Watsons Bay Military Rd	...	...	...	...	17:06	...	...	...	...	...	17:22	...	...

[illegible]

Monday to Friday (cont...)														
map ref	Route Number	381	381	380	381	380	381	380	380	381	380	381	380	381
J	City - Circular Quay Alfred St	...	...	p16:59	...	...	...	...	p17:11	...	...	...	p17:23	...
I	City - Martin Pl Elizabeth St	...	...	p17:05	...	p17:11	...	...	p17:17	...	p17:23	...	p17:29	...
H	Darlinghurst Taylor Square	...	...	p17:19	...	p17:25	...	...	p17:31	...	p17:37	...	p17:43	...
G	Bondi Jn Interchange Stand A	p17:32	p17:37	p17:38	p17:42	p17:44	p17:47	p17:49	p17:50	p17:52	p17:56	p18:00	p18:02	p18:04
E	Bondi Fletcher St	17:38	17:43	...	17:48	...	17:53	...	...	17:58	...	18:06	...	18:10
D	Bondi Beach Campbell Pde	17:44	17:49	17:48	17:54	17:54	17:59	17:59	18:00	18:04	18:06	18:12	18:12	18:16
C	North Bondi Military Rd	17:47	17:52	17:51	...	17:57	18:02	18:02	18:03	...	18:09	18:15	18:15	18:19
B	Dover Heights Military Rd	...	...	18:01	...	...	...	...	18:13	...	18:19	...	...	...
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...

Monday to Friday (cont...)														
map ref	Route Number	381	380	381	380	381	381	380	381	380	380	380	381	380
J	City - Circular Quay Alfred St	...	...	...	p17:37	...	...	...	...	p17:52	...	...	...	p18:07
I	City - Martin Pl Elizabeth St	...	p17:37	...	p17:43	...	...	p17:51	...	p17:58	...	p18:04	...	p18:11
H	Darlinghurst Taylor Square	...	p17:51	...	p17:57	...	...	p18:04	...	p18:10	...	p18:15	...	p18:22
G	Bondi Jn Interchange Stand A	p18:07	p18:10	p18:12	p18:16	p18:17	p18:22	p18:23	p18:27	p18:29	p18:32	p18:34	p18:37	p18:41
E	Bondi Fletcher St	18:13	...	18:18	...	18:23	18:28	...	18:33	...	...	...	18:43	...
D	Bondi Beach Campbell Pde	18:19	18:20	18:24	18:26	18:29	18:34	18:33	18:39	18:39	18:42	18:44	18:49	18:51
C	North Bondi Military Rd	18:22	18:23	...	18:29	18:32	18:37	18:36	...	18:42	18:45	18:47	...	18:54
B	Dover Heights Military Rd	...	18:33	...	...	...	...	...	...	...	18:55	...	...	19:04
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...

Monday to Friday (cont...)														
map ref	Route Number	381	380	381	380	381	380	381	380	381	381	380	381	380
J	City - Circular Quay Alfred St	...	...	...	p18:15	...	...	...	p18:37	...	...	p18:52	...	19:05
I	City - Martin Pl Elizabeth St	...	p18:17	...	p18:19	...	p18:27	...	p18:41	...	...	p18:56	...	19:09
H	Darlinghurst Taylor Square	...	p18:28	...	p18:30	...	p18:38	...	p18:52	...	...	19:07	...	19:20
G	Bondi Jn Interchange Stand A	p18:42	p18:47	p18:47	p18:49	p18:52	p18:57	19:04	19:11	19:14	19:20	19:26	19:31	19:38
E	Bondi Fletcher St	18:48	...	18:53	...	18:58	...	19:10	...	19:20	19:26	...	19:37	...
D	Bondi Beach Campbell Pde	18:54	18:57	18:59	18:59	19:04	19:07	19:16	19:21	19:26	19:32	19:36	19:43	19:48
C	North Bondi Military Rd	...	...	...	19:02	19:07	19:10	...	19:24	19:29	...	19:39	...	19:51
B	Dover Heights Military Rd	...	...	...	...	...	19:20	...	19:34	...	...	19:48	...	20:00
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...

Monday to Friday (cont...)										
map ref	Route Number	380	380	380	380	380	380	380	380	380
J	City - Circular Quay Alfred St	f01:25	...	01:40	f01:55	02:10	f02:25	02:40	03:10	03:40
I	City - Martin Pl Elizabeth St	f01:28	...	01:43	f01:58	02:13	f02:28	02:43	03:13	03:43
H	Darlinghurst Taylor Square	f01:34	...	01:49	f02:04	02:19	f02:34	02:49	03:19	03:49
G	Bondi Jn Interchange Stand A	f01:44	f01:53	01:59	f02:14	02:29	f02:44	02:59	03:29	03:59
E	Bondi Fletcher St	...	...	...	...	...	...	...	...	...
D	Bondi Beach Campbell Pde	f01:52	f02:01	02:07	f02:22	02:37	f02:52	03:07	03:37	04:07
C	North Bondi Military Rd	f01:55	f02:04	02:10	f02:25	02:40	f02:55	03:10	03:40	04:10
B	Dover Heights Military Rd	...	...	...	...	...	...	...	...	...
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...

Saturday														
map ref	Route Number	380	380	380	380	380	380	381	380	381	380	381	380	381
J	City - Circular Quay Alfred St	04:09	04:40	05:10	05:45	06:13	06:36	...	07:01	...	07:28	...	07:58	...
I	City - Martin Pl Elizabeth St	04:12	04:43	05:13	05:48	06:16	06:39	...	07:04	...	07:31	...	08:02	...
H	Darlinghurst Taylor Square	04:18	04:51	05:21	05:56	06:24	06:47	...	07:12	...	07:40	...	08:11	...
G	Bondi Jn Interchange Stand A	04:28	05:02	05:34	06:09	06:37	07:00	07:12	07:25	07:42	07:53	08:14	08:24	08:31
E	Bondi Fletcher St	...	...	...	...	...	...	07:18	...	07:48	...	08:20	...	08:37
D	Bondi Beach Campbell Pde	04:36	05:12	05:44	06:19	06:47	07:10	07:24	07:35	07:54	08:03	08:26	08:34	08:43
C	North Bondi Military Rd	04:39	05:15	05:47	06:22	06:50	07:13	07:27	07:38	07:57	08:06	08:29	08:37	08:46
B	Dover Heights Military Rd	...	...	...	...	06:58	07:21	...	07:46	...	08:14	...	08:45	...
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...

Saturday (continued...)														
map ref	Route Number	380	381	380	381	381	381	380	380	381	380	381	380	381
J	City - Circular Quay Alfred St	08:08	...	08:28	...	...	...	08:54	09:04	...	09:24	...	09:43	...
I	City - Martin Pl Elizabeth St	08:12	...	08:32	...	...	...	08:58	09:08	...	09:28	...	09:47	...
H	Darlinghurst Taylor Square	08:21	...	08:41	...	...	...	09:09	09:19	...	09:39	...	09:58	...
G	Bondi Jn Interchange Stand A	08:34	08:45	08:54	09:00	09:11	09:20	09:24	09:34	09:45	09:54	10:01	10:17	10:29
E	Bondi Fletcher St	...	08:51	...	09:07	09:18	09:27	...	...	09:52	...	10:10	...	10:38
D	Bondi Beach Campbell Pde	08:44	08:57	09:05	09:14	09:25	09:34	09:36	09:46	09:59	10:07	10:19	10:32	10:47
C	North Bondi Military Rd	08:47	09:00	09:08	09:17	09:28	09:37	09:39	09:49	10:02	10:10	10:22	10:35	10:50
B	Dover Heights Military Rd	...	...	09:18	...	...	...	09:49	09:59	...	10:20	...	10:45	...
A	Watsons Bay Military Rd	...	...	...	...	...	...	09:57	10:07	...	10:28	...	10:53	...

Saturday (continued...)														
map ref	Route Number	380	380	381	380	380	380	381	380	380	381	380	380	381
J	City - Circular Quay Alfred St	10:08	10:18	...	10:28	10:38	10:48	...	10:58	11:08	...	11:18	11:28	...
I	City - Martin Pl Elizabeth St	10:12	10:22	...	10:32	10:42	10:52	...	11:02	11:12	...	11:22	11:32	...
H	Darlinghurst Taylor Square	10:24	10:34	...	10:44	10:54	11:04	...	11:14	11:24	...	11:34	11:44	...
G	Bondi Jn Interchange Stand A	10:44	10:54	11:00	11:04	11:14	11:24	11:30	11:34	11:44	11:50	11:54	12:04	12:10
E	Bondi Fletcher St	...	...	11:09	...	...	...	11:39	...	...	11:59	...	...	12:19
D	Bondi Beach Campbell Pde	10:59	11:09	11:18	11:19	11:29	11:39	11:48	11:49	11:59	12:08	12:09	12:19	12:28
C	North Bondi Military Rd	11:02	11:12	11:21	11:22	11:32	11:42	11:51	11:52	12:02	12:11	12:12	12:22	12:31
B	Dover Heights Military Rd	11:12	11:22	...	11:32	11:42	11:52	...	12:02	...	...	12:22	...	...
A	Watsons Bay Military Rd	11:20	11:30	...	11:40	11:50	...	...	12:10	...	...	12:30	...	...

Saturday (continued...)														
map ref	Route Number	380	380	380	381	380	380	380	381	380	380	380	381	380
J	City - Circular Quay Alfred St	11:38	11:48	11:58	...	12:08	12:18	12:28	...	12:38	12:48	12:58	...	13:08
I	City - Martin Pl Elizabeth St	11:42	11:52	12:02	...	12:12	12:22	12:32	...	12:42	12:52	13:02	...	13:12
H	Darlinghurst Taylor Square	11:54	12:04	12:14	...	12:24	12:34	12:44	...	12:54	13:04	13:14	...	13:24
G	Bondi Jn Interchange Stand A	12:14	12:24	12:34	12:40	12:44	12:54	13:04	13:10	13:14	13:24	13:34	13:40	13:44
E	Bondi Fletcher St	...	...	...	12:49	...	...	...	13:19	...	...	...	13:49	...
D	Bondi Beach Campbell Pde	12:29	12:39	12:49	12:58	12:59	13:09	13:19	13:28	13:29	13:39	13:49	13:58	13:59
C	North Bondi Military Rd	12:32	12:42	12:52	13:01	13:02	13:12	13:22	13:31	13:32	13:42	13:52	14:01	14:02
B	Dover Heights Military Rd	12:42	...	13:02	...	...	13:22	...	...	13:42	...	14:02	...	...
A	Watsons Bay Military Rd	12:50	...	13:10	...	...	13:30	...	...	13:50	...	14:10	...	...

Saturday (continued...)														
map ref	Route Number	380	380	381	380	380	380	381	380	380	380	381	380	381
J	City - Circular Quay Alfred St	13:18	13:28	...	13:38	13:48	13:58	...	14:08	14:18	14:28	...	14:38	...
I	City - Martin Pl Elizabeth St	13:22	13:32	...	13:42	13:52	14:02	...	14:12	14:22	14:32	...	14:42	...
H	Darlinghurst Taylor Square	13:34	13:44	...	13:54	14:04	14:14	...	14:24	14:34	14:44	...	14:54	...
G	Bondi Jn Interchange Stand A	13:54	14:04	14:10	14:14	14:24	14:34	14:40	14:44	14:54	15:04	15:10	15:14	15:21
E	Bondi Fletcher St	...	...	14:19	...	...	...	14:49	...	...	...	15:19	...	15:30
D	Bondi Beach Campbell Pde	14:09	14:19	14:28	14:29	14:39	14:49	14:58	14:59	15:09	15:19	15:28	15:29	15:39
C	North Bondi Military Rd	14:12	14:22	14:31	14:32	14:42	14:52	15:01	15:02	15:12	15:22	15:31	15:32	15:42
B	Dover Heights Military Rd	14:22	...	...	14:42	...	15:02	...	...	15:22	...	...	15:42	...
A	Watsons Bay Military Rd	14:30	...	...	14:50	...	15:10	...	...	15:30	...	...	15:50	...

Saturday (continued...)														
map ref	Route Number	380	380	381	380	380	380	381	380	380	380	381	380	380
J	City - Circular Quay Alfred St	14:48	14:58	...	15:08	15:18	15:28	...	15:38	15:48	15:58	...	16:08	16:18
I	City - Martin Pl Elizabeth St	14:52	15:02	...	15:12	15:22	15:32	...	15:42	15:52	16:02	...	16:12	16:22
H	Darlinghurst Taylor Square	15:04	15:14	...	15:24	15:34	15:44	...	15:54	16:04	16:14	...	16:24	16:34
G	Bondi Jn Interchange Stand A	15:24	15:34	15:40	15:44	15:54	16:04	16:10	16:14	16:24	16:34	16:40	16:44	16:54
E	Bondi Fletcher St	...	...	15:49	...	...	...	16:19	...	...	...	16:49	...	...
D	Bondi Beach Campbell Pde	15:39	15:49	15:58	15:59	16:09	16:19	16:28	16:29	16:39	16:49	16:58	16:59	17:07
C	North Bondi Military Rd	15:42	15:52	16:01	16:02	16:12	16:22	16:31	16:32	16:42	16:52	17:01	17:02	17:10
B	Dover Heights Military Rd	...	16:02	...	...	16:22	...	...	16:42	...	17:02	...	...	17:20
A	Watsons Bay Military Rd	...	16:10	...	...	16:30	...	...	16:50	...	17:10	...	...	17:28

Saturday (continued...)														
map ref	Route Number	380	381	380	380	380	381	380	380	381	380	380	381	380
J	City - Circular Quay Alfred St	16:28	...	16:38	16:48	16:58	...	17:08	17:18	...	17:28	17:38	...	17:48
I	City - Martin Pl Elizabeth St	16:32	...	16:42	16:52	17:02	...	17:12	17:22	...	17:32	17:42	...	17:52
H	Darlinghurst Taylor Square	16:44	...	16:54	17:04	17:14	...	17:24	17:34	...	17:44	17:54	...	18:03
G	Bondi Jn Interchange Stand A	17:04	17:06	17:13	17:22	17:32	17:34	17:42	17:52	17:53	18:02	18:12	18:13	18:21
E	Bondi Fletcher St	...	17:13	...	...	...	17:41	...	...	18:00	...	...	18:20	...
D	Bondi Beach Campbell Pde	17:15	17:19	17:24	17:33	17:43	17:47	17:53	18:03	18:06	18:13	18:23	18:26	18:32
C	North Bondi Military Rd	17:18	17:22	17:27	17:36	17:46	17:50	17:56	18:06	18:09	18:16	18:26	18:29	18:35
B	Dover Heights Military Rd	...	...	17:37	...	...	...	...	...	...	18:25	...	...	...
A	Watsons Bay Military Rd	...	...	17:45	...	...	...	...	...	...	...	...	...	...

Saturday (continued...)														
map ref	Route Number	381	380	381	380	381	380	380	381	380	381	380	381	380
J	City - Circular Quay Alfred St	...	17:58	...	18:09	...	18:22	18:29	...	18:46	...	19:06	...	19:26
I	City - Martin Pl Elizabeth St	...	18:02	...	18:13	...	18:26	18:33	...	18:50	...	19:10	...	19:30
H	Darlinghurst Taylor Square	...	18:12	...	18:23	...	18:36	18:43	...	19:00	...	19:20	...	19:40
G	Bondi Jn Interchange Stand A	18:22	18:30	18:38	18:41	18:53	18:54	19:01	19:08	19:18	19:28	19:38	19:48	19:58
E	Bondi Fletcher St	18:29	...	18:45	...	19:00	...	...	19:15	...	19:35	...	19:55	...
D	Bondi Beach Campbell Pde	18:35	18:41	18:51	18:52	19:06	19:05	19:12	19:21	19:29	19:41	19:49	20:01	20:09
C	North Bondi Military Rd	18:38	18:44	18:54	18:55	19:09	19:08	19:15	19:24	19:32	19:44	19:52	20:04	20:12
B	Dover Heights Military Rd	...	18:53	...	...	...	19:17	...	...	19:41	...	20:01	...	20:21
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...

Saturday (continued...)			
map ref	Route Number	380	380
J	City - Circular Quay Alfred St	03:10	03:40
I	City - Martin Pl Elizabeth St	03:13	03:43
H	Darlinghurst Taylor Square	03:21	03:49
G	Bondi Jn Interchange Stand A	03:33	03:59
E	Bondi Fletcher St	...	...
D	Bondi Beach Campbell Pde	03:41	04:07
C	North Bondi Military Rd	03:44	04:10
B	Dover Heights Military Rd	...	...
A	Watsons Bay Military Rd	...	...

Sunday & Public Holidays														
map ref	Route Number	380	380	380	380	380	380	380	381	380	381	380	381	380
J	City - Circular Quay Alfred St	04:10	04:44	05:10	05:45	06:20	06:50	07:20	...	07:50	...	08:20	...	08:47
I	City - Martin Pl Elizabeth St	04:13	04:47	05:13	05:48	06:23	06:53	07:23	...	07:54	...	08:24	...	08:51
H	Darlinghurst Taylor Square	04:19	04:55	05:21	05:56	06:31	07:01	07:31	...	08:03	...	08:33	...	09:00
G	Bondi Jn Interchange Stand A	04:29	05:06	05:34	06:09	06:43	07:13	07:43	08:00	08:15	08:41	08:45	09:12	09:15
E	Bondi Fletcher St	...	...	...	...	...	...	...	08:06	...	08:47	...	09:19	...
D	Bondi Beach Campbell Pde	04:37	05:16	05:44	06:19	06:53	07:23	07:53	08:12	08:25	08:53	08:55	09:26	09:27
C	North Bondi Military Rd	04:40	05:19	05:47	06:22	06:56	07:26	07:56	08:15	08:28	08:56	08:58	...	09:30
B	Dover Heights Military Rd	...	...	...	...	...	07:34	08:04	...	08:36	...	09:08	...	09:40
A	Watsons Bay Military Rd	...	...	...	...	...	...	...	...	...	...	...	...	...

Sunday & Pub Hols (cont...)														
map ref	Route Number	380	381	380	381	380	381	381	380	381	380	381	381	380
J	City - Circular Quay Alfred St	08:57	...	09:19	...	09:38	...	...	09:54	...	10:08	...	...	10:23
I	City - Martin Pl Elizabeth St	09:01	...	09:23	...	09:42	...	...	09:58	...	10:12	...	...	10:27
H	Darlinghurst Taylor Square	09:12	...	09:34	...	09:53	...	...	10:09	...	10:23	...	...	10:38
G	Bondi Jn Interchange Stand A	09:27	09:43	09:49	10:04	10:08	10:13	10:23	10:27	10:34	10:41	10:43	10:54	10:56
E	Bondi Fletcher St	...	09:50	...	10:15	...	10:24	10:34	...	10:45	...	10:54	11:05	...
D	Bondi Beach Campbell Pde	09:39	09:57	10:02	10:26	10:28	10:35	10:45	10:47	10:56	11:01	11:05	11:16	11:16
C	North Bondi Military Rd	09:42	...	10:05	...	10:31	...	...	10:50	...	11:04	...	...	11:19
B	Dover Heights Military Rd	...	...	10:15	...	10:41	...	...	11:00	...	11:14	...	...	11:29
A	Watsons Bay Military Rd	...	...	...	...	10:49	...	...	11:08	...	11:22	...	...	11:37

Sunday & Pub Hols (cont...)														
map ref	Route Number	381	380	381	381	380	381	380	381	381	380	381	380	381
J	City - Circular Quay Alfred St	...	10:38	...	...	10:53	...	11:08	...	...	11:23	...	11:38	...
I	City - Martin Pl Elizabeth St	...	10:42	...	...	10:57	...	11:12	...	...	11:27	...	11:42	...
H	Darlinghurst Taylor Square	...	10:53	...	...	11:08	...	11:23	...	...	11:38	...	11:53	...
G	Bondi Jn Interchange Stand A	11:05	11:11	11:13	11:23	11:26	11:35	11:41	11:43	11:53	11:56	12:05	12:11	12:13
E	Bondi Fletcher St	11:16	...	11:24	11:34	...	11:46	...	11:54	12:04	...	12:16	...	12:24
D	Bondi Beach Campbell Pde	11:27	11:31	11:35	11:45	11:46	11:57	12:01	12:05	12:15	12:16	12:27	12:31	12:35
C	North Bondi Military Rd	...	11:34	...	...	11:49	...	12:04	...	...	12:19	...	12:34	...
B	Dover Heights Military Rd	...	11:44	...	...	11:59	...	12:14	...	...	12:29	...	12:44	...
A	Watsons Bay Military Rd	...	11:52	...	...	12:07	...	12:22	...	...	12:37	...	12:52	...

Sunday & Pub Hols (cont...)														
map ref	Route Number	381	380	381	380	380	381	381	380	381	380	381	380	381
J	City - Circular Quay Alfred St	...	11:53	...	...	12:08	...	...	12:23	...	12:38	...	...	...
I	City - Martin Pl Elizabeth St	...	11:57	...	...	12:12	...	...	12:27	...	12:42	...	...	...
H	Darlinghurst Taylor Square	...	12:08	...	...	12:23	...	...	12:38	...	12:53	...	...	...
G	Bondi Jn Interchange Stand A	12:23	12:26	12:33	12:36	12:41	12:43	12:53	12:56	13:03	13:11	13:13	13:16	13:23
E	Bondi Fletcher St	12:34	...	12:44	...	...	12:54	13:04	...	13:14	...	13:24	...	13:34
D	Bondi Beach Campbell Pde	12:45	12:46	12:55	12:56	13:01	13:05	13:15	13:16	13:25	13:31	13:35	13:36	13:45
C	North Bondi Military Rd	...	12:49	...	...	13:04	...	...	13:19	...	13:34	13:38	...	13:48
B	Dover Heights Military Rd	...	12:59	...	...	13:14	...	...	13:29	...	13:44	...	...	...
A	Watsons Bay Military Rd	...	13:07	...	...	13:22	...	...	13:37	...	13:52	...	...	...

Sunday & Pub Hols (cont...)														
map ref	Route Number	380	381	380	381	381	380	380	381	380	381	381	380	381
J	City - Circular Quay Alfred St	12:53	...	13:08	...	...	13:23	...	...	13:38	...	...	13:53	...
I	City - Martin Pl Elizabeth St	12:57	...	13:12	...	...	13:27	...	...	13:42	...	...	13:57	...
H	Darlinghurst Taylor Square	13:08	...	13:23	...	...	13:38	...	...	13:53	...	...	14:08	...
G	Bondi Jn Interchange Stand A	13:26	13:35	13:41	13:43	13:53	13:56	13:56	14:05	14:11	14:13	14:23	14:26	14:35
E	Bondi Fletcher St	...	13:46	...	13:54	14:04	...	...	14:16	...	14:24	14:34	...	14:46
D	Bondi Beach Campbell Pde	13:46	13:57	14:01	14:05	14:15	14:16	14:16	14:27	14:31	14:35	14:45	14:46	14:57
C	North Bondi Military Rd	13:49	14:00	14:04	14:08	14:18	14:19	14:19	14:30	14:34	14:38	14:48	14:49	15:00
B	Dover Heights Military Rd	13:59	...	14:14	...	...	14:29	...	...	14:44	...	...	14:59	...
A	Watsons Bay Military Rd	14:07	...	14:22	...	...	14:37	...	...	14:52	...	...	15:07	...

Sunday & Pub Hols (cont...)														
map ref	Route Number	380	381	381	380	380	381	380	381	381	380	381	380	381
J	City - Circular Quay Alfred St	14:08	...	...	14:23	...	...	14:38	...	...	14:53	...	15:08	...
I	City - Martin Pl Elizabeth St	14:12	...	...	14:27	...	...	14:42	...	...	14:57	...	15:12	...
H	Darlinghurst Taylor Square	14:23	...	...	14:38	...	...	14:53	...	...	15:08	...	15:23	...
G	Bondi Jn Interchange Stand A	14:41	14:43	14:53	14:56	14:56	15:02	15:11	15:13	15:23	15:26	15:35	15:41	15:43
E	Bondi Fletcher St	...	14:54	15:04	...	...	15:13	...	15:24	15:34	...	15:46	...	15:54
D	Bondi Beach Campbell Pde	15:01	15:05	15:15	15:16	15:16	15:24	15:31	15:35	15:45	15:46	15:57	16:01	16:05
C	North Bondi Military Rd	15:04	15:08	15:18	15:19	15:19	15:27	15:34	15:38	15:48	15:49	16:00	16:04	16:08
B	Dover Heights Military Rd	15:14	...	...	15:29	...	...	15:44	...	...	15:59	...	16:14	...
A	Watsons Bay Military Rd	15:22	...	...	15:37	...	...	15:52	...	...	16:07	...	16:22	...

Sunday & Pub Hols (cont...)														
map ref	Route Number	381	380	381	380	381	381	380	381	380	381	381	380	381
J	City - Circular Quay Alfred St	...	15:23	...	15:38	...	...	15:53	...	16:08	...	...	16:23	...
I	City - Martin Pl Elizabeth St	...	15:27	...	15:42	...	...	15:57	...	16:12	...	...	16:27	...
H	Darlinghurst Taylor Square	...	15:38	...	15:53	...	...	16:08	...	16:23	...	...	16:38	...
G	Bondi Jn Interchange Stand A	15:53	15:56	16:05	16:11	16:13	16:22	16:26	16:35	16:41	16:43	16:53	16:56	17:05
E	Bondi Fletcher St	16:04	...	16:16	...	16:24	16:33	...	16:46	...	16:54	17:04	...	17:16
D	Bondi Beach Campbell Pde	16:15	16:16	16:27	16:31	16:35	16:44	16:46	16:57	17:01	17:05	17:15	17:16	17:27
C	North Bondi Military Rd	16:18	16:19	16:30	16:34	16:38	16:47	16:49	17:00	17:04	17:08	17:18	17:19	17:30
B	Dover Heights Military Rd	...	16:29	...	16:44	...	...	16:59	...	17:14	...	...	17:29	...
A	Watsons Bay Military Rd	...	16:37	...	16:52	...	...	17:07	...	17:22	...	...	17:37	...

Sunday & Pub Hols (cont...)														
map ref	Route Number	380	381	381	380	381	380	381	381	380	381	380	381	380
J	City - Circular Quay Alfred St	16:38	...	...	16:56	...	17:08	...	...	17:23	...	17:39	...	17:55
I	City - Martin Pl Elizabeth St	16:42	...	...	17:00	...	17:12	...	...	17:27	...	17:43	...	17:59
H	Darlinghurst Taylor Square	16:53	...	...	17:11	...	17:23	...	...	17:38	...	17:54	...	18:09
G	Bondi Jn Interchange Stand A	17:11	17:13	17:25	17:29	17:35	17:41	17:42	17:53	17:56	18:06	18:10	18:17	18:23
E	Bondi Fletcher St	...	17:24	17:36	...	17:46	...	17:53	18:03	...	18:15	...	18:26	...
D	Bondi Beach Campbell Pde	17:31	17:35	17:47	17:49	17:57	18:01	18:02	18:09	18:10	18:21	18:23	18:32	18:36
C	North Bondi Military Rd	17:34	17:38	17:50	17:52	18:00	18:04	18:05	18:12	18:13	18:24	18:26	18:35	18:39
B	Dover Heights Military Rd	17:44	...	...	18:02	...	18:14	...	...	...	...	18:36	...	...
A	Watsons Bay Military Rd	17:52	...	...	...	...	...	...	...	...	...	...	...	...

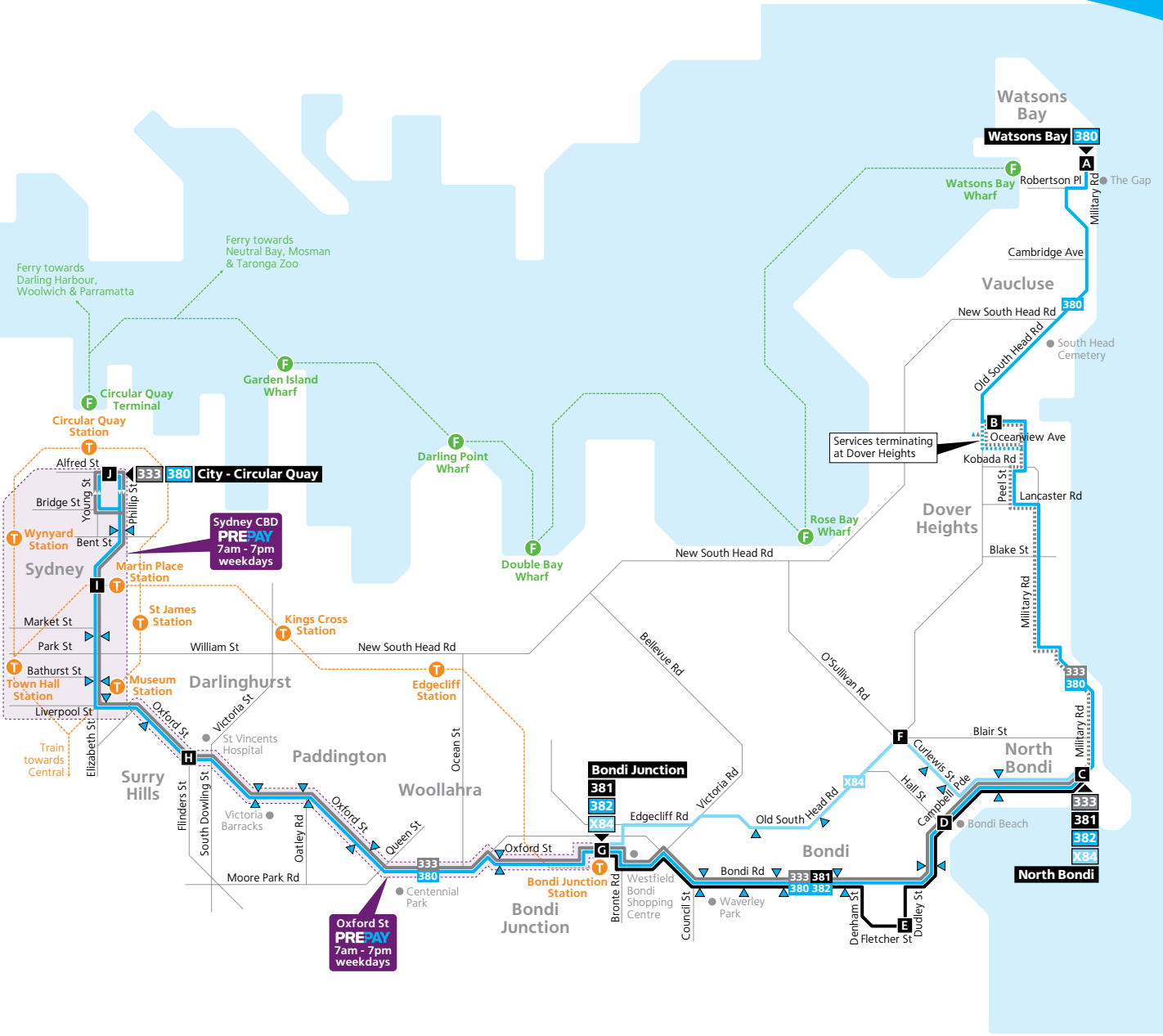
[illegible]

Explanation of definitions and symbols

- b** Starts at Dover Heights 8 minutes earlier.
- c** Starts at Dover Heights 9 minutes earlier.
- d** Starts at Dover Heights 10 minutes earlier.
- e** Starts at Waverley Bus Depot 5 minutes earlier.
- f** Operates late Friday night / early Saturday morning.
- g** Starts at St James Station 7 minutes earlier.
- l** Continues to Dover Heights.
- m** Continues to City - Martin Place.
- n** Continues to City - Martin Place. PrePay-only. No tickets sold on board.
- o** Commences from Oxford & Queen Sts, Paddington 9 minutes earlier. Continues to City - Martin Place. PrePay-only. No tickets sold on board.
- p** PrePay-only. No tickets sold on board.
- q** Commences from Oxford & Queen Sts, Paddington 9 minutes earlier. PrePay-only. No tickets sold on board.
- r** Commences from Oxford & Queen Sts, Paddington 14 minutes earlier.
- z** Continues to North Bondi.

Timing Points

- A** Watsons Bay Military Road
- B** Dover Heights Military Road
- C** North Bondi Military Road & Brighton Boulevard
- D** Bondi Beach Campbell Parade
- E** Bondi Dudley Street & Fletcher Street
- F** Bondi Curlewis Street & Simpson Street
- G** Bondi Junction Interchange
- H** Darlinghurst Taylor Square
- I** City - Martin Place Elizabeth Street
- J** City - Circular Quay Young Street / Alfred Street



- Legend**
- Bus route
 - Diversion/extended route
 - Bus route number
 - Timing point
 - Stops for limited stops services (other than timing points)
 - Train line/station
 - Ferry route/wharf

Diagrammatic Map
North
Not to Scale



Description of routes in this timetable

Route 323

Dover Heights to Edgecliff

via Rose Bay and Double Bay.

Service operates Monday to Friday peak hours.

Route 324

Watsons Bay to City - Walsh Bay

via Vaucluse Heights, Vaucluse, Rose Bay, Double Bay, Edgecliff, Rushcutters Bay, Kings Cross and City - Town Hall.

Service operates daily.

Route L24

Watsons Bay to City - Wynyard

LIMITED STOPS (PrePay-only)

via Vaucluse Heights, Vaucluse, Rose Bay, Double Bay, Edgecliff, Rushcutters Bay and City - Town Hall.

Service operates Monday to Friday morning peak hours.

Route 325

Watsons Bay to City - Walsh Bay

via Nielsen Park, Vaucluse, Rose Bay, Double Bay, Edgecliff, Rushcutters Bay, Kings Cross and City - Town Hall.

Service operates daily.

New South Head Road to Edgecliff & City

Bus Timetable

323

324

L24

325



Includes accessible services

Effective from 5 June 2016

STA No: 175109 - v5.0



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Timetables

From New South Head Road towards Edgecliff & City

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From City & Edgecliff towards New South Head Road

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Your Bus timetable

Bus services take you around Sydney and outer Sydney metropolitan areas, including Newcastle, the Lower Hunter, the Central Coast, the Blue Mountains, Lithgow and the Illawarra. If you have any questions about getting around on buses, just ask. Staff are here for you.

Opal. Your ticket to public transport.

Opal is the easy way of travelling on public transport in Sydney, the Blue Mountains, Central Coast, Hunter, Illawarra and Southern Highlands.

An Opal card is a smartcard you keep and reuse. You load value onto the card to pay for your travel on any mode of public transport, including trains, buses, ferries and light rail.

Opal benefits

- Free travel after eight paid journeys each week
- Fares capped daily and weekly
- Fares capped on Sundays
- The option of auto top up, so you’re always ready to travel

Find out more at **opal.com.au**.

Which Opal card is right for you?

- **Adult Opal card** – For customers aged 16 or over who pay full fare.
- **Child/Youth Opal card** – A concession fare Opal card for customers aged 4–15 years (inclusive), or customers aged 16 and over who hold a NSW Senior Secondary Student Concession Card.
- **Gold Senior/Pensioner Opal card** – A concession fare Opal card with fares capped at \$2.50 a day for eligible seniors, pensioners and asylum seekers.
- **Concession Opal card** – A concession fare Opal card for eligible tertiary students, job seekers, apprentices and trainees.


How to get your Opal card

Adult and Child/Youth Opal cards are available over the counter from 2,000 Opal retailers. To find your nearest one, visit **retailers.opal.com.au** or look for the Opal symbol at retailers near you.

Adult, Child/Youth, Senior/Pensioner and Concession Opal cards can all be ordered via **opal.com.au** or **13 67 25 (13 OPAL)**.

For more information about ticketing visit **transportnsw.info** or call **131 500**.

Accessible services

All new buses are wheelchair-accessible with low-level floors and space for wheelchairs, prams or strollers. Look for the symbol  in this timetable. Some older buses may not have all the features you need. There will be more accessible services as older buses are replaced.

We try to make sure accessible buses run as intended. If an accessible bus is not available for a scheduled route, we apologise in advance for the inconvenience.

How to use this timetable

- Go to the route map at the back of this timetable and find the two timing points your bus stop is located between.
- Then find these two timing points on the timetable.
- Your bus is scheduled to arrive between the times shown for these points.

For example

If your bus stop is located between timing points A and B on the route map, then your bus is scheduled to arrive between the times shown for A and B in the timetable. Please arrive at your bus stop around 5 minutes before your bus is scheduled.

This timetable is expressed in 24-hour time.

12 midnight to 12 midday	12 midday to 12 midnight
00:00 to 11:59	12:00 to 23:59
12.00 am = 00:00	12.00 pm = 12:00
1.00 am = 01:00	1.00 pm = 13:00
2.00 am = 02:00	2.00 pm = 14:00
3.00 am = 03:00	3.00 pm = 15:00
4.00 am = 04:00	4.00 pm = 16:00
5.00 am = 05:00	5.00 pm = 17:00
6.00 am = 06:00	6.00 pm = 18:00
7.00 am = 07:00	7.00 pm = 19:00
8.00 am = 08:00	8.00 pm = 20:00
9.00 am = 09:00	9.00 pm = 21:00
10.00 am = 10:00	10.00 pm = 22:00
11.00 am = 11:00	11.00 pm = 23:00

Download real-time apps transportnsw.info/apps

Real-time apps let you track trains, buses, ferries and light rail in real time on the go. So don't miss your next Transport connection. Download one of the handy apps to track your service on your mobile device.

- Where your train, bus, ferry or light rail service is right now
- Estimated arrival times
- Service updates
- Closest stations, stops, wharves and routes
- Accessibility details.

Who is providing my bus services?

The bus services shown in this timetable are run by State Transit.

Is this timetable current?

We try to make sure services depart at the specified times. However, timetables may change and services may be delayed, cancelled or diverted due to circumstances beyond our control.

If you have not travelled with us for a while, you can confirm this timetable is still current by visiting **transportnsw.info** or calling **131 500**.

Over Christmas and the New Year, a reduced timetable may operate. If you're travelling during this time, plan your trip at **transportnsw.info** or call **131 500**.

Bus etiquette

Eating, drinking, smoking or playing loud music on the bus is not allowed. By law, smoking is not allowed at any bus stop, or at train stations, ferry wharves or light rail stops.

Helpful contacts

To plan your trip, get service information and make general enquiries:

Visit **transportnsw.info** or call **131 500**.

If you are deaf, or have a hearing or speech impairment contact us through the National Relay Service on **133 677**. For more information visit **relayservice.gov.au**.

Lost property offices

Visit **transportnsw.info** or call **131 500** NRS **133 677** to contact the operator of your service. If you still have your bus ticket, it will help identify the bus you travelled on.

Emergencies

Call Triple Zero (**000**)

Crime Stoppers

To give information that may help stop, solve or prevent criminal activity
Call **1800 333 000**

Police Assistance Line

To report thefts or other non-life threatening matters
Call **131 444**

Disclaimer: Information in this timetable is based on the latest details at the time of printing, and is subject to change without notice.

Monday to Friday													
map ref	Route Number	324	324	324	324	323	325	324	324	323	325	324	325
A	Watsons Bay Military Road	04:40	05:10	05:40	05:59	...	06:12	06:25	...	...	06:45	06:57	07:04
B	Vaucluse Heights Old South Head Rd	04:45	05:15	05:45	06:04	...	...	06:31	...	...	...	07:03	...
C	Vaucluse Hopetoun Avenue	...	...	...	...	...	06:16	...	...	...	06:50	...	07:09
D	Dover Heights Military Road	...	...	...	...	06:10	...	...	...	06:46	...	...	...
E	Rose Bay Dover Road	04:50	05:20	05:50	06:09	06:19	06:25	06:37	06:49	06:55	06:59	07:09	07:18
F	Double Bay Manning Road	04:58	05:28	05:58	06:18	06:29	06:35	06:47	06:59	07:05	07:09	07:19	07:28
G	Edgecliff Station New South Head Rd	05:00	05:30	06:00	06:21	e06:32	06:38	06:50	07:02	e07:08	07:12	07:22	07:31
H	Kings Cross Bayswater Road	05:04	05:34	06:04	06:26	...	06:43	06:55	07:07	...	07:17	07:27	07:38
I	City - Town Hall Park Street	05:11	05:41	06:11	06:34	...	06:51	p07:03	p07:16	...	p07:26	p07:37	p07:48
J	City - Walsh Bay Hickson Road	05:20	05:50	06:20	06:43	...	07:00	07:12	07:25	...	07:35	07:46	07:57

Monday to Friday (continued...)													
map ref	Route Number	323	324	325	L24	323	324	325	L24	324	323	325	324
A	Watsons Bay Military Road	...	07:13	07:18	p07:24	...	07:26	07:30	p07:39	07:41	...	07:48	08:02
B	Vaucluse Heights Old South Head Rd	...	07:19	...	p07:30	...	07:32	...	p07:45	07:47	...	...	08:08
C	Vaucluse Hopetoun Avenue	...	...	07:23	...	...	...	07:35	...	...	...	07:53	...
D	Dover Heights Military Road	07:14	...	...	...	07:27	...	...	...	...	07:50	...	...
E	Rose Bay Dover Road	07:23	07:25	07:32	p07:36	07:37	07:39	07:46	p07:51	07:54	08:00	08:04	08:15
F	Double Bay Manning Road	07:35	07:38	07:47	p07:49	07:52	07:54	08:01	p08:04	08:09	08:15	08:19	08:30
G	Edgecliff Station New South Head Rd	e07:39	07:42	07:51	p07:53	e07:56	07:58	08:05	p08:08	08:13	e08:19	08:23	08:33
H	Kings Cross Bayswater Road	...	07:49	07:58	...	...	08:05	08:12	...	08:20	...	08:30	08:39
I	City - Town Hall Park Street	...	p07:59	p08:08	q08:09	...	p08:15	p08:22	q08:24	p08:30	...	p08:40	p08:49
J	City - Walsh Bay Hickson Road	...	08:08	08:17	...	...	08:24	08:31	...	08:39	...	08:49	08:58

Monday to Friday (continued...)													
map ref	Route Number	324	323	325	324	324	324	325	324	325	324	325	324
A	Watsons Bay Military Road	08:14	...	08:19	...	08:34	...	08:49	09:07	09:19	09:37	09:49	10:07
B	Vaucluse Heights Old South Head Rd	08:20	...	...	08:35	08:40	08:50	...	09:13	...	09:43	...	10:13
C	Vaucluse Hopetoun Avenue	...	...	08:24	...	...	...	08:54	...	09:24	...	09:54	...
D	Dover Heights Military Road	...	08:20	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	08:27	08:30	08:35	08:42	08:47	08:57	09:04	09:19	09:34	09:49	10:04	10:19
F	Double Bay Manning Road	08:40	08:43	08:48	08:55	09:00	09:08	09:15	09:30	09:45	10:00	10:15	10:30
G	Edgecliff Station New South Head Rd	08:43	e08:46	08:51	e08:57	09:03	e09:10	09:18	09:33	09:48	10:03	10:18	10:33
H	Kings Cross Bayswater Road	08:49	...	08:57	...	09:08	...	09:23	09:38	09:53	10:08	10:23	10:38
I	City - Town Hall Park Street	p08:59	...	p09:07	...	p09:18	...	p09:33	p09:48	p10:03	p10:18	p10:33	p10:48
J	City - Walsh Bay Hickson Road	09:08	...	09:16	...	09:27	...	09:42	09:57	10:12	10:27	10:42	10:57

Monday to Friday (continued...)													
map ref	Route Number	325	324	325	324	325	324	325	324	325	324	325	324
A	Watsons Bay Military Road	10:19	10:37	10:49	11:07	11:19	11:37	11:49	12:07	12:19	12:37	12:49	13:07
B	Vaucluse Heights Old South Head Rd	...	10:43	...	11:13	...	11:43	...	12:13	...	12:43	...	13:13
C	Vaucluse Hopetoun Avenue	10:24	...	10:54	...	11:24	...	11:54	...	12:24	...	12:54	...
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	10:34	10:49	11:04	11:19	11:34	11:49	12:04	12:19	12:34	12:49	13:04	13:19
F	Double Bay Manning Road	10:45	11:00	11:15	11:30	11:45	12:00	12:15	12:30	12:45	13:00	13:15	13:30
G	Edgecliff Station New South Head Rd	10:48	11:03	11:18	11:33	11:48	12:03	12:18	12:33	12:48	13:03	13:18	13:33
H	Kings Cross Bayswater Road	10:53	11:08	11:23	11:38	11:53	12:08	12:23	12:38	12:53	13:08	13:23	13:38
I	City - Town Hall Park Street	p11:03	p11:18	p11:33	p11:48	p12:03	p12:18	p12:33	p12:48	p13:03	p13:18	p13:33	p13:48
J	City - Walsh Bay Hickson Road	11:12	11:27	11:42	11:57	12:12	12:27	12:42	12:57	13:12	13:27	13:42	13:57

Monday to Friday (continued...)													
map ref	Route Number	325	324	325	324	325	324	324	324	325	324	324	324
A	Watsons Bay Military Road	13:19	13:37	13:49	14:07	14:19	14:32	14:41	...	14:49	...	...	15:02
B	Vaucluse Heights Old South Head Rd	...	13:43	...	14:13	...	14:38	14:47	14:52	...	15:02	15:05	15:08
C	Vaucluse Hopetoun Avenue	13:24	...	13:54	...	14:24	...	...	...	14:54	...	...	...
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	13:34	13:49	14:04	14:19	14:34	14:44	14:53	14:58	15:04	15:08	15:11	15:14
F	Double Bay Manning Road	13:45	14:00	14:15	14:30	14:45	14:55	15:04	15:08	15:14	15:18	15:21	15:24
G	Edgecliff Station New South Head Rd	13:48	14:03	14:18	14:33	14:48	14:58	15:08	e15:10	15:18	e15:20	e15:23	15:28
H	Kings Cross Bayswater Road	13:53	14:08	14:23	14:38	14:53	15:03	15:13	...	15:23	...	...	15:33
I	City - Town Hall Park Street	p14:03	p14:18	p14:33	p14:48	p15:03	p15:13	p15:23	...	p15:33	...	...	p15:43
J	City - Walsh Bay Hickson Road	14:12	14:27	14:42	14:57	15:12	15:22	15:32	...	15:42	...	...	15:52

Monday to Friday (continued...)													
map ref	Route Number	324	324	325	324	324	325	324	324	325	324	324	325
A	Watsons Bay Military Road	...	15:12	15:19	...	15:32	15:39	15:52	...	16:19	16:32	...	16:49
B	Vaucluse Heights Old South Head Rd	15:13	15:18	...	15:33	15:38	...	15:58	16:14	...	16:38	16:48	...
C	Vaucluse Hopetoun Avenue	...	...	15:24	...	...	15:44	...	...	16:24	...	...	16:54
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	15:19	15:24	15:34	15:39	15:44	15:54	16:04	16:20	16:34	16:44	16:54	17:04
F	Double Bay Manning Road	15:29	15:34	15:44	15:49	15:54	16:04	16:14	16:30	16:44	16:54	17:04	17:14
G	Edgecliff Station New South Head Rd	e15:31	15:38	15:48	e15:51	15:58	16:08	16:18	16:34	16:48	16:58	17:08	17:18
H	Kings Cross Bayswater Road	...	15:43	15:53	...	16:03	16:13	16:23	16:39	16:53	17:03	17:13	17:23
I	City - Town Hall Park Street	...	p15:53	p16:03	...	p16:13	p16:22	p16:33	p16:48	p17:02	p17:12	p17:22	p17:32
J	City - Walsh Bay Hickson Road	...	16:02	16:12	...	16:22	16:31	16:43	16:58	17:12	17:22	17:32	17:42



Monday to Friday

New South Head Road to Edgecliff & City

Monday to Friday (continued...)													
map ref	Route Number	324	324	325	324	325	324	325	324	325	324	325	324
A	Watsons Bay Military Road	17:07	...	17:34	17:52	18:06	18:29	18:46	19:19	19:46	20:19	20:47	21:21
B	Vaucluse Heights Old South Head Rd	17:13	17:28	...	17:58	...	18:35	...	19:25	...	20:25	...	21:26
C	Vaucluse Hopetoun Avenue	...	...	17:39	...	18:11	...	18:51	...	19:50	...	20:51	...
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	17:19	17:34	17:49	18:04	18:21	18:41	19:01	19:29	19:59	20:29	21:00	21:30
F	Double Bay Manning Road	17:29	17:44	17:59	18:14	18:31	18:51	19:10	19:38	20:08	20:38	21:08	21:38
G	Edgecliff Station New South Head Rd	17:33	17:48	18:03	18:18	18:35	18:55	19:12	19:40	20:10	20:40	21:10	21:40
H	Kings Cross Bayswater Road	17:38	17:53	18:08	18:23	18:40	19:00	19:16	19:44	20:14	20:44	21:13	21:43
I	City - Town Hall Park Street	p17:47	p18:02	p18:17	p18:32	p18:49	19:08	19:24	19:51	20:21	20:51	21:20	21:50
J	City - Walsh Bay Hickson Road	17:57	18:11	18:26	18:41	18:58	19:17	19:33	20:00	20:30	21:00	21:29	21:59

Monday to Friday (continued...)								
map ref	Route Number	325	324	325	324	324	324	324
A	Watsons Bay Military Road	21:49	22:21	22:49	23:21	23:51	00:22	f01:15
B	Vaucluse Heights Old South Head Rd	...	22:26	...	23:26	23:56	00:27	f01:20
C	Vaucluse Hopetoun Avenue	21:53	...	22:53	...	...	...	...
D	Dover Heights Military Road	...	...	...	...	...	...	...
E	Rose Bay Dover Road	22:00	22:30	23:00	23:30	00:00	00:31	f01:24
F	Double Bay Manning Road	22:08	22:38	23:08	23:38	00:08	00:38	f01:31
G	Edgecliff Station New South Head Rd	22:10	22:40	23:10	23:40	00:10	00:40	f01:33
H	Kings Cross Bayswater Road	22:13	22:43	23:13	23:43	00:13	00:43	f01:36
I	City - Town Hall Park Street	22:20	22:50	23:20	23:50	00:20	00:50	f01:43
J	City - Walsh Bay Hickson Road	22:29	22:59	23:29	23:59	00:29	00:59	f01:52

Saturday													
map ref	Route Number	324	324	324	324	324	324	325	324	325	324	325	324
A	Watsons Bay Military Road	04:31	05:01	05:31	06:01	06:31	07:01	07:25	07:45	07:55	08:15	08:25	08:44
B	Vaucluse Heights Old South Head Rd	04:36	05:06	05:36	06:06	06:36	07:06	...	07:50	...	08:20	...	08:49
C	Vaucluse Hopetoun Avenue	...	...	...	...	...	...	07:29	...	08:00	...	08:30	...
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	04:40	05:10	05:40	06:10	06:40	07:10	07:38	07:54	08:09	08:24	08:39	08:53
F	Double Bay Manning Road	04:47	05:18	05:48	06:18	06:48	07:18	07:47	08:03	08:18	08:33	08:48	09:03
G	Edgecliff Station New South Head Rd	04:49	05:20	05:50	06:20	06:50	07:20	07:49	08:05	08:20	08:35	08:50	09:05
H	Kings Cross Bayswater Road	04:53	05:24	05:54	06:24	06:54	07:24	07:53	08:09	08:24	08:39	08:54	09:10
I	City - Town Hall Park Street	04:59	05:30	06:00	06:30	07:00	07:30	08:00	08:16	08:31	08:47	09:02	09:18
J	City - Walsh Bay Hickson Road	05:08	05:39	06:09	06:39	07:09	07:39	08:09	08:25	08:41	08:57	09:12	09:28

Saturday (continued...)													
map ref	Route Number	325	324	325	324	325	324	325	324	325	324	325	324
A	Watsons Bay Military Road	08:51	09:13	09:20	09:43	09:50	10:13	10:20	10:43	10:50	11:13	11:20	11:43
B	Vaucluse Heights Old South Head Rd	...	09:18	...	09:48	...	10:18	...	10:48	...	11:18	...	11:48
C	Vaucluse Hopetoun Avenue	08:56	...	09:25	...	09:55	...	10:25	...	10:55	...	11:25	...
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	09:07	09:22	09:37	09:52	10:07	10:22	10:37	10:52	11:07	11:22	11:37	11:52
F	Double Bay Manning Road	09:18	09:33	09:48	10:03	10:18	10:33	10:48	11:03	11:18	11:33	11:48	12:03
G	Edgecliff Station New South Head Rd	09:20	09:35	09:50	10:05	10:20	10:35	10:50	11:05	11:20	11:35	11:50	12:05
H	Kings Cross Bayswater Road	09:25	09:40	09:55	10:10	10:25	10:40	10:55	11:10	11:25	11:40	11:55	12:10
I	City - Town Hall Park Street	09:33	09:48	10:03	10:18	10:33	10:48	11:03	11:18	11:33	11:48	12:03	12:18
J	City - Walsh Bay Hickson Road	09:45	10:00	10:15	10:30	10:45	11:00	11:16	11:31	11:46	12:01	12:16	12:31

Saturday (continued...)													
map ref	Route Number	325	324	325	324	325	324	325	324	325	324	325	324
A	Watsons Bay Military Road	11:50	12:13	12:20	12:43	12:50	13:13	13:20	13:43	13:50	14:13	14:20	14:43
B	Vaucluse Heights Old South Head Rd	...	12:18	...	12:48	...	13:18	...	13:48	...	14:18	...	14:48
C	Vaucluse Hopetoun Avenue	11:55	...	12:25	...	12:55	...	13:25	...	13:55	...	14:25	...
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	12:07	12:22	12:37	12:52	13:07	13:22	13:37	13:52	14:07	14:22	14:37	14:52
F	Double Bay Manning Road	12:18	12:33	12:48	13:03	13:18	13:33	13:48	14:03	14:18	14:33	14:48	15:03
G	Edgecliff Station New South Head Rd	12:20	12:35	12:50	13:05	13:20	13:35	13:50	14:05	14:20	14:35	14:50	15:05
H	Kings Cross Bayswater Road	12:25	12:40	12:55	13:10	13:25	13:40	13:55	14:10	14:25	14:40	14:55	15:10
I	City - Town Hall Park Street	12:33	12:48	13:03	13:18	13:33	13:48	14:03	14:18	14:33	14:48	15:03	15:18
J	City - Walsh Bay Hickson Road	12:46	13:01	13:16	13:31	13:46	14:01	14:16	14:31	14:46	15:01	15:16	15:31

Saturday (continued...)													
map ref	Route Number	325	324	325	324	325	324	325	324	325	324	325	324
A	Watsons Bay Military Road	14:50	15:13	15:20	15:43	15:50	16:13	16:20	16:44	16:52	17:15	17:23	17:45
B	Vaucluse Heights Old South Head Rd	...	15:18	...	15:48	...	16:18	...	16:49	...	17:20	...	17:50
C	Vaucluse Hopetoun Avenue	14:55	...	15:25	...	15:55	...	16:25	...	16:57	...	17:27	...
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	15:07	15:22	15:37	15:52	16:07	16:22	16:37	16:53	17:09	17:24	17:39	17:54
F	Double Bay Manning Road	15:18	15:33	15:48	16:03	16:18	16:33	16:48	17:04	17:19	17:34	17:49	18:04
G	Edgecliff Station New South Head Rd	15:20	15:35	15:50	16:05	16:20	16:35	16:50	17:06	17:21	17:36	17:51	18:06
H	Kings Cross Bayswater Road	15:25	15:40	15:55	16:10	16:25	16:40	16:55	17:11	17:26	17:41	17:56	18:11
I	City - Town Hall Park Street	15:33	15:48	16:03	16:18	16:33	16:48	17:03	17:18	17:33	17:48	18:03	18:18
J	City - Walsh Bay Hickson Road	15:46	16:01	16:16	16:31	16:46	17:01	17:16	17:31	17:46	18:01	18:16	18:31





Saturday (continued...)													
map ref	Route Number	325	324	324	325	324	324	325	324	325	324	325	324
A	Watsons Bay Military Road	17:53	18:15	18:30	18:37	18:59	19:14	19:37	20:14	20:41	21:11	21:39	22:11
B	Vaucluse Heights Old South Head Rd	...	18:20	18:35	...	19:04	19:19	...	20:19	...	21:16	...	22:16
C	Vaucluse Hopetoun Avenue	17:57	...	...	18:41	...	...	19:41	...	20:45	...	21:43	...
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	18:09	18:24	18:39	18:53	19:08	19:23	19:53	20:23	20:57	21:20	21:50	22:20
F	Double Bay Manning Road	18:19	18:34	18:49	19:03	19:18	19:33	20:03	20:33	21:05	21:28	21:58	22:28
G	Edgecliff Station New South Head Rd	18:21	18:36	18:51	19:05	19:20	19:35	20:05	20:35	21:07	21:30	22:00	22:30
H	Kings Cross Bayswater Road	18:26	18:41	18:56	19:10	...	19:40	20:10	20:40	21:10	21:33	22:03	22:33
I	City - Town Hall Park Street	18:33	18:48	19:03	19:16	...	19:46	20:16	20:46	21:16	21:39	22:09	22:39
J	City - Walsh Bay Hickson Road	18:46	19:01	19:13	19:26	...	19:56	20:26	20:56	21:26	21:49	22:19	22:49










Saturday (continued...)								
map ref	Route Number	325	324	324	324	324	324	324
A	Watsons Bay Military Road	22:39	23:11	23:41	00:11	00:41	01:11	02:11
B	Vaucluse Heights Old South Head Rd	...	23:16	23:46	00:16	00:46	01:16	02:16
C	Vaucluse Hopetoun Avenue	22:43	...	...	...	...	...	...
D	Dover Heights Military Road	...	...	...	...	...	...	...
E	Rose Bay Dover Road	22:50	23:20	23:50	00:20	00:50	01:20	02:20
F	Double Bay Manning Road	22:58	23:28	23:58	00:28	00:57	01:27	02:27
G	Edgecliff Station New South Head Rd	23:00	23:30	00:00	00:30	00:59	01:29	02:29
H	Kings Cross Bayswater Road	23:03	23:33	00:03	00:33	01:02	01:32	02:32
I	City - Town Hall Park Street	23:09	23:39	00:09	00:39	01:08	01:38	02:38
J	City - Walsh Bay Hickson Road	23:19	23:49	00:19	00:48	01:17	01:47	02:47

Sunday & Public Holidays													
map ref	Route Number	324	324	324	324	324	324	325	324	325	324	325	324
A	Watsons Bay Military Road	...	...	07:01	07:31	08:01	08:16	08:28	08:45	08:54	09:11	09:22	09:41
B	Vaucluse Heights Old South Head Rd	...	...	07:06	07:36	08:06	08:21	...	08:50	...	09:17	...	09:47
C	Vaucluse Hopetoun Avenue	...	...	...	...	...	...	08:32	...	08:58	...	09:28	...
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	06:08	06:38	07:10	07:40	08:10	08:25	08:40	08:54	09:08	09:23	09:38	09:53
F	Double Bay Manning Road	06:16	06:46	07:18	07:48	08:18	08:33	08:48	09:03	09:18	09:33	09:48	10:03
G	Edgecliff Station New South Head Rd	06:18	06:48	07:20	07:50	08:20	08:35	08:50	09:05	09:20	09:35	09:50	10:05
H	Kings Cross Bayswater Road	06:22	06:52	07:24	07:54	08:24	08:39	08:54	09:09	09:24	09:39	09:54	10:09
I	City - Town Hall Park Street	06:28	06:58	07:30	08:00	08:30	08:45	09:00	09:16	09:31	09:46	10:01	10:16
J	City - Walsh Bay Hickson Road	06:36	07:06	07:38	08:08	08:38	08:53	09:10	09:26	09:41	09:56	10:11	10:26

Sunday & Public Holidays (cont...)													
map ref	Route Number	325	324	325	324	325	324	325	324	325	324	325	324
A	Watsons Bay Military Road	09:52	10:11	10:22	10:41	10:52	11:11	11:22	11:41	11:52	12:11	12:22	12:41
B	Vaucluse Heights Old South Head Rd	...	10:17	...	10:47	...	11:17	...	11:47	...	12:17	...	12:47
C	Vaucluse Hopetoun Avenue	09:58	...	10:28	...	10:58	...	11:28	...	11:58	...	12:28	...
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	10:08	10:23	10:38	10:53	11:08	11:23	11:38	11:53	12:08	12:23	12:38	12:53
F	Double Bay Manning Road	10:18	10:33	10:48	11:03	11:18	11:33	11:48	12:03	12:18	12:33	12:48	13:03
G	Edgecliff Station New South Head Rd	10:20	10:35	10:50	11:05	11:20	11:35	11:50	12:05	12:20	12:35	12:50	13:05
H	Kings Cross Bayswater Road	10:24	10:39	10:54	11:09	11:24	11:39	11:54	12:09	12:24	12:39	12:54	13:09
I	City - Town Hall Park Street	10:31	10:47	11:02	11:17	11:32	11:47	12:02	12:17	12:32	12:47	13:02	13:17
J	City - Walsh Bay Hickson Road	10:41	10:59	11:14	11:29	11:44	11:59	12:14	12:29	12:44	12:59	13:14	13:29

Sunday & Public Holidays (cont...)													
map ref	Route Number	325	324	325	324	325	324	325	324	325	324	325	324
A	Watsons Bay Military Road	12:52	13:11	13:22	13:41	13:52	14:11	14:22	14:41	14:52	15:11	15:22	15:41
B	Vaucluse Heights Old South Head Rd	...	13:17	...	13:47	...	14:17	...	14:47	...	15:17	...	15:47
C	Vaucluse Hopetoun Avenue	12:58	...	13:28	...	13:58	...	14:28	...	14:58	...	15:28	...
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	13:08	13:23	13:38	13:53	14:08	14:23	14:38	14:53	15:08	15:23	15:38	15:53
F	Double Bay Manning Road	13:18	13:33	13:48	14:03	14:18	14:33	14:48	15:03	15:18	15:33	15:48	16:03
G	Edgecliff Station New South Head Rd	13:20	13:35	13:50	14:05	14:20	14:35	14:50	15:05	15:20	15:35	15:50	16:05
H	Kings Cross Bayswater Road	13:24	13:39	13:54	14:09	14:24	14:39	14:54	15:09	15:24	15:39	15:54	16:09
I	City - Town Hall Park Street	13:32	13:47	14:02	14:17	14:32	14:47	15:02	15:17	15:32	15:47	16:02	16:17
J	City - Walsh Bay Hickson Road	13:44	13:59	14:14	14:29	14:44	14:59	15:14	15:29	15:44	15:59	16:14	16:29

Sunday & Public Holidays (cont...)													
map ref	Route Number	325	324	325	324	325	324	325	324	325	324	324	325
A	Watsons Bay Military Road	15:52	16:11	16:22	16:42	16:53	17:12	17:23	17:43	17:58	18:13	18:28	18:43
B	Vaucluse Heights Old South Head Rd	...	16:17	...	16:48	...	17:18	...	17:49	...	18:19	18:34	...
C	Vaucluse Hopetoun Avenue	15:58	...	16:28	...	16:59	...	17:29	...	18:03	...	...	18:47
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	16:08	16:23	16:38	16:54	17:09	17:24	17:39	17:55	18:11	18:24	18:39	18:55
F	Double Bay Manning Road	16:18	16:33	16:48	17:04	17:19	17:34	17:49	18:04	18:19	18:32	18:47	19:03
G	Edgecliff Station New South Head Rd	16:20	16:35	16:50	17:06	17:21	17:36	17:51	18:06	18:21	18:34	18:49	19:05
H	Kings Cross Bayswater Road	16:24	16:39	16:54	17:10	17:25	17:40	17:55	18:10	18:25	18:38	18:53	19:09
I	City - Town Hall Park Street	16:32	16:47	17:02	17:18	17:33	17:48	18:02	18:16	18:31	18:44	18:59	19:15
J	City - Walsh Bay Hickson Road	16:44	16:59	17:14	17:30	17:45	18:00	18:12	18:26	18:41	18:54	19:09	19:25

Sunday & Public Holidays (cont...)										
map ref	Route Number	324	325	324	325	324	325	324	325	324
A	Watsons Bay Military Road	19:14	19:43	20:14	20:43	21:11	21:39	22:11	22:39	23:11
B	Vaucluse Heights Old South Head Rd	19:20	...	20:20	...	21:16	...	22:16	...	23:16
C	Vaucluse Hopetoun Avenue	...	19:47	...	20:47	...	21:43	...	22:43	...
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...
E	Rose Bay Dover Road	19:25	19:55	20:25	20:55	21:20	21:50	22:20	22:50	23:20
F	Double Bay Manning Road	19:33	20:03	20:33	21:03	21:28	21:58	22:28	22:58	23:28
G	Edgecliff Station New South Head Rd	19:35	20:05	20:35	21:05	21:30	22:00	22:30	23:00	23:30
H	Kings Cross Bayswater Road	19:39	20:09	20:39	21:08	21:33	22:03	22:33	23:03	23:33
I	City - Town Hall Park Street	19:45	20:15	20:45	21:14	21:39	22:09	22:39	23:09	23:39
J	City - Walsh Bay Hickson Road	19:54	20:24	20:54	21:22	21:47	22:17	22:47	23:17	23:47

Monday to Friday (continued...)													
map ref	Route Number	324	325	324	325	324	325	324	325	324	324	325	324
J	City - Walsh Bay Hickson Road	12:57	13:12	13:27	13:42	13:57	14:12	14:27	14:42	14:57	15:07	15:17	15:27
I	City - Town Hall Park Street	p13:06	p13:21	p13:36	p13:51	p14:06	p14:21	p14:36	p14:51	p15:06	p15:16	p15:26	p15:36
H	Kings Cross Bayswater Road	13:17	13:32	13:47	14:02	14:17	14:32	14:47	15:02	15:17	15:27	15:37	15:47
G	Edgecliff Station Interchange	13:26	13:41	13:56	14:11	14:26	14:41	14:56	15:10	15:25	15:35	15:45	15:55
F	Double Bay Manning Road	13:29	13:44	13:59	14:14	14:29	14:44	14:59	15:13	15:28	15:38	15:48	15:58
E	Rose Bay Dover Road	13:38	13:53	14:08	14:23	14:38	14:53	15:09	15:23	15:38	15:48	15:58	16:08
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	...	14:02	...	14:32	...	15:02	...	15:32	...	...	16:06	...
B	Vaucluse Heights Old South Head Rd	13:44	...	14:14	...	14:44	...	15:15	...	15:44	15:54	...	16:13
A	Watsons Bay Military Road	13:50	14:07	14:20	14:37	14:50	15:08	15:21	15:38	15:50	...	16:11	16:19

Monday to Friday (continued...)													
map ref	Route Number	324	323	325	324	325	323	324	324	325	323	324	324
J	City - Walsh Bay Hickson Road	15:37	...	15:47	15:57	16:07	...	16:17	16:27	16:36	...	16:43	16:53
I	City - Town Hall Park Street	p15:46	...	p15:56	p16:06	p16:16	...	p16:26	p16:36	p16:45	...	p16:55	p17:05
H	Kings Cross Bayswater Road	15:57	...	16:08	16:18	16:28	...	16:38	16:48	16:58	...	17:08	17:18
G	Edgecliff Station Interchange	16:05	16:10	16:16	16:26	16:36	16:40	16:46	16:56	17:06	17:10	17:16	17:26
F	Double Bay Manning Road	16:08	16:13	16:19	16:29	16:39	16:43	16:49	16:59	17:09	17:13	17:19	17:29
E	Rose Bay Dover Road	16:18	...	16:29	16:39	16:49	...	16:59	17:09	17:19	...	17:29	17:39
D	Dover Heights Military Road	...	16:34	...	...	...	17:04	...	...	...	17:34	...	...
C	Vaucluse Hopetoun Avenue	...	...	16:37	...	16:57	...	...	...	17:27	...	...	...
B	Vaucluse Heights Old South Head Rd	16:23	...	...	16:44	...	...	17:04	17:14	...	...	17:34	17:44
A	Watsons Bay Military Road	16:29	...	16:42	16:50	17:02	...	17:10	17:20	17:32	...	17:40	17:50

Monday to Friday (continued...)													
map ref	Route Number	325	323	324	325	324	324	323	324	325	324	324	324
J	City - Walsh Bay Hickson Road	17:03	...	17:13	17:23	...	17:33	...	17:39	17:45	...	17:55	...
I	City - Town Hall Park Street	p17:15	...	p17:25	p17:35	...	p17:45	...	p17:51	p17:57	...	p18:07	...
H	Kings Cross Bayswater Road	17:28	...	17:38	17:48	...	17:58	...	18:03	18:08	...	18:18	...
G	Edgecliff Station Interchange	17:36	17:40	17:46	17:56	18:01	18:06	18:08	18:11	18:16	18:21	18:26	18:31
F	Double Bay Manning Road	17:39	17:43	17:49	17:59	18:04	18:09	18:11	18:14	18:19	18:24	18:29	18:34
E	Rose Bay Dover Road	17:49	...	17:59	18:09	18:14	18:19	...	18:24	18:29	18:34	18:39	18:44
D	Dover Heights Military Road	...	18:04	...	...	...	...	18:32	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	17:57	...	...	18:17	...	...	...	...	18:37	...	...	...
B	Vaucluse Heights Old South Head Rd	...	...	18:04	...	18:19	18:24	...	18:29	...	18:39	18:44	18:49
A	Watsons Bay Military Road	18:02	...	18:10	18:22	...	18:30	...	18:35	18:42	...	18:50	...

Monday to Friday (continued...)													
map ref	Route Number	324	323	325	324	324	325	324	325	324	325	324	324
J	City - Walsh Bay Hickson Road	18:07	...	18:15	18:28	18:38	18:48	18:58	19:11	19:28	19:43	19:58	20:13
I	City - Town Hall Park Street	p18:19	...	p18:27	p18:37	p18:47	p18:57	19:07	19:20	19:37	19:52	20:07	20:22
H	Kings Cross Bayswater Road	18:30	...	18:38	18:48	18:58	19:08	19:18	19:31	19:46	20:01	20:16	20:31
G	Edgecliff Station Interchange	18:38	18:41	18:46	18:56	19:06	19:16	19:26	19:36	19:51	20:06	20:21	20:36
F	Double Bay Manning Road	18:41	18:44	18:49	18:59	19:09	19:19	19:29	19:39	19:54	20:09	20:24	20:39
E	Rose Bay Dover Road	18:51	...	18:59	19:09	19:19	19:29	19:39	19:49	20:04	20:19	20:34	20:49
D	Dover Heights Military Road	...	19:05	...	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	...	...	19:07	...	...	19:36	...	19:56	...	20:26	...	...
B	Vaucluse Heights Old South Head Rd	18:56	...	...	19:14	19:24	...	19:43	...	20:08	...	20:38	20:53
A	Watsons Bay Military Road	19:02	...	19:12	19:20	19:30	19:40	19:48	20:00	20:13	20:30	...	20:58

Monday to Friday (continued...)												
map ref	Route Number	325	324	325	324	325	324	325	324	324	324	324
J	City - Walsh Bay Hickson Road	20:43	21:13	21:43	22:13	22:43	23:13	23:43	00:13	00:45	01:15	f02:15
I	City - Town Hall Park Street	20:52	21:22	21:52	22:22	22:52	23:22	23:52	00:22	00:54	01:24	g02:24
H	Kings Cross Bayswater Road	b21:01	b21:31	b22:01	b22:31	b23:01	b23:31	b00:01	b00:31	b01:01	b01:31	...
G	Edgecliff Station Interchange	21:06	21:36	22:06	22:36	23:06	23:36	00:06	00:35	01:06	01:36	f02:36
F	Double Bay Manning Road	21:08	21:38	22:08	22:38	23:08	23:38	00:08	00:37	01:08	01:38	f02:38
E	Rose Bay Dover Road	21:16	21:46	22:16	22:46	23:16	23:46	00:16	00:43	01:14	01:44	f02:44
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	21:23	...	22:23	...	23:23	...	00:23	...	...	...	...
B	Vaucluse Heights Old South Head Rd	...	21:50	...	22:50	...	23:50	...	00:47	01:18	01:48	f02:48
A	Watsons Bay Military Road	21:27	21:54	22:27	22:54	23:27	23:54	00:27	00:51	01:22	01:52	f02:52

Saturday													
map ref	Route Number	324	324	324	324	325	324	324	325	324	325	324	325
J	City - Walsh Bay Hickson Road	05:28	05:58	06:28	06:58	...	07:19	07:46	08:08	08:23	08:40	08:55	09:11
I	City - Town Hall Park Street	05:37	06:07	06:37	07:07	...	07:28	07:56	08:18	08:33	08:50	09:05	09:22
H	Kings Cross Bayswater Road	05:43	06:13	06:43	07:13	...	07:35	08:03	08:25	08:40	08:57	09:15	09:32
G	Edgecliff Station Interchange	05:48	06:18	06:48	07:18	07:25	07:40	08:08	08:30	08:45	09:04	09:24	09:41
F	Double Bay Manning Road	05:50	06:20	06:50	07:20	07:27	07:42	08:10	08:32	08:47	09:07	09:27	09:44
E	Rose Bay Dover Road	05:56	06:26	06:56	07:26	07:33	07:49	08:17	08:39	08:54	09:16	09:36	09:53
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	...	...	...	...	07:42	...	...	08:48	...	09:24	...	10:01
B	Vaucluse Heights Old South Head Rd	06:00	06:30	07:00	07:30	...	07:53	08:21	...	08:58	...	09:40	...
A	Watsons Bay Military Road	06:05	06:35	07:05	07:35	07:47	07:58	08:26	08:53	09:03	09:29	09:45	10:06

Saturday (continued...)													
map ref	Route Number	324	325	324	325	324	325	324	325	324	325	324	325
J	City - Walsh Bay Hickson Road	09:25	09:41	09:55	10:11	10:25	10:41	10:56	11:11	11:26	11:41	11:56	12:11
I	City - Town Hall Park Street	09:36	09:52	10:06	10:22	10:36	10:52	11:08	11:24	11:39	11:54	12:09	12:24
H	Kings Cross Bayswater Road	09:46	10:02	10:16	10:32	10:46	11:02	11:18	11:34	11:49	12:04	12:19	12:34
G	Edgecliff Station Interchange	09:55	10:11	10:25	10:41	10:55	11:11	11:27	11:43	11:58	12:13	12:28	12:43
F	Double Bay Manning Road	09:58	10:14	10:28	10:44	10:58	11:14	11:30	11:46	12:01	12:16	12:31	12:46
E	Rose Bay Dover Road	10:07	10:23	10:37	10:53	11:07	11:23	11:39	11:55	12:10	12:25	12:40	12:55
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	...	10:31	...	11:01	...	11:31	...	12:03	...	12:33	...	13:03
B	Vaucluse Heights Old South Head Rd	10:11	...	10:41	...	11:11	...	11:43	...	12:14	...	12:44	...
A	Watsons Bay Military Road	10:16	10:36	10:46	11:06	11:16	11:36	11:48	12:08	12:19	12:38	12:49	13:08

Saturday (continued...)													
map ref	Route Number	324	325	324	325	324	325	324	325	324	325	324	325
J	City - Walsh Bay Hickson Road	12:27	12:42	12:57	13:12	13:27	13:42	13:57	14:12	14:27	14:42	14:57	15:12
I	City - Town Hall Park Street	12:40	12:55	13:10	13:25	13:40	13:55	14:10	14:25	14:40	14:55	15:10	15:25
H	Kings Cross Bayswater Road	12:50	13:05	13:20	13:35	13:50	14:05	14:20	14:35	14:50	15:05	15:20	15:35
G	Edgecliff Station Interchange	12:59	13:14	13:29	13:44	13:59	14:14	14:29	14:44	14:59	15:14	15:29	15:44
F	Double Bay Manning Road	13:02	13:17	13:32	13:47	14:02	14:17	14:32	14:47	15:02	15:17	15:32	15:47
E	Rose Bay Dover Road	13:11	13:26	13:41	13:56	14:11	14:26	14:41	14:56	15:11	15:26	15:41	15:56
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	...	13:34	...	14:04	...	14:34	...	15:04	...	15:34	...	16:04
B	Vaucluse Heights Old South Head Rd	13:15	...	13:45	...	14:15	...	14:45	...	15:15	...	15:45	...
A	Watsons Bay Military Road	13:20	13:39	13:50	14:09	14:20	14:39	14:50	15:09	15:20	15:39	15:50	16:09

Saturday (continued...)													
map ref	Route Number	324	325	324	325	324	325	324	325	324	325	324	325
J	City - Walsh Bay Hickson Road	15:27	15:42	15:57	16:12	16:27	16:42	16:57	17:12	17:27	17:42	17:58	18:13
I	City - Town Hall Park Street	15:40	15:55	16:10	16:25	16:40	16:55	17:10	17:25	17:40	17:55	18:10	18:25
H	Kings Cross Bayswater Road	15:50	16:05	16:20	16:35	16:50	17:05	17:20	17:35	17:50	18:05	18:20	18:35
G	Edgecliff Station Interchange	15:59	16:14	16:29	16:44	16:59	17:14	17:29	17:44	17:59	18:14	18:29	18:44
F	Double Bay Manning Road	16:02	16:17	16:32	16:47	17:02	17:17	17:32	17:47	18:02	18:17	18:32	18:47
E	Rose Bay Dover Road	16:11	16:26	16:41	16:56	17:11	17:26	17:41	17:56	18:11	18:26	18:41	18:56
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	...	16:34	...	17:04	...	17:34	...	18:04	...	18:34	...	19:04
B	Vaucluse Heights Old South Head Rd	16:15	...	16:45	...	17:15	...	17:45	...	18:15	...	18:45	...
A	Watsons Bay Military Road	16:20	16:39	16:50	17:09	17:20	17:39	17:50	18:09	18:20	18:39	18:50	19:09

Saturday (continued...)													
map ref	Route Number	324	325	324	325	324	325	324	325	324	325	324	325
J	City - Walsh Bay Hickson Road	18:28	18:43	18:58	19:13	19:28	19:43	20:10	20:37	21:07	21:37	22:07	22:37
I	City - Town Hall Park Street	18:40	18:55	19:10	19:25	19:40	19:55	20:21	20:48	b21:17	b21:47	b22:17	b22:47
H	Kings Cross Bayswater Road	18:50	19:05	19:20	19:35	19:50	20:05	20:30	20:57	...	...	...	...
G	Edgecliff Station Interchange	18:59	19:14	19:29	19:44	19:59	20:10	20:35	21:02	21:31	22:01	22:31	23:01
F	Double Bay Manning Road	19:02	19:17	19:32	19:47	20:01	20:12	20:37	21:04	21:33	22:03	22:33	23:03
E	Rose Bay Dover Road	19:11	19:26	19:41	19:56	20:09	20:20	20:45	21:12	21:41	22:11	22:41	23:11
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	...	19:34	...	20:04	...	20:28	...	21:19	...	22:18	...	23:18
B	Vaucluse Heights Old South Head Rd	19:15	...	19:45	...	20:13	...	20:49	...	21:45	...	22:45	...
A	Watsons Bay Military Road	19:20	19:39	19:50	20:09	20:18	20:33	20:54	21:23	21:49	22:22	22:49	23:22

Saturday (continued...)									
map ref	Route Number	324	325	324	324	324	324	324	324
J	City - Walsh Bay Hickson Road	23:07	23:37	00:07	00:45	01:11	01:31	02:01	03:01
I	City - Town Hall Park Street	b23:17	b23:47	b00:17	b00:54	b01:20	b01:40	b02:10	b03:10
H	Kings Cross Bayswater Road	...	...	...	...	...	...	...	...
G	Edgecliff Station Interchange	23:31	00:01	00:31	01:05	01:31	01:51	02:21	03:21
F	Double Bay Manning Road	23:33	00:03	00:33	01:07	01:33	01:53	02:23	03:23
E	Rose Bay Dover Road	23:41	00:11	00:39	01:13	01:39	01:59	02:29	03:29
D	Dover Heights Military Road	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	...	00:18	...	...	...	...	...	...
B	Vaucluse Heights Old South Head Rd	23:45	...	00:43	01:17	01:43	02:03	02:33	...
A	Watsons Bay Military Road	23:49	00:22	00:47	01:21	01:47	02:07	02:37	...

Sunday & Public Holidays													
map ref	Route Number	324	324	324	324	324	324	325	324	325	324	325	324
J	City - Walsh Bay Hickson Road	06:58	07:18	07:48	08:18	08:48	09:15	09:30	09:43	09:58	10:13	10:28	10:43
I	City - Town Hall Park Street	07:06	07:26	07:56	08:26	08:56	09:24	09:39	09:54	10:09	10:24	10:39	10:54
H	Kings Cross Bayswater Road	07:13	07:33	08:03	08:33	09:04	09:33	09:48	10:03	10:18	10:33	10:48	11:03
G	Edgecliff Station Interchange	07:18	07:38	08:08	08:38	09:09	09:38	09:53	10:08	10:23	10:38	10:53	11:08
F	Double Bay Manning Road	07:20	07:40	08:10	08:40	09:12	09:41	09:56	10:11	10:26	10:41	10:56	11:11
E	Rose Bay Dover Road	07:27	07:47	08:17	08:47	09:22	09:51	10:07	10:21	10:37	10:51	11:07	11:21
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	...	...	...	...	...	...	10:16	...	10:46	...	11:16	...
B	Vaucluse Heights Old South Head Rd	07:31	07:51	08:21	08:51	09:26	09:55	...	10:25	...	10:55	...	11:25
A	Watsons Bay Military Road	07:36	07:56	08:26	08:56	09:32	10:01	10:20	10:31	10:50	11:01	11:20	11:31

Sunday & Public Holidays (cont...)													
map ref	Route Number	325	324	325	324	325	324	325	324	325	324	325	324
J	City - Walsh Bay Hickson Road	10:58	11:13	11:28	11:43	11:57	12:12	12:27	12:42	12:57	13:12	13:27	13:42
I	City - Town Hall Park Street	11:09	11:24	11:39	11:54	12:09	12:24	12:39	12:54	13:09	13:24	13:39	13:54
H	Kings Cross Bayswater Road	11:18	11:33	11:48	12:03	12:18	12:33	12:48	13:03	13:18	13:33	13:48	14:03
G	Edgecliff Station Interchange	11:23	11:38	11:53	12:08	12:23	12:38	12:53	13:08	13:23	13:38	13:53	14:08
F	Double Bay Manning Road	11:26	11:41	11:56	12:11	12:26	12:41	12:56	13:11	13:26	13:41	13:56	14:11
E	Rose Bay Dover Road	11:37	11:51	12:08	12:23	12:38	12:53	13:08	13:23	13:38	13:53	14:08	14:23
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	11:46	...	12:17	...	12:47	...	13:17	...	13:47	...	14:17	...
B	Vaucluse Heights Old South Head Rd	...	11:55	...	12:27	...	12:57	...	13:27	...	13:57	...	14:27
A	Watsons Bay Military Road	11:50	12:01	12:21	12:33	12:51	13:03	13:21	13:33	13:51	14:03	14:21	14:33

Sunday & Public Holidays (cont...)													
map ref	Route Number	325	324	325	324	325	324	325	324	325	324	325	324
J	City - Walsh Bay Hickson Road	13:57	14:12	14:27	14:42	14:57	15:12	15:27	15:42	15:57	16:12	16:27	16:42
I	City - Town Hall Park Street	14:09	14:24	14:39	14:54	15:09	15:24	15:39	15:54	16:09	16:24	16:39	16:54
H	Kings Cross Bayswater Road	14:18	14:33	14:48	15:03	15:18	15:33	15:48	16:03	16:18	16:33	16:48	17:03
G	Edgecliff Station Interchange	14:23	14:38	14:53	15:08	15:23	15:38	15:53	16:08	16:23	16:38	16:53	17:08
F	Double Bay Manning Road	14:26	14:41	14:56	15:11	15:26	15:41	15:56	16:11	16:26	16:41	16:56	17:11
E	Rose Bay Dover Road	14:38	14:53	15:08	15:23	15:38	15:53	16:08	16:23	16:38	16:53	17:08	17:23
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	14:47	...	15:17	...	15:47	...	16:17	...	16:47	...	17:17	...
B	Vaucluse Heights Old South Head Rd	...	14:57	...	15:27	...	15:57	...	16:27	...	16:57	...	17:27
A	Watsons Bay Military Road	14:51	15:03	15:21	15:33	15:51	16:03	16:21	16:33	16:51	17:03	17:21	17:33

Sunday & Public Holidays (cont...)													
map ref	Route Number	325	324	325	324	325	324	325	324	325	324	325	324
J	City - Walsh Bay Hickson Road	16:57	17:12	17:27	17:42	17:57	18:12	18:27	18:42	18:57	19:12	19:27	19:42
I	City - Town Hall Park Street	17:09	17:24	17:39	17:54	18:09	18:24	18:39	18:54	19:08	19:22	19:37	19:52
H	Kings Cross Bayswater Road	17:18	17:33	17:48	18:03	18:18	18:33	18:48	19:03	19:17	19:31	19:46	20:01
G	Edgecliff Station Interchange	17:23	17:38	17:53	18:08	18:23	18:38	18:53	19:08	19:22	19:36	19:51	20:06
F	Double Bay Manning Road	17:26	17:41	17:56	18:11	18:26	18:41	18:56	19:11	19:25	19:39	19:54	20:08
E	Rose Bay Dover Road	17:38	17:53	18:07	18:21	18:36	18:51	19:06	19:21	19:35	19:49	20:03	20:16
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	17:47	...	18:14	...	18:43	...	19:13	...	19:42	...	20:10	...
B	Vaucluse Heights Old South Head Rd	...	17:57	...	18:25	...	18:55	...	19:25	...	19:53	...	20:20
A	Watsons Bay Military Road	17:51	18:03	18:18	18:30	18:47	19:00	19:17	19:30	19:46	19:58	20:14	20:24

Sunday & Public Holidays (cont...)										
map ref	Route Number	324	325	324	325	324	325	324	325	324
J	City - Walsh Bay Hickson Road	20:12	20:38	21:08	21:38	22:08	22:38	23:08	23:38	00:08
I	City - Town Hall Park Street	20:21	20:47	21:17	21:47	22:17	22:47	23:17	23:47	00:17
H	Kings Cross Bayswater Road	20:30	20:56	21:26	21:56	22:26	22:56	23:26	23:56	00:26
G	Edgecliff Station Interchange	20:35	21:01	21:31	22:01	22:31	23:01	23:31	00:01	00:31
F	Double Bay Manning Road	20:37	21:03	21:33	22:03	22:33	23:03	23:33	00:03	00:33
E	Rose Bay Dover Road	20:45	21:11	21:41	22:11	22:41	23:11	23:41	00:11	00:39
D	Dover Heights Military Road	...	...	...	...	...	...	...	...	...
C	Vaucluse Hopetoun Avenue	...	21:18	...	22:18	...	23:18	...	00:18	...
B	Vaucluse Heights Old South Head Rd	20:49	...	21:45	...	22:45	...	23:45	...	...
A	Watsons Bay Military Road	20:53	21:22	21:49	22:22	22:49	23:22	23:49	00:22	...

Explanation of definitions and symbols

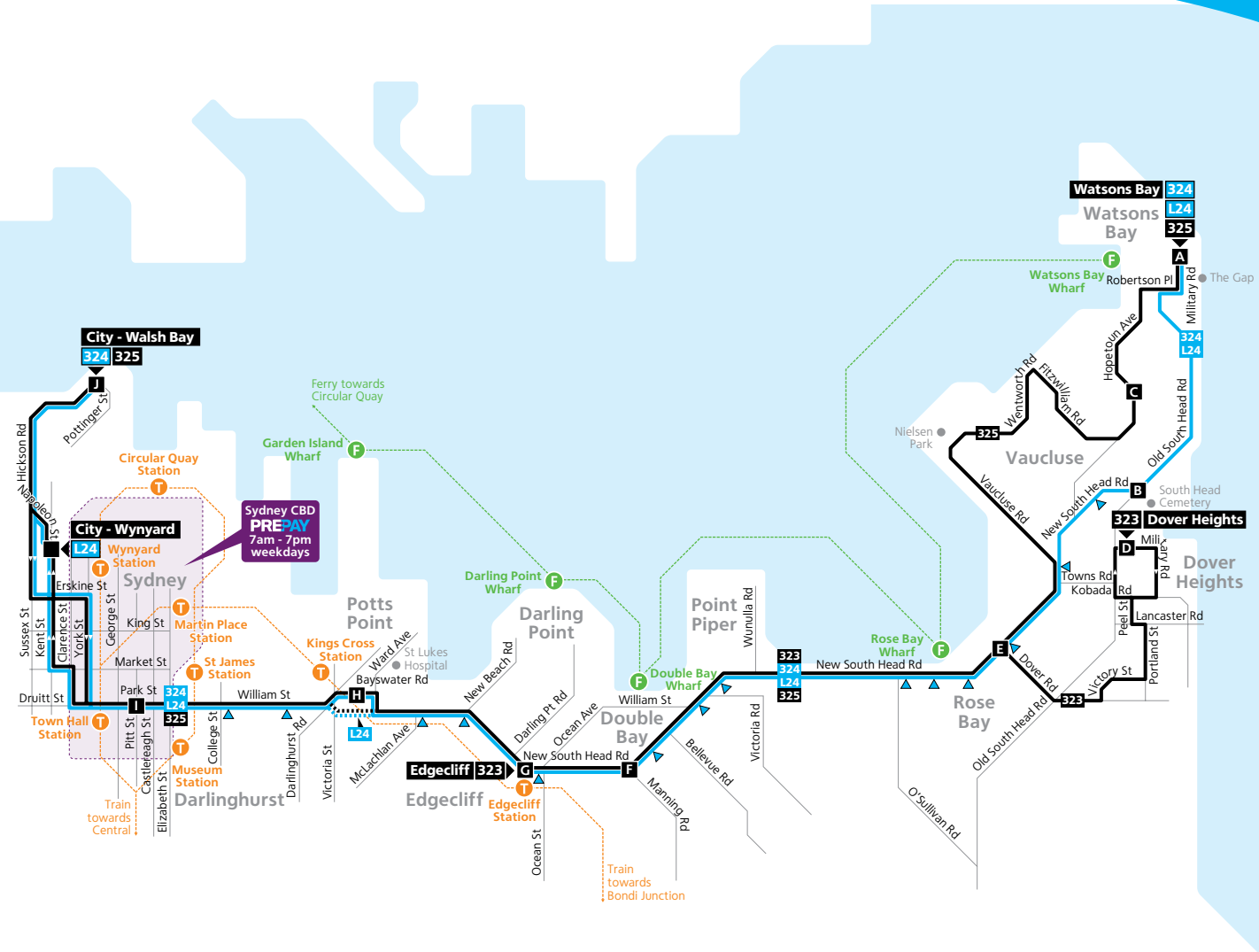
- b** Operates direct via Kings Cross Rd on Friday and Saturday nights.
- e** Time shown is for Edgecliff Interchange.
- f** Operates Friday only.
- g** Operates direct via Kings Cross Rd. Operates Friday only.
- p** PrePay-only. No tickets sold on board.
- q** PrePay-only. No tickets sold on board. Continues to City - Wynyard (Kent St).

Route L24 to City

Takes up and sets down at all stops to Laguna St Vaucluse, then only at Towns Rd, Dover Rd, Kent Rd, Elanora St, O’Sullivan Rd, Wolseley Rd Point Piper, Preston Ave Double Bay, Double Bay Shops, Edgecliff Station, New Beach Rd, Neild Ave Rushcutters Bay, William St at Forbes St, then all Route 324 stops to City - Wynyard (Kent St).

Timing Points

- A** Watsons Bay Military Road
- B** Vaucluse Heights Old South Head Road
- C** Vaucluse Hopetoun Avenue
- D** Dover Heights Military Road
- E** Rose Bay Dover Road
- F** Double Bay Manning Road
- G** Edgecliff Station
- H** Kings Cross Bayswater Road
- I** City - Town Hall Park Street
- J** City - Walsh Bay Hickson Road



Legend

- Bus route
- Diversion/extended route
- Bus route number
- Timing point
- Stops for limited stops services
- Train line/station
- Ferry route/wharf

Diagrammatic Map
Not to Scale



F7

Eastern Suburbs

For detailed timetable information, please contact Transport Info on **131 500**. If you are deaf, or have a hearing or speech impairment contact us through the National Relay Service on **133 677**. For more information, visit **relayservice.gov.au**.

Stay safe and on time

To board safely and to help services stay on schedule, please try to be on the wharf five minutes before your ferry's scheduled departure time. Please note that gates at Manly Wharf and Circular Quay close **two minutes** before ferry departure.

Explanation of definitions and symbols

- F** Service operates on Friday only, and may include stops early on Saturday morning.
- S** Service operates on Saturday only, and may include stops early on Sunday morning.

Need an Opal card?
opal.com.au



Visit **transportnsw.info**
Call **131 500** NRS 133 677

Disclaimer: Information contained in this timetable is based on the latest details at time of printing and is subject to change without notice.



Eastern Suburbs

Effective from 20 October 2013

Monday to Friday – **Circular Quay to Watsons Bay and return**

Monday to Friday																								
Service	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7
Circular Quay	06:22	06:46	06:59	07:05	07:19	07:29	07:39	07:55	07:59	08:19	08:29	08:55	09:20	10:05	10:40	11:10	11:40	12:10	13:10	13:40	14:10	15:10	16:10	16:40
Garden Island	...	...	...	...	...	...	...	...	...	...	...	...	09:26	10:11	10:46	11:16	11:46	12:16	13:16	13:46	14:16	15:16	...	...
Darling Point	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	16:46
Double Bay	...	...	07:14	...	...	07:44	...	...	08:14	...	08:44	...	09:32	...	...	...	...	...	13:22	...	14:22	15:22	16:19	16:51
Rose Bay	06:35	06:57	...	07:16	07:30	...	07:50	08:06	...	08:30	...	09:06	09:39	...	...	...	...	...	13:29	...	14:29	15:29	16:27	16:59
Watsons Bay <i>arr</i>	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10:22	10:57	11:27	11:57	12:27	13:35	13:55	14:35	15:35	16:35
Watsons Bay <i>dep</i>	...	...	...	...	...	...	...	...	...	...	...	...	...	...	10:35	11:05	11:35	12:07	12:35	13:45	14:15	14:45	15:45	16:45
Rose Bay	06:38	07:00	...	07:20	07:40	...	08:00	08:20	...	08:40	...	09:10	09:43	10:43	11:13	11:43	...	...	...	...	14:55	15:55	...	17:09
Double Bay	06:48	...	07:18	...	...	07:48	...	...	08:18	...	08:48	...	09:51	10:51	11:21	11:51	...	...	...	...	...	...	...	...
Darling Point	06:54	...	07:24	...	...	07:54	...	...	08:24	...	08:54	...	09:56	...	...	...	...	...	...	...	...	...	...	...
Garden Island	...	...	...	...	...	...	...	...	...	...	...	...	10:02	10:57	11:27	11:57	12:18	12:46	13:56	14:26	15:01	16:01	...	...
Circular Quay	07:01	07:11	07:37	07:31	07:51	08:07	08:11	08:31	08:37	08:51	09:07	09:21	10:07	11:02	11:32	12:02	12:23	12:51	14:01	14:31	15:06	16:06	17:00	17:20

Monday to Friday														
Service	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7
Circular Quay	17:10	17:27	17:30	17:50	17:57	18:10	18:27	18:30	18:57	19:00	19:55	20:55	21:55F	22:55F
Garden Island	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Darling Point	...	17:40	...	...	18:10	...	18:40	...	19:10	...	...	...	...	...
Double Bay	...	17:46	...	...	18:16	...	18:46	...	19:16	...	20:06	21:06	22:06F	23:06F
Rose Bay	17:21	...	17:43	18:03	...	18:23	...	18:43	...	19:13	20:16	21:16	22:16F	23:16F
Watsons Bay <i>arr</i>	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Watsons Bay <i>dep</i>	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rose Bay	17:29	...	17:49	18:09	...	18:26	...	18:46	...	19:16	20:19	21:19	22:19F	23:19F
Double Bay	...	17:49	...	...	18:19	...	18:49	...	19:19	...	...	...	...	...
Darling Point	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Garden Island	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Circular Quay	17:40	18:04	18:02	18:22	18:34	18:39	19:04	18:59	19:34	19:29	20:32	21:32	22:32F	23:32F

**F7**

Eastern Suburbs

Effective from 20 October 2013

Saturday, Sunday & Public Holidays – Circular Quay to Watsons Bay and return

Saturday, Sunday & Public Holidays																								
Service	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7	F7
Circular Quay	08:35	09:35	09:55	10:05	10:35	10:55	11:05	11:35	11:55	12:05	12:35	12:55	13:05	13:35	13:55	14:05	14:35	14:55	15:05	15:35	15:55	16:05	16:35	16:55
Garden Island	...	...	10:02	...	...	11:02	...	...	12:02	...	...	13:02	...	...	14:02	...	...	15:02	...	...	16:02	...	...	...
Darling Point	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Double Bay	...	...	10:11	...	...	11:11	...	...	12:11	...	...	13:11	...	...	14:11	...	...	15:11	...	...	16:11	...	...	17:10
Rose Bay	...	09:46	...	10:16	10:46	...	11:16	11:46	...	12:16	12:46	...	13:16	13:46	...	14:16	14:46	...	15:16	15:46	...	16:16	16:46	...
Watsons Bay <i>arr</i>	08:50	09:54	...	10:24	10:54	...	11:24	11:54	...	12:24	12:54	...	13:24	13:54	...	14:24	14:54	...	15:24	15:54	...	16:24	16:54	...
Watsons Bay <i>dep</i>	09:00	10:00	...	10:30	11:00	...	11:30	12:00	...	12:30	13:00	...	13:30	14:00	...	14:30	15:00	...	15:30	16:00	...	16:30	17:00	...
Rose Bay	09:08	10:08	...	10:38	11:08	...	11:38	12:08	...	12:38	13:08	...	13:38	14:08	...	14:38	15:08	...	15:38	16:08	...	16:38	17:08	...
Double Bay	09:16	...	10:14	...	...	11:14	...	...	12:14	...	...	13:14	...	...	14:14	...	...	15:14	...	...	16:14	...	...	17:14
Darling Point	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Garden Island	09:22	...	10:23	...	...	11:23	...	...	12:23	...	...	13:23	...	...	14:23	...	...	15:23	...	...	16:23	...	...	...
Circular Quay	09:28	10:19	10:30	10:49	11:19	11:30	11:49	12:19	12:30	12:49	13:19	13:30	13:49	14:19	14:30	14:49	15:19	15:30	15:49	16:19	16:30	16:49	17:19	17:29

Saturday, Sunday & Public Holidays								
Service	F7	F7	F7	F7	F7	F7	F7	F7
Circular Quay	17:05	17:35	17:55	18:55	19:55	20:55	21:55S	22:55S
Garden Island	...	...	...	...	...	...	...	...
Darling Point	...	...	...	...	...	...	...	...
Double Bay	...	...	18:06	19:06	20:06	21:06	22:06S	23:06S
Rose Bay	17:16	17:46	18:16	19:16	20:16	21:16	22:16S	23:16S
Watsons Bay <i>arr</i>	17:24	17:54	18:26	19:26	20:26	21:26	...	...
Watsons Bay <i>dep</i>	17:30	18:00	18:30	19:30	20:30	21:30	...	...
Rose Bay	17:38	18:08	...	...	...	...	22:19S	23:19S
Double Bay	...	...	...	...	...	...	...	...
Darling Point	...	...	...	...	...	...	...	...
Garden Island	...	...	...	...	...	...	...	...
Circular Quay	17:49	18:19	18:48	19:48	20:48	21:48	22:32S	23:32S

Appendix B

Indicative Parking Layout Plan

Revised Exhibition Draft



Revision notes:		
Rev:	Date:	Notes:

Drawn By: TL
Client: Dockside Group

Project: 0075 Gap Bluff Precinct
Drawing Title: Parking Arrangement

Date: 20 December 2016
Scale @ A3: 1:750
Drawing No: 01

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Appendix C

Appendix C: NSW Office of Environment & Heritage
Trail Proposals

Revised Exhibition Draft



To South Head
Heritage Trail

KEY	
	Pedestrian Access Link
	Existing Swale Drain
	Top of Bank
	Stone Steps
	Steel Stair System
	Track Head Sign

1m Stone steps

Camp
Cove
Carpark

3m Rock shelf
steel stair

1.5m Stone steps

Lighthouse Road

Cliff Street

Gap Bluff Road

To
Gap Park

TRAIL ALIGNMENT STAGE 2 : OPTION A

Considered potential additional stage to extend track network, contingent on Stage 1 performance

Description

Option A would utilise a series of steel and sandstone steps to negotiate the escarpment and deliver pedestrians to the northeast end of Camp Cove carpark. Existing vegetation will provide shade for pedestrians and screening to adjacent properties.

- The current informal track would be closed and fenced and additional signage installed to guide pedestrians
- The configuration of Camp Cove carpark may need to change in the future to comply with relevant standards
- Woollahra Council intend to install further storm water elements on the east side of Camp Cove carpark to reduce flooding. This option could be considered as an additional stage once storm water works are resolved
- Due to the requirement for tree removal and additional ascent structures, this option may prove cost prohibitive



To South Head
Heritage Trail

KEY	
	Pedestrian Access Link
	Existing Swale Drain
	Top of Bank
	Proposed Pedestrian Crossing
	Sandstone Steps
	Boardwalk
	Trail Head Sign
	Pedestrian Exclusion Fence

Concrete landings

Camp Cove
Carpark

Retain stormwater drain

Lighthouse Road

Cliff Street

Gap Bluff Road

To Gap Park

TRAIL ALIGNMENT STAGE 2 : OPTION C

Considered potential additional stage to extend track network, contingent on Stage 1 performance

Description

Option C utilises a new trail alignment linking Lighthouse Rd & Cliff St. Trail to be benched into bank and avoid significant remnant vegetation in National Park. Combination of onground trail, sandstone steps and boardwalk sections to traverse bank and drainage lines.

- The current informal track would be closed and fenced and additional signage installed to guide pedestrians
- Raised pedestrian crossing with blisters to allow safe and direct crossing to adjacent footpath on Lighthouse Rd and Cliff Street
- 1.2m pedestrian connection through National Park with sandstone steps on slope. Trail alignment along middle of escarpment to minimise visual impact and avoid remnant vegetation
- This option would adopt the Stage 1 pedestrian link from Gap Bluff Rd to Lighthouse Road
- Woolahra Council intend to install further storm water elements on the east side of Camp Cove carpark to reduce flooding. This option could be considered as an additional stage once storm water works are resolved
- Due to the requirement for tree removal and additional boardwalk and assent structures, this option may prove cost prohibitive.

Appendix D

Appendix D: Driver Code of Conduct

Revised Exhibition Draft

- Driver Code of Conduct -

All vehicle operators accessing the site must:

- Take reasonable care for his or her own personal health and safety.
 - Not adversely, by way of actions or otherwise, impact on the health and safety of other persons.
 - Obey all applicable road rules and laws at all times.
 - Obey all on-site signposted speed limits and comply with directions of traffic control supervisors in relation to movements in and around the site.
 - Operate their vehicles in a safe and professional manner, with consideration for all other road users.
 - Hold a current and valid driver's licence.
 - Comply with other applicable workplace policies, including a zero tolerance of driving while under the influence of alcohol and/or illicit drugs.
 - Not use mobile phones when driving a vehicle.
 - Advise management of any situations in which you know, or think may, present a threat to workplace health and safety.
 - Drive according to prevailing conditions (such as during inclement weather) and reduce speed, if necessary.
 - Have necessary identification documentation at hand and ready to present to security staff on entry and departure from the site, as necessary, to avoid unnecessary delays to other vehicles.
-



Douglas Partners
Geotechnics | Environment | Groundwater

Integrated Practical Solutions

Hazardous Building Materials Report

Proposed Development
The Gap, Watsons Bay

Prepared for
Ray Fitz-Gibbon & Associates Pty Ltd

Project 85743.01
December 2016



Document History

Document details

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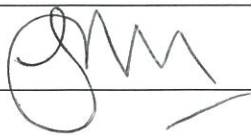
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Revision 0	1	0	Ray Fitz-Gibbon & Associates Pty Ltd

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, photographic logs and Register have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		20 December 2016
Reviewer		20 December 2016



Executive Summary

Douglas Partners Pty Ltd (DP) conducted a full access sampling and identification survey (pre-demolition / upgrade survey) of six buildings at Watsons Bay National Park, namely Green Point Cottage, Constables Cottage, 30 Cliff Street, the Armoury, Gap Bluff Cottage, and the Officers' Mess (see Drawing 1, Appendix A). The survey was undertaken to facilitate the identification and location of asbestos-containing materials (ACM) and other hazardous materials (Hazmat Survey) to enable their removal prior to proposed demolition and refurbishment works. It involved visually identifying known or suspected hazardous materials, collecting representative samples from suspected ACM and other hazardous materials, and recording the type and location of hazardous materials throughout the accessed areas of the buildings.

From the site survey and laboratory analysis results an *Asbestos Materials and Other Hazardous Materials Register* (the Register) has been produced in accordance with the requirements of the Work Health and Safety Regulation 2011 (NSW) and other relevant legislation.

The surveyors were unable to gain full access to the following areas:

- The ceiling cavity of the Officers' Mess due to height.

All areas where access was not possible must be presumed to contain asbestos until proven otherwise. See also Limitations in Section 6.

The information in this report is supplied on the understanding that the area surveyed is subject to demolition works, and that all identified asbestos and other hazardous materials will be removed prior to, or as part of these works. Any asbestos or other hazardous materials remaining *in situ* at the conclusion of the project will need to be detailed in a site specific Register and Asbestos Management Plan as required by the Work, Health and Safety Regulation 2011 (NSW).

The client should be made aware of the limitations of a survey being conducted in a destructive manner and is referred to in Section 6 – Limitations.

This report should be read in its entirety and may not be reproduced other than in full, except with the prior written approval of DP.

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Pre-demolition Hazardous Building Materials Report

Various Locations – The Gap National Park

1. Introduction

This report presents the findings of an asbestos and other hazardous building materials survey undertaken by Matthew Hyde of Douglas Partners Pty Ltd (DP) at client specified buildings at The Gap National Park on 1 and 2 December 2016. The survey was undertaken in accordance with DP's proposal SYD161384, dated 10 November 2016. The survey and report was commissioned by Mr Ray Fitz-Gibbon of Ray Fitz-Gibbon & Associates Pty Ltd. The survey was undertaken to facilitate the identification and location of asbestos-containing materials (ACM) and other hazardous materials (Hazmat Survey) to enable their removal prior to proposed demolition works. It involved collecting representative bulk samples from suspected ACM and recording the type, extent and location of these and other hazardous materials throughout the buildings. This type of survey may involve intrusive or destructive inspection techniques in an attempt to locate potential concealed ACM.

The purpose of the survey was to comply with current regulations regarding proposed demolition of the buildings on the subject site. The assessment was conducted on the basis of the condition of the materials at the time of the survey and the future anticipated activities at the site.

HBMs include asbestos containing materials (ACM), synthetic mineral fibre (SMF) products, lead-containing paint (LCP) and polychlorinated biphenyl (PCB) contained in capacitors in fluorescent light fittings. The survey was undertaken to identify and record the type and location of hazardous building materials and involved visually identifying known or suspected hazardous materials, and collecting representative samples from suspected ACM and potential lead-containing paint systems throughout the buildings. Other hazardous building materials (HBMs) were identified visually (see below).

From the site survey and laboratory analysis results a Register of ACM and other hazardous materials has been produced in accordance with the requirements of the Work Health and Safety Regulation 2011 (NSW) and other relevant legislation.

HBMs including asbestos were identified or suspected during the survey. Details of the material assessments and photographs can be found within the *Asbestos Materials and Other Hazardous Materials Register* (the Register) in Appendix B.

A Certificate of Analysis for bulk samples obtained during the survey is included within Appendix C of this report.

2. Scope of Work

The scope of the hazardous building materials survey included:

- i. Undertake a building survey to identify HBMs in the accessible areas of the subject buildings at the client specified buildings at The Gap National Park, Watsons Bay. All floors including the roof (where accessible) were accessed;
- ii. Where accessible, collect samples of building materials suspected of or commonly known to contain hazardous material (e.g. asbestos materials, potential lead-containing paint, and settled dust for lead). SMF installations and PCBs are identified by visual assessment only;
- iii. Submit building material samples to a NATA accredited laboratory for analysis, document the results and provide photographs of positive findings; and
- iv. Provision of an Asbestos Materials Register (and other HBMs) in accordance with the requirements of WHS Regulation 2011 (NSW) as part of this Hazardous Building Materials Assessment Report.

No survey inspection can be guaranteed to locate all asbestos and other hazardous materials without extensive destruction of the building and therefore this assessment cannot be regarded as absolute.

Planned or future demolition to site structures may expose situations which were concealed or otherwise impractical or a health hazard to access during this assessment. The client should be aware that asbestos ceilings and panels etc. may conceal further ACM, for example asbestos insulated duct or lagged pipework. Removal of asbestos products to identify concealed ACM requires additional controlled conditions and is beyond the scope of a normally executed survey.

3. Site Description

The site at The Gap national Park consists of six buildings on two lots, specified as Lot 3 DP 605078, and DP455565. The buildings covered by this report include those identified as Green Point Cottage, Constables Cottage, 30 Cliff Street, The Armoury, Gap Bluff Cottage, and the Officers' Mess, as per the client supplied site plan. The individual addresses are shown on Drawing 1, Appendix A.

Green Point Cottage is a single storey timber framed building with external weatherboards and a corrugated sheet metal roof with timber weatherboard gables. The floor is constructed of floating timber floorboards. A small timber framed extension to the west is covered with a skillion roof, and is sheeted internally and externally with flat fibre cement.

The Constables Cottage is a single storey timber framed weather board building with a hipped corrugated sheet metal roof and timber floor boards. A corrugated sheet metal verandah faces the west, and to the east there are multiple skillion roofed extensions on concrete hardstand.

30 Cliff Street is a single storey brick veneer building with a hipped corrugated sheet metal roof and timber floorboards.

The Armoury is single storey double brick building with hipped corrugated sheet metal roof and timber floorboards.

The Gap Bluff Cottage is a single storey timber framed weather board building with a gable ended tiled roof on timber floorboards, with a skillion roofed extension to the north on concrete hardstand.

The Officers' Mess is a masonry building with two sections; the older original building is to the west and consists of a double brick, two storey, masonry construction with a hipped tiled roof and timber floorboards. The extension to the east is a masonry and suspended concrete two storey building connected by a hallway

Hazardous building materials have been identified in all of the buildings. Refer to Appendix B for the types and locations.

4. Fieldwork Methodology

4.1 Inspection Methods

The DP licensed asbestos assessor (Matthew Hyde) undertook a systematic survey of the nominated areas with a view to identifying the type, location and extent of asbestos and other hazardous building materials prior to the proposed demolition / refurbishment at the site.

In order to expose potential concealed construction materials, survey techniques may involve the use of destructive techniques and the opening up of holes in fixtures or fittings in an intrusive manner to facilitate sample collection. DP is not liable for any reinstatement or associated costs to make good. These techniques are employed on the understanding that the area is to be demolished and any hazardous materials identified are removed prior to the building being demolished/re-occupied.

Where the surveyor encounters access restrictions during the survey, these situations are documented and reported (refer Executive Summary).

4.2 Sampling Methodology

All sampling was undertaken according to DP's field procedures HAZSAMP. Asbestos bulk samples were obtained using fibre suppressant techniques in order to minimise fibre release and breaking small portions from the bulk of the suspected ACM using hand tools.

Lead-paint samples were taken by scraping off paint from the suspect area and dust swabs taken with 'ghost' wipes. The sampling tools were decontaminated prior to collecting each sample in accordance with DP's field procedures HAZDEC.

The collected samples were recorded, placed in sealed, labelled plastic bags and sent to a laboratory NATA accredited to ISO/IEC 17025 for the scientific identification methods of analysis employed. For similar or repetitive building elements, a representative bulk sampling protocol has been adopted following visual examination and assessment.

SMF materials were identified by visual inspection only. Serial numbers of capacitors in fluorescent light capacitors were recorded only where it was safe to do so and the details of the capacitor identified within were checked against the 1997 ANZECC register for Identification of PCB-Containing Capacitors. Only one of each type of fluorescent light fitting was inspected.

4.3 Analytical Methods

The asbestos materials were qualitatively identified in the laboratory by polarised light microscopy (PLM) in conjunction with dispersion staining in accordance with AS: 4964-2004 Method for the qualitative identification of asbestos in bulk samples.

The testing of paint and dust samples for lead content involved the quantitative analysis of lead following sample digestion using ICP-AES/MS, ICP-OES and or CV/AAS. All laboratory analytical methods employed are NATA endorsed.

The Certificate of Analysis is attached in Appendix C.

5. Recommendations Summary

Refer to Appendix B for the Asbestos Materials Register and Other Hazardous Materials Register for recommendations, comments and suggested actions.

5.1 Asbestos-containing Materials Identified

Prior to any demolition, decommissioning, or refurbishment, ACM liable or likely to be disturbed by those works should be removed in accordance with the Code of Practice: How to Safely Remove Asbestos [Safe Work Australia (2011)]. The transport and disposal of asbestos waste is regulated by the EPA. According to the *Waste Classification Guidelines, Part 1 Classifying Waste* (NSW EPA 2014), asbestos waste is considered Special Waste and has unique regulatory requirements. All asbestos waste must be legally disposed of at an appropriately licensed waste disposal facility and records must be kept of disposal i.e. waste dockets or receipts.

5.1.1 Friable and Bonded Asbestos

ACM are referred to as either friable or bonded. Friable ACM exhibits the greatest risk to human health as fibres are released upon minimal disturbance.

Friable asbestos is in the form of a powder, or can be crumbled, pulverized or reduced to powder by hand pressure when dry. Friable asbestos includes materials such as: sprayed insulation, pipe or cylinder insulation, low density boards, woven textiles, millboard, paper and gaskets. These products can release fibres with only minimal disturbance.

Bonded asbestos products are ones in which the asbestos fibres are bound within the matrix of the material. Bonded asbestos is difficult to damage or cause the release of fibres by hand and includes materials such as asbestos cement products (fibre cement or 'fibro'), vinyl floor tiles, linoleum, mastic and 'zelemite' electrical backing boards. However, bonded ACM that have been subjected to weathering, physical damage, water damage, fire or other conditions may present exposed fibre bundles or loose fibres which could be released upon disturbance.

The asbestos information contained within this report is insufficient to meet the requirement for a full risk assessment for an ongoing management plan (if required). Any asbestos or other hazardous materials remaining *in situ* at the conclusion of the demolition project will need to be detailed in a site Asbestos Materials Register (and other hazardous materials register) and Management Plan as required by the Work, Health and Safety Regulation 2011 (NSW), and detailed in the Code of Practice: How to Manage and Control Asbestos in the Workplace [Safe Work Australia (2011)]. Handling and disposal must be undertaken according to these guidelines and the Waste Classification Guidelines as noted above.

5.2 Other Hazardous Materials Identified

5.2.1 Synthetic Mineral Fibre

Prior to any demolition, synthetic mineral fibre materials liable or likely to be disturbed by those works should be removed in accordance with the Code of Practice for the Safe Use of Synthetic Mineral Fibres [NOHSC:2006 (1990)]. SMF waste must be disposed of in accordance with EPA and local guidelines at a licensed land fill facility.

Loose or bonded SMF that has severely deteriorated has the potential of becoming airborne. Health effects that may occur with exposure to certain SMF materials include: irritation of the skin, eyes and upper respiratory tract.

5.2.2 Lead-based Paint and Dust

The selection of the most appropriate removal control measures should be determined from risk assessments and detailed knowledge of the workplace and proposed activities. Removal is to be undertaken prior to any demolition or decommissioning in accordance with AS 4361.2 - 1998 *Guide to lead paint management, Part 2: Residential and commercial buildings*. Disposal of waste contaminated with lead (including lead paint waste/dust) should be undertaken according to EPA *Waste Classification Guidelines, Part 1 Classifying Waste* (2014).

5.2.3 PCBs

All capacitors containing or suspected as containing PCB should be removed by a specialist electrical contractor prior to any demolition or decommissioning, in accordance with the Code of Practice for the safe handling of equipment containing Polychlorinated Biphenyl (PCB) Electrical Contractors' Association of Australia (1993).

PCB material and waste must be transported in accordance with the Australian Dangerous Goods Code, EPA guidelines, Chemical Control Order (CCO 1997) and other applicable legislative requirements. PCB waste must be legally disposed of or treated at an appropriately licensed waste disposal facility and records kept of disposal i.e. waste dockets or receipts.

Should any further suspect ACM or other hazardous materials become evident during demolition works, then works should stop in that area and the suspect material be inspected by a competent person.

6. Limitations

Douglas Partners (DP) has prepared this report for a project at client specified buildings at The Gap National Park in accordance with DP's proposal, SYD161384 dated 10 November 2016 and acceptance received from Mr Ray Fitz-Gibbon of Ray Fitz-Gibbon & Associates Pty Ltd in November 2016.

The work was carried out under DP's Conditions of Engagement. The report is provided for the exclusive use of Ray Fitz-Gibbon & Associates Pty Ltd It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the conditions observed on the date of inspection. Changes may occur after DP's inspection and field testing has been completed. Whilst the surveyors make every reasonable effort, DP cannot guarantee that every ACM has been identified and survey results are definitive. Some ACM could be present in the building that may only be discovered by extensive invasion of structures, or when the building is subject to demolition or major refurbishment works.

DP's advice is based upon the conditions encountered during this investigation and by the scope and feasibility of the investigations based on accessibility and other limitations. The accuracy of the advice provided by DP in this report may be limited by inaccessible areas and differing conditions between observed locations. The advice may also be limited by budget constraints imposed by others and the scope of works undertaken constrained as a result, or may have been limited by site accessibility. This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

The scope of the survey was to identify every reasonably accessible ACM. Reasonably accessible does not extend to searching for concealed ACM within concrete encased structural beams or beneath concrete floors, behind other ACM, or any other locations which, to access, would cause structural damage that could potentially destabilise the structure or the building. Given the way in which ACM was used in the construction of buildings, some ACM may only be detected during the course of subsequent demolition.

The sampling regime is dictated by the building nature. Sufficient representative bulk samples were taken throughout the building i.e. one like sample per consistent material type, situation or item. It is advisable to assume that materials similar to those positively identified as asbestos also contain asbestos until proven to be otherwise. It should not automatically be assumed that materials similar in appearance to those tested and found not to contain asbestos also do not contain asbestos. Due to the very low concentration of asbestos fibres and the non-homogenous matrix of vinyl floor tiles, false negative results may be obtained. With some asbestos containing bulk material it can be very difficult or impossible to detect the presence of asbestos using the polarised light microscopy analytical method, even after ashing or disintegration of samples. This is due to the small length or diameter of

asbestos fibres present in the material, or attributed to the fact that very fine fibres have been dispersed individually throughout the material.

Any areas within the scope of the survey but not described within the body of the report or in the Asbestos Materials Register and other hazardous materials register should be regarded by the client as not having been surveyed, and thus may potentially contain ACM. A competent person should assess such areas before any work affecting them is carried out.

It must be assumed that building materials visually assessed as asbestos contain amphibole asbestos, until sampled and laboratory analysis proves otherwise. All areas where access was not possible must also be assumed to contain asbestos until proven otherwise. Subsurface drains, pipes and formwork or surrounds may be constructed of asbestos cement but subsurface areas are not accessed. Any subsurface pipes, particularly those constructed of cement, should be assumed to contain asbestos until otherwise assessed.

Please note the following limitations and restrictions to specific installations and locations that are commonly found during surveys of this nature. Even if safe access can be provided through consultation with the client, this survey and report may not include the following areas:

- **Risers, ceiling, floor, wall cavities and voids** - may be completely blocked or bricked in. Occasionally may only be detected if shown on building construction plans or during demolition;
- **Columns or structural elements** - these will not be penetrated if doing so will damage the stability of the building;
- **Roofs and external areas** - these will only be inspected if safe access can be achieved;
- **Confined spaces** - these will only be inspected if safe access can be achieved;
- **Restricted access** - areas subject to restricted or specialist access will not be inspected unless prior arrangements have been made through the client within the scope of the survey;
- **Lifts / lift shafts** - these will not be inspected for safety reasons unless a lift engineer accompanies the surveyor;
- **Live plant or electrical installations** - live electrical installations including fuse boxes, electrical control cabinets, distribution panels etc. are not routinely inspected for safety reasons. Electrical equipment will only be examined if it is locked off and an isolation certificate has been issued. Under exceptional circumstances, when arranged by the client, examination of non-isolated equipment may take place under the supervision of an electrician;
- **Boilers** - may contain asbestos internally, or conceal further ACM, which are not accessible until the boiler is dismantled. Note: Where a bulk sample is obtained from a non-dismantled boiler it should not be regarded as definitive of all materials contained within the boiler's structure;
- **Live refrigerators, cold rooms, mechanical equipment, heater units, kilns** - may contain asbestos internally, which is not visible or accessible until the unit is isolated and dismantled; and
- **Safes** - the walls of some safes cannot be penetrated even where access arrangements have been made.

The recommendations and conclusions contained in this report shall not abrogate a person of their responsibility to work in accordance with Statutory Requirements, Codes of Practice, Guidelines, Material Safety Data Sheets, Work Instructions or industry best practices.

7. Legislation and References

- Work Health and Safety Act and Regulations 2011 (Commonwealth, NSW, ACT & QLD).
- Dangerous Substances Act and Regulations 2004 (ACT).
- Work Health and Safety Act and Regulations 2012 (SA, TAS).
- Occupational Health and Safety Act 2004 and Regulations 2007 (VIC).
- Occupational Health and Safety Act 1984 [Amended 7 January 2011] and Regulations 1996 (WA). Health (Asbestos) Regulations 1992 (WA).
- Work Health and Safety (National Uniform Legislation) Act 2011 (NT)
- Work Health and Safety (National Uniform Legislation) Regulations 2013 (NT).

Asbestos

- Code of Practice: How to Manage and Control Asbestos in the Workplace [Safe Work Australia (2011)].
- Code of Practice: How to Safely Remove Asbestos [Safe Work Australia (2011)].
- Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)].
- Code of Practice for the Safe Removal of Asbestos, [NOHSC: 2002 (2005)].
- Compliance Code Managing asbestos in workplaces [Worksafe VIC (2008)].
- Compliance Code Removing asbestos in workplaces [Worksafe VIC (2008)].
- AS 4964 – 2004 “Australian Standard™ Method for the qualitative identification of asbestos in bulk samples”.
- Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition, [NOHSC:3003 (2005)].
- AS 2601 - 2001 “Australian Standard™ The Demolition of Structures, Section 1.6”.
- Demolition Work Code of Practice (NSW WorkCover 2014).
- Health and Safety Laboratory UK – HSG 264 Asbestos The Survey Guide 2010.
- Health and Safety Laboratory UK - Methods for the Determination of Hazardous Substances (MDHS) 100 Surveying, sampling and assessment of asbestos-containing materials 2001.
- Health and Safety Laboratory UK - HSG 227 A Comprehensive Guide to Managing Asbestos in Premises 2002.

SMF

- National Standard for Synthetic Mineral Fibres [NOHSC: 1004 (1990)].
- Code of Practice for the Safe Use of Synthetic Mineral Fibres [NOHSC: 2006 (1990)].
- “Position Paper on Synthetic Mineral Fibres (SMF) & Occupational Health Issues“, AIOH including exposure Standards Committee 2011.

- “Industry Code of Practice for the Safe Use of Glass Wool and Rock Wool Products“, jointly developed by AMNWU, CFMEU, CEPU and FARIMA, 2003.

Lead in Paint

- AS 4361.2 - 1998 “Australian Standard™ Guide to lead paint management, Part 2: Residential and commercial buildings”.
- AS 4361.1—1995 “Australian Standard™ Guide to lead paint management, Part 1: Industrial applications”.
- National Code of Practice for the Control and Safe Use of Inorganic Lead at Work [NOHSC: 2015 (1994)].
- AS 4874 - 2000 “Australian Standard™ Guide to the investigation of potentially contaminated soil and deposited dust as source of lead available to humans”.
- ‘Standard for the Uniform Scheduling of Medicines and Poisons No. 3’, National Health and Medical Research Council (NHMRC), Poisons Standard 2012.
- AS 3640 - 2009 “Australian Standard™ Workplace Atmospheres Method for Sampling and Gravimetric Determination of Inhalable Dust”.

PCBs

- Identification of PCB-containing capacitors [(ANZECC) 1997].
- Polychlorinated Biphenyls Management Plan, [(ANZECC) 1999 revised 2003].
- Code of Practice for the safe handling of equipment containing Polychlorinated Biphenyl (PCB) Electrical Contractors’ Association of Australia, 1993.
- Polychlorinated Biphenyl (PCB) Chemical Control Order 1997

Classification and Wastes

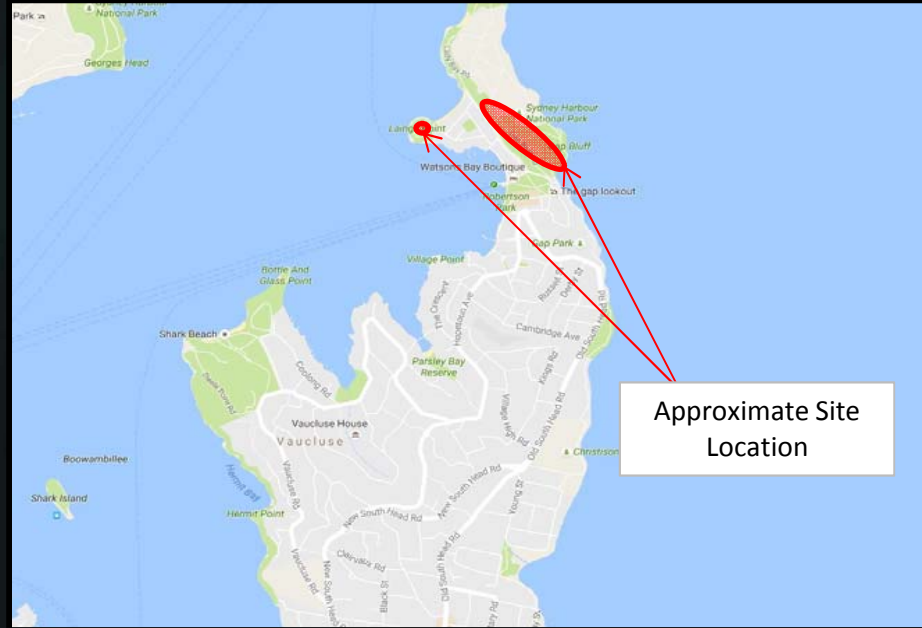
- Approved Criteria for Classifying Hazardous Substances, [NOHSC: 1008 (2004)].
- EPA Waste Classification Guidelines, Part 1 Classifying Waste (2014).

Douglas Partners Pty Ltd

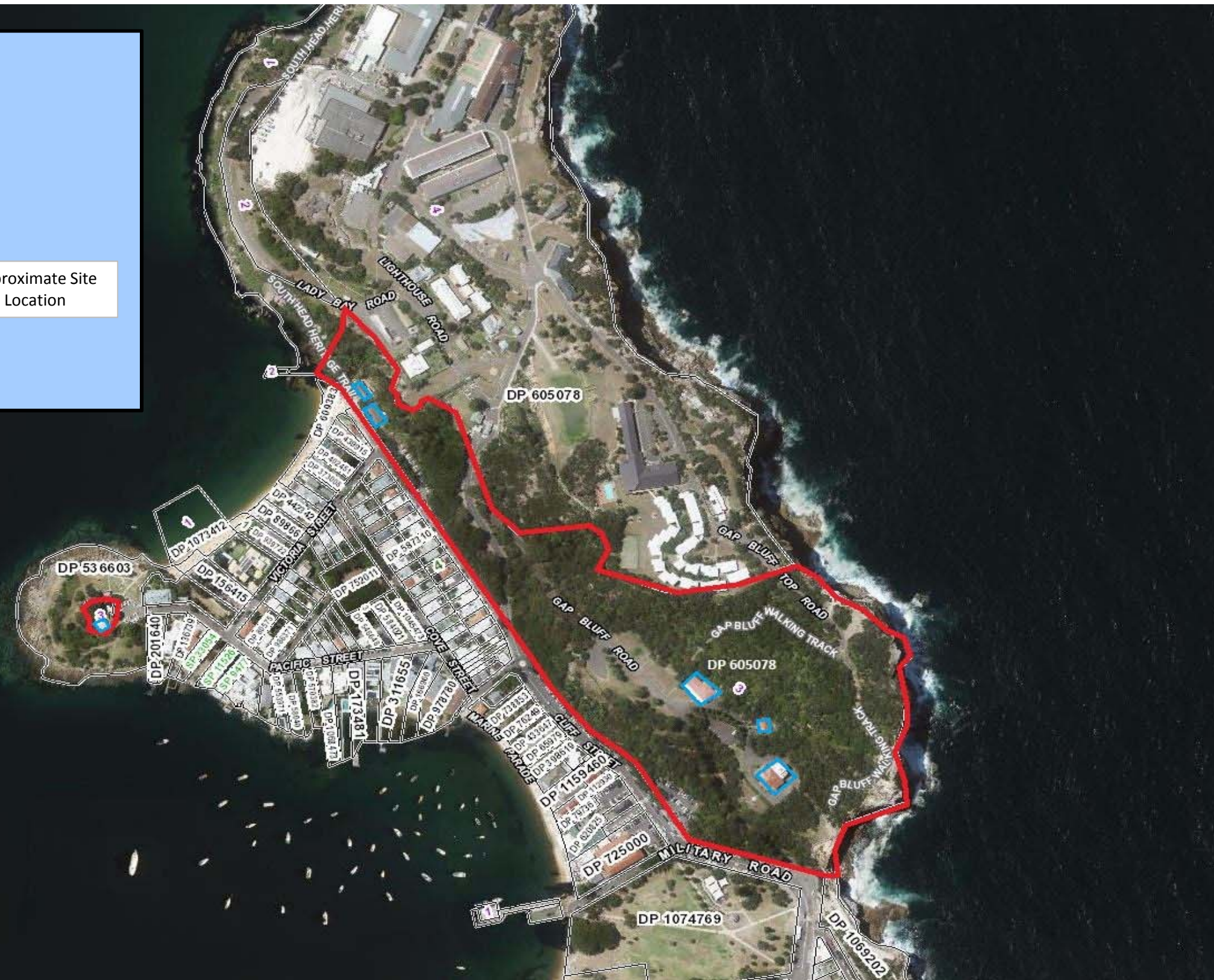
Appendix A

Site Drawing

Notes About this Inspection Report



Approximate Site Location



LEGEND

— - Lot Boundary

□ - Site Location



Source: Sixmaps

 Douglas Partners Geotechnics | Environment | Groundwater	CLIENT: Ray Fitz-Gibbon & Associates Pty Ltd		TITLE: Site Location Hazardous Building Materials The Gap, Watsons Bay	PROJECT No: 85743.00
	OFFICE: Sydney	DRAWN BY: CB		DRAWING No: 1
	SCALE: No Scale	DATE: 14 Nov 2016		REVISION: 0

About this Inspection Report

Douglas Partners



Introduction

These notes are provided to amplify DP's inspection report in regard to the limitations of carrying out inspection work. Not all notes are necessarily relevant to this report.

Standards

This inspection report has been prepared by qualified personnel to current engineering standards of interpretation and analysis.

Copyright and Limits of Use

This inspection report is the property of DP and is provided for the exclusive use of the client for the specific project and purpose as described in the report. It should not be used by a third party for any purpose other than to confirm that the construction works addressed in the report have been inspected as described. Use of the inspection report is limited in accordance with the Conditions of Engagement for the commission.

DP does not undertake to guarantee the works of the contractors or relieve them of their responsibility to produce a completed product conforming to the design.

Reports

This inspection report may include advice or opinion that is based on engineering and/or geological interpretation, information provided by the client or the client's agent, and information gained from:

- an investigation report for the project (if available to DP);
- inspection of the work, exposed ground conditions, excavation spoil and performance of excavating equipment while DP was on site;
- investigation and testing that was carried out during the site inspection;
- anecdotal information provided by authoritative site personnel; and

- DP's experience and knowledge of local geology.

Such information may be limited by the frequency of any inspection or testing that was able to be practically carried out, including possible site or cost constraints imposed by the client/contractor(s). For these reasons, the reliability of this inspection report is limited by the scope of information on which it relies.

Every care is taken with the inspection report as it relates to interpretation of subsurface conditions and any recommendations or suggestions for construction or design. However, DP cannot anticipate or assume responsibility for:

- unexpected variations in subsurface conditions that are not evident from the inspection; and
- the actions of contractors responding to commercial pressures.

Should these issues occur, then additional advice should be sought from DP and, if required, amendments made.

This inspection report must be read in conjunction with any attached information. This inspection report should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions from review by others of this inspection report or test data, which are not otherwise supported by an expressed statement, interpretation, outcome or conclusion stated in this inspection report.




Appendix B





Asbestos and other Hazardous Materials Register





Asbestos Materials Register




For Action Classification, Material Descriptions and Register Terminology please refer to GLOSSARY.





Client:	Ray Fitz-Gibbon & Associates Pty Ltd	Assessment by:	Matthew Hyde
Site location:	The Gap National Park	Assessment date:	1 & 2 December 2016


Location Description	Sample No	Asbestos Type	Friability Status	Product Type	Recommendation (A1 - A4)*	Comments / Action	Photo
Green Point Cottage is a single storey timber framed building with external weatherboards and a corrugated sheet metal roof with timber weatherboard gables. The floor is constructed of floating timber floorboards. A small timber framed extension to the west is covered with a skillion roof, and is sheeted internally and externally with flat fibre cement. 							
Walls to west extension, internal and external	18	Chrysotile, Amosite, and Crocidolite Asbestos detected	Non Friable	Flat Asbestos Cement Sheet	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	
Electrical backing board	VO	Presume asbestos	Non Friable	Electrical backing board	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	

Location Description	Sample No	Asbestos Type	Friability Status	Product Type	Recommendation (A1 - A4)*	Comments / Action	Photo
<p>The Constables Cottage is a single storey timber framed weather board building with a hipped corrugated sheet metal roof and timber floor boards. A corrugated sheet metal verandah faces the west, and to the east there are multiple skillion roofed extensions on concrete hardstand.</p> 							
Rear bathroom walls	9	No Asbestos detected Organic Fibres Detected	Non Friable	Flat Asbestos Cement Sheet	–	–	–
Internal walls to original building	11	Chrysotile, Amosite, and Crocidolite Asbestos detected	Non Friable	Flat Asbestos Cement Sheet	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	
Internal ceiling to original building	13	Chrysotile, and Crocidolite Asbestos detected	Non Friable	Flat Asbestos Cement Sheet	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	–
Ceiling to rear extension	15	Chrysotile Asbestos detected Organic Fibres Detected	Non Friable	Flat Asbestos Cement Sheet	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	
Eaves to rear extension	16	Chrysotile Asbestos detected	Non Friable	Flat Asbestos Cement Sheet	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	

Location Description	Sample No	Asbestos Type	Friability Status	Product Type	Recommendation (A1 - A4)*	Comments / Action	Photo
Flat panel behind weatherboard to rear extension	VO	Presume asbestos	Non Friable	Flat Asbestos Cement Sheet	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	
Front verandah	VO	Presume asbestos	Non Friable	Electrical backing board	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	
30 Cliff Street is a single storey brick veneer building with a hipped corrugated sheet metal roof and timber floorboards. 							
Eaves and soffit of car port	22	Chrysotile, Amosite, and Crocidolite Asbestos detected	Non Friable	Flat Asbestos Cement Sheet	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	


Location Description	Sample No	Asbestos Type	Friability Status	Product Type	Recommendation (A1 - A4)*	Comments / Action	Photo
Front verandah	VO	Presume asbestos	Non Friable	Electrical backing board	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	
Rear verandah	VO	Presume asbestos	Non Friable	Electrical backing board	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	
Laundry	23	No Asbestos detected Organic Fibres Detected	Non Friable	Vinyl Floor Tile	-	—	—
Laundry, bathroom, and toilet wall sheeting	24	Chrysotile, Amosite, and Crocidolite Asbestos detected	Non Friable	Flat Asbestos Cement Sheet	-	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	





Location Description	Sample No	Asbestos Type	Friability Status	Product Type	Recommendation (A1 - A4)*	Comments / Action	Photo
The Armoury is a single storey double brick building with hipped corrugated sheet metal roof and timber floorboards. 							
Toilet wall sheeting	2	No Asbestos detected Organic Fibres Detected	Non Friable	Flat Cement Sheet	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	
Eaves sheeting	3	No Asbestos detected Organic Fibres Detected	Non Friable	Flat Cement Sheet	–	–	–
Packers to joists	5	Chrysotile Asbestos detected	Non Friable	Flat Asbestos Cement Sheet	A1	Remove prior to any demolition or refurbishment works that may disturb the installation. Should the material not be affected by the works, leave <i>in-situ</i> , affix asbestos warning labels, manage and re-inspect.	
The Gap Bluff Cottage is a single storey timber framed weather board building with a gable ended tiled roof on timber floorboards, with a skillion roofed extension to the north on concrete hardstand. 							
Bathroom walls	25	No Asbestos detected Organic Fibres Detected	Non Friable	Flat Cement Sheet	–	–	–
Kitchen floor	26	No Asbestos detected Organic Fibres Detected	Non Friable	Vinyl Floor Tile	–	–	–




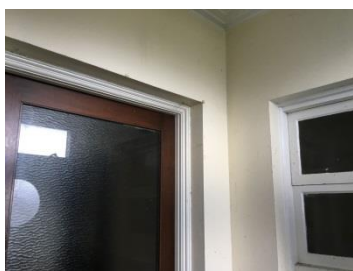
Location Description	Sample No	Asbestos Type	Friability Status	Product Type	Recommendation (A1 - A4)*	Comments / Action	Photo
Verandah soffit	27	No Asbestos detected	Non Friable	Flat Asbestos Cement Sheet	-	-	-
<p>The Officers' Mess is a masonry building with two sections; the older original building is to the west and consists of a double brick, two storey, masonry construction with a hipped tiled roof and timber floorboards. The extension to the east is a masonry and suspended concrete two storey building connected by a central hallway.</p> 							
Eaves sheeting	28	No Asbestos detected Organic Fibres Detected	Non Friable	Flat Cement Sheet	-	-	-
Mens Toilet to second floor	30	No Asbestos detected Organic Fibres Detected	Non Friable	Flat Cement Sheet	-	-	-

Other Hazardous Materials Register

Lead Paint and Lead Dust


Location and description	Sample ID	Lead	Recommendation	Photo
Green point cottage ceiling – Lead (Pb) Dust	19	3.1mg/m ²	Remove without discharge to the environment	-
Green point cottage – cream pain to external walls	20	<0.05	<1% not classified as lead containing paint	

Location and description	Sample ID	Lead	Recommendation	Photo
Constables Cottage – Lead flashing to chimney	VO	+ve	Remove without discharge to the environment	
Constables Cottage – cream paint to exterior weatherboard	10	0.1%	<1% not classified as lead containing paint.	
Constables Cottage – dust to ceiling cavity	12	8.0mg/m ²	5 mg/m ² . Above Pb levels permissible on window sills. Remove using appropriately trained and equipped personnel without discharge to the environment.	–
Constables Cottage – cream paint to internal window frames	14	0.3%	<1% not classified as lead containing paint.	-
Constables Cottage – white paint to external window frames	17	0.1%	<1% not classified as lead containing paint.	
30 Cliff Street – no lead paint / lead dust sampled	–	–	–	–
The Armoury – Pb paint, Black to infill panel to ceiling of male toilets	1	12%	>1% lead-containing paint. Remove using appropriately trained and equipped personnel without discharge to the environment.	

Location and description	Sample ID	Lead	Recommendation	Photo
The Armoury – Pb paint cream to external walls	4	6.4%	>1% lead-containing paint. Remove using appropriately trained and equipped personnel without discharge to the environment.	
The Armoury – Pb paint, green to underfloor access door	6	3.2%	>1% lead-containing paint. Remove using appropriately trained and equipped personnel without discharge to the environment.	
The Armoury – Pb dust to ceiling cavity	7	0.26mg/m ²	No action necessary	–
The Armoury – Pb paint, white to walls of interior store room	8	<0.05	<1% not classified as lead containing paint.	–
Gap Cottage – no lead paint / lead dust sampled	–	–	–	–
Officers' Mess – Pb paint, grey-blue paint to gutters and windows	29	0.1%	<1% not classified as lead containing paint.	
Officers' Mess – Pb Flashing to roof	VO	+ve	Remove using appropriately trained and equipped personnel without discharge to the environment.	–
Officers' Mess – Pb paint, cream to foyer	31	0.1%	<1% not classified as lead containing paint.	

Synthetic Mineral Fibres (SMF)

Location and description	Sample ID	Friability	Recommendation	Photo Identification
30 Cliff Street – Laundry Medium Hot water unit	VO	Non-friable	Remove prior to major demolition works	
The Armoury – Roof Cavity SMF insulation	VO	Friable	Remove prior to major demolition works	
The Armoury – instant hot water unit (Zip Hydroboil)	VO	Non-friable	Remove prior to major demolition works	
The Officers' Mess – AC ductwork	VO	Non-friable	Remove prior to major demolition works	

Location and description	Sample ID	Friability	Recommendation	Photo Identification
The Officers' Mess – instant hot water unit (Zip Hydroboil)	VO	Non-friable	Remove prior to major demolition works	

Polychlorinated Biphenyls (PCB)

Location and description	Sample ID	Recommendation	Photo identification
Number 43 – internal light fitting throughout	VO	Remove prior to major demolition / refurbishment works.	–

Glossary

The asbestos information in this report is supplied on the understanding that the area surveyed is to be subject to demolition or major refurbishment and that all the identified **ACM** and other hazardous materials will be removed as part of those works.

Action *

A1	Action 1	Remove prior to demolition, refurbishment, decommissioning or maintenance
		All asbestos and other hazardous materials likely or liable to be disturbed should be removed prior to, or during demolition, refurbishment, decommissioning or maintenance.

Douglas Partners adopt the following material assessments for asbestos in order to assess the risks associated with the **ACM** identified:

Friability

Variable	Score	Description
Friable	Y	Material which when dry may become crumbled, pulverised or reduced to powder by hand pressure. Includes severely weathered or damaged cement products.
	N	Bonded

Materials Assessment

Variable	Scores	Score Description
Asbestos Type	0	No asbestos
	1	Chrysotile only
	2	Amphibole asbestos (excluding Crocidolite)
	3	Crocidolite
Product Type	0	No asbestos detected
	1	Bonded asbestos in good condition
	2	Friable asbestos in good condition or cement in poor condition
	3	Friable asbestos in poor condition

Douglas Partners adopt the following material assessments in order to assess the risks associated with hazardous materials identified other than asbestos:

Friability

Variable	Score	Description
Friable	Y	Loose or unsealed SMF
	N	Sealed SMF
	NA	Applicable to PCB, Lead in paint

The following abbreviations or acronyms may be used in the report or register:

CH	Chrysotile (white) asbestos
CR	Crocidolite (blue) asbestos
AM	Amosite (brown) asbestos
NAD	No asbestos detected
SMF	Synthetic Mineral Fibre
PCB	Polychlorinated Biphenyls
LCP	Lead-containing paint
VO	Visual observation

Appendix C

Laboratory Report of Analysis



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email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS

158649

Client:

Douglas Partners Pty Ltd
96 Hermitage Rd
West Ryde
NSW 2114

Attention: Matthew Hyde, Paul Gorman

Sample log in details:

Your Reference:	85743.01, Watsons Bay
No. of samples:	3 swabs 15 materials 13 paints
Date samples received / completed instructions received	07/12/16 / 07/12/16

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	14/12/16 / 12/12/16
Date of Preliminary Report:	Not Issued

NATA accreditation number 2901. This document shall not be reproduced except in full.

Accredited for compliance with ISO/IEC 17025 - Testing

Tests not covered by NATA are denoted with *.

Results Approved By:

David Springer
General Manager

Envirolab Reference: 158649
Revision No: R 00



Asbestos ID - materials Our Reference: Your Reference	UNITS ----- -	158649-2 2	158649-3 3	158649-5 5	158649-9 9	158649-11 11
Date Sampled Type of sample	----- -	30/11/2016 paint	30/11/2016 paint	30/11/2016 material	30/11/2016 material	30/11/2016 material
Date analysed	-	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016
Mass / Dimension of Sample	-	20x20x3mm	40x25x4mm	15x10x5mm	50x40x5mm	20x10x3mm
Sample Description	-	Beige layered fibre cement material	Beige layered fibre cement material	Grey compressed fibre cement material	Beige layered fibre cement material	Grey fibre cement material
Asbestos ID in materials	-	No asbestos detected Organic fibres detected	No asbestos detected Organic fibres detected	Chrysotile asbestos detected	No asbestos detected Organic fibres detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected

Asbestos ID - materials Our Reference: Your Reference	UNITS ----- -	158649-13 13	158649-15 15	158649-16 16	158649-18 18	158649-22 22
Date Sampled Type of sample	----- -	30/11/2016 material	30/11/2016 material	30/11/2016 material	30/11/2016 material	30/11/2016 material
Date analysed	-	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016
Mass / Dimension of Sample	-	15x15x5mm	25x20x5mm	250x50x5mm	38x13x5mm	30x15x4mm
Sample Description	-	Grey compressed fibre cement material	Beige layered fibre cement material	Pink layered fibre cement material	Grey compressed fibre cement material	Grey compressed fibre cement material
Asbestos ID in materials	-	Chrysotile asbestos detected Crocidolite asbestos detected	Chrysotile asbestos detected Organic fibres detected	Chrysotile asbestos detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected

Asbestos ID - materials						
Our Reference:	UNITS	158649-23	158649-24	158649-25	158649-26	158649-27
Your Reference	-----	23	24	25	26	27
	-					
Date Sampled	-----	30/11/2016	30/11/2016	30/11/2016	30/11/2016	30/11/2016
Type of sample		material	material	material	material	material
Date analysed	-	12/12/2016	12/12/2016	12/12/2016	12/12/2016	12/12/2016
Mass / Dimension of Sample	-	60x58x2mm	25x25x3mm	40x35x4mm	60x50x2mm	30x20x4mm
Sample Description	-	Beige brittle vinyl tile	Grey fibre cement material	Beige layered fibre cement material	Beige brittle vinyl tile & adhesive	Brown layered fibre cement material
Asbestos ID in materials	-	No asbestos detected Organic fibres detected	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected	No asbestos detected Organic fibres detected	No asbestos detected Organic fibres detected	No asbestos detected

Asbestos ID - materials			
Our Reference:	UNITS	158649-28	158649-30
Your Reference	-----	28	30
	-		
Date Sampled	-----	30/11/2016	30/11/2016
Type of sample		material	material
Date analysed	-	12/12/2016	12/12/2016
Mass / Dimension of Sample	-	35x20x3mm	40x30x4mm
Sample Description	-	Beige layered fibre cement material	Beige layered fibre cement material
Asbestos ID in materials	-	No asbestos detected Organic fibres detected	No asbestos detected Organic fibres detected

Lead in swab Our Reference: Your Reference	UNITS ----- -	158649-7 7	158649-12 12	158649-19 19
Date Sampled Type of sample	----- -	30/11/2016 swab	30/11/2016 swab	30/11/2016 swab
Date prepared	-	08/12/2016	08/12/2016	08/12/2016
Date analysed	-	08/12/2016	08/12/2016	08/12/2016
Lead in Swabs	µg/swab	260	8,000	3,100

Lead in Paint Our Reference: Your Reference	UNITS ----- -	158649-1 1	158649-4 4	158649-6 6	158649-8 8	158649-10 10
Date Sampled Type of sample	----- -	30/11/2016 paint	30/11/2016 paint	30/11/2016 paint	30/11/2016 paint	30/11/2016 paint
Date prepared	-	08/12/2016	08/12/2016	08/12/2016	08/12/2016	08/12/2016
Date analysed	-	08/12/2016	08/12/2016	08/12/2016	08/12/2016	08/12/2016
Lead in paint	% w/w	12	6.4	3.2	<0.05	0.1

Lead in Paint Our Reference: Your Reference	UNITS ----- -	158649-14 14	158649-17 17	158649-20 20	158649-21 21	158649-29 29
Date Sampled Type of sample	----- -	30/11/2016 paint	30/11/2016 paint	30/11/2016 paint	30/11/2016 paint	30/11/2016 paint
Date prepared	-	08/12/2016	08/12/2016	08/12/2016	08/12/2016	08/12/2016
Date analysed	-	08/12/2016	08/12/2016	08/12/2016	08/12/2016	08/12/2016
Lead in paint	% w/w	0.3	0.1	<0.05	0.1	0.1

Lead in Paint Our Reference: Your Reference	UNITS ----- -	158649-31 31
Date Sampled Type of sample	----- -	30/11/2016 paint
Date prepared	-	08/12/2016
Date analysed	-	08/12/2016
Lead in paint	% w/w	0.1

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.
Metals-005	Digestion of Dust wipes/swabs and /or miscellaneous samples for Metals determination by ICP-AES/MS and/or CV-AAS
Metals-004	Digestion of Paint chips/scrapings/liquids for Metals determination by ICP-AES/MS and or CV/AAS.

Client Reference: 85743.01, Watsons Bay

QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Lead in swab						Base II Duplicate II %RPD		
Date prepared	-			08/12/2016	[NT]	[NT]	LCS-1	08/12/2016
Date analysed	-			08/12/2016	[NT]	[NT]	LCS-1	08/12/2016
Lead in Swabs	µg/swab	1	Metals-005	<1	[NT]	[NT]	LCS-1	101%
QUALITYCONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike % Recovery
Lead in Paint						Base II Duplicate II %RPD		
Date prepared	-			08/12/2016	[NT]	[NT]	LCS-1	08/12/2016
Date analysed	-			08/12/2016	[NT]	[NT]	LCS-1	08/12/2016
Lead in paint	% w/w	0.05	Metals-004	<0.05	[NT]	[NT]	LCS-1	98%

Report Comments:

Asbestos ID was analysed by Approved Identifier: Lucy Zhu
Asbestos ID was authorised by Approved Signatory: Paul Ching

INS: Insufficient sample for this test
NR: Test not required
<: Less than

PQL: Practical Quantitation Limit
RPD: Relative Percent Difference
>: Greater than

NT: Not tested
NA: Test not required
LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

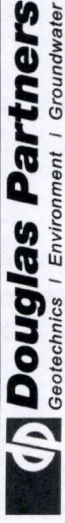
In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

CHAIN OF CUSTODY



Client:	Douglas Partners	Project Number:	85743.01
Contact Person:	Matthew Hyde	Project Name:	Watsons Bay
Project Mgr:	Paul Gorman	PO No.:	
Address:	96 Hermitage Road West Ryde NSW 2114		
Phone:	9809 0666	Mob:	+61413886051
Email:	Matthew Hyde Paul Gorman @douglaspartners.com.au @douglaspartners.com.au		
Lab Quote No.:	Standard		
Date results required:	30/11/2016		
Or choose:	Note: Inform lab in advance if urgent turnaround is required - surcharges apply		
Report format:	esdat / PDF / Excel		
Comments:			

Sample Information					Tests Required				Comments	
Lab Sample ID	Field Sample ID	Depth	Date sampled	Container Type	Type of sample	Asbestos	Lead %	Lead mg		Provide as much information about the sample as you can
1		NA	30/11/2016	BAG						
2		NA	30/11/2016	BAG			X			
3		NA	30/11/2016	BAG		X				
4		NA	30/11/2016	BAG			X			
5		NA	30/11/2016	BAG		X				
6		NA	30/11/2016	BAG			X			
7		NA	30/11/2016	BAG				X		
8		NA	30/11/2016	BAG			X			
9		NA	30/11/2016	BAG		X				
10		NA	30/11/2016	BAG		X				
11		NA	30/11/2016	BAG						
12		NA	30/11/2016	BAG		X		X		
13		NA	30/11/2016	BAG						
14		NA	30/11/2016	BAG		X	X			
15		NA	30/11/2016	BAG		X				
16		NA	30/11/2016	BAG		X				
17		NA	30/11/2016	BAG			X			
18		NA	30/11/2016	BAG		X				
19		NA	30/11/2016	BAG				X		
20		NA	30/11/2016	BAG			X			
21		NA	30/11/2016	BAG			X			
22		NA	30/11/2016	BAG		X				
23		NA	30/11/2016	BAG		X				
24		NA	30/11/2016	BAG		X				
25		NA	30/11/2016	BAG		X				
26		NA	30/11/2016	BAG		X				
27		NA	30/11/2016	BAG		X				
28		NA	30/11/2016	BAG		X				
29		NA	30/11/2016	BAG			X			
30		NA	30/11/2016	BAG		X				
31		NA	30/11/2016	BAG			X			
Relinquished by: Douglas Partners Courier (by whom): <i>Mail/UPS</i> Condition of Sample at dispatch: Cool or Ambient (circle one) Temperature (if Applicable): Print Name: Matthew Hyde Date & Time: 6/12/2016 1300 Signature:					Sample Receipt Received by (Company): <i>ELS</i> Print Name: <i>JE</i> Date & Time: 7.12.16 12.00 Signature: <i>JE</i>		Lab use only: Samples Received: Cool or Ambient (circle one) Temperature Received at: (if applicable) Transported by: Hand delivered / courier		FCM = FIBRE CEMENT MATERIAL VFS = VINYL FLOOR SHEET VFT = VINYL FLOOR TILE	

Envirolab Services
 12 Ashley St
 Chatswood NSW 2067
 Ph: (02) 9970 6200
 Job No: 158649
 Date Received: 7.12.16
 Time Received: 12.00
 Received by: JE
 Temp: Cool/Ambient
 Cooling: Ice/icepack
 Security: Intact/Broken/None

Attachment 1

Site Waste Minimisation and Management

Guidelines for the preparation of site waste minimization and management

This guide was developed to complement the Woollahra Development Control Plan 2014, Chapter E5 - Waste management. It assists people who are intending submit a development application (DA) to include relevant information regarding minimising and managing waste.

All DAs are required to submit a Site Waste Minimisation and Management Plan (SWMMP). The SWMMP must address all phases of development, including demolition, construction and occupation of site/premises.

In addition to submission of an SWMMP, DA plans must clearly illustrate the proposed waste management facilities.

This guide contains:

1. A template for SWMMPs
2. A checklist of DA plan requirements
3. Information to assists applicants complete the SWMMP

Site waste minimisation and management plan

What is an SWMMP?

An SWMMP outlines measures to minimise and manage waste generated during demolition, construction and the ongoing use of the site/premises.

The SWMMP nominates:

- ▶ volume and type of waste and recyclables to be generated
- ▶ storage and treatment of waste and recyclables on site
- ▶ disposal of residual waste and recyclables
- ▶ operational procedures for ongoing waste management once the development is complete
- ▶ information to be shown on the DA plans

The SWMMP highlights the method of recycling or disposal and the waste management service provider.

SWMMP template

Part A - Project details

Applicant and project details (all developments)	
Applicant details	
Application no.	
Name	
Address	
Phone number(s)	
Email	
Project details	
Address of development	
Existing buildings and other structures currently on the site	
Description of proposed development	
<i>This development achieves the waste objectives set out in the Woollahra Development Control Plan 2014, Chapter E5 - Waste management. The details on this form are the provisions and intentions for minimising waste relating to this project. All records demonstrating lawful disposal of waste will be retained and kept readily accessible for inspection by regulatory authorities such as council, DECC or Work Cover NSW.</i>	
Name	
Signature	
Date	

Part B - Reuse, recycling or disposal of materials during demolition

	<i>Most favourable Reuse</i>	Recycling	<i>Least favourable Disposal</i>	
Type of waste generated	Estimated volume (m ³) or weight (t)	Estimated volume (m ³) or weight (t)	Estimated volume (m ³) or weight (t)	Specify method of onsite reuse, contractor and recycling outlet and/or waste depot to be used
Excavation material				
Timber (specify)				
Concrete				
Bricks/pavers				
Tiles				
Metal (specify)				
Glass				
Furniture				
Fixtures and fittings				
Floor coverings				
Packaging (used pallets, pallet wrap)				
Garden organics				
Containers (cans, plastic, glass)				
Paper/cardboard				
Residual waste				
Hazardous/special waste e.g. asbestos (specify)				
Other (specify)				

Part C - Reuse, recycling or disposal of materials during construction

	<i>Most favourable Reuse</i>	Recycling	<i>Least favourable Disposal</i>	
Type of waste generated	Estimated volume (m ³) or weight (t)	Estimated volume (m ³) or weight (t)	Estimated volume (m ³) or weight (t)	Specify method of onsite reuse, contractor and recycling outlet and/or waste depot to be used
Excavation material				
Timber (specify)				
Concrete				
Bricks				
Tiles				
Metal (specify)				
Glass				
Plasterboard (offcuts)				
Fixtures and fittings				
Floor coverings				
Packaging (used pallets, pallet wrap)				
Garden organics				
Containers (cans, plastic, glass)				
Paper/cardboard				
Residual waste				
Hazardous/special waste (specify)				
Other (specify)				

Part D - Ongoing waste management

Applicants must estimate the total volume of waste the development will generate and its associated waste storage requirements. Table 1 below will assist the completion of Part D.

	Recyclables		Compostables	Residual waste	Other
	Paper and cardboard	Metals, plastic or glass			
Amount generated (L per unit per day)					
Amount generated (L per development per week)					
Any reduction due to compacting equipment					
Frequency of collections (per week)					
Number and size of storage bins required					
Floor area required for storage bins (m ²)					
Floor area required for manoeuvrability (m ²)					
Height required for manoeuvrability (m)					

Source: Model Waste Chapter 2008 - Department of Environment and Climate Change

Premises type	Waste generation	Recyclable material generation
Backpackers' accommodation	40L/occupant space/week	20L/occupant space/week
Boarding houses, Guest house	60L/occupant space/week	20L/occupant space/week
Hairdresser, beauty salon	60L/occupant space/week	Variable
Hotel or motel accommodation, registered clubs	5L/bed space/day 50L/100m ² bar area/day 10L/1.5m ² dining area/day	1L/bed space/day 50L/100m ² bar area/day 50L/100m ² dining area/day
Office premises	10L/100m ² floor area/day	10L/100m ² floor area/day
Restaurants or cafes Take away food and drink premises	10L/1.5m ² floor area/day 80L/100m ² floor area/day	2L/1.5m ² floor area/day Variable
Retail premises e.g. Butcher Delicatessen Fish Shop Greengrocer Showroom Supermarket	80L/100m ² floor area/day 80L/100m ² floor area/day 80L/100m ² floor area/day 240L/100m ² floor area/day 40L/100m ² floor area/day 240L/100m ² floor area/day	Variable Variable Variable 120L/100m ² floor area/day 10L/100m ² floor area/day 240L/100m ² floor area/day
Shop less than 100m ² floor area Shop greater than 100m ² floor area	50L/100m ² floor area/day 50L/100m ² floor area/day	25L/100m ² floor area/day 50L/100m ² floor area/day

Table 1: Waste and recycling generation rates

Part E - Waste avoidance from design to construction

Construction design

Outline how measures for waste avoidance have been incorporated into the design, material purchasing and construction techniques of the development. Refer to Table 2 below for potential reuse/recycling opportunities.

Materials

Lifecycle

Material	Reuse/recycling potential
Concrete	Can be reused for filling, levelling or road base
Bricks and pavers	Can be cleaned for reuse or rendered over or crushed for use in landscaping and driveways
Untreated timber	Can be reused as floorboards, fencing, furniture, mulched or sent to second hand timber suppliers
Treated timber	Can be reused as formwork, bridging, blocking and propping or sent to second hand timber suppliers
Doors, windows, fittings	Sent to second hand suppliers
Glass	Can be reused as glazing or aggregate for concrete production
Metals (fittings, appliances and wiring)	Removal for recycling
Synthetic rubber (carpet underlay)	Reprocessed for use in safety devices and speed humps
Significant trees	Relocated either onsite or offsite
Overburden	Power screened and used as topsoil
Garden waste mulched	Composted
Carpet	Can be sent to recyclers or reused in landscaping
Plasterboard	Removal for recycling, return to supplier

Table 2: Examples of demolition materials and potential reuse/recycling opportunities (based on the Combined Sydney Regional Organisation of Councils Model DCP 1997)

Part F - Details of ongoing use

Identify each state of waste transfer between residents' units/commercial tenancies and loading into the collection vehicle,
Detail the responsibility for and location and frequency of, transfer and collection.

DA plan checklist

SWMMPs must be accompanied by DA plans to allow application assessment. Plans must be to scale, clearly indicating the location of, and provisions for, the storage and collection of waste and recyclables during demolition, construction and during the ongoing operation of the completed buildings.

Refer to Chapter E5, section 5.2 to 5.7 of the Woollahra DCP for specific objectives and measures.

Demolition

The site plans detail/indicate:

	Tick Yes
Size and location of waste and recycling storage area	
Types and numbers of storage bins likely to be required	
Signage required to facilitate correct use of storage facilities	
Access for waste collection vehicles	
Areas to be excavated	

Construction

The site plans detail/indicate:

	Tick Yes
Size and location(s) of waste and recycling storage area(s)	
Types and numbers of storage bins likely to be required	
Signage required to facilitate correct use of storage facilities	
Access for waste collection vehicles	
Areas to be excavated	

Ongoing operation

The site plans detail/indicate:

	Tick Yes
Space	
Location and size of the temporary indoor waste and recycling space which accommodates at least one day's waste and recycling for each dwelling or and tenancy (See and waste generation rates in Table 1)	
Size and location(s) of waste and recycling storage areas (See 3.2.3 Bin sizes)	
Recycling bins are placed next to residual waste bins in the waste and recycling storage area	
Any additional facilities	
Location of individual or communal composting in residential development	
Waste chute, compaction unit and caged area for bulky goods (if required)	
Location of goods lift (if required)	
Waste and recycling collection point	
Access	
Space for accessing and manoeuvring bins/equipment in the waste and recycling storage area	
Access route(s) to deposit material in the waste and recycling storage area	
Access route(s) from the waste and recycling storage area to collection point (including distances)	
A grade of no more than 1:8 between the waste and recycling storage area and the collection point	
Clearance, geometric design and strength of internal access driveways and roads	
Direction of traffic flow for internal access driveways and roads	
Security to prevent public access to waste and recycling storage areas	
Amenity	
The location and type of any signage	
Construction details of waste and recycling storage areas (including floor, walls, doors, ceiling design, sewer connection, lighting, ventilation, security, wash down provisions etc.)	

Information to assist applicants to complete the SWMMP

Implementing the SWMMP during demolition and construction - All buildings or structures

The following information can assist applicants to implement an SWMMP and maximise resource recovery and minimise residual waste during demolition and construction, per Chapter E5 Waste Management of the Comprehensive DCP.

When implementing the SWMMP you must:

- ▶ Clearly 'signpost' the purpose and content of the bins and storage areas.
- ▶ Implement measures to prevent damage by the elements, odour and health risks, and windborne litter.
- ▶ Promote separate collection bins or areas for the storage of residual waste.
- ▶ Arrange contractors for the transport, processing and disposal of waste and recycling. Ensure that all contractors are aware of the legal requirements for disposing of waste.
- ▶ Retain all records demonstrating lawful disposal of waste such as weighbridge dockets and invoices for waste disposal and recycling services.

Additional considerations during construction:

- ▶ Arrange for the delivery of materials so that materials are delivered 'as needed' to prevent the degradation of materials through weathering and moisture damage.
- ▶ Consider organising to return excess materials to the supplier or manufacturer.

Waste and recycling requirements for multi-unit development and commercial development

Waste storage areas and servicing arrangements:

Location and appearance

The development must integrate waste recycling and storage areas into its design, preferably:

- ▶ behind the front building line,
- ▶ in a basement within the main building envelope, and
- ▶ finished in a similar style and quality to external elements of the building.

Waste recycling and storage areas must be located and designed to reduce adverse impacts upon the inhabitants or any dwellings on the site and upon neighbouring properties. The room should minimise impacts associated with:

- ▶ The proximity of the room to any dwellings
- ▶ The visibility of the room
- ▶ Noise generated by any equipment
- ▶ Noise generated by the movement of bins into and out of the room
- ▶ Noise generated by collection vehicles accessing the site
- ▶ Odours

Separate waste recycling and storage areas are required for the residential and commercial component of mixed use development.

Size

Waste recycling and storage must comfortably contain all waste and recycling bins associated with the development.

Waste recycling and storage areas for commercial tenancies must comfortably contain separate general waste bins and recycling bins to cater for the quantity of waste generated at the rate described in Table 1 of the SWMMP template between collections.

To calculate the appropriate area based on the number of bins, see 3.2.3 Bin sizes below.

Surfaces

Floors must be smooth and durable.

Any floors or ramps associated with emptying bins must have a grade of no more than 1:8.

Durable walls or fences must enclose waste and recycling storage areas and extend to the height of any bins kept within it.

Access

Where bins cannot be collected from a kerbside location or from a temporary holding area located immediately inside the property boundary, the development design must allow access by waste collection vehicles used by the nominated waste contractor.

Driveways to be used by collection vehicles must be of sufficient strength to support such vehicles and provide a sufficient turning area.

Collection vehicles should be able to enter and exit the site in a forward direction.

Commercial development must provide convenient access from each tenancy to the waste recycling and storage area. Step-free access must be provided between the waste collection area and the storage area.

Waste recycling and storage areas must be inaccessible to the public and vermin proof.

The dimensions and weight of garbage trucks for domestic waste collection are provided in **Table 3** below.

Length	8.0 metres
Width	2.5 metres
Operational height	4.3 metres
Travel height	4.3 metres
Weight (vehicle and load)	22.5 tonnes
Weight (vehicle only)	13 tonnes
Turning circle	25.0 metres

Table 3: Garbage truck dimensions and weights

Doors and gates

Any doors/gates to waste recycling and storage areas must be durable. A sign should indicate whether the door/gate is to remain closed when the room is not being accessed

All doors/gates must be openable from both inside and outside the room, and wide enough to allow easy passage of bins.

Signage

Signage should clearly describe the types of materials that can be deposited in recycling and general waste bins.

Services

Waste/recycling storage areas must be serviced by hot and cold water provided through a centralised mixer. A tap for hoses should be provided, which is protected from the waste containers and accessible when the bins are in the room.

The floor must have drainage to the sewer.

Ongoing management

Waste recycling and storage areas must be regularly maintained and cleaned. Bins or containers must be washed in an area which drains to the sewer.

Garbage chutes and service rooms

- ▶ Garbage chutes must be located and insulated in a manner that reduces noise impacts
- ▶ Chutes, service openings and charging devices must be constructed of material (such as metal) that is smooth, durable, impervious, non-corrosive and fire resistant
- ▶ Chutes, service openings and charging devices must be capable of being easily cleaned
- ▶ Chutes must be cylindrical and should have a diameter of at least 500mm
- ▶ There must not be bends (or sections of reduced diameter) in the main shaft of the chute
- ▶ Internal overlaps in the chute must follow the direction of the waste flow
- ▶ Chutes must deposit rubbish directly into a bin or compactor located within a waste and recycling storage area
- ▶ A cut-off device must be located at or near the base of the chute so that the bottom of the chute can be closed when the bin or compacting device at the bottom is withdrawn or being replaced
- ▶ The upper end of the chute should extend above the roofline of the building
- ▶ The upper end of the chute should be weather protected in a manner that doesn't impede the upward movement of air out of the chute

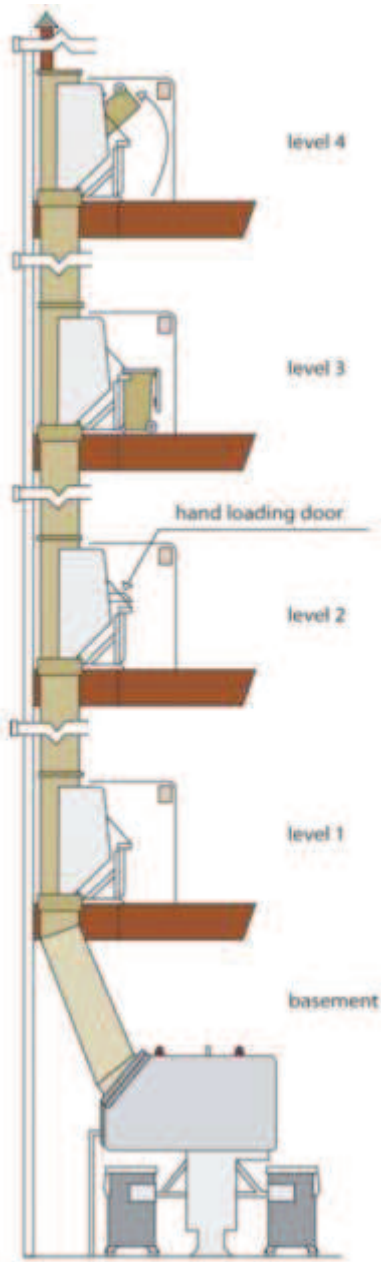
Garbage chute service room design

- ▶ The service opening (for depositing rubbish into the main chute) on each floor of the building must be located in a dedicated service room
- ▶ The charging device for each service opening must be self-closing and must not project into the main chute
- ▶ Branches connecting service openings to the chute are to be no more than one metre long
- ▶ Each service room must include containers for the storage of recyclables. Signage regarding the materials that can be recycled should be displayed near these containers
- ▶ Each service room must be located for convenient access by users and must be well ventilated and well lit
- ▶ The floors, walls and ceilings of service rooms must be finished with smooth, durable materials that are capable of being easily cleaned
- ▶ Service rooms must include signage that clearly describes the types of materials which can be deposited into the garbage chute and the types of materials that can be recycled

Ongoing management

- ▶ Garbage chutes are not to be used for the disposal of recyclables. Signage to this effect should be displayed near service openings
- ▶ Arrangements must be in place for the regular maintenance and cleaning of garbage chutes and associated service rooms, service openings and charging devices

Example of a garbage chute system



Source: Source: *Better Practice Guide for Waste Management in Multi-Unit Dwellings*, DECC, 2008

Bin sizes

Bin type	Height	Length	Width
55L black co-mingled recycling crate	330mm	510mm	420mm
55L garden refuse crate	330mm	510mm	420mm
55L garbage bin (Paddington/West Woollahra only)	560mm	450mm	450mm



Garden refuse crate

Co-mingled recycling crate

55L garbage bin (Paddington & West Woollahra only)

Bin type	Height	Depth	Width
120L	940mm	560mm	485mm
240L	1,080mm	735mm	580mm
660L (bulk bin)	1,250mm	850mm	1,370mm

120L garbage bin



120L & 240L food and garden organics bin (60L available in Paddington/West Woollahra)



120L & 240L co-mingled recycling bin



Waste Classification Guidelines Part 1: Classifying waste

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Classifying wastes into groups that pose similar risks to the environment and human health facilitates their management and appropriate disposal. It is the responsibility of those who generate waste to classify that waste. To assist waste generators classify the wastes they produce, the EPA has developed the Waste Classification Guidelines ('the Guidelines') which are a step-by-step process for classifying waste.

Generators and waste facilities must carefully follow the procedures in these Guidelines to ensure they comply with applicable laws in classifying their waste and safeguard protection of the environment and human health.

The Guidelines are comprised of the following sections, of which this document is Part 1:

Overview of the Guidelines

Part 1: Classifying waste

Part 2: Immobilisation of waste

Part 3: Waste containing radioactive material

Part 4: Acid sulfate soils

All sections of the Guidelines are available for download from the EPA website at www.epa.nsw.gov.au/waste/classification.htm.

Introduction

This part of the Waste Classification Guidelines (the Guidelines) covers the classification of wastes into groups that pose similar risks to the environment and human health.

The following classes of waste are defined in clause 49 of Schedule 1 of the *Protection of the Environment Operations Act 1997* (POEO Act):

- special waste
- liquid waste
- hazardous waste
- restricted solid waste
- general solid waste (putrescible)
- general solid waste (non-putrescible).

To determine which of the above classifications applies to your waste, the following steps must be followed in the order below. Once a waste's classification has been established under a particular step, do not go to the next step¹; the waste will be taken to have that classification and must be managed accordingly.

If an immobilisation approval applies to a waste, a generator who complies with the terms of that approval may classify that waste as set out in the approval, rather than according to these Guidelines.

Step 1: Is the waste special waste?

'Special waste' is a class of waste that has unique regulatory requirements. The potential environmental impacts of special waste need to be managed to minimise the risk of harm to the environment and human health.

Special waste means any of the following:

- clinical and related waste
- asbestos waste
- waste tyres
- anything classified as special waste under an EPA gazettal notice.

Generators of special waste do not need to make any further assessment of their waste if it falls within the definitions of special wastes below.

The only exception to this is where special waste is mixed with restricted solid or hazardous waste. In these circumstances, the waste must be classified as special waste and restricted solid or hazardous waste (as applicable), and managed as both of those classifications.

The meanings of the terms clinical and related waste, asbestos waste, and waste tyres are detailed below.

Clinical and related waste

Clinical and related waste means:

- clinical waste
- cytotoxic waste

¹ The only exception to this is where special waste is mixed with or incorporates other restricted solid waste or hazardous waste – see Step 1 for further details.

- pharmaceutical, drug or medicine waste
- sharps waste.

Clinical waste means any waste resulting from medical, nursing, dental, pharmaceutical, skin penetration or other related clinical activity, being waste that has the potential to cause injury, infection or offence, and includes waste containing any of the following:

- human tissue (other than hair, teeth and nails)
- bulk body fluids or blood
- visibly blood-stained body fluids, materials or equipment
- laboratory specimens or cultures
- animal tissue, carcasses or other waste from animals used for medical research

but does not include any such waste that has been treated by a method approved in writing by the Director-General of NSW Health.

Cytotoxic waste means any substance contaminated with any residues or preparations that contain materials that are toxic to cells principally through their action on cell reproduction.

Pharmaceutical, drug or medicine waste means waste that has been generated by activities carried out for business or other commercial purposes and that consists of pharmaceutical or other chemical substances specified in the Poisons List made under section 8 of the *Poisons and Therapeutic Goods Act 1966*.

Sharps waste means any waste collected from designated sharps waste containers used in the course of business, commercial or community service activities, being waste resulting from the use of sharps for any of the following purposes:

- human health care by health professionals and other health care providers
- medical research or work on cadavers
- veterinary care or veterinary research
- skin penetration or the injection of drugs or other substances for medical or non-medical reasons

but does not include waste that has been treated on the site where it was generated, and to a standard specified in an EPA gazettal notice.

Sharps means those things:

- that have sharp points or edges capable of cutting, piercing or penetrating the skin (such as needles, syringes with needles or surgical instruments)
- that are designed for the purpose of cutting, piercing or penetrating the skin
- that have the potential to cause injury or infection.

Asbestos waste

Asbestos means the fibrous form of those mineral silicates that belong to the serpentine or amphibole groups of rock-forming minerals, including actinolite, amosite (brown asbestos), anthophyllite, chrysotile (white asbestos), crocidolite (blue asbestos) and tremolite.

Asbestos waste means any waste that contains asbestos.

Waste tyres

Waste tyres means used, rejected or unwanted tyres, including casings, seconds, shredded tyres or tyre pieces.

Step 2: Is the waste liquid waste?

If you have established that the waste is not special waste, decide whether it is 'liquid waste'.

Liquid waste means any waste (other than special waste) that:

- has an angle of repose of less than 5 degrees above horizontal
- becomes free-flowing at or below 60 degrees Celsius or when it is transported
- is generally not capable of being picked up by a spade or shovel
- is classified as liquid waste under an EPA gazettal notice.

If the waste meets the criteria outlined above, it is classified as liquid waste, and no further assessment for classification is required.

Note: The waste generator may choose to separate the waste into its liquid and solid fractions so that the solid fraction can be further classified in accordance with these Guidelines.

Step 3: Is the waste pre-classified?

If the waste is neither special nor liquid waste, establish whether the waste has been pre-classified by the EPA.

Some commonly generated waste types have been pre-classified as hazardous waste, general solid waste (putrescible) or general solid waste (non-putrescible). These pre-classifications are contained in the definitions of those classifications in Schedule 1 of the POEO Act.

The following wastes have already been pre-classified by the EPA. The EPA may also pre-classify other waste types as either hazardous waste, restricted solid waste, general solid waste (putrescible) or general solid waste (non-putrescible) by a notice published in the *NSW Government Gazette*. All currently gazetted special, liquid and pre-classified wastes are listed on the EPA website at: [Types of waste](#).

Once a waste's classification has been established under a particular pre-classification below, do not go to the next classification; the waste has that classification and must be managed accordingly.

Hazardous waste

The following waste types (other than special waste or liquid waste) have been pre-classified by the EPA as 'hazardous waste':

- containers, having previously contained a substance of Class 1, 3, 4, 5 or 8 within the meaning of the Transport of Dangerous Goods Code, or a substance to which Division 6.1 of the Transport of Dangerous Goods Code applies, from which residues have not been removed by washing² or vacuuming
- coal tar or coal tar pitch waste (being the tarry residue from the heating, processing or burning of coal or coke) comprising of more than 1% (by weight) of coal tar or coal tar pitch waste
- lead-acid or nickel-cadmium batteries (being waste generated or separately collected by activities carried out for business, commercial or community services purposes)
- lead paint waste arising otherwise than from residential premises or educational or child care institutions
- any mixture of the wastes referred to above.

² The cleaning method used must be as good as or better than the triple-rinsing method outlined in Appendix 2.

Transport of Dangerous Goods Code means the document called the Australian Code for the Transport of Dangerous Goods by Road and Rail (7th edition), approved by the Ministerial Council for Road Transport and published by the Commonwealth Government from time to time.

Restricted solid waste

Currently, no wastes have been pre-classified by the EPA as 'restricted solid waste'. Restricted solid waste therefore currently only includes wastes assessed and classified as restricted solid waste in accordance with the procedures in Step 5 of this guide.

General solid waste (putrescible)

The following wastes (other than special waste, liquid waste, hazardous waste or restricted solid waste) have been pre-classified by the EPA as 'general solid waste (putrescible)':

- household waste that contains putrescible organics
- waste from litter bins collected by or on behalf of local councils
- manure and night soil
- disposable nappies, incontinence pads or sanitary napkins
- food waste
- animal waste
- grit or screenings from sewage treatment systems that have been dewatered so that the grit or screenings do not contain free liquids
- any mixture of the wastes referred to above.

In assessing whether waste has been pre-classified as general solid waste (putrescible), the following definitions apply:

Animal waste includes dead animals and animal parts and any mixture of dead animals and animal parts.

Food waste means waste from the manufacture, preparation, sale or consumption of food but does not include grease-trap waste.

Manure includes any mixture of manure and biodegradable animal bedding, such as straw.

General solid waste (non-putrescible)

The following wastes (other than special waste, liquid waste, hazardous waste, restricted solid waste or general solid waste (putrescible)) are pre-classified as 'general solid waste (non-putrescible)':

- glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal
- paper or cardboard
- household waste from municipal clean-up that does not contain food waste
- waste collected by, or on behalf of, local councils from street sweepings
- grit, sediment, litter and gross pollutants collected in, and removed from, stormwater treatment devices and/or stormwater management systems, that has been dewatered so that they do not contain free liquids
- grit and screenings from potable water and water reticulation plants that has been dewatered so that it does not contain free liquids
- garden waste
- wood waste
- waste contaminated with lead (including lead paint waste) from residential premises or educational or child care institutions

- containers, previously containing dangerous goods, from which residues have been removed by washing³ or vacuuming
- drained oil filters (mechanically crushed), rags and oil-absorbent materials that only contain non-volatile petroleum hydrocarbons and do not contain free liquids
- drained motor oil containers that do not contain free liquids
- non-putrescible vegetative waste from agriculture, silviculture or horticulture
- building cavity dust waste removed from residential premises or educational or child care institutions, being waste that is packaged securely to prevent dust emissions and direct contact
- synthetic fibre waste (from materials such as fibreglass, polyesters and other plastics) being waste that is packaged securely to prevent dust emissions, but excluding asbestos waste
- virgin excavated natural material
- building and demolition waste
- asphalt waste (including asphalt resulting from road construction and waterproofing works)
- biosolids categorised as unrestricted use, or restricted use 1, 2 or 3, in accordance with the criteria set out in the *Biosolids Guidelines* (EPA 2000)
- cured concrete waste from a batch plant
- fully cured and set thermosetting polymers and fibre-reinforcing resins
- fully cured and dried residues of resins, glues, paints, coatings and inks
- any mixture of the wastes referred to above.

In assessing whether waste has been pre-classified as general solid waste (non-putrescible), the following definitions apply:

Building and demolition waste means unsegregated material (other than material containing asbestos waste or liquid waste) that results from:

- the demolition, erection, construction, refurbishment or alteration of buildings other than
 - chemical works
 - mineral processing works
 - container reconditioning works
 - waste treatment facilities
- the construction, replacement, repair or alteration of infrastructure development such as roads, tunnels, sewage, water, electricity, telecommunications and airports

and includes materials such as:

- bricks, concrete, paper, plastics, glass and metal
- timber, including unsegregated timber, that may contain timber treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP)

but does not include excavated soil (for example, soil excavated to level off a site prior to construction or to enable foundations to be laid or infrastructure to be constructed).

Garden waste means waste that consists of branches, grass, leaves, plants, loppings, tree trunks, tree stumps and similar materials, and includes any mixture of those materials.

³ The cleaning method must be as good as or better than the triple-rinsing method outlined in Appendix 2.

Virgin excavated natural material means natural material (such as clay, gravel, sand, soil or rock fines):

- that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities
- that does not contain sulfidic ores or soils, or any other waste,

and includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the *NSW Government Gazette*.

Wood waste means sawdust, timber offcuts, wooden crates, wooden packaging, wooden pallets, wood shavings and similar materials, and includes any mixture of those materials, but does not include wood treated with chemicals such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LOSP).

Step 4: Does the waste possess hazardous characteristics?

If a waste has not been classified under Steps 1–3, it must be classified as ‘hazardous waste’ if it is a dangerous good under any of the following classes or divisions of the *Transport of Dangerous Goods Code*

- Class 1: Explosives
- Class 2: Gases (compressed, liquefied or dissolved under pressure)
- Division 4.1: Flammable solids (excluding garden waste, natural organic fibrous material and wood waste, and all physical forms of carbon such as activated carbon and graphite)
- Division 4.2: Substances liable to spontaneous combustion (excluding garden waste, natural organic fibrous material and wood waste, and all physical forms of carbon such as activated carbon and graphite)
- Division 4.3: Substances which when in contact with water emit flammable gases
- Class 5: Oxidising agents and organic peroxides
- Division 6.1: Toxic substances
- Class 8: Corrosive substances.

For further information on the test methods to establish whether the waste exhibits any of the above characteristics, please refer to the *Transport of Dangerous Goods Code*.

Step 5: Determining a waste’s classification using chemical assessment

Waste generators must chemically assess their waste in accordance with Step 5 to determine the waste’s classification where it has not been classified under Steps 1–4 of the Guidelines.

If the waste generator does not undertake chemical assessment of the waste, the waste must be classified as hazardous waste. Waste classified as hazardous waste cannot be disposed of in NSW and must be treated prior to disposal.

The chemical assessment process is based around the waste’s potential to release chemical contaminants into the environment through contact with liquids, which leads to the production of leachates.

Testing of contaminants as set out below, however, is not necessary where the waste generator knows the processes which produced the waste and the maximum possible levels of contaminants it contains. In order to classify the waste, the generator must be certain that

the maximum possible levels of contaminants in the waste do not exceed the specific contaminant concentration (SCC) and/or toxicity characteristics leaching procedure (TCLP) test values for that classification (see *Measurable properties of waste* below). In these cases, the generator must ensure that the reasons for not undertaking the chemical assessment are documented and records of the decision are retained for three years.

Guidance on sampling and analytical methods is provided in Appendix 1. Where waste generators are unsure of the appropriate sampling or analytical methods for a particular waste, they are strongly encouraged to seek expert help, either from a laboratory that specialises in waste analysis or someone specialising in waste management issues, or both.

Measurable properties of waste

The two measurable properties of chemical contaminants used to classify waste are:

- the SCC of any chemical contaminant in the waste, expressed as milligrams per kilogram (mg/kg)
- the leachable concentration of any chemical contaminant using TCLP, expressed as milligrams per litre (mg/L).

Generators of waste must select the chemical contaminants that are known to be present, or are likely to be present in the waste. This may be informed by the site activities, site history, or the processes which produced the waste. Generators of waste must be able to justify the chemical contaminants selected for testing and keep records of that decision for three years.

If a waste generator reasonably suspects that a waste contains chemical contaminants that are not listed in Tables 1 and 2 below, the waste generator must test for these contaminants and contact EPA's Waste and Resource Recovery Branch for advice.

Classifying a waste using the SCC test

The first test which must be used to chemically assess waste is the SCC test.

The SCC test acts as an initial screening test for the classification of a waste. Based on SCC alone, the test value for each contaminant must be less than or equal to the contaminant threshold (CT) value specified for that contaminant in Table 1, and if so it will fall into one of the following classes:

- general solid waste \leq CT1
- restricted solid waste \leq CT2.

If a waste's SCC test value exceeds the contaminant threshold value set for general solid waste (CT1), further assessment using the TCLP test may be used.

Where the contaminant threshold value set for restricted solid waste (CT2) is exceeded, a TCLP test must be carried out to determine the leachable concentration of that contaminant and the class of waste.

For waste assessment and classification, it is recommended that the sample mean, the sample standard deviation and the 95% upper confidence limit (UCL) of the mean concentration is calculated for each contaminant to ensure that the 95% UCL for the mean concentration is less than or equal to the CT limit value specified for that contaminant.

Classifying a waste using the SCC and TCLP tests

To establish the waste's classification using both SCC and TCLP, the test values for each chemical contaminant must be compared with the threshold values set in Table 2, and the classification is then determined as follows:

Classification	SCC value	TCLP value
General solid waste	≤SCC1	≤TCLP1
Restricted solid waste	≤SCC2	≤TCLP2
Hazardous waste	>SCC2	>TCLP2

If any of the SCC or TCLP threshold values specified in Table 2 are exceeded for general solid waste, the waste must be classified as restricted solid waste. If any of the SCC or TCLP threshold values specified in Table 2 are exceeded for restricted solid waste, the waste must be classified as hazardous waste. Detailed interpretative guidance regarding the use of both SCC and TCLP values to establish a waste's classification is provided in Table 3.

For waste assessment and classification, it is recommended that the sample mean, the sample standard deviation and the 95% UCL of the mean concentration is calculated for each contaminant to ensure that the 95% UCL for the mean concentration is less than or equal to the SCC or TCLP limit value specified for that contaminant.

Table 1: CT1 & CT2 values for classifying waste by chemical assessment without the TCLP test

For disposal requirements for organic and inorganic chemical contaminants not listed below, contact the EPA. Aluminium, barium, boron, chromium (0 and III oxidation states), cobalt, copper, iron, manganese, vanadium and zinc have not been listed with values in this table and need not be tested for.

Contaminant	Maximum values of <i>specific contaminant concentration (SCC)</i> for classification without TCLP		CAS Registry Number
	General solid waste ¹	Restricted solid waste	
	CT1 (mg/kg)	CT2 (mg/kg)	
Arsenic	100	400	
Benzene	10	40	71-43-2
Benzo(a)pyrene ²	0.8	3.2	50-32-8
Beryllium	20	80	
Cadmium	20	80	
Carbon tetrachloride	10	40	56-23-5
Chlorobenzene	2,000	8,000	108-90-7
Chloroform	120	480	67-66-3
Chlorpyrifos	4	16	2921-88-2
Chromium (VI) ³	100	400	
m-Cresol	4,000	16,000	108-39-4
o-Cresol	4,000	16,000	95-48-7
p-Cresol	4,000	16,000	106-44-5
Cresol (total)	4,000	16,000	1319-77-3
Cyanide (amenable) ⁴	70	280	
Cyanide (total)	320	1,280	
2,4-D	200	800	94-75-7
1,2-Dichlorobenzene	86	344	95-50-1
1,4-Dichlorobenzene	150	600	106-46-7
1,2-Dichloroethane	10	40	107-06-2
1,1-Dichloroethylene	14	56	75-35-4
Dichloromethane	172	688	75-09-2
2,4-Dinitrotoluene	2.6	10.4	121-14-2
Endosulfan ⁵	60	240	See below ⁵
Ethylbenzene	600	2,400	100-41-4
Fluoride	3,000	12,000	
Fluroxypyr	40	160	69377-81-7
Lead	100	400	

Contaminant	Maximum values of <i>specific contaminant concentration (SCC)</i> for classification without TCLP		CAS Registry Number
	General solid waste ¹	Restricted solid waste	
	CT1 (mg/kg)	CT2 (mg/kg)	
Mercury	4	16	
Methyl ethyl ketone	4,000	16,000	78-93-3
Moderately harmful pesticides ⁶ (total)	250	1,000	See below ⁶
Molybdenum	100	400	
Nickel	40	160	
Nitrobenzene	40	160	98-95-3
C6–C9 petroleum hydrocarbons ⁷	650	2,600	
C10–C36 petroleum hydrocarbons ⁷	10,000	40,000	
Phenol (non-halogenated)	288	1,152	108-95-2
Picloram	60	240	1918-02-1
Plasticiser compounds ⁸	20	80	See below ⁸
Polychlorinated biphenyls ⁹	<50	<50	1336-36-3
Polycyclic aromatic hydrocarbons (total) ¹⁰	200	800	
Scheduled chemicals ¹¹	<50	<50	
Selenium	20	80	
Silver	100	400	
Styrene (vinyl benzene)	60	240	100-42-5
Tebuconazole	128	512	107534-96-3
1,2,3,4-Tetrachlorobenzene	10	40	634-66-2
1,1,1,2-Tetrachloroethane	200	800	630-20-6
1,1,2,2-Tetrachloroethane	26	104	79-34-5
Tetrachloroethylene	14	56	127-18-4
Toluene	288	1,152	108-88-3
1,1,1-Trichloroethane	600	2,400	71-55-6
1,1,2-Trichloroethane	24	96	79-00-5
Trichloroethylene	10	40	79-01-6
2,4,5-Trichlorophenol	8,000	32,000	95-95-4
2,4,6-Trichlorophenol	40	160	88-06-2
Triclopyr	40	160	55335-06-3

Contaminant	Maximum values of <i>specific contaminant concentration (SCC)</i> for classification without TCLP		CAS Registry Number
	General solid waste ¹	Restricted solid waste	
	CT1 (mg/kg)	CT2 (mg/kg)	
Vinyl chloride	4	16	75-01-4
Xylenes (total)	1,000	4,000	1330-20-7

Notes

1. Values are the same for general solid waste (putrescible) and general solid waste (non-putrescible).
2. There may be a need for the laboratory to concentrate the sample to achieve the TCLP limit value for benzo(a)pyrene with confidence.
3. These limits apply to chromium in the +6 oxidation state only.
4. Analysis for cyanide (amenable) is the established method for assessing potentially leachable cyanide. The EPA may consider other methods if it can be demonstrated that these methods yield the same information.
5. Endosulfan (CAS Registry Number 115-29-7) means the total of Endosulfan I (CAS Registry Number 959-98-8), Endosulfan II (CAS Registry Number 891-86-1) and Endosulfan sulfate (CAS Registry Number 1031-07-8).
6. The following moderately harmful pesticides are to be included in the total values specified:

Moderately harmful pesticides (total)			
Name	CAS Registry Number	Name	CAS Registry Number
Atrazine	1912-24-9	Imidacloprid	138261-41-3
Azoxystrobin	131860-33-8	Indoxacarb	173584-44-6
Bifenthrin	82657-04-3	Malathion (Maldison)	121-75-5
Brodifacoum	56073-10-0	Metalaxyl	57837-19-1
Carboxin	5234-68-4	Metalaxyl-M	70630-17-0
Copper naphthenate	1338-02-9	Methidathion	950-37-8
Cyfluthrin	68359-37-5	3-Methyl-4-chlorophenol	59-50-7
Cyhalothrin	68085-85-8	Methyl chlorpyrifos	5598-13-0
Cypermethrin	52315-07-08	N-Methyl pyrrolidone	872-50-4
Deltamethrin	52918-63-5	2-octylthiazol-3-one	26530-20-1
Dichlofluanid	1085-98-9	Oxyfluorfen	42874-03-3
Dichlorvos	62-73-7	Paraquat dichloride	1910-42-5
Difenoconazole	119446-68-3	Parathion methyl	298-00-0
Dimethoate	60-51-5	Permethrin	52645-53-1
Diquat dibromide	85-00-7	Profenofos	41198-08-7
Emamectin benzoate	137515-75-4 & 155569-91-8	Prometryn	7287-19-6
Ethion	563-12-2	Propargite	2312-35-8
Fenthion	55-38-9	Pentachloronitrobenzene (Quintozone)	82-68-8
Fenitrothion	122-14-5	Simazine	122-34-9
Fipronil	120068-37-3	Thiabendazole	148-79-8

Moderately harmful pesticides (total)			
Name	CAS Registry Number	Name	CAS Registry Number
Fluazifop-P-butyl	79241-46-6	Thiamethoxam	153719-23-4
Fludioxonil	131341-86-1	Thiodicarb	59669-26-0
Glyphosate	1071-83-6	Thiram	137-26-8

- Approximate range of petroleum hydrocarbon fractions: petrol C6–C9, kerosene C10–C18, diesel C12–C18, and lubricating oils above C18. Laboratory results are reported as four different fractions: C6–C9, C10–C14, C15–C28 and C29–C36. The results of total petroleum hydrocarbons (TPH) (C10–C36) analyses are reported as a sum of the relevant three fractions. Please note that hydrocarbons are defined as molecules that only contain carbon and hydrogen atoms. Prior to TPH (C10–C36) analysis, clean-up may be necessary to remove non-petroleum hydrocarbon compounds. Where the presence of other materials that will interfere with the analysis may be present, such as oils and fats from food sources, you are advised to treat the extract that has been solvent exchanged to hexane with silica gel as described in *USEPA Method 1664A* (USEPA 2000).
- Plasticiser compounds means the total of di-2-ethyl hexyl phthalate (CAS Registry Number 117-81-7) and di-2-ethyl hexyl adipate (CAS Registry Number 103-23-1) contained within a waste.
- Polychlorinated biphenyls must be managed in accordance with the EPA's polychlorinated biphenyl (PCB) chemical control order 1997, which is available on the EPA website at Polychlorinated Biphenyl (PCB) Chemical Control Order 1997.
- The following polycyclic aromatic hydrocarbons (PAHs) are assessed as the total concentration of 16 USEPA Priority Pollutant PAHs, as follows:

Polycyclic aromatic hydrocarbons (total)			
PAH name	CAS Registry Number	PAH name	CAS Registry Number
Acenaphthene	83-32-9	Chrysene	218-01-9
Acenaphthylene	208-96-8	Dibenzo(a,h)anthracene	53-70-3
Anthracene	120-12-7	Fluoranthene	206-44-0
Benzo(a)anthracene	56-55-3	Fluorene	86-73-7
Benzo(a)pyrene	50-32-8	Indeno(1,2,3-cd)pyrene	193-39-5
Benzo(b)fluoranthene	205-99-2	Naphthalene	91-20-3
Benzo(ghi)perylene	191-24-2	Phenanthrene	85-01-8
Benzo(k)fluoranthene	207-08-9	Pyrene	129-00-0

- Scheduled chemicals must be managed in accordance with the EPA's scheduled chemical wastes chemical control order 2004, which is available on the EPA website at Scheduled Chemical Wastes Chemical Control Order 2004.

The following scheduled chemicals are to be included in the total values specified:

Scheduled chemicals (total)			
Name	CAS Registry Number	Name	CAS Registry Number
Aldrin	309-00-2	Heptachlor	76-44-8
Alpha-BHC	319-84-6	Heptachlor epoxide	1024-57-3
Beta-BHC	319-85-7	Hexachlorobenzene	118-74-1
Gamma-BHC (Lindane)	58-89-9	Hexachlorophene	70-30-4
Delta-BHC	319-86-8	Isodrin	465-73-6

Scheduled chemicals (total)			
Name	CAS Registry Number	Name	CAS Registry Number
Chlordane	57-74-9	Pentachlorobenzene	608-93-5
DDD	72-54-8	Pentachloronitrobenzene	82-68-8
DDE	72-55-9	Pentachlorophenol	87-86-5
DDT	50-29-3	1,2,4,5-Tetrachlorobenzene	95-94-3
Dieldrin	60-57-1	2,3,4,6-Tetrachlorophenol	58-90-2
Endrin	72-20-8	1,2,4-Trichlorobenzene	120-82-1
Endrin aldehyde	7421-93-4	2,4,5-Trichlorophenoxyacetic acid, salts and esters	93-76-5

Table 2: TCLP and SCC values for classifying waste by chemical assessment

For disposal requirements for organic and inorganic chemical contaminants not listed below, contact the EPA. Aluminium, barium, boron, chromium (0 and III oxidation states), cobalt, copper, iron, manganese, vanadium and zinc have not been listed with values in this table and need not be tested for.

Contaminant	Maximum values for <i>leachable concentration</i> and <i>specific contaminant concentration</i> when used together				CAS Registry Number
	General solid waste ¹		Restricted solid waste		
	Leachable concentration	Specific contaminant concentration	Leachable concentration	Specific contaminant concentration	
	TCLP1 (mg/L)	SCC1 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)	
Arsenic	5.0 ²	500	20	2,000	
Benzene	0.5 ²	18	2	72	71-43-2
Benzo(a)pyrene ³	0.04 ⁴	10	0.16	23	50-32-8
Beryllium	1.0 ⁵	100	4	400	
Cadmium	1.0 ²	100	4	400	
Carbon tetrachloride	0.5 ²	18	2	72	56-23-5
Chlorobenzene	100 ²	3,600	400	14,400	108-90-7
Chloroform	6 ²	216	24	864	67-66-3
Chlorpyrifos	0.2	7.5	0.8	30	2921-88-2
Chromium (VI) ⁶	5 ²	1,900	20	7,600	
m-Cresol	200 ²	7,200	800	28,800	108-39-4
o-Cresol	200 ²	7,200	800	28,800	95-48-7
p-Cresol	200 ²	7,200	800	28,800	106-44-5
Cresol (total)	200 ²	7,200	800	28,800	1319-77-3
Cyanide (amenable) ^{7,8}	3.5 ⁷	300	14	1,200	
Cyanide (total) ⁷	16 ⁷	5,900	64	23,600	
2,4-D	10 ²	360	40	1,440	94-75-7
1,2-Dichlorobenzene	4.3 ²	155	17.2	620	95-50-1
1,4-Dichlorobenzene	7.5 ²	270	30	1,080	106-46-7
1,2-Dichloroethane	0.5 ²	18	2	72	107-06-2
1,1-Dichloroethylene	0.7 ²	25	2.8	100	75-35-4
Dichloromethane	8.6 ²	310	34.4	1,240	75-09-2
2,4-Dinitrotoluene	0.13 ²	4.68	0.52	18.7	121-14-2
Endosulfan ⁹	3	108	12	432	See below ⁹

Contaminant	Maximum values for <i>leachable concentration</i> and <i>specific contaminant concentration</i> when used together				CAS Registry Number
	General solid waste ¹		Restricted solid waste		
	Leachable concentration	Specific contaminant concentration	Leachable concentration	Specific contaminant concentration	
	TCLP1 (mg/L)	SCC1 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)	
Ethylbenzene	30 ¹⁰	1,080	120	4,320	100-41-4
Fluoride	150 ¹⁰	10,000	600	40,000	
Fluroxypyr	2	75	8	300	69377-81-7
Lead	5 ²	1,500	20	6,000	
Mercury	0.2 ²	50	0.8	200	
Methyl ethyl ketone	200 ²	7,200	800	28,800	78-93-3
Moderately harmful pesticides ¹¹ (total)	N/A ¹²	250	N/A ¹²	1,000	See below ¹¹
Molybdenum	5 ¹⁰	1,000	20	4,000	
Nickel	2 ¹⁰	1,050	8	4,200	
Nitrobenzene	2 ²	72	8	288	98-95-3
C6–C9 petroleum hydrocarbons ¹³	N/A ¹²	650	N/A ¹²	2,600	
C10–C36 petroleum hydrocarbons ¹³	N/A ¹²	10,000	N/A ¹²	40,000	
Phenol (non-halogenated)	14.4 ¹⁴	518	57.6	2,073	108-95-2
Picloram	3	110	12	440	1918-02-1
Plasticiser compounds ¹⁵	1	600	4	2,400	See below ¹⁵
Polychlorinated biphenyls ¹²	N/A ¹²	< 50	N/A ¹²	< 50	1336-36-3
Polycyclic aromatic hydrocarbons (total) ¹⁶	N/A ¹²	200	N/A ¹²	800	
Scheduled chemicals ¹⁷	N/A ¹²	< 50	N/A ¹²	< 50	See below ¹⁷
Selenium	1 ²	50	4	200	
Silver	5.0 ²	180	20	720	
Styrene (vinyl benzene)	3 ¹⁰	108	12	432	100-42-5
Tebuconazole	6.4	230	25.6	920	107534-96-3
1,2,3,4-Tetrachlorobenzene	0.5	18	2	72	634-66-2

Contaminant	Maximum values for <i>leachable concentration</i> and <i>specific contaminant concentration</i> when used together				CAS Registry Number
	General solid waste ¹		Restricted solid waste		
	Leachable concentration	Specific contaminant concentration	Leachable concentration	Specific contaminant concentration	
	TCLP1 (mg/L)	SCC1 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)	
1,1,1,2-Tetrachloroethane	10 ²	360	40	1,440	630-20-6
1,1,2,2-Tetrachloroethane	1.3 ²	46.8	5.2	187.2	79-34-5
Tetrachloroethylene	0.7 ²	25.2	2.8	100.8	127-18-4
Toluene	14.4 ¹⁴	518	57.6	2,073	108-88-3
1,1,1-Trichloroethane	30 ²	1,080	120	4,320	71-55-6
1,1,2-Trichloroethane	1.2 ²	43.2	4.8	172.8	79-00-5
Trichloroethylene	0.5 ²	18	2	72	79-01-6
2,4,5-Trichlorophenol	400 ²	14,400	1,600	57,600	95-95-4
2,4,6-Trichlorophenol	2 ²	72	8	288	88-06-2
Triclopyr	2	75	8	300	55335-06-3
Vinyl chloride	0.2 ²	7.2	0.8	28.8	75-01-4
Xylenes (total)	50 ¹⁸	1,800	200	7,200	1330-20-7

Notes

1. Values are the same for general solid waste (putrescible) and general solid waste (non- putrescible).
2. See *Hazardous Waste Management System: Identification and Listing of Hazardous Waste – Toxicity Characteristics Revisions, Final Rule* (USEPA 2012b) for TCLP levels.
3. There may be a need for the laboratory to concentrate the sample to achieve the TCLP limit value for benzo(a)pyrene with confidence.
4. Calculated from *Hazardous Waste: Identification and Listing* (USEPA 2012a).
5. Calculated from 'Beryllium' in *The Health Risk Assessment and Management of Contaminated Sites* (DiMarco & Buckett 1996).
6. These limits apply to chromium in the +6 oxidation state only.
7. Taken from the *Land Disposal Restrictions for Newly Identified and Listed Hazardous Wastes and Hazardous Soil: Proposed Rule* (USEPA 1993).
8. Analysis for cyanide (amenable) is the established method used to assess the potentially leachable cyanide. The EPA may consider other methods if it can be demonstrated that these methods yield the same information.
9. Endosulfan (CAS Registry Number 115-29-7) means the total of endosulfan I (CAS Registry Number 959-98-8), endosulfan II (CAS Registry Number 891-86-1) and endosulfan sulfate (CAS Registry Number 1031-07-8).
10. Calculated from *Australian Drinking Water Guidelines* (NHMRC 2011).
11. The following moderately harmful pesticides are to be included in the total values specified:

Moderately harmful pesticides (total)			
Name	CAS Registry Number	Name	CAS Registry Number
Atrazine	1912-24-9	Imidacloprid	138261-41-3
Azoxystrobin	131860-33-8	Indoxacarb	173584-44-6
Bifenthrin	82657-04-3	Malathion (Maldison)	121-75-5
Brodifacoum	56073-10-0	Metalaxyl	57837-19-1
Carboxin	5234-68-4	Metalaxyl-M	70630-17-0
Copper naphthenate	1338-02-9	Methidathion	950-37-8
Cyfluthrin	68359-37-5	3-Methyl-4-chlorophenol	59-50-7
Cyhalothrin	68085-85-8	Methyl chlorpyrifos	5598-13-0
Cypermethrin	52315-07-08	N-Methyl pyrrolidone	872-50-4
Deltamethrin	52918-63-5	2-octylthiazol-3-one	26530-20-1
Dichlofluanid	1085-98-9	Oxyfluorfen	42874-03-3
Dichlorvos	62-73-7	Paraquat dichloride	1910-42-5
Difenoconazole	119446-68-3	Parathion methyl	298-00-0
Dimethoate	60-51-5	Permethrin	52645-53-1
Diquat dibromide	85-00-7	Profenofos	41198-08-7
Emamectin benzoate	137515-75-4 & 155569-91-8	Prometryn	7287-19-6
Ethion	563-12-2	Propargite	2312-35-8
Fenthion	55-38-9	Pentachloronitrobenzene (Quintozone)	82-68-8
Fenitrothion	122-14-5	Simazine	122-34-9
Fipronil	120068-37-3	Thiabendazole	148-79-8
Fluazifop-P-butyl	79241-46-6	Thiamethoxam	153719-23-4
Fludioxonil	131341-86-1	Thiodicarb	59669-26-0
Glyphosate	1071-83-6	Thiram	137-26-8

12. No TCLP analysis is required. Moderately harmful pesticides, petroleum hydrocarbons, polychlorinated biphenyls, polycyclic aromatic hydrocarbons and scheduled chemicals are assessed using SCC1 and SCC2.

Polychlorinated biphenyls must be managed in accordance with the EPA's polychlorinated biphenyl (PCB) chemical control order 1997, which is available on the EPA website at Polychlorinated Biphenyl (PCB) Chemical Control Order 1997.

13. Approximate range of petroleum hydrocarbon fractions: petrol C6–C9, kerosene C10–C18, diesel C12–C18, and lubricating oils above C18. Laboratory results are reported as four different fractions: C6–C9, C10–C14, C15–C28 and C29–C36. The results of total petroleum hydrocarbons (C10–C36) analyses are reported as a sum of the relevant three fractions. Please note that hydrocarbons are defined as molecules that only contain carbon and hydrogen atoms. Prior to TPH (C10–C36) analysis, clean-up may be necessary to remove non-petroleum hydrocarbon compounds. Where the presence of other materials that will interfere with the analysis may be present, such as oils and fats from food sources, you are advised to treat the extract that has been solvent exchanged to hexane with silica gel as described in USEPA *Method 1664A* (USEPA 2000).
14. Proposed level for phenol and toluene in *Hazardous Waste Management System: Identification and Listing of Hazardous Waste – Toxicity Characteristics Revisions, Final Rule* (USEPA 2012b).

15. Plasticiser compounds means the total of di-2-ethyl hexyl phthalate (CAS Registry Number 117-81-7) and di-2-ethyl hexyl adipate (CAS Registry Number 103-23-1) contained within a waste.
16. The following polycyclic aromatic hydrocarbons are assessed as the total concentration of 16 USEPA Priority Pollutant PAHs, as follows:

Polycyclic aromatic hydrocarbons (total)			
PAH name	CAS Registry Number	PAH name	CAS Registry Number
Acenaphthene	83-32-9	Chrysene	218-01-9
Acenaphthylene	208-96-8	Dibenzo(a,h)anthracene	53-70-3
Anthracene	120-12-7	Fluoranthene	206-44-0
Benzo(a)anthracene	56-55-3	Fluorene	86-73-7
Benzo(a)pyrene	50-32-8	Indeno(1,2,3-cd)pyrene	193-39-5
Benzo(b)fluoranthene	205-99-2	Naphthalene	91-20-3
Benzo(ghi)perylene	191-24-2	Phenanthrene	85-01-8
Benzo(k)fluoranthene	207-08-9	Pyrene	129-00-0

17. Scheduled chemicals must be managed in accordance with the EPA's scheduled chemical wastes chemical control order 2004, which is available on the EPA website at Scheduled Chemical Wastes Chemical Control Order 2004.

The following scheduled chemicals are to be included in the total values specified:

Scheduled chemicals (total)			
Name	CAS Registry Number	Name	CAS Registry Number
Aldrin	309-00-2	Heptachlor	76-44-8
Alpha-BHC	319-84-6	Heptachlor epoxide	1024-57-3
Beta-BHC	319-85-7	Hexachlorobenzene	118-74-1
Gamma-BHC (Lindane)	58-89-9	Hexachlorophene	70-30-4
Delta-BHC	319-86-8	Isodrin	465-73-6
Chlordane	57-74-9	Pentachlorobenzene	608-93-5
DDD	72-54-8	Pentachloronitrobenzene	82-68-8
DDE	72-55-9	Pentachlorophenol	87-86-5
DDT	50-29-3	1,2,4,5-Tetrachlorobenzene	95-94-3
Dieldrin	60-57-1	2,3,4,6-Tetrachlorophenol	58-90-2
Endrin	72-20-8	1,2,4-Trichlorobenzene	120-82-1
Endrin aldehyde	7421-93-4	2,4,5-Trichlorophenoxyacetic acid, salts and esters	93-76-5

18. Calculated from *Guidelines for Drinking Water Quality* (WHO 2011).

Table 3: Summary of criteria for chemical assessment to determine waste classification

Waste classification	Criteria¹ for classification by chemical assessment (any of the alternative options given)	Comments
General solid waste	1. SCC test values \leq CT1	TCLP test not required
	2. TCLP test values \leq TCLP1 and SCC test values \leq SCC1	
	3. TCLP test values \leq TCLP1 and SCC test values $>$ SCC1 ²	Classify as restricted solid or hazardous (as applicable) If immobilisation approval applies, classify in accordance with that approval
Restricted solid waste	1. SCC test values \leq CT2	TCLP test not required
	2. TCLP1 $<$ TCLP test values \leq TCLP2 and SCC test values \leq SCC2	
	3. TCLP test values \leq TCLP2 and SCC1 $<$ SCC test values \leq SCC2	
	4. TCLP1 $<$ TCLP test values \leq TCLP2 and SCC test values $>$ SCC2 ²	Classify as hazardous. If immobilisation approval applies, classify in accordance with that approval
Hazardous waste	1. TCLP test values $>$ TCLP 2	
	2. TCLP test values \leq TCLP2 and SCC test values $>$ SCC2	Classify as hazardous if no immobilization approval applies

Notes

1. These criteria apply to each toxic and ecotoxic contaminant present in the waste (see Tables 1 and 2).
2. In certain cases the EPA will consider specific conditions, such as segregation of the waste from all other types of waste in a monofill or monocell in order to achieve a greater margin of safety against a possible failure of the immobilisation in the future. Information about the construction and operation of a monofill/monocell is available in the *Draft Environmental Guidelines for Industrial Waste Landfilling* (EPA 1998).

Step 6: Is the waste putrescible or non-putrescible?

Where chemical assessment of a waste under Step 5 results in classification of the waste as general solid waste, further assessment may be undertaken to determine whether the waste can be classified as 'general solid waste (putrescible)' or 'general solid waste (non-putrescible)'. Otherwise (for example, if the waste generator does not wish to undertake this chemical assessment), the waste must be classified as 'general solid waste (putrescible)'.

General solid waste may only be classified as non-putrescible if:

- it does not readily decay under standard conditions, does not emit offensive odours and does not attract vermin or other vectors (such as flies, birds and rodents), or
- it has a specific oxygen uptake of less than 1.5 milligrams O₂ per hour per gram of total organic solids at 20 degrees Celsius, or
- it is such that, during composting (for the purpose of stabilisation), the mass of volatile solids in the organic waste has been reduced by at least 38%, or
- it has been treated by composting for at least 14 days, during which time the temperature of the organic waste must have been greater than 40 degrees Celsius and the average temperature greater than 45 degrees Celsius.

Non-putrescible materials typically do not:

- readily decay under standard conditions
- emit offensive odours
- attract vermin or other vectors (such as flies, birds and rodents).

Wastes that are generally not classified as putrescible include soils, timber, garden trimmings, agricultural, forestry and crop materials, and natural fibrous organic and vegetative materials.

Output from Alternative Waste Technology facilities (AWTs) that requires disposal must be assessed in accordance with the above to determine its putrescibility.

Appendix 1: Chemical assessment

Sampling and analytical methods

Sampling identifies the average levels of contaminants in the waste being assessed. While the following is provided as a guide, it is not possible to recommend sampling methods for all waste types. Appropriate sampling depends on how consistent any tested property is throughout a batch of waste. It is the waste generator's responsibility to ensure that the sampling and analytical methods used are appropriate for the contaminants they are testing for.

Where the property being tested for is highly consistent throughout the waste, sampling is relatively straightforward and useful guidance can be found in the following Australian Standards:

- *AS 1199.0–2003: Sampling Procedures for Inspection by Attributes – Introduction to the ISO2859 Attribute Sampling System* (Standards Australia 2003)
- *AS 1141.3.1–2012: Methods for sampling and testing aggregates – Sampling – Aggregates* (Standards Australia 2012a) is useful for sampling wastes such as aggregates, foundry sand, furnace slag or mining waste.

It is more difficult to accurately sample waste that consists of many different types of waste materials or has chemical contaminants that are not distributed evenly throughout the batch. In such situations, keeping different waste types separate, or separating portions of waste that contain high levels of contaminants from the rest, can be of great benefit.

If unsure of the appropriate sampling or analytical methods for a particular waste, waste generators are strongly encouraged to seek expert help, either from a laboratory that specialises in waste analysis or an appropriately qualified person specialising in such waste management issues, or both. Since most incorrect chemical assessments of waste are due to poor sampling, it is essential that the sampling regime and analytical method used ensure the results are representative of all components and their variability in the waste.

Test methods for determining SCC and TCLP

The reference test methods for determining both the SCC and TCLP values are as described in the United States Environmental Protection Agency's *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (USEPA 2007) and Updates I, II, IIIA, IIIB, IVA and IVB, available at [Hazardous Waste Test Methods / SW-846 – US EPA](#).

The following procedures for leachate preparation are recommended:

- *AS 4439.1–1999: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Preliminary Assessment* (Standards Australia 1999)
- *AS 4439.3–1997: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Bottle Leaching Procedure* (Standards Australia 1997a)
- *AS 4439.2–1997: Wastes, Sediments and Contaminated Soils – Preparation of Leachates, Zero Headpace Procedure* (Standards Australia 1997b).

The standard pH for the leaching solutions used must be either 4.93 ± 0.05 if the pH of the waste sample is less than 5.0, or 2.88 ± 0.05 if the pH of the waste sample is greater than 5.0.

To determine the pH of the waste sample, use the test method specified in Clause 7.5 (Selection of Leaching Fluid) of AS 4439.3–1997 (Standards Australia 1997a).

In some instances the EPA may permit the use of leachates with a pH different from those specified above. EPA authorisation to use an alternative must be sought in writing and will only be provided with adequate justification for the proposed variation. An example might be the testing of a non-putrescible waste for disposal into a monofill or monocell which it can be

shown will not be penetrated by acidic leachate or groundwater. For further assistance, contact the EPA's Waste and Resource Recovery Branch.

Precision in chemical analyses

It is important that the test methods and instruments used in analysing a waste are capable of measuring the concentration of each chemical contaminant with enough confidence to assure correct classification.

It is recommended that the upper limit of the combined confidence interval of sampling and analysis (at a probability of 95%) is used for comparison with the maximum values specified in Tables 1 and 2. This approach should give the assessor confidence that a correct classification has been made.

Who can do the chemical analysis and leaching tests?

Analytical laboratories accredited by the National Association of Testing Authorities (NATA) must be used to perform these analyses and tests. If accredited laboratories are not available locally, contact the EPA's Waste and Resource Recovery Branch for advice.

Frequency of testing

There may be situations in which frequent testing of the waste for an initial period establishes that the characteristics of the waste are consistent enough to give the waste generator confidence to reduce the frequency of testing.

On the other hand, some waste streams may show such large variations in properties that every load of waste would need to be tested before classification.

It is the responsibility of the waste generator to ensure that frequency of testing provides representative samples for all contaminants in that waste.

Appendix 2: Triple-rinsing procedure for cleaning containers

Containers, having previously contained a substance of Class 1, 3, 4, 5 or 8 within the meaning of the *Transport of Dangerous Goods Code*, or a substance to which Division 6.1 of the *Transport of Dangerous Goods Code* applies, from which residues have not been removed by washing or vacuuming, are pre-classified as hazardous waste.

The triple rinsing procedure outlined below is for effective washing of empty chemical containers in an effort to change the waste classification of such containers from hazardous waste to general solid waste (non-putrescible). Rinsing must be done immediately after emptying the container, as residues on the walls are more difficult to remove when dry. It is acceptable to use other rinsing treatments, such as pressure rinsing, integrated rinsing or vacuuming, if the results achieved are equal to or better than those from the triple-rinse procedure.

Triple-rinsing (a three-stage rinsing process)

1. Empty the contents into the spray tank and allow the container to drain for an extra 30 seconds after the flow reduces to drops.
2. Fill the container with clean water to between 20% and 25% of its capacity and replace the cap securely.
3. Shake, rotate, roll or invert the container vigorously for at least 30 seconds, so that the rinse reaches all inside surfaces.
4. Empty the rinsate from the container into the spray tank. Let it drain for an extra 30 seconds after the flow reduces to drops.
5. Repeat until the container has been rinsed three times.

Follow these procedures after rinsing the container

After rinsing the container, check the container thread and outside of the container and, if contaminated, rinse with a hose into the spray tank. Rinse the cap separately in a bucket of water and empty the rinsate into the spray tank.

To ensure that it is fully drained, puncture the container from the inside, for example using a crowbar through the container opening. Allow the container to dry completely and store it in a dry place awaiting disposal.

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MARSHALL DAY
Acoustics 

GAP BLUFF AND CAMP COVE PRECINCTS
REVIEW OF ENVIRONMENTAL FACTORS –
ACOUSTICS, REVISED EXHIBITION DRAFT

Rp 001 r02 20161667 | 11 July 2017

Project: **GAP BLUFF AND CAMP COVE PRECINCTS**

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Report No.: **Rp 001 r02 20161667**

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EXECUTIVE SUMMARY

Gap Bluff is a historic precinct located within Watsons Bay in Sydney's Eastern suburbs. The precinct includes six properties on publicly accessible parkland. In recent years, the National Parks and Wild Life Services (NPWS) operated the properties as short stay accommodation and function spaces.

The proponent, Gap Bluff Hospitality, have entered a Heads of Agreement with National Parks, a division of the Department of Environment and Heritage for the renovations, maintenance and adaptive reuse of the properties within the precinct.

Marshall Day Acoustics (MDA) has been commissioned by Gap Bluff Hospitality to carry out an acoustic assessment Review of Environmental Factors (REF) of the proposed adaptive reuse of the properties. This report documents a complete standalone assessment of the potential future noise impacts from the proposed Gap Bluff Hospitality operation of the revised Gap Bluff and Camp Cove precincts.

An initial development scheme was prepared in 2015 by the proponent, allowing for the Armoury and Officers Mess buildings continuing use as function venues and Constables Cottage as a café / restaurant venue. The remainder of the buildings were to be refurbished and continue as short stay accommodation.

Following a period of public review and comment the proponent has made several revisions to the proposed development. The revisions will potentially reduce the noise impact generated by the site and as such, a new noise impact report is therefore appropriate.

The revised proposal now comprises:

Armoury Building	Continued use as function centre Deletion of previously proposed upper level function space Allowance to fully enclose the ground level terrace with permanent building structure
Officers Mess	Continued use as function centre
Constables Cottage	Continued use as short stay accommodation
33 Cliff Street	New use as short stay accommodation
Green Point Cottage	Continued use as short stay accommodation
Internal Roads	Revision of traffic entry/exit directions to minimise noise impacts on public roads

The report takes into consideration items raised in the NSW Office of Environment and Heritage (OEH) review for the revised Review of Environmental Factors (REF) letter to Gap Bluff Hospitality dated 31/5/2016 (reference DOC16/219301).

Summary of Assessment & Recommendations

Functions within Armoury and Officers Mess Buildings

An assessment has been carried out of noise emissions from the proposed use of the buildings within the Gap Bluff and Camp Cove Precincts.

The analysis includes a review of noise from functions within the Armoury and Officers Mess buildings, noise from patrons outside the buildings, and vehicles accessing the site.

Recommendations for acoustic upgrades for the Armoury and Officers Mess buildings have been developed to provide the necessary noise mitigation.

The upgrades include acoustic rated windows, doors, roof and ceilings as necessary. Acoustic outcomes have been calculated allowing for the physical and operational controls recommended in this report.

Noise breakout from the Gap Bluff precinct function centres was considered for range of operational scenarios. Compliance is demonstrated for the following operations allowing for the acoustic upgrades and scenarios in Section 6.0 of this report:

- Functions with music in all rooms during Day, Evening and Night (up to midnight), all windows closed
- Outdoor ceremonies during the Day period
- Indoor functions in the Armoury building with limited music, windows open, outdoor ceremony, function in Officers Mess with windows closed, Day period only
- Indoor functions in the Armoury building with limited music, windows open, functions in Officers Mess with windows closed, Day and Evening periods only

The following operations are not compliant:

- Outdoor ceremonies during the Evening and Night periods
- Operation of the Armoury building with windows open during functions with full music level such as that during a wedding. More limited levels of music (e.g. background music) would permit the Armoury windows to be opened during the Day and Evening periods.

Traffic Noise

The assessment has determined that noise from patrons and vehicles within the Gap Bluff Precinct access roads will be within acceptable limits.

Noise from Vehicles on public roads is however subject to separate assessment criteria. In this instance noise increases from vehicles associated with the operation of the precinct are likely to also be within the acceptable 2 dB increase limit. The limit is however expected to be exceeded during the night timed hours as a result of the low existing traffic flow levels.

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1.0 INTRODUCTION

Gap Bluff is a historic precinct located within Watsons Bay in Sydney's Eastern suburbs. The precinct includes six properties on publicly accessible parkland. In recent years, the National Parks and Wildlife Services (NPWS) operated the properties as short stay accommodation and function spaces.

The proponent, Gap Bluff Hospitality, have entered a Heads of Agreement with National Parks, a division of the Department of Environment and Heritage for the renovations, maintenance and adaptive reuse of the properties within the precinct.

An initial development scheme was prepared in 2015 by the proponent, allowing for the Armoury and Officers Mess buildings continuing use as function venues and Constables Cottage as a café / restaurant venue. The remainder of the buildings were to be refurbished and continue as short stay accommodation.

An acoustic report was prepared by PKA Acoustic Consulting (PKA) (reference 215 043 R01 v2.4 Gap Bluff Acoustic Report dated 10/6/2015) covering the operation of the proposed buildings. The report concluded that noise controls would be required including both physical and operational measures.

Following a period of public review and comment the proponent has made several revisions to the proposed development. The revisions will potentially reduce the noise impact generated by the site and as such, a new noise impact report is therefore appropriate. The revised proposal now comprises:

Armoury Building	Continued use as function centre
	Deletion of previously proposed upper level function space
	Allowance to fully enclose the ground level terrace with permanent building structure
Officers Mess	Continued use as function centre
Constables Cottage	Continued use as short stay accommodation
33 Cliff Street	New use as short stay accommodation
Green Point Cottage	Continued use as short stay accommodation
Internal Roads	Revision of traffic entry/exit directions to minimise noise impacts on public roads

Marshall Day Acoustics (MDA) has been commissioned by Gap Bluff Hospitality to carry out the acoustic component of the Review of Environmental Factors (REF) of the proposed adaptive reuse of Gap Bluff buildings.

This report is a complete stand-alone assessment of the potential future noise impacts from the proposed Gap Bluff Hospitality operation of the revised Gap Bluff and Camp Cove precincts. The report takes into consideration the previous PKA assessment and subsequent modifications to the design and operation of buildings in the Gap Bluff and Camp Cove precincts. This acoustic assessment addresses items raised in the NSW Office of Environment and Heritage (OEH) review for the revised Review of Environmental Factors (REF) letter to Gap Bluff Hospitality dated 31/5/2016 (reference DOC16/219301). The attachment to the letter includes reference peer review comments that informed the OEH action items.

Overall the MDA assessment is based on the following:

- Noise surveys conducted by PKA as per the original assessment and additional background noise level surveys carried out by MDA
- Inspection of existing buildings and the site carried out by MDA

- Revised Traffic Impact Report prepared by Ason Group
- Revised Usage Data provided by GAP Hospitality Pty Ltd
- Detailed drawings prepared by Ray Fitzgibbon Architects Pty Ltd.

1.1 OEH REF Action Items

Action items were raised in the OEH review of the PKA acoustic impact assessment report, to be considered for any future acoustic review.

Action items have been addressed in this assessment, including;

- A 3 dimensional computer model has been created in the environmental noise modelling program, SoundPlan V7.4, which utilises the methodology defined in International Standard ISO 9613-2: 1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO 9613).
- Review and consolidation of compliance criteria
- Traffic assessment utilising the 3 dimensional computer model and revised traffic management plan as documented in the Traffic Impact Assessment Report
- Modelling of concurrent function activities to assess the combined noise impact

Refer to Section 7.3 of this report listing the full OEH review comments and details of how they have been addressed in the MDA assessment.

2.0 SITE DESCRIPTION

2.1 Existing Site

The Gap Bluff precinct is part of the Sydney Harbour National Park in Watsons Bay, Sydney. It is bounded by Military Road and Cliff Street to the south west, HMAS Watson military reserve to the north-west and the Pacific Ocean to the east / north east.

The precinct is heavily vegetated, apart from cleared areas surrounding buildings and the carpark areas and cleared grassed areas toward the south-western portion of the site. The site falls toward the west, with an elevated cliff face to Cliff Street and Military Road.

A detailed description of the site is included within the JBA planning document. Buildings in the Gap Bluff and Camp Cove precincts are shown in Figure 1. The site accommodates a number of existing buildings, six of which included within the proponents heads of agreement. The six buildings are located as follows:

- Gap Bluff precinct buildings - the Offices Mess, Armoury and Gap Bluff Cottage which are all located on Gap Bluff Road, accessible from Military Road in Watsons Bay
- Camp Cove precinct buildings;
 - o Constables Cottage is located at 32 Cliff Street, Watsons Bay
 - o Adjacent to Constables Cottage is 33 Cliff Street Watsons Bay
 - o Green Point Cottage is located at 36 Pacific Street Watsons Bay, although located further away, for the purposes of this report is defined as being in the Camp Cove precinct



Figure 1: Site plan, Gap Bluff and Camp Cove precinct buildings

The currently vacant Officers Mess and Armoury buildings most recent use was as a function / reception centre. This use is proposed to be continued.

A detailed site map of receivers in proximity to Gap Bluff precinct buildings proposed to be used for functions (Armoury, Officers Mess buildings) is shown in Figure 2.

The closest residential properties to the Officers Mess and the Armoury Buildings are those to the west of Cliff Street, at approximately 100 metres distance. Other residential properties are located immediately west of Cliff Street. The Watsons Bay Boutique Hotel is located adjacent the residential areas, on the corner of Cliff Street and Military Road.

The HMAS Watson base is located immediately to the north. The most exposed noise sensitive location is identified as the lodging barracks on Gap Bluff Top Road. Receivers to the south are across Robertson Park to Clovelly Road and Military Road.



Figure 2: Gap Bluff precinct buildings and receivers, unattended logger location (L), photo source: SixMaps

Table 1: Receiver locations

#	Building
1	Officers Mess Building
2	Armoury Building
3	Watson Bay Boutique Hotel
4	Residential properties bound by Cliff Street and Short Street
5	Residential properties bound by Cliff Street and Cove Street
6	Residential properties on Pacific Street
7	HMAS Watson Base Accommodation
8	27 Military Road, Residential
9	Clovelly Street Residences

For Camp Cove precinct buildings, the closest residential properties to the Constable Cottage building and 33 Cliff Street are those to the south west of Cliff Street, at approximately 15-20 metres distance. Closest receivers to the Green Point cottage are on Pacific Street, approximately 40m away.

3.0 DEVELOPMENT DESCRIPTION

The following outlines the revised development description for each building.

3.1 Gap Bluff Precinct

3.1.1 Officers Mess Building

The Officers Mess building was most recently used as a function / reception centre. Gap Bluff Hospitality has proposed to continue operating the venue as per the most recent usage, i.e. as a function / reception centre.

Overall the proposal is for adaptive reuse of the building, with internal and roof alterations including acoustic treatments and external landscaping. The building will have capacity for 115 for banquet-type functions, or 130 for cocktail functions (see Section 3.1.4 for the overall Gap Bluff precinct function capacity).

The Officer Mess building envelope is to be predominately retained, the only major modification being the replacement of the first level pitched roof sections with a flat roof. Changes to the roof are to restore to the original building envelope configuration.

The Officers Mess ground level includes the main reception area with outdoor enclosed verandah, kitchen, bridal rooms, theatre and amenities and a lift. The first floor includes two private dining rooms, secondary bridal room and a servery.

The ground floor reception is to be used as the larger function space (e.g. for weddings and corporate functions) with the capacity for controlled amplified music, suitable for a wedding or corporate function. First floor reception rooms are proposed to be used for smaller functions and gatherings (e.g. lunch and dinner). Music in first floor reception rooms will be limited to background ambient levels from portable music devices.

The ground floor theatre internal layout is intended to be retained with the room used for seminar presentations and lecture style events. Activities are to be limited to speech with no expectation for amplified music.

To control breakout via the building envelope, acoustic upgrades are proposed for the following function areas;

- Upgrade of the existing glazing in the ground level reception, reception verandah and first level reception via the addition of an inner glazing frame
- Upgrade of the ground level reception and verandah roof, whilst retaining the existing interior ceiling
- Sound lock entry to the ground level reception verandah

Further details of the building construction and acoustic performance are provided in Section 6.2.4.

The grassed area adjacent to the existing fountain immediately in-front of the Officers Mess building is proposed to be used for outdoor ceremonies associated with functions in the ground level reception. Separate stand-alone outdoor functions or events are not proposed.

Outdoor ceremonies will be limited to 80 people, matching the maximum function capacity for the ground level function room. Music for outdoor ceremonies will be restricted to background ambient only.

3.1.2 Armoury Building

The Armoury building was most recently used as a function / reception centre. Gap Bluff Hospitality has proposed to continue operating the venue as per the most recent usage, i.e. as a function / reception centre.

Overall the proposal is for adaptive reuse, with internal alterations including acoustic treatments, addition of a side wing and external landscaping.

The Armoury is to be retained as a single storey building with an external balcony. Initial considerations for a second storey are no longer proposed.

The Armoury building includes a main reception area, kitchen, amenities and external enclosed terrace. The proposed function use will have the capacity for controlled amplified music, suitable for a wedding or corporate function.

To control breakout from the balcony, the balcony is to be fully contained with openable awning windows. Entry to function areas is to be from either the main entrance or via the external terrace. To control noise breakout via entrances, a sound lock entry is proposed for the main entry and balcony.

Further details of the building construction and acoustic performance are provided in Section 6.2.4.

3.1.3 Gap Bluff Cottage

Gap Bluff Cottage is a single level building with a single bedroom. It is proposed continue its existing use as short stay accommodation. Refurbishment works will include minor alteration and internal reconfiguration only.

3.1.4 Gap Bluff Precinct Function Capacity

A summary of the function capacity for the Officers Mess and Armoury buildings is shown in Table 2.

Table 2: Function space capacity

Building	Location	Banquet Event	Cocktail Event
Officers Mess	Ground Floor – Dining Room	70	80
	1 st Floor Private Dining Room	25	30
	Total	95	110
Armoury	Ground Floor – Dining Room	140	160
Combined		235	270

Gap Bluff Hospitality proposed hours of operation for function centres are from 7am (8am Sunday and Public Holidays) with drinks and music for functions ceasing at 11:30pm. The site is to be empty of patrons by 12 midnight. A list of potentially concurrent events is shown in Table 3.

Table 3: Potentially concurrent function events

Building	Activity	Day (7am – 6pm)	Evening / Night (6pm – midnight)
Armoury	Function, reception and balcony	✓	✓
Officers Mess	Function, ground level reception	✓ Note 1	✓
	Function, 1 st level reception room	✓	✓

Note 1: Daytime activities may include outdoor ceremonies. During an outdoor ceremony the reception room will not be occupied.

3.1.5 Gap Bluff Precinct Vehicle Access and Carpark

Vehicle access and carpark utility is outlined in the Traffic Impact Assessment Report ref 0075r02 dated 15/12/2016 prepared by Ason Group.

The proposed traffic management plan for vehicles accessing Gap Bluff precinct function centres is shown in Figure 3. To mitigate disturbance, car and mini-bus vehicle access to the Gap Bluff precinct function areas will be via Gap Bluff Road, accessible from Lighthouse Road and egress from the site only via the Military Road exit. Vehicle access will be controlled by Gap Bluff Hospitality staff at the Lighthouse Road entry, with access for function guests and staff only. Bus / coach entry and exit will be via Military Road as per the existing arrangement.

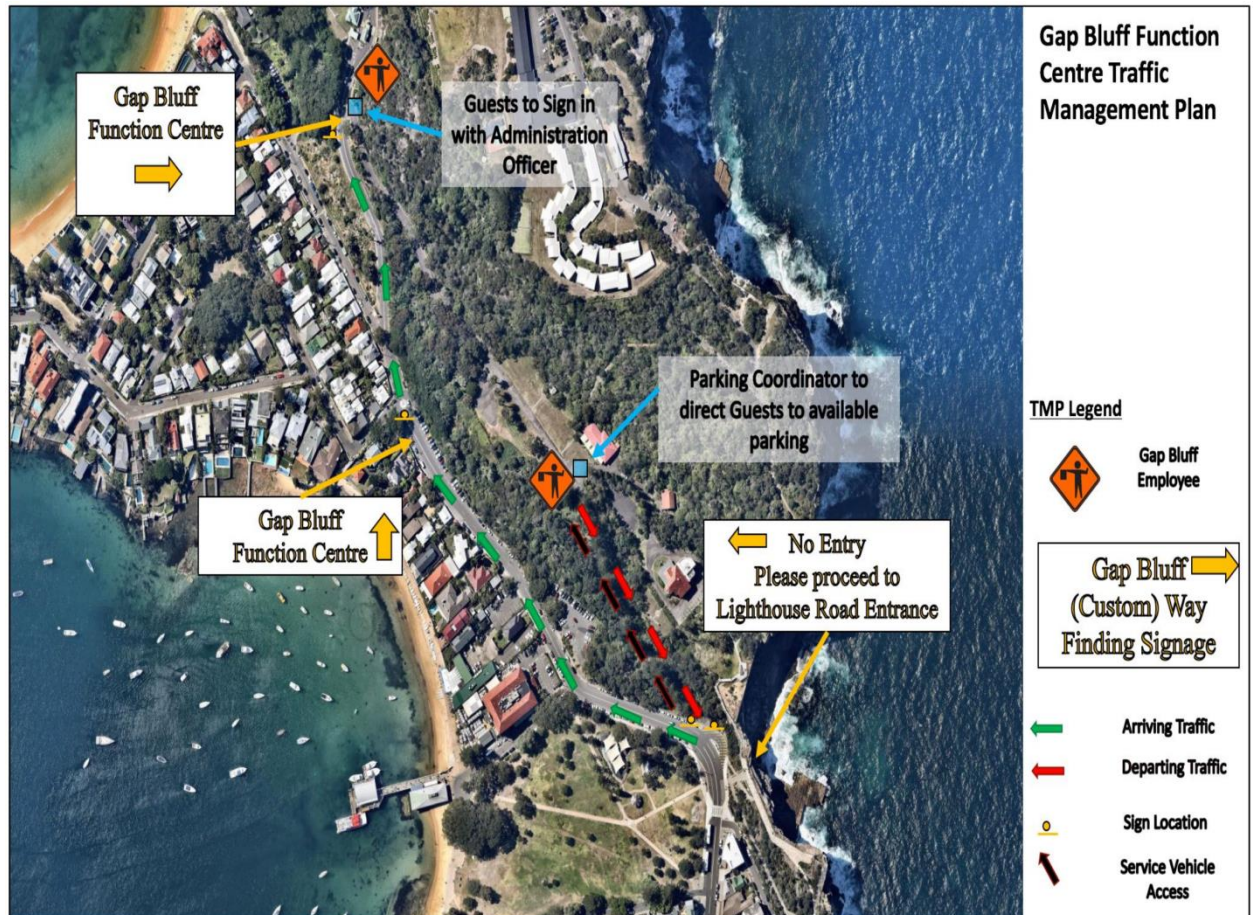


Figure 3: Traffic management plan, source: Traffic Impact Assessment Report

The traffic management plan notes vehicles will be signposted to 10 km/hr on Gap Bluff Road with speed humps to assist in enforcing the slow speed environment.

On-site parking will be limited to existing parking bays near the Armoury and Officers Mess buildings, shown in Figure 4.

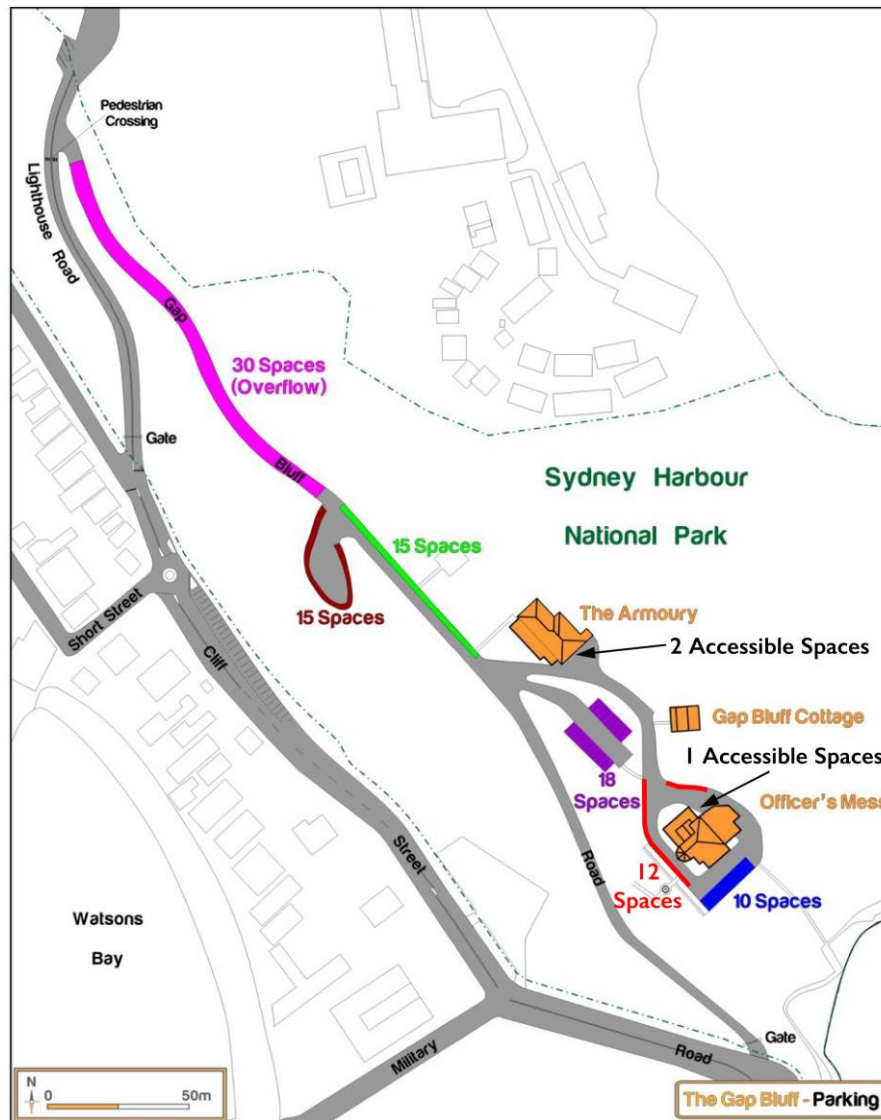


Figure 4: Gap Bluff precinct car parking spaces, source: Traffic Impact Assessment Report

Peak traffic volumes for concurrent events in the Gap Bluff precinct are listed in the Traffic Impact Assessment Report as;

- 110 pre-function trips (85 arrival, 25 departure)
- 110 post-function trips (25 arrival, 85 departure)

Carpark usage has been defined as;

In summary, the Gap Bluff precinct provides 70 parking spaces that consists of 60 parking spaces for guests and 10 parking spaces for staff. This would accommodate up to 100% of parking demands generated by the site on a standard busy operation period.

On occasions that generate a higher parking demand, overflow parking for a further 30 cars can be provided on the northern access road, which would more than meet that additional demand for 8 parking spaces for both function centres operating simultaneously at maximum capacity.

3.2 Camp Cove Short Stay Accommodation

The proposal is for the Camp Cove precinct dwellings continue their existing use as short stay accommodation;

- Constables Cottage – 3 bedrooms
- 33 Cliff Street – 3 bedrooms
- Green Point Cottage (36 Pacific Street) – 2 bedrooms

Refurbishment works will include minor alteration and reconfiguration only.

Gap Bluff Hospitality have advised that accommodation will be operated in accordance with the Holiday and Short Term Rental Code of Conduct released 24 March 2015, effective from 31 May 2015 published by the Holiday Rental Industry Association (HRIA).

Part 3 of the HRIA guide outlines obligations on Owners and Guests (where required to implement the Code) through the standards set for Terms and Conditions of the contract between the Owner and Guests. Schedule A sets out model terms and conditions as a “deemed to satisfy” solution to the requirements of Part 3. Applicable requirements are outlined in Table 4.

Table 4: ‘Deemed to satisfy’ obligations on owners and guests, HRIA

Section	Rule
3.8 Noise and Residential Amenity	<p>a) Guests and Visitors must not create noise which is offensive to neighbours especially between 10pm-8am and during arrival and departure at any time throughout the occupancy.</p> <p>b) Offensive noise is prohibited and may result in:</p> <ol style="list-style-type: none"> Termination of permission to occupy the Property; Eviction; Loss of rental paid; and Extra charges for security and other expenses which may be deducted from Security Deposits or Bonds. <p>c) Guests and Visitors must abide by any noise abatement conditions, standards and orders issued by police or any regulatory authority to minimise impacts upon the residential amenity of neighbours and local community</p>
4.4 Gatherings or functions	<p>a) The Property is not a “party house” and any such activities are strictly prohibited;</p> <p>and b) Any gathering, celebration or entertainment permitted at a Property must not conflict with residential amenity and must comply with all the other requirements.</p>

4.0 SITE SURVEY

4.1 Gap Bluff Precinct

For the purposes of the assessment a new logger survey has been conducted in the Gap Bluff Precinct to establish baseline noise levels. A new logger assessment was conducted to;

- Confirm that there has not been any change to existing ambient noise levels, and
- Obtain a more detailed ambient noise level survey. The deployed logger has the capability of overall and octave band measurements, providing a longer octave band survey period than the 24-hour octave band survey conducted in the PKA assessment.

As a cross-check, a comparison to previous logging conducted as detailed in the PKA assessment is detailed below.

The logger is located adjacent to the sealed road overflow carpark adjacent near the Armoury building, adjacent to residences at 26 Cliff Street as shown in Figure 2 and in detail in Figure 5. The logger location is considered to be representative of the ambient background noise level of most affected noise sensitive dwellings from function activities in the Officers Mess and Armoury buildings.

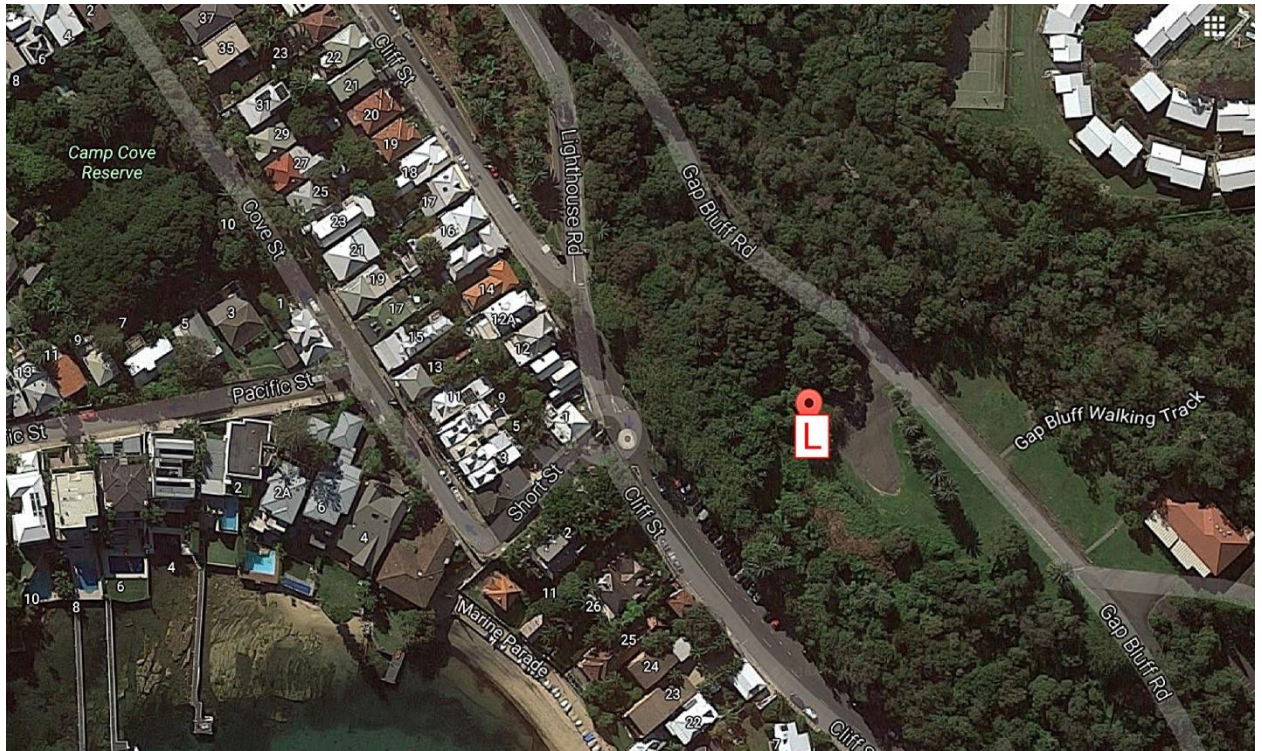


Figure 5: Logger Location, L Gap Bluff precinct

Logging was conducted with a 01dB Duo noise logger Serial number 10419. The logger was calibrated immediately before and after deployment and found to be acceptable, the calibration certificate is provided in Appendix E.

Baseline noise levels were recorded from Tuesday 29th November to Monday 5th December 2016 inclusive. Measurements were recorded continuously over this period and grouped to 15 minute intervals. The survey results are summarised in Appendix B.

In determining existing noise levels, any data affected by extraneous noise events in addition to rainfall were excluded in accordance with EPA INP guidance. A weather station was installed adjacent to the noise logger to measure wind and rain conditions to establish periods to be excluded from the weather data. Exclusions were made for the Evening and Night period for the 2nd December and the Night period for 5th December.

The results of the unattended monitoring are provided in Table 5. To assess against L&GNSW criteria (see Section 5.1), octave band noise levels at the minimum background level Night period are reported.

Table 5: Ambient and background noise level survey

Period	Time Period	RBL, L _{A90} dB	L _{Aeq} dB
Day	0700-1800 hours	44	56
Evening	1800-2200 hours	43	60
Night ¹	2200-0700 hours	37	47

Table 6: Minimum period L₉₀ octave band noise levels

Period	Measurement Time	Centre Frequency Octave Band, Hz									Overall, dBA
		31.5	63	125	250	500	1000	2000	4000	8000	
Day	11AM - 12 midday	54	54	46	39	38	35	33	31	26	41
Evening	7PM -8PM	53	52	46	40	38	35	31	30	24	41
Night	11PM -12 midnight	41	37	35	34	32	29	24	40*	25	42* (34 ¹)

Note 1: Overall level excluding 4kHz values

From interrogation of the logging measurements it was found that Night measurements were influenced by regular peaks in the 4kHz octave band. Raised levels in the 4kHz octave band were typically measured over the period of 9pm to 3am. The source of the exceedance was not able to be confirmed, however it is expected that the raised levels were due to local wildlife. Minimum period L₉₀ levels excluding the 4kHz peak are listed for comparison in Table 6, showing that for the measured period the 4kHz peak increased the overall level by 8dBA.

For comparison, results from the noise survey conducted by PKA are summarised in Table 7 as overall levels, and for minimum night-time background noise levels in Table 8. The location of the logger for the current assessment and the PKA assessment are considered to be equivalent for the purposes of the noise survey.

Table 7: Ambient Noise Level Survey Summary (PKA Report 215 043 R01 V2.4 Gap Bluff Precinct Acoustic Report)

Period	Time Period	RBL, L _{A90} dB	L _{Aeq} dB
Day	0700-1800 hours	40.5	51
Evening	1800-2200 hours	39.5	51
Night ¹	2200-0700 hours	33	46

Table 8: Ambient Noise Level Survey Summary (PKA Report 215 043 R01 V2.4 Gap Bluff Precinct Acoustic Report), L_{A90}

Location	Measurement / Time	Centre Frequency Octave Band, Hz									Overall, dBA
		31.5	63	125	250	500	1000	2000	4000	8000	
5-7 Cliff Street	Lowest survey value, 12 midnight	39.5	35.5	31.5	28.5	27.5	25.5	21.5	20.5	13.5	30.5

¹ The night-time period on Sundays and Public Holidays is 2200 to 0800hrs

Overall the PKA measurements were in the order of 3dBA less in each period. Octave band measurements reported in the PKA assessment for the Night period did not record the 4kHz peak as measured in the current logging survey. It is noted the PKA noise survey was conducted in late March early April, suggesting potential seasonal variations from local wildlife activity.

As the reason for the discrepancy between the site surveys has not been able to have been identified, for the purposes of establishing site noise criteria, site survey conditions as documented in the PKA report are utilised for the assessment. Utilising the PKA site survey establishes a lower site background conditions, which is more restrictive to activities in the Gap Bluff precinct.

4.2 Camp Cove Precinct

The PKA assessment included details of logging conducted at the far end of Cliff Street, close to the 33 Cliff Street building. In the PKA report it was noted that logging was considered to be representative of conditions at 1 Victoria Street. A summary of logging results is shown in Table 9 with minimum night-time background noise levels listed in Table 10.

For the purposes of establishing the existing noise environment, logging measurements conducted in the previous PKA assessment are considered to be appropriate for quantifying the noise environment for residences in the vicinity of Constables Cottage and 33 Cliff Street. In addition the surveyed ambient noise levels are considered to be appropriate for residential receivers in the vicinity of Green Point Cottage. It is noted that in the OEH review of the PKA report that surveys conducted at 1 Victoria Street are representative of receivers in the vicinity of Green Point Cottage.

Table 9: Ambient Noise Level Survey Summary (PKA Report 215 043 R01 V2.4 Gap Bluff Precinct Acoustic Report)

Location	Existing Noise Levels	
	L _{Aeq}	L ₉₀ RBL
1 Victoria Street	Day	52.5
	Evening	39.5
	Night	55.5
		46
		33.5

Table 10: Ambient Noise Level Survey Summary (PKA Report 215 043 R01 V2.4 Gap Bluff Precinct Acoustic Report)

Location	Time	Centre Frequency Octave Band, Hz									Overall, dBA
		31.5	63	125	250	500	1000	2000	4000	8000	
1 Victoria Street	Lowest survey value, 11pm	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5	35.5

5.0 NOISE CRITERIA

A summary of applicable noise criteria for the Gap Bluff and Camp Cove precincts are listed in Table 11. The OEH review did not require historical site specific noise criteria identified in the PKA assessment are required to be adopted for REF. On this basis, reference to historical noise criteria applied to the NSW National Parks and site specific noise limits for Gap Bluff Centre events has been omitted in this assessment.

The following identifies applicable noise criteria, accounting for additional noise logging, and incorporating OEH review comments as to the applicability of criteria.

Table 11: Environmental noise criteria

Noise Criteria	Application	Comment
Liquor and Gaming NSW (L&GNSW) (previously Office of Liquor, Gaming and Racing, OLGR)	Noise emission from licensed venues. Applies to patrons and provision of music entertainment in the building	Assessment is against the standard consent conditions Compliance limits established based on existing noise ambient noise levels
New South Wales Industrial Noise Policy (INP)	Noise emission from industrial noise sources (e.g. plant and equipment) and noise from vehicle movements on private roads within the property boundary	Project specific noise level criteria derived from an involved analysis of the ambient noise environment and zoning information
Woollahra Council, Chapter C3 Watsons Bay Heritage Conservation Area DCP	Noise and vibration emission from activity on the site	Identifies Specific Development Control Plan for the Watson Bay Heritage Conservation Area
Road Noise Policy (RNP)	Noise from additional traffic on existing public roads from the change in use of the development	Applies to public road only. Internal roads on the Gap Bluff precinct (e.g. access roads to Armoury and Officers Mess carparks) are subject to NSW INP criteria nominated above
Sleep disturbance (guidance only)	Noise emission from activity on the site	Recommendations to mitigate disturbance to nearby residential receivers

In addition to the nominated criteria, Gap Bluff Hospitality have required short stay accommodation to be subject to the Holiday and Short Term Rental Code of Conduct conditions as established by the Holiday Rental Industry Association (HRIA), outlined in Section 3.2.

5.1 Liquor & Gaming NSW (L&GNSW) Noise Criteria

Noise emissions from licensed premises are governed by the Liquor and Gaming NSW (L&GNSW), formerly the Office of Liquor, Gaming and Racing (OLGR). L&GNSW sets the following standard conditions to be imposed on liquor licences for any entertainment noise from a licensed venue:

The L_{A10} noise level emitted from the licensed premises shall not exceed the background noise level in any octave band centre frequency (31.5 Hz – 8k Hz inclusive) by more than 5dB between 07.00am and 12.00 midnight at the boundary of any affected residence.

The L_{A10} noise level emitted from the licensed premises shall not exceed the background noise level in any octave band centre frequency (31.5 Hz – 8k Hz inclusive) between 12.00 midnight and 07.00am at the boundary of any affected residence.

Notwithstanding compliance with the above, the noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12.00 midnight and 07.00am.

Interior noise levels which still exceed safe hearing levels are in no way supported or condoned by Liquor and Gaming NSW.

This is a minimum standard. In some instances the Board may specify a time earlier than midnight in respect of the above condition.

For the purposes of this condition, the L_{A10} can be taken as the average maximum deflection of the noise emission from the premises.

For the purposes of this assessment, the following activities are identified to be assessed against the L&GNSW criteria;

- Noise breakout from music and patrons from functions held inside nominated function areas in the Gap Bluff precinct (i.e. Armoury and Officers Mess buildings) during the Day, Evening and Night periods
- Noise from patrons and background music from outdoor ceremonies in the courtyard immediately adjacent to the Officers Mess during the Day period only (noting ceremonies are exclusively limited to bookings associated with the indoor function centres)

As short stay private accommodation, activities within the Constables Cottage, 33 Cliff Street, Green Point Cottage and Gap Bluff Cottage are not assessed against the L&GNSW criteria.

5.1.1 Gap Bluff Precinct Function Areas

Site L&G NSW criteria for the Gap Bluff Centre are listed in Table 12 based on background noise levels from noise logging measurements detailed in Section 4.0. Separate criteria are nominated for Day, Evening and Night operation to reflect the variation in site background ambient noise levels over the day. As activities are nominated to cease before midnight, the more stringent post-midnight L&G NSW criteria are not required.

As noted in Section 4.1, for the purposes of the assessment existing background noise levels are taken from the site survey documented in the PKA report. Minimum 1-hour period L_{90} values are chosen to represent the most restrictive assessment of the background level, as this could be potentially applied in assessment to the L&G NSW criteria. Day and Evening octave band background levels are taken from the site survey conducted, adjusted for the difference in the overall Day and Evening RBL values between the current and PKA site survey.

Table 12: L&GNSW Criteria, Gap Bluff Precinct

Period	Time	L ₁₀ Sound Pressure Levels									Overall, dBA L ₁₀
		Centre Frequency Octave Band, Hz									
		31.5	63	125	250	500	1k	2k	4k	8k	
Day	10:00am – 6:00pm	58.5	58.0	50.5	43.5	42.0	39.5	37.0	35.0	30.0	45.5
Evening	6:00pm - 10:00pm	56.5	56.0	50.0	44.0	41.5	39.0	35.0	33.5	28.0	44.5
Night	10:00pm–12:00am	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5	35.5

5.2 Industrial Noise Policy (INP)

In NSW, the EPA's INP is the guideline for assessing noise emissions from industrial and commercial noise sources. The INP sets out a procedure where a facility can be assessed against a series of noise level criteria. In the INP, these criteria are called the project specific noise levels and are derived from an analysis of the ambient noise environment and zoning information.

For the purposes of this assessment, the following activities are identified to be assessed against the INP criteria;

- Building plant and equipment (e.g. air-conditioning, pumps, kitchen exhaust etc.)
- Vehicle movements on internal private roads

5.2.1 Gap Bluff Precinct

Based on site ambient noise level measurements, INP project specific noise levels for affected receivers are outlined in Table 13.

Table 13: Project specific noise levels, dB

Time of Day	Period	Intrusive Criteria	Amenity Criteria
Day	0700 ² – 1800hrs	45.5 L _{Aeq,15min}	55 L _{Aeq, 11hr}
Evening	1800-2200 hours	44.5 L _{Aeq,15min}	45 L _{Aeq, 4hr}
Night	2200-0700 ² hours	38 L _{Aeq,15min}	40 L _{Aeq, 9hr}

Further detail regarding the derivation of the project specific noise limits is provided in Appendix C. Where applicable, modifying factors as defined in the NSW INP are added to the predicted noise level estimate for assessment.

5.2.2 Camp Cove Precinct

Based on site ambient noise level measurements, INP project specific noise levels for affected receivers are outlined in Table 13 for the Camp Cove Precinct (including Green Point Cottage).

Table 14: Project specific noise levels, dB

Time of Day	Period	Intrusive Criteria	Amenity Criteria
Day	0700 ³ – 1800hrs	45.5 L _{Aeq,15min}	55 L _{Aeq, 11hr}
Evening	1800-2200 hours	43 L _{Aeq,15min}	45 L _{Aeq, 4hr}
Night	2200-0700 ³ hours	38.5 L _{Aeq,15min}	40 L _{Aeq, 9hr}

Further detail regarding the derivation of the project specific noise limits is provided in Appendix C.

5.3 Woollahra Council, Watsons Bay Heritage Conservation Area Development Control Plans

Development Control Plans relating to noise emissions are defined in Section 3.5.10 Acoustic and Visual Privacy Requirements, with specific applicable clauses listed in Table 15.

Table 15: Woollahra Council, Watsons Bay Heritage Conservation Area DCP Conditions

Condition	Assessment of the Condition
<i>Clause 12 transmission of vibration to any other premises;</i>	No plant, equipment or activities in short stay accommodations are expected to generate any level of vibration warranting acoustic control. On the basis of the expected activities and the physical separation of the Armoury and Officers Mess function areas to the site boundary and nearby residential receivers, vibration transmission is considered negligible, and is not assessed further.

² 0800 on Sundays

³ 0800 on Sundays

Condition	Assessment of the Condition
<p><i>Clause 12</i></p> <p><i>an offensive noise as defined in the Noise Control Act 1975; and</i></p> <p><i>Clause 7</i></p> <p><i>Electrical, mechanical, hydraulic and plant equipment are to be suitably housed so as to not create 'offensive noise', as defined in the Noise Control Act 1975.</i></p>	<p>It is noted the <i>Noise Control Act 1975</i> has been superceded by The Protection of the Environment Operations Act 1997 (PoEO Act). Offensive noise is defined in the PoEO Act as being noise:</p> <p><i>(a) that, by reason of its level, nature, character or quality, or the time at which it is made, or any other circumstances:</i></p> <p><i>(i) is harmful to (or is likely to be harmful to) a person who is outside the premises from which it is emitted, or</i></p> <p><i>(ii) interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted, or</i></p> <p><i>(b) that is of a level, nature, character or quality prescribed by the regulations or that is made at a time, or in other circumstances, prescribed by the regulations.</i></p> <p>In the absence of prescribed level in the Regulations, the most stringent interpretation of the requirement is (ii) unreasonably interfering with the comfort or repose at the closest receiver location.</p> <p>For residential premises the Operation (Noise Control) Regulations (PoEO Regulations) further defines in Clause 52 the operation of residential air-conditioning units during the Night-time period;</p> <p><i>A person must not cause or permit an air conditioner or heat pump water heater to be used on residential premises in such a manner that it emits noise that can be heard within a habitable room in any other residential premises (regardless of whether any door or window to that room is open):</i></p> <p><i>(a) before 8 am or after 10 pm on any Saturday, Sunday or public holiday, or</i></p> <p><i>(b) before 7 am or after 10 pm on any other day.</i></p>

Condition	Assessment of the Condition
<p><i>Clause 12</i></p> <p><i>a sound level at any point on the boundary of the site greater than the levels specified in the relevant Australian Standard.</i></p>	<p>It is noted that there is no Australian Standard that specifies an acceptable level of external noise emission.</p> <p>The PKA assessment made the following interpretations of this requirement;</p> <ul style="list-style-type: none"> AS 1055 is the most relevant Australian Standard, noting that the standard does not identify prescriptive noise control limits. The standard provides guidance for the measurement and evaluation of environmental noise and provides guidance in setting noise limits. In lieu of receivers directly on the site boundary, assessment has been conducted to the boundary of the nearest receiver. For the purposes of the PKA assessment, PKA interpreted the intent of the DCP criteria as; <ul style="list-style-type: none"> The exceedance limit is 0 dB above background The measurement parameter is $L_{eq}(15 \text{ minutes})$ Ambient background noise levels were taken as the lowest survey night-time background levels against each of the 31.5Hz to 8kHz octave band frequencies. On the basis that the L_{eq} requirement from the DCP criteria is 0dB above background, that this criteria is likely to be similar to the L&GNSW criteria of the L_{10} level not exceeding the background by +5dB. The conclusion was based on the expected difference between the 'average' levels that would be recorded with a L_{eq} measurement compared to the 'average maximum' levels that would be recorded with a L_{10} measurement. <p>Overall we identify the PKA approach is a valid (albeit conservative) interpretation of the DCP requirement in the absence of any specific numerical noise control compliance targets.</p> <p>It is considered appropriate that assessment to L&GNSW criteria meets the intent of the DCP requirement.</p>

Taking into consideration the above requirements the following conclusions are made from the Watsons Bay Heritage Conservation Area requirements;

- L&GNSW criteria are appropriate for licensed venues (i.e. Armoury and Officers Mess function areas) to assess patron and music noise
- PoEO provisions are appropriate for air-conditioning for short-stay accommodation for Night-time operation.
- For Day and Evening periods, INP criteria are deemed to be appropriate in demonstrating that air-conditioning equipment does not unreasonably interfere with the amenity of affected noise sensitive receivers.

No specific criteria are identified for assessing occupant noise from short stay accommodation. Assessment therefore is identified to be to interpretation of the requirement of;

(ii) unreasonably interfering with the comfort or repose at the closest receiver location.

The OEH peer review identified that an appropriate criteria for the short-stay accommodation is 'background plus 5dBA assessment'. Although not specifically applicable to residential noise sources, this aligns with the INP 'Intrusive' criteria.

It is argued that adopting the 'background plus 5dBA assessment' is unnecessarily restrictive when compared to the guidelines in the Noise Guidelines for Local Governments (NGLG) for officers to assess this requirement.

On the basis however of community sensitivity to the Camp Cove residences, assessment is made to the 'background plus 5dBA assessment' criteria, but noting that minor non-compliances do not demonstrate the intent of the DCP is not met. In accordance with the INP it is assumed that the background measure is the RBL and the assessment parameter is the average L_{Aeq} .

5.4 Road Noise Policy (RNP)

The noise level criteria for increased traffic flow as a result of land-use development with the potential to create additional traffic are set by the EPA's *Road Noise Policy (RNP)*. Table 16 presents the traffic noise criteria for this development.

Table 16: Road Traffic Noise Criteria

Type of Development	Criteria	
	Day 0700-2200hrs	Night 2200-0700hrs
Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{eq(15hr)}$ 60dBA (external)	$L_{eq(9hr)}$ 55dBA (external)
Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{eq(1hr)}$ 55dBA (external)	$L_{eq(1hr)}$ 50dBA (external)

Source: Table3 EPA – RNP

In addition to the above criteria, Section 3.4 of the RNP notes that *"an increase of up to 2dB represents a minor impact that is considered barely perceptible to the average person"* and that *"for existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2dB above that of the corresponding 'no build option'".*

Additional traffic to Watson Bay is expected during functions in the Officers Mess and Armoury buildings. An assessment to the RNP considers the impact of additional traffic from land use developments. The Officers Mess and Armoury although currently vacant, were previously operated as function centres with associated traffic flows. For the purposes of this assessment, traffic from the operation of the function centres is conservatively considered as additional to the condition of no traffic flow to the Armoury and Officers Mess buildings.

As single building short-stay accommodation, traffic impacts from Green Point Cottage, 33 Cliff Street, Constables Cottage and Gap Bluff Cottage are considered negligible and therefore not assessed further.

5.5 Guidance for Sleep Disturbance

Noise from site activity during the night period has the potential to cause sleep disturbance for the nearby residents.

The NSW EPA does not currently provide any criteria to assess sleep disturbance. Some discussion of the issue is given in the *Noise Guide for Local Government (NGLG)* and the EPA's most recent summary of research available is given in the *NSW Road Noise Policy (RNP)*.

In the *Noise Guide for Local Government (NGLG)*, the EPA provides the following criteria as an example of a 'screening test' to determine the potential for sleep arousal:

- The L_{A1} level of any specific noise source should not exceed the background noise level (L_{A90}) by more than 15dB when measured outside a bedroom window.

L_{A1} is defined as the A-weighted noise level that is exceeded for 1% of the measurement time and is similar to, but numerically lower than L_{Amax} . The EPA has stated that it will accept analysis based on either L_{A1} or L_{Amax} descriptors.

For the Gap Bluff Precinct site the 'screening test' for sleep disturbance becomes 48dB L_{Amax} at nearby residences.

In the INP application notes (last updated 12 June 2013), the EPA has recognised that the above criteria are "not ideal". However, the EPA "will continue to use it as a guide to identify the likelihood of sleep disturbance. This means that where the criterion is met, sleep disturbance is not likely, but where it is not, a more detailed analysis is required."

The EPA recommends that detailed analysis is carried out to address the extent to which sleep disturbance may occur. The use of the RNP by the EPA is recommended to review the extent of possible impacts.

The RNP suggests that potential sleep arousal from traffic should be assessed. The RNP has compared a number of sleep disturbance criteria and concluded the following:

- *Maximum internal noise levels below 50-55dB L_{Amax} are unlikely to cause awakening reactions*
- *One or two noise events per night, with maximum internal noise levels of 65-70dB L_{Amax} are not likely to affect health and wellbeing significantly.*

Based on these findings, a noise level of 60-65dB L_{Amax} outside an open bedroom window would be unlikely to cause awakening reactions (assuming that the facade of the residential building provides 10dB attenuation, which would be typical of a facade with partially open windows). Furthermore, one or two events with a noise level of 75-80dB L_{Amax} outside an open bedroom window would be unlikely to affect health and well-being significantly.

In assessing sleep arousal assessment should consider any activity that has the potential to cause complaint including the combination of;

- Patron and music noise in function centres
- Vehicle activity in the carpark and travel on private roads within the Gap Bluff Precinct
- Plant and equipment

5.6 Summary of Applicable Criteria

5.6.1 Gap Bluff Precinct

Limiting site noise emission criteria for the Gap Bluff Precinct are listed in Table 17.

Table 17: Summary of applicable noise criteria, Gap Bluff precinct

Time of Day	Period	Application	Policy / Regulation	Criteria
Day	0700 ⁴ – 1800hrs	• Vehicle & carpark activity within the precinct	INP	45.5 L _{Aeq,15min}
		• Building plant & equipment		
		• Functions (Patrons and Music)	L&GNSW	45.5 L _{A10, 15min} ⁵
Evening	1800-2200hrs	• Vehicle & carpark activity within the precinct	INP	44.5 L _{Aeq,15 min}
		• Building plant & equipment		
		• Functions (Patrons and Music)	L&GNSW	44.5 L _{A10, 15min} ⁴
Night	2200-0000hrs	• Vehicle & carpark activity within the precinct	INP	38 L _{Aeq,15min}
		• Building plant & equipment		
		• Functions (Patrons and Music)	L&GNSW	35.5 L _{A10, 15min} ⁴

Table 18: L&GNSW Criteria, Gap Bluff precinct

Period	Time	L ₁₀ Sound Pressure Levels									Overall, dBA L ₁₀
		Centre Frequency Octave Band, Hz									
		31.5	63	125	250	500	1k	2k	4k	8k	
Day	10:00am – 6:00pm	58.5	58.0	50.5	43.5	42.0	39.5	37.0	35.0	30.0	45.5
Evening	6:00pm - 10:00pm	56.5	56.0	50.0	44.0	41.5	39.0	35.0	33.5	28.0	44.5
Night	10:00pm–12:00am	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5	35.5

RNP criteria are applied separately on assessment of vehicle traffic on public roads associated with the use of function centres.

5.6.2 Camp Cove Precinct

Limiting site noise emission criteria for the Camp Cove Precinct are listed in Table 19.

Table 19: Summary of Applicable Noise Criteria, Camp Cove Precinct

Time of Day	Period	Application	Policy / Regulation	Criteria
Day	0700 – 1800hrs	• Air-conditioning plant	NSW INP	45.5 L _{Aeq,15min}
		• Occupants	Woollahra DCP	45.5 L _{Aeq, 15min}
Evening	1800-2200hrs	• Air-conditioning plant	NSW INP	43 L _{Aeq,15 min}
		• Occupants	L&GNSW	43 L _{Aeq, 15min}
Night	2200-0000hrs	• Air-conditioning plant	PoEO	Inaudible
		• Occupants	HRIA Code of Conduct	– ¹

Note 1: Guests must not create offensive noise between 10pm-8am

⁴ 0800 on Sundays

⁵ Compliance is required to the overall dBA value and individual octave bands as identified in Table 18

6.0 ASSESSMENT

6.1 OVERVIEW

The following outlines the assessment conducted for;

- Gap Bluff precinct
- Camp Cove precinct

6.1.1 Gap Bluff Precinct

The assessment considers the following;

- Noise emission from functions in the Armoury and Officers Mess Buildings, and outdoor events in the Officers Mess courtyard associated with an indoor function in the Officers Mess ground level reception
- On-site vehicle movements and carpark activities associated with functions in the Armoury and Officers Mess buildings
- Traffic increases on public roads associated with use of the function centres

The Officers Mess ground floor theatre will be used for seminar presentations and lecture style events. As limited to speech and presentations only with no amplified music, noise emission will be largely contained within the building envelope. On the basis of the distance to nearest receivers, no further assessment is deemed to be required.

As Gap Bluff Cottage is in the order of 100m from the nearest noise sensitive receiver, no further assessment is deemed necessary for noise breakout.

6.1.2 Camp Cove Precinct, including Green Point Cottage

Noise breakout from short stay accommodation in the Camp Cove is divided into the following;

- Noise from occupants from the normal use of the accommodation; and
- Noise from air-conditioning plant

As the air-conditioning plant is yet to be designed, assessment is not possible. Applicable noise criteria for air-conditioning plant are defined in Section 7.2.2.

6.2 Modelling assumptions for the Gap Bluff precinct function areas

6.2.1 Noise Propagation

MDA have used 3D acoustic modelling software to predict noise levels from function activities to identified nearby noise sensitive receivers. The predictions incorporate the assumptions and recommended noise controls outlined within this report.

To predict the noise impact of the subject site on adjacent residential areas, the following items have been considered:

- The amount of noise being generated by the music and patron noise sources, expressed in terms of the indoor noise level
- Transmission loss performance of building elements
- The distance between the sources and receivers
- The presence of obstacles such as buildings, screens or barriers in the propagation path
- The hardness of the ground between the source and receiver

- Absorption of sound by the air over long distances
- Meteorological influences such as wind or temperature gradients

A 3-dimensional computer model has been created in the environmental noise modelling program, *SoundPlan V7.4*, which utilises the methodology defined in International Standard *ISO 9613-2: 1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* (ISO 9613).

With regard to calculation conditions, ISO 9613 states that:

“The method predicts the equivalent continuous A-weighted sound pressure level under meteorological conditions favourable to propagation from sources of known sound emission.”

The conditions used by the standard that are favourable to sound propagation are as follows:

- wind blowing from source to receiver within an angle of $\pm 45^\circ$ of the direction connecting the dominant sound source to the specified receiver region
- wind speed between 1m/s and 5m/s.

This environmental noise prediction method is an internationally recognised standard that has been used extensively throughout Australia, New Zealand, and Europe since its publication in 1996. This model is considered to provide a suitable methodology for the purposes of predicting environmental noise levels from industry and other sources and has been adopted for this assessment.

Ground topography is modelled with ground contour data to 1m fidelity, sourced from site surveys in the vicinity of Gap Bluff Precinct buildings and LiDAR ground contour data procured from the NSW Spatial Data Catalogue.

6.2.2 Model Inputs

Table 20 summarises model inputs for the assessment.

Table 20: SoundPlan model inputs

Parameter	Model Input
Ground Effect (A_{gr});	<p>As per ISO 9613-2:1996 terminology, the absorption coefficient (G) ranges from 0 (absorptive) to 1 (hard ground, reflective)</p> <p>G = 0.6 (moderate) for vegetated areas in the Gap Bluff precinct</p>
Screening (A_{bar})	<p>The SoundPlan Digital Ground Model has been created from LiDAR profile data sourced from NSW Government Land & Property data. Ground profiles have a 1m height fidelity. The SoundPlan model is shown in Figure 6.</p> <p>Only screening resulting from the ground profile is taken into account in the SoundPlan model. Direct screening from vegetation is conservatively considered negligible. Losses from the vegetation are only considered as a ground effect as per noted above.</p> <p>Screening at the receiver from adjacent residences is conservatively excluded in the model via the modelling of separate scenarios with potentially screening residences omitted.</p>
Meteorological Correction (C_{met})	<p>The Watson Bay site is subject to regular winds from the north-east that have the potential to affect noise levels at receivers. Site wind conditions are reviewed in Appendix D.</p> <p>For the purposes of the assessment, modelling has been conducted on the basis of favourable conditions for sound propagation as per identified in Section 6.2.1. A sensitivity analysis is conducted of predicted noise levels with unfavourable wind conditions in Section 7.1.1.</p>
Receivers	<p>The assessment considers receivers as identified in Figure 2 and Table 1.</p> <p>The selection considers receivers immediately adjacent to the Gap Bluff Precinct across Cliff Street that may be shielded by the ground topography. The selection also considers distant receivers that do not benefit from shielding by the ground topography</p>

Figure 6 shows the SoundPlan model ground terrain imported for the assessment.

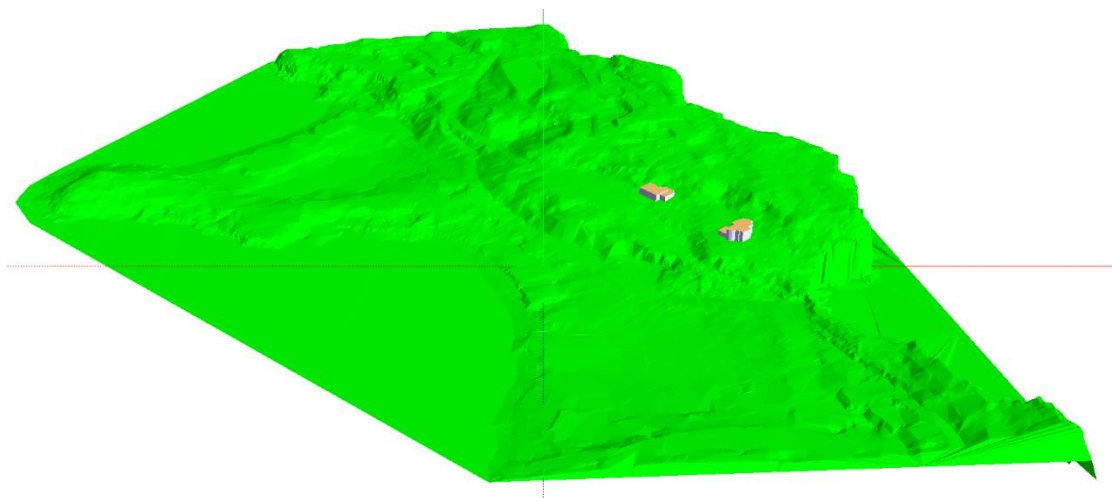


Figure 6: SoundPlan model ground contours

6.2.3 Function Source Noise Levels

Indoor Functions in the Armoury Building & Officers Mess Ground Level Reception

The following two scenarios are considered for functions in the Armoury Building and Officers Mess Ground Level Reception;

- Function with music (e.g. for a wedding reception with a DJ playing music)
- Function with either no music or limited ambient background music not sufficient to disturb normal conversation in the venue (e.g. for a corporate luncheon event)

Gap Bluff Hospitality have advised that for function events, music noise levels in the Officers Mess ground level reception and Armoury Building are to be electronically noise limited to the sign-posted historical plaque noise limit in the Armoury Building of 85dBA. For the purposes of this assessment, it is assumed that the limit of 85 dB(A) is an L_{eq} measure.

On the basis that sound systems may be brought in for functions, to ensure that nominated noise level limits will be maintained an internal noise limiter will need to be installed, only accessible to Gap Bluff Hospitality staff.

We offer the following comments as to the suitability of the nominated noise limits;

- Nominated noise level limits are below noise levels that have been measured in wedding venues without consideration for noise control.
- Previous acoustic testing has been carried out by MDA in various licensed and music venues, with results shown in Table 21. As is shown levels are marginally below measurements taken for moderate amplified music in a bar.
- Overall the limits will be limiting for events where loud unrestricted music is expected. However limits are fit-for-purpose for a wedding venue.

Table 21: Typical internal music noise levels

Description	L_{Aeq} dB	L_{10} dB
Typical upper levels in live "heavy" rock band/nightclub	107	112
Typical average levels in live "heavy" rock band/nightclub	98	103
Wedding band (loud)	94	99
Amplified music in bar (moderate)	87	92
3 piece jazz band (up tempo loud song)	89	94
3 piece jazz band (ballad – low)	80	85

For the purposes of this assessment internal music noise levels are modelled at 85 dB L_{Aeq} , equating to an overall 90 dB L_{A10} level. For consistency, the assumed spectral content as detailed in the PKA assessment is adopted, modified for the overall noise level limit. The assumed music spectrum agrees with other measurements conducted by MDA for similar functions. The octave band spectral content for amplified music presented in the PKA assessment includes a substantive low-frequency component. This is typical of a hall function event, and is considered appropriate for the intended use.

Internal noise levels from patrons have been predicted based on consideration of the number of talking patrons, expected voice level effort and internal room finishes. The following has been assumed for the assessment;

- Venues are at full capacity in the cocktail event configuration.
- On average up to 1 in 3 of patrons will be talking in a loud voice at any time. A loud voice is assumed to be required to be intelligible to immediately adjacent patrons above the ambient room noise level.
- Overall noise levels for a loud voice and spectral content are derived from the Handbook of Noise Control, Harris & Crede and ANSI 53.5-1997 'Methods for Calculation of the Speech Intelligibility Index'.
- Retention of predominately hard internal finishes in the Officer Mess building in accordance with heritage considerations. Armoury building to have predominately hard internal ceiling and floor finishes.
- Background music will be limited to the order of 60-65dBA with a limited low-frequency bass component, excluding music intended as a feature or for dancing. At full capacity, the background music will not be typically audible and not raise the overall reverberant level in the room.

Overall noise levels from music, patrons and the combination of both patrons and music are shown in Table 22. Consistent with previous MDA measurements, the music dominates the internal noise level when combined with the patrons. Higher patron levels are calculated for the Armoury as a result of the higher capacity, offset by the larger room volume.

Table 22: Modelled function noise levels, Armoury and Ground Level Officers Mess

Location, Source	Measure	Octave Band Centre Frequency (Hz)										Overall
		31.5	63	125	250	500	1k	2k	4k	8k	dBA	
Armoury & Ground level Officers Mess, music only	L ₁₀	58	90	94	86	86	88	79	72	63	90	
Armoury, patrons only	L ₁₀	-*	75*	81	80	84	81	79	79	77	87	
Ground level Officers Mess, patrons only	L ₁₀	-*	73*	79	78	81	79	77	77	75	85	
Armoury, patrons and music	L ₁₀	58	90	94	87	88	89	82	80	77	92	
Ground level Officers Mess, patrons and music	L ₁₀	58	90	94	87	87	89	81	78	75	91	

* Conservatively estimated at 63Hz, no substantive component expected at 31.5Hz

Indoor Functions in the 1st Level Officers Mess Reception Rooms

Gap Bluff Hospitality have advised music to function rooms will be from small portable playback units. Therefore overall noise levels for functions in the 1st floor reception rooms will be comparatively lower than the ground level Officers Mess reception.

With a capacity of 20 and 30 respectively, function rooms will be used for smaller corporate events, intimate gatherings and smaller celebrations where music is not a primary consideration.

The following assumptions are made for predicting internal noise levels;

- On the basis that an ease of conversation between patrons is prioritised, background music noise levels are expected to up to 80 L_{Aeq} / 90 L_{A10} without a substantive low-frequency component, typical of a portable unit.

- Venues are at full capacity in the cocktail event configuration.
- On average up to 1 in 3 of patrons will be talking in a loud voice at any time. A loud voice is assumed to be required to be intelligible to immediately adjacent patrons above the ambient room noise level.
- Overall noise levels for a loud voice and spectral content are derived from the Handbook of Noise Control, Harris & Crede and ANSI 53.5-1997 'Methods for Calculation of the Speech Intelligibility Index'.
- Retention of predominately hard internal finishes in the Officer Mess building in accordance with heritage considerations.

Table 23: Modelled function noise levels, 1st Level Officers Mess

Location, Source	Measure	Octave Band Centre Frequency (Hz)										Overall
		31.5	63	125	250	500	1k	2k	4k	8k		dBA
Officers Mess, 1 st floor function rooms 1 & 2, music	L ₁₀	53	75	84	81	81	83	74	67	58		85
Officers Mess, 1 st floor function rooms 1 & 2, patrons only	L ₁₀	-	73	79	78	82	79	77	78	75		85
Officers Mess, 1 st floor function rooms 1 & 2, music & patrons	L ₁₀	53	77	85	83	84	85	79	78	75		88

Outdoor Ceremony, Officers Mess Grounds

The following assumptions were made in modelling the noise emission from outdoor ceremonies proposed in the grassed area adjacent to the existing fountain, immediately in-front of the Officers Mess building;

- The capacity of the outdoor ceremony is up to 80 people, matching the maximum event layout for the ground level function room.
- On average up to 1 in 3 of patrons will be talking in a raised voice at any time. The modelled patron voice level is shown in Table 24. Overall noise levels for a loud voice and spectral content are derived from the Handbook of Noise Control, Harris & Crede, consistent with values used in the PKA assessment. Patrons are assumed to not be facing any particular direction. The correction for a random speaker direction is shown in Table 25 (source: AAAC Draft Licensed premises guidelines 2016).
- No loud amplified music to be played in the outdoor area. Background music will be limited to the order of 60-65dBA with a limited low-frequency bass component.

Table 24: Patron voice level efforts, raised voice

Location, Source	Measure	Octave Band Centre Frequency (Hz)										Overall
		31.5	63	125	250	500	1k	2k	4k	8k		dBA
Outdoor patrons, log average male and female with background music	L ₁₀ @ 1m in front	-*	52*	58	64	67	64	60	55	50		68

* Conservatively estimated at 63Hz, no substantive component expected at 31.5Hz

Table 25: Correction for random directionality

Location, Source	Octave Band Centre Frequency (Hz)								
	31.5	63	125	250	500	1k	2k	4k	8k
Correction for directionality	-	-	-1	-2	-2	-2	-4	-4	-5

6.2.4 Armoury Building Constructions

Table 26 lists the proposed construction for critical building elements and the modelled Transmission Loss (TL) performance of each of the elements. Refer to the Architectural drawings for details of the proposed constructions.

The retained building envelope to the reception is a double brick cavity construction.

Table 26: Modelled construction, Armoury building

Building Element	Proposed Construction	Overall TL Performance, R_w	Comment
Balcony awning windows, south-west, north-west & south-east	Openable acoustic rated awning windows with 12.5mm VLam hush single glazing	37	<ul style="list-style-type: none"> The performance requirement applies to the awning window system (including frame and seals) Openable area for awning windows approximately 28m²
External terrace external walls, south-east	<ul style="list-style-type: none"> 2x16mm fire-rated plasterboard layers (min. 12.3 kg/m² per sheet) Structural stud (order 150mm, subject to structural requirements) with 75mm thick infill insulation Minimum 15mm thick Compressed Fibre Cement (CFC) sheeting 	54	<ul style="list-style-type: none"> Internal layer mounted on resilient furring channels External CFC sheet
High level perimeter glazing, all sides	Fixed deep cavity double glazed units; <ul style="list-style-type: none"> 12.38mm laminated glass Minimum 100mm air-gap 10.38mm laminated glazing 	45	<ul style="list-style-type: none"> Acoustic rated frame to achieve the target transmission loss performance
Rear reception external windows, north-east	Fixed deep cavity double glazed units; <ul style="list-style-type: none"> 12.38mm laminated glass Minimum 100mm air-gap 10.38mm laminated glazing 	45	<ul style="list-style-type: none"> Replacement of existing windows Acoustic rated frame to achieve the target transmission loss performance
External terrace and main building roof	Minimum 150mm thick concrete slab	50	<ul style="list-style-type: none"> Services penetrations to be acoustically sealed No acoustic requirements for the internal ceiling

Building Element	Proposed Construction	Overall TL Performance, R_w	Comment
External terrace entrance, Main reception entrance	Sound lock arrangement consisting of two sets of acoustic rated doors (R_w 30 performance per door set)	30	<ul style="list-style-type: none"> For assessment assume one door will be open Management controls to ensure doors are not propped open and doors open sequentially for passage

To achieve the required low-frequency performance for the external terrace and main building roof a concrete slab construction is proposed.

The air-conditioning system will include outside air ventilation provisions allowing nominated windows to be closed during peak capacity events. Ventilation and exhaust air paths to be acoustically controlled sufficient to not contribute to the overall noise emission from the closed building envelope.

6.2.5 Officers Mess Building Construction

Table 27 lists the proposed construction for critical building elements and the modelled transmission loss performance. Refer to the Architectural drawings for details of the proposed constructions.

The retained building envelope is understood to be a rendered double brick construction. The south-east entrance door to the main foyer is to be retained with new internal doors to reception areas.

Table 27: Modelled construction, Officers Mess building

Building Element	Proposed Construction	Overall TL Performance, R_w	Comment
All ground and 1 st level windows to reception rooms Ground - curved south-west, south and west 1 st floor - curved south-west, south and west to Reception Room 1 and south-west and north-west to Reception Room 2	<ul style="list-style-type: none"> Either retain existing external heritage windows (estimated to be 4mm) or replace glass with 6mm standard glass Approximately 100mm air-gap New 10.38mm laminated glass integrated to the existing window opening 	45	Estimated performance based on previous site measurements of similar glazing system
Enclosed reception / verandah windows (all), south-west, north-west and north-east	<ul style="list-style-type: none"> Replace existing glass panes with 6.38mm laminated glass Approximately 50-70mm air-gap (to be accommodated in the existing window opening) New glazing frame integrated to the existing window opening, minimum 10.38mm laminated glass 	45	Estimated performance based on previous site measurements of similar glazing system
Enclosed reception / verandah entrance door	Sound lock arrangement consisting of two sets of acoustic rated doors (R_w 30 performance)	30	Overall minimum performance of the sound lock with at least one door closed
South-west entrance door	<ul style="list-style-type: none"> Sound lock arrangement Existing entrance door and internal sound lock doors to be fitted without acoustic perimeter seals 	30	Overall minimum performance of the soundlock with at least one door closed
Ground level reception and enclosed verandah roof, First floor reception rooms roof	Retention of existing heritage plasterboard ceiling <ul style="list-style-type: none"> Internal 100mm thick infill insulation to the ceiling cavity Minimum 9mm fibre-cement sheet New metal deck roof 	52	Cavity depth between existing heritage ceiling and fibre-cement layer to be minimum 200mm.

In addition, the internal design includes the following;

- two sets of non-acoustic rated doors between the reception area to the kitchen, and
- two sets of non-acoustic rated doors from the reception to the eastern foyer entrance

The air-conditioning system will include outside air ventilation provisions allowing nominated windows to be closed during peak capacity events. Ventilation and exhaust air paths to be acoustically controlled sufficient to not contribute to the overall noise emission from the closed building envelope.

6.2.6 Traffic and Carpark Activity

Noise emission from vehicle and carpark activity within the Gap Bluff precinct has been modelled in SoundPlan to account for the variation in ground topography and distance to the receivers.

Traffic direction is modelled as per outlined in Section 3.1.5 with 'pick-up' traffic assumed to entry via the Lighthouse Road entrance.

Traffic and car park activity will be directly related to the time of functions either in the Armoury, ground level reception of the Officers Mess or to one of the two first level reception rooms. As it is possible that all of the events may start and finish at the same time, assessment conservatively assumes that they do.

The following assumptions are made for vehicle movements for pre- and post- function traffic;

- Prior to functions, nominated traffic volumes for vehicles parking and 'dropping-off' are all within a half hour period.
- Post functions, nominated traffic volumes for parked vehicles exiting and 'picking-up' are all within a half hour period. Staff vehicles exiting the site follow the egress of patrons.
- One mini-bus / coaster per 15 minute period during the peak traffic prior to and post a function event

As noted in the traffic management plan vehicles will be signposted to 10 km/hr on Gap Bluff Road with speed humps to assist in enforcing the slow speed environment. Modelled noise levels for vehicles are shown in Table 28 based on previous MDA vehicle measurements.

Table 28: Modelled vehicle sound power levels, dB

Source	Octave Band Centre Frequency (Hz)								Overall, dBA
	63	125	250	500	1k	2k	4k	8k	
Vehicle	90	83	78	78	77	75	71	70	82
Mini- bus / Coaster	94	98	93	92	88	94	78	71	97

The traffic report identified that vehicles attending function have on average 3 passengers. To account for noise from patrons exiting and exiting vehicles the following is assumed for each vehicle;

- On arrival and parking, 3 door slam events
- Exiting the site, 3 door slam events and a vehicle start-up

The following sound power levels have been modelled;

- Car door slam: 94 dBA
- Vehicle start-up: 91 dBA

6.2.7 Road Noise Policy Assessment

Increased local traffic as a result of a function will be immediately prior and following the event. Previously the Armoury and Officers Mess were used as function centres with similar capacity to the

proposed usage. For the purposes of the assessment however any traffic associated with the function centres is defined as increased traffic.

Prior to a function arriving traffic will be directed to the Lighthouse Road entry, exiting vehicles will be the southern exit of Gap Bluff Road to Military Road. As noted in Section 3.1.5, the majority of traffic will park on-site, however pre-function and post-function will include some drop-off and pick-up traffic respectively as well. Local traffic increases both pre and post event therefore will be to Cliff Street and Military Road.

For the purposes of the assessment, roads are classified according the Road Noise Policy guidance as;

- Cliff Street – local road, providing vehicle access to abutting properties
- Military Road – sub-arterial road, supporting non-local traffic to the Watsons Bay Wharf, hotel and restaurant venues

The Traffic Impact Assessment report includes details of a traffic survey conducted on Cliff Street just south of the roundabout intersection of Cliff Street and Short Street, reproduced in Figure 7. The Traffic Impact Assessment Report notes that traffic on Cliff Street north of the roundabout (i.e. to Lighthouse Road) is expected to be half of that shown in Figure 7.

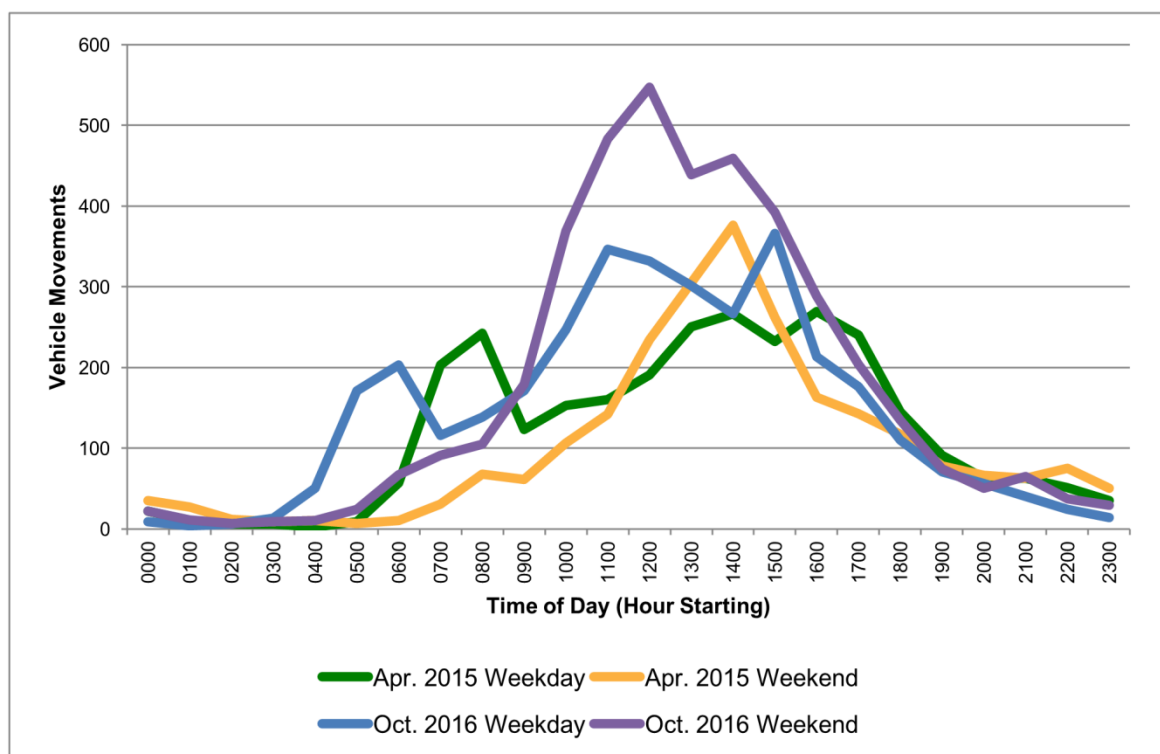


Figure 7: Traffic survey, Cliff Street (combined both directions)

The following assumptions are made for the Road Noise Policy assessment;

- Functions can start up to 8pm. On this basis, the worst-case period is defined as being from 7pm to 8pm when the existing vehicle traffic is the lowest (as shown in Figure 7).
- Exit from a function is assumed to be in the 11pm to midnight period.
- Vehicles on Cliff Street are modelled at 40kph as per reported as the 85th percentile average traffic speed of 39kph as reported in the Traffic Impact Assessment Report.

All vehicles are assumed to arrive in a half hour period immediately before the function. Similarly, all vehicles are assumed to exit in a half hour period following the function.

6.2.8 Sleep Arousal Assessment

The potentially loudest Night time event is assessed to the Sleep Arousal criteria, regardless of the source. Activities in the Gap Bluff precinct during the night period include;

- Noise breakout from functions,
- Vehicle movements, and
- Carpark activity, including door slams and vehicle start-ups

As part of the Gap Bluff Hospitality function management procedures, guests will be informed of the need to limit the disturbance to nearby residences and staff will be trained to control rowdy patron behaviour. On this basis noise from patrons leaving the venue to vehicles is not expected to contribute to noise levels audible at the nominated receivers.

Noise from activities with the Armoury and Officers Mess Buildings, when upgraded and operated in accordance with the recommendations in this report are not expected to generate noise levels that would exceed sleep Arousal Criteria.

In assessing sleep arousal, the following worst case-assumptions are made;

- Simultaneous door slam and vehicle start-up in each of the car parks
- Vehicles exiting the site, spacing of 20m between vehicles

6.3 Predicted noise levels from functions in the Gap Bluff precinct

The following outlines predicted noise levels at nominated receiver locations from functions in the Gap Bluff Precinct.

6.3.1 Representative Receiver Locations

The SoundPlan model covers all potentially impacted receivers in the Watsons Bay area. The model includes receivers immediately to the west on Cliff Street and receivers further away on Cliff Street, Pacific Street and Cove Street, that although further away, have less shielding from ground topography.

Assessment to the HMAS Watson Base is to the accommodation barracks on the southern edge of the HMAS Watson site.

Ranking the predicted levels at receivers, the following locations are identified as potentially the most affected receiver locations;

- 2, 5-7, 11, 15 Cliff Street
- Watsons Bay Hotel
- HMAS Watson barracks
- 27 Military Rd
- 1 Short Street
- 6 Pacific Street

Receivers are shown in Appendix F.

6.3.2 Modelled Scenarios

Modelled operating scenarios are shown in Table 29. The intent is for awning windows to the outdoor balcony in the Armoury building to be open where the noise breakout is acceptable. Scenarios are therefore identified for having awning windows open when music levels are restricted to background level only.

Table 29: Modelled scenarios

	Modelled Noise Sources		Comment
	Armoury	Officers Mess	
1 – Functions with music in all rooms	<ul style="list-style-type: none"> Function with music Awning windows closed 	<ul style="list-style-type: none"> Functions with music in all rooms – windows closed 	Typical worst-case night function, e.g. weddings
2 – Indoor functions and outdoor ceremony	<ul style="list-style-type: none"> Function with music Awning windows closed 	<ul style="list-style-type: none"> Functions with music in 1st level reception rooms – windows closed Outdoor ceremony, no activity in the indoor function room 	Outdoor ceremonies only during the Day period
3 – Indoor functions (limited music in the armoury) and outdoor ceremony	<ul style="list-style-type: none"> Function with limited background music only Awning windows open 	<ul style="list-style-type: none"> Functions with music in 1st level reception rooms – windows closed Outdoor ceremony, no activity in the indoor function room 	Outdoor ceremonies only during the Day period
4 – Indoor functions with limited music in the Armoury, music in the Officers Mess	<ul style="list-style-type: none"> Function with limited background music only Awning windows open 	<ul style="list-style-type: none"> Functions with music in all rooms – windows closed 	Typical worst-case night
5 – Indoor functions with limited music in both the Armoury and Officers Mess buildings	<ul style="list-style-type: none"> Function with limited background music only Awning windows open 	<ul style="list-style-type: none"> Ground level function with limited background music only – windows closed Functions with music in 1st level reception rooms – windows closed 	Worst-case night-time corporate style events

6.3.3 Predicted Levels from Functions

Predicted levels at nominated receiver locations for the modelled scenarios are shown in Table 30.

Table 30: Predicted level at receiver, functions, L_{10,15minutes}

Operating Condition	Nominated Receiver Location	Overall, dBA	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
1 – Functions with music in all rooms – all windows closed	2 Cliff Street	22	*	41	32	18	15	17	<10	<10	<10
	5-7 Cliff Street	19	*	39	31	16	12	12	<10	<10	<10
	Watsons Bay Hotel	21	*	39	31	18	15	17	<10	<10	<10
	HMAS Watson	21	*	38	30	17	15	17	<10	<10	<10
	27 Military Rd	16	*	34	26	13	10	12	<10	<10	<10
	11 Cliff Street	17	*	37	28	15	11	11	<10	<10	<10
	15 Cliff Street	14	*	34	25	12	<10	<10	<10	<10	<10
	1 Short Street	15	*	36	26	12	<10	<10	<10	<10	<10
	6 Pacific Street	14	*	32	25	11	<10	<10	<10	<10	<10
2 – Indoor functions - all windows closed and outdoor ceremony	2 Cliff Street	34	*	36	34	31	33	29	23	20	<10
	5-7 Cliff Street	30	*	33	31	27	29	26	20	17	<10
	Watsons Bay Hotel	34	*	34	33	31	33	29	24	21	<10
	HMAS Watson	31	*	34	30	24	30	27	20	15	<10
	27 Military Rd	31	*	32	31	29	30	27	21	17	<10
	11 Cliff Street	28	*	33	29	25	27	23	17	11	<10
	15 Cliff Street	23	*	30	27	22	23	18	10	<10	<10
	1 Short Street	24	*	31	28	22	23	19	12	<10	<10
	6 Pacific Street	24	*	28	25	21	23	19	12	<10	<10
3 – Indoor functions (limited music in the armoury) and outdoor ceremony, windows open Armoury only	2 Cliff Street	42	*	34	36	35	39	36	34	33	22
	5-7 Cliff Street	40	*	34	36	34	38	35	31	28	16
	Watsons Bay Hotel	42	*	33	35	34	39	38	35	32	18
	HMAS Watson	34	*	31	32	30	33	29	24	20	<10
	27 Military Rd	35	*	32	32	31	34	31	26	21	<10
	11 Cliff Street	38	*	32	33	33	36	33	30	27	11
	15 Cliff Street	34	*	29	30	29	33	30	26	21	<10
	1 Short Street	34	*	31	32	30	33	30	25	19	<10
	6 Pacific Street	35	*	26	28	27	33	31	28	21	<10

Operating Condition	Nominated Receiver Location	Overall, dBA	Octave Band Centre Frequency (Hz)								
			31.5	63	125	250	500	1k	2k	4k	8k
4 – Indoor functions with limited music in the Armoury, music in the Officers Mess, windows open Armoury only	2 Cliff Street	41	*	39	35	33	38	36	34	33	21
	5-7 Cliff Street	39	*	38	35	33	37	34	31	28	15
	Watsons Bay Hotel	42	*	39	34	32	38	38	35	32	17
	HMAS Watson	31	*	37	32	27	30	26	22	19	<10
	27 Military Rd	33	*	32	28	26	30	28	26	22	<10
	11 Cliff Street	38	*	36	33	32	36	33	30	26	11
	15 Cliff Street	34	*	33	30	28	33	30	26	21	<10
	1 Short Street	34	*	35	31	29	33	29	25	19	<10
	6 Pacific Street	35	*	31	28	26	32	31	28	21	<10
5 – Indoor functions with limited music in both the Armoury, and Officers Mess buildings, windows open Armoury only	2 Cliff Street	41	*	32	34	33	38	36	34	33	21
	5-7 Cliff Street	39	*	33	35	33	37	34	31	28	15
	Watsons Bay Hotel	42	*	31	33	32	38	38	35	32	17
	HMAS Watson	31	*	30	30	27	30	26	22	19	<10
	27 Military Rd	33	*	26	27	26	30	28	26	22	<10
	11 Cliff Street	38	*	31	33	32	36	33	30	26	11
	15 Cliff Street	34	*	28	29	28	33	30	26	21	<10
	1 Short Street	34	*	29	31	29	33	29	25	19	<10
	6 Pacific Street	35	*	24	27	26	32	31	28	21	<10
L&GNSW Compliance Limit	Day: 0700 ⁶ – 1800hrs	45.5	58.5	58.0	50.5	43.5	42.0	39.5	37.0	35.0	30.0
	Evening: 1800-2200hrs	44.5	56.5	56.0	50.0	44.0	41.5	39.0	35.0	33.5	28.0
	Night: 2200-0000hrs	35.5	44.5	40.5	36.5	33.5	32.5	30.5	26.5	25.5	18.5

* No significant component expected

A summary of compliance with the project criteria for the Day (D), Evening (E) and Night (N) periods is shown in Table 31.

⁶ 0800 hours for Sundays and Public Holidays

Table 31: Compliance with project criteria for Day (D), Evening (E), Night (N)

Compliance with Project Criteria															
Nominated Receiver Location	1 – Functions with music in all rooms – all windows closed			2 – Indoor functions - all windows closed and outdoor ceremony			3 – Indoor functions (limited music in the armoury) and outdoor ceremony, windows open Armoury only			4 – Indoor functions with limited music in the Armoury, music in the Officers Mess, windows open Armoury only			5 – Indoor functions with limited music in both the Armoury, and Officers Mess buildings, windows open Armoury only		
	D	E	N	D	E	N	D	E	N	D	E	N	D	E	N
2 Cliff Street	✓	✓	✓	✓	-	-	✓	-	-	✓	✓	✗	✓	✓	✗
5-7 Cliff Street	✓	✓	✓	✓	-	-	✓	-	-	✓	✓	✗	✓	✓	✗
Watsons Bay Hotel	✓	✓	✓	✓	-	-	✓	-	-	✓	✓	✗	✓	✓	✗
HMAS Watson	✓	✓	✓	✓	-	-	✓	-	-	✓	✓	✓	✓	✓	✓
27 Military Rd	✓	✓	✓	✓	-	-	✓	-	-	✓	✓	✓	✓	✓	✓
11 Cliff Street	✓	✓	✓	✓	-	-	✓	-	-	✓	✓	✗	✓	✓	✗
15 Cliff Street	✓	✓	✓	✓	-	-	✓	-	-	✓	✓	✓	✓	✓	✓
1 Short Street	✓	✓	✓	✓	-	-	✓	-	-	✓	✓	✓	✓	✓	✓
6 Pacific Street	✓	✓	✓	✓	-	-	✓	-	-	✓	✓	✓	✓	✓	✓

Key: ✓ Complies ✗ Does not Comply - Not applicable to this scenario

6.3.4 Predicted Levels from Vehicle and Carpark Activity

The following scenarios are assessed for vehicle and carpark activity;

- Pre-event – Vehicles arriving and parking, as well as vehicles arriving, dropping-off attendees and leaving. As potentially occurring in the Day and Evening periods, assessed to the more stringent Evening criteria
- Post-event – Parked vehicles leaving the site, as well as vehicles arriving, picking-up attendees and leaving. As potentially occurring in the Day, Evening and Night periods, assessed to the more stringent Night criteria.

Overall predicted levels from vehicle and carpark activity and comparison to compliance criteria are shown in Table 32. Additional receivers are nominated to account for exposure from vehicles near the Lighthouse Road entry.

Table 32: Predicted level at receiver, vehicle and carpark movements, $L_{eq,15min}$

Operating Condition	Receiver	Overall, dBA	Compliance Target	Complies
Pre-Event	Watsons Bay Hotel	30	44.5	✓
	HMAS Watson	34	44.5	✓
	27 Military Rd	26	44.5	✓
	2 Cliff Street	30	44.5	✓
	5-7 Cliff Street	28	44.5	✓
	11 Cliff Street	30	44.5	✓
	15 Cliff Street	33	44.5	✓
	19 Cliff Street	31	44.5	✓
	24 Cliff Street	30	44.5	✓
	28 Cliff Street	27	44.5	✓
	1 Short Street	31	44.5	✓
	10 Victoria Street	25	44.5	✓
	6 Pacific Street	27	44.5	✓
	25 Pacific Street	24	44.5	✓
Post Event	Watsons Bay Hotel	32	38	✓
	HMAS Watson	35	38	✓
	27 Military Rd	29	38	✓
	2 Cliff Street	32	38	✓
	5-7 Cliff Street	29	38	✓
	11 Cliff Street	30	38	✓
	15 Cliff Street	30	38	✓
	19 Cliff Street	27	38	✓
	24 Cliff Street	26	38	✓
	28 Cliff Street	24	38	✓
	1 Short Street	30	38	✓
	10 Victoria Street	24	38	✓
	6 Pacific Street	26	38	✓
	25 Pacific Street	23	38	✓

6.3.5 Sleep Arousal Assessment

Predicted maximum noise levels at receivers for the Night-time period are shown in Table 33, assessed against the sleep arousal criteria, divided into noise from internal noise from functions and from vehicle traffic / carpark activity.

Table 33: Sleep arousal assessment, L_{Amax}

Receiver	Vehicle and Carpark Activity	Sleep Arousal Criteria, External	Compliance
Watsons Bay Hotel	47	< 60	✓
HMAS Watson	50	< 60	✓
27 Military Rd	45	< 60	✓
2 Cliff Street	48	< 60	✓
5-7 Cliff Street	45	< 60	✓
11 Cliff Street	46	< 60	✓
15 Cliff Street	47	< 60	✓
19 Cliff Street	46	< 60	✓
24 Cliff Street	45	< 60	✓
28 Cliff Street	42	< 60	✓
1 Short Street	46	< 60	✓
10 Victoria Street	41	< 60	✓
6 Pacific Street	42	< 60	✓
25 Pacific Street	40	< 60	✓

Key: ✓ Complies *Does not Comply - Not applicable to this scenario

6.4 Road Noise Policy Assessment

The Road Noise Policy assessment for residences on nominated roads is shown in Table 34. Predicted levels at the façade are shown for the most affected residents on the nominated streets. Due to the different existing traffic levels, separate assessment is conducted for Cliff Street north and south of the roundabout to the Short Street intersection respectively.

Table 34: Road Noise Policy assessment

Situation	Location	Additional Vehicle Traffic	Predicted Increase, dB (Period)		Overall at the closest façade, period	Meets RNP Noise Assessment Criteria
			Weekday	Weekend		
Prior to Function	Cliff Street, from Military Road to the roundabout	60	2	2.5	61	✗
	Cliff Street, roundabout to Lighthouse Road	60	4	4	59	✗
	Military Road	85	<2	<2	-	✓
Post-function	Cliff Street, from Military Road to the roundabout	25	2.5	2	58	✗
	Cliff Street, roundabout to Lighthouse Road	25	4	3	56	✗
	Military Road	85	<2	<2	-	✓

Key: ✓ Complies ✗ Does not Comply - Not applicable to this scenario

6.5 Camp Cove Short Stay Accommodation

A list of nearest noise sensitive receivers to Camp Cove accommodation is shown in Table 35.

Table 35: Nearest receivers to Camp Cove precinct buildings

Building	Nearest Noise Sensitive Receiver	Approximate Distance	Potential for Disturbance
33 Cliff Street	1 Victoria Street	20m	<ul style="list-style-type: none"> Gatherings on the outdoor deck Air-conditioning unit
Constables Cottage	1 Victoria Street	25m	<ul style="list-style-type: none"> Breakout from indoor activity Air-conditioning unit
Green Point Cottage	31 & 32 Pacific Street	40m	<ul style="list-style-type: none"> Occupants on the external deck Air-conditioning unit

Potential disturbance from short stay occupants is dependent on the behaviour of the short stay residences. In adopting the HRIA standard rental terms and conditions guests will be aware of their expected conduct and measures will be implemented to penalise disruptive behaviour.

On this basis noise emission is expected to be no more than from neighbouring residential properties. Nonetheless, noting the community sensitivity, an assessment has been conducted of the 33 Cliff Street premises to quantify the potential disturbance. Noise emission from the Constables Cottage is assumed to be negligible with no exposed outdoor deck area, not warranting an assessment. With the same number of bedrooms but more distant potential receivers, where compliance is demonstrated for the 33 Cliff Street premises, compliance is also demonstrated for Green Point Cottage.

The following conservative assumptions are made for the assessment;

- Maximum occupancy as per the HRIA guidelines of 2 persons per bedroom plus 2
- All congregating on outdoor deck areas up to 10pm (noting HRIA guidelines of not creating a disturbance after 10pm)
- On average, up to 1 in 3 of patrons will be talking in a raised voice at any time.
- No loss from shielding. The outdoor deck area has glass balustrades, however with a reflective underside to the outdoor deck the acoustic shielding is expected to be minimal.

The overall predicted level is shown in Table 36.

Table 36: Predicted level at nearest receiver

Assessment Condition		Value
Predicted level at 1 Victoria Street		41
Criteria	Day	44.5
	Evening	43.5
Compliance with Criteria	Day	✓
	Evening	✓

Key: ✓ Complies ✗ Does not Comply - Not applicable to this scenario

7.0 DISCUSSION AND RECOMMENDATIONS

The following section is a discussion of the assessment presented in Section 6.0, noting the implications of non-compliances and acoustic controls and / or management practices that will need to be enacted to ensure that predicted compliances will be achieved in operation.

7.1 Gap Bluff Precinct

7.1.1 Function Noise Breakout

Noise breakout from the Gap Bluff precinct function centres was considered for range of operational scenarios. Compliance is demonstrated for the following operations allowing for the acoustic upgrades and scenarios in Section 6.0 of this report:

- Functions with music in all rooms during Day, Evening and Night (up to midnight), all windows closed
- Outdoor ceremonies during the Day period
- Indoor functions in the Armoury building with limited music, windows open, outdoor ceremony, function in Officers Mess with windows closed, Day period only
- Indoor functions in the Armoury building with limited music, windows open, functions in Officers Mess with windows closed, Day and Evening periods only

The following operations are not compliant.

- Outdoor ceremonies during the Evening and Night periods
- Operation of the Armoury building with windows open during functions with full music level such as that during a wedding. More limited levels of music (e.g. background music) would permit the Armoury windows to be opened during the Day and Evening periods.

Corrections for the wind direction (refer to Appendix D for discussion) are calculated to be negligible for close receivers, up to +1.5 for more distant receivers. Overall compliance with the scenarios nominated in Table 30 and Table 31 are unchanged, indicating that where potential corrections for wind direction may apply the margin of compliance is sufficient.

Development of the noise control designs will need to consider the following;

- Electronic noise limiting system, locked to prevent access only to Gap Bluff Hospitality staff. The noise limiting system is to be calibrated during building works commissioning to ensure both the overall and octave band output is within the limits prescribed in Section 6.2.3.
- Development of the design to ensure the transmission loss performance of critical façade elements outlined in Section 6.2.4 and Section 6.2.5 for the Armoury and Officers Mess respectively are achieved in construction.
- Design of the building services system to ensure ventilation and exhaust openings do not limit the overall façade performance contributing to increased levels at receivers.

The following operational controls will need to be enacted to ensure compliance;

- Management controls to ensure windows are closed when hosting functions with music.
- Service vehicle, bottle and garbage collection to be limited to the Day period. Where it is required for the collection of bottles or rubbish during the Night period (e.g. after a function), collection must occur with all doors and windows closed. Disposal to outdoor bins must only occur in the Day period.
- Gap Bluff Hospitality staff to be trained to limit unruly and loud behaviour within the premises and in transit to transport at the cessation of events, notwithstanding training as required under Responsible Service of Alcohol Legislation.
- The Awning windows to the Armoury Building to be closed at all times after 10 pm. The Awning windows will also need to be closed during the daytime and evening hours during functions with music (see compliant scenarios above).
- All sound locks must be design and operated such that there at least one door set closed at any time during patron entry and exit.

7.1.2 Plant, Equipment and Vehicle Activity

Vehicle and carpark activity is shown to comply with the NSW INP criteria for the worst-case of all functions starting at the same time, and for all functions finishing at the same time. Practically where function start and finish times are staggered, cumulative noise levels at any point in time will be less.

Gap Bluff Hospitality staff will need to be trained to limit unruly and loud behaviour in transit to transport at the cessation of events, notwithstanding training as required under Responsible Service of Alcohol Legislation.

Noise emission from building plant and equipment will need to be designed to ensure that overall noise emission criteria are not exceeded.

In addition the building services design will need to ensure that penetrations, intakes and exhausts do not reduce the overall sound isolation performance of the façade.

7.1.3 Sleep Arousal Assessment

Predicted maximum noise levels are not expected to result in sleep arousal at receivers. Practically it is unlikely that the modelled conditions would occur in operation (e.g. simultaneous slamming of car doors in each carpark at the same time), therefore the risk is considered negligible.

7.1.4 Impact on Local Public Roads

The assessment of the impact on local public roads found that RNP criteria are predicted to be exceeded for Cliff Street from the Military Road intersection to the Lighthouse Road intersection for both pre-function and post-function periods. It is re-iterated that the assessment considers all function traffic to the Gap Bluff precinct as additional traffic, noting the venues previous usage.

Impacts from pre-function traffic increases are more pronounced for evening functions when the existing traffic levels are low. The traffic volume survey found that for the majority of the day, existing levels are substantially higher than at 7pm. Periods when the increase is below the 2dB threshold of '*minor impact that is considered barely perceptible to the average person*' as per stated in the RNP, are shown in Figure 8.

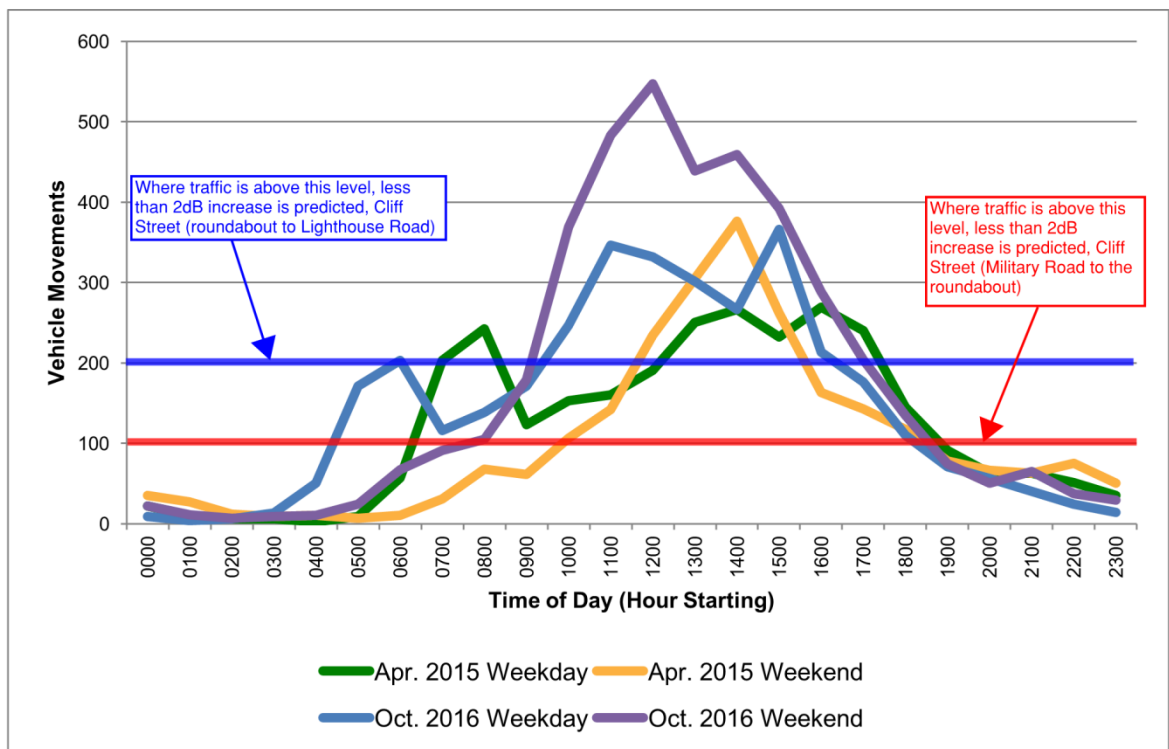


Figure 8: Pre-function periods where increase will be less than 2dB

Post-function exceedances at Cliff Street residences are from vehicle pick-ups utilising the Lighthouse Road entry. Although traffic volumes for 'pick-ups' are low, relative exceedances are noted to be a result of the existing low traffic volumes, with exceedances to overall levels the result of the close proximity of residences to Cliff Street.

A potential mitigation measure is to restrict vehicles using the Lighthouse Road entrance for late night entry for 'pick-up'. Otherwise noise treatments to residences (e.g. upgrade of the façade or noise control barrier) would need to be in direct negotiation with affected residences as resident property boundaries are to the pedestrian path.

7.1.5 Combined Noise Impacts from Functions and Vehicle Transit and Carpark Activities

It is not practicable to combine noise levels from function activities and vehicle transit and carpark activities as they are assessed by different metrics. Assessment of function noise breakout has been to the L&GNSW criteria which is an L_{10} criteria against each octave band, whilst assessment to vehicle traffic and carpark activities is to the L_{eq} NSW INP requirements.

Practically however overall vehicle transit and carpark noise levels are not expected to be materially increased during compliant function events. Differences between the predicted L_{10} octave band noise

levels for Scenario 1 (Functions with music in all rooms – all windows closed) relative to predicted post-event traffic levels are shown in Table 37.

Table 37: Differences between function L_{10} noise levels and Vehicle and Road Traffic L_{eq} levels at receivers

Nominated Receiver Location	Overall, dBA	Octave Band Centre Frequency (Hz)								
		31.5	63	125	250	500	1k	2k	4k	8k
2 Cliff Street	10	*	7	5	>10	>10	9	>10	>10	>10
5-7 Cliff Street	10	*	7	6	>10	>10	>10	>10	>10	>10
Watsons Bay Hotel	11	*	6	5	>10	>10	>10	>10	>10	>10
HMAS Watson	14	*	>10	>10	>10	>10	>10	>10	>10	>10
27 Military Rd	13	*	>10	7	>10	>10	>10	>10	>10	>10
11 Cliff Street	13	*	>10	9	>10	>10	>10	>10	>10	>10
15 Cliff Street	16	*	>10	9	>10	>10	>10	>10	>10	>10
1 Short Street	15	*	>10	>10	>10	>10	>10	>10	>10	>10
6 Pacific Street	12	*	8	7	>10	>10	>10	>10	>10	>10

7.2 Camp Cove Precinct & Green Point Cottage

7.2.1 Discussion of Compliance

Where behaviour is effectively controlled within the HRIA guidelines, disturbance from occupants is predicted to be minimal, meeting the intent of the Woollahra DCP and within the guideline Day and Evening noise criteria.

As there are no specific mechanical plant design proposals, no assessment was conducted for outdoor air-conditioning plant.

7.2.2 Required Acoustic Controls

Noise emission from outdoor air-conditioning equipment is to be designed to not exceed limits identified in Table 19 at the nearest receiver. To meet the strict Night-time provisions a timer control may be required to prevent the operation of equipment during the Night period.

To ensure that occupant behaviour is controlled within the HRIA code of conduct the following is recommended;

- House rules are established and prominently displayed for Visitors and Guests at a Property to ensure that the amenity of neighbouring properties is not adversely affected. Schedule B of the HRIA code of conduct sets out model House Rules as a “deemed to satisfy” solution to the requirements of Part 4, shown in Table 38.
- Air-conditioning plant and equipment is assessed to ensure that overall noise levels do not exceed the NSW INP criteria established for each premises

Table 38: Deemed to satisfy 'house rules' HRIA code of conduct

Section	Rule
4.2 Noise and Residential amenity	<p>a) Guests and Visitors must not create noise which is offensive to occupiers of neighbouring properties especially between 10pm - 8am and during arrival and departure at any time throughout the occupancy;</p> <p>b) Offensive noise is prohibited and may result in termination of permission to occupy the Property, eviction, loss of rental paid and extra charges for security and other expenses which may be deducted from the Security Deposit or Bond under the Terms and Conditions; and</p> <p>c) Guests and Visitors must not engage in anti-social behaviour and must minimise their impact upon the residential amenity of neighbours and local community.</p>
4.4 Gatherings or functions	<p>a) The Property is not a "party house" and any such activities are strictly prohibited;</p> <p>and b) Any gathering, celebration or entertainment permitted at a Property must not conflict with residential amenity and must comply with all the other requirements.</p>

7.3 OEH Comments on the Original PKA Acoustic Assessment

Notwithstanding that this report is a complete re-assessment of the acoustic impacts to nearby residences, responses to comments raised against the original PKA acoustic assessment are listed in Table 39.

Table 39: Office and Environment and Heritage review comments and responses

Office of Environment and Heritage Comment	Response
<p>The acoustic report identifies noise emission criteria from unattended noise survey and identifies the nearest residential receivers at both Gap Bluff and Camp Cove to assess potential impacts / compliance. Whilst the nearest receivers are agreed, the report does not necessarily identify and assess the impact on the potentially most affected receivers which may be more distant properties. The steep, sloping topography at Gap Bluff may have the effect that further from the proposed development are more affected than those closer to the site. Acoustic shielding may be afforded to closer properties by the intervening ground topography whereas more distance properties may not benefit from this shielding notwithstanding distance.</p> <p>Whilst it is considered that the noise survey locations are representative of nearby residential receivers the report should address the lack of noise logging near Green Point Cottage. In this regard, it is considered that levels from 33 Cliff Street are representative of receivers near Green Point Cottage.</p> <p><u>Action:</u> It is considered that further analysis and noise modelling is required to ensure the most affected receivers are identified and assessed, and the location of noise logging is clearly explained and justified. The modelling should also consider the impact of the proposal on the Fleet Commander's residence to the east of Constables Cottage within HMAS Watson.</p>	<p>3-dimensional acoustic modelling software has been used to predict noise levels from function activities to identified nearby noise sensitive receivers.</p> <p>The computer model has been created in the environmental noise modelling program, SoundPlan V7.4, which utilises the methodology defined in International Standard ISO 9613-2: 1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO 9613).</p> <p>The Modelling considers;</p> <ul style="list-style-type: none"> • The presence of obstacles such as buildings, screens or barriers in the propagation path • The hardness of the ground between the source and receiver • Absorption of sound by the air over long distances • Meteorological influences such as wind or temperature gradients <p>Identified potentially affected receivers include;</p> <ul style="list-style-type: none"> • Residential premises on Cliff Street, closest to Gap Bluff Precinct • Residential Premises off Short and Pacific Streets, more distant from Gap Bluff Precinct • HMAS Watson accommodation <p>In assessment of Green Point Cottage, noise logging conducted in the PKA assessment near 33 Cliff Street has been used as representative for Green Point Cottage. The locations of each are within the same precinct, within a residential area in close proximity to the harbour. The Gap Bluff Hospitality proposal is for Green Point Cottage retain its use as short-stay accommodation, maintain the residential environment</p> <p>On this basis noise logging conducted at 33 Cliff Street is deemed representative.</p>
<p>The predicted patron and entertainment noise emissions for both the Armoury and the Officer's Mess have not been confirmed by the peer review, rather higher noise emissions have been predicted.</p> <p><u>Action:</u> To allow confirmation of predictions, further information should be provided included an explanation of assumptions and methods used to calculate the noise emissions. This should also clarify whether noise breakout from door opening has been taken into account.</p>	<p>Section 6 of the report identifies and explains the basis for all the assumptions for the modelling conducted.</p> <p>The report identifies that modelling of noise breakout from sound lock doors assumes that as a worst-case at least one of the doors will be open at any time, noting that management practice should ensure that doors are not held open.</p>

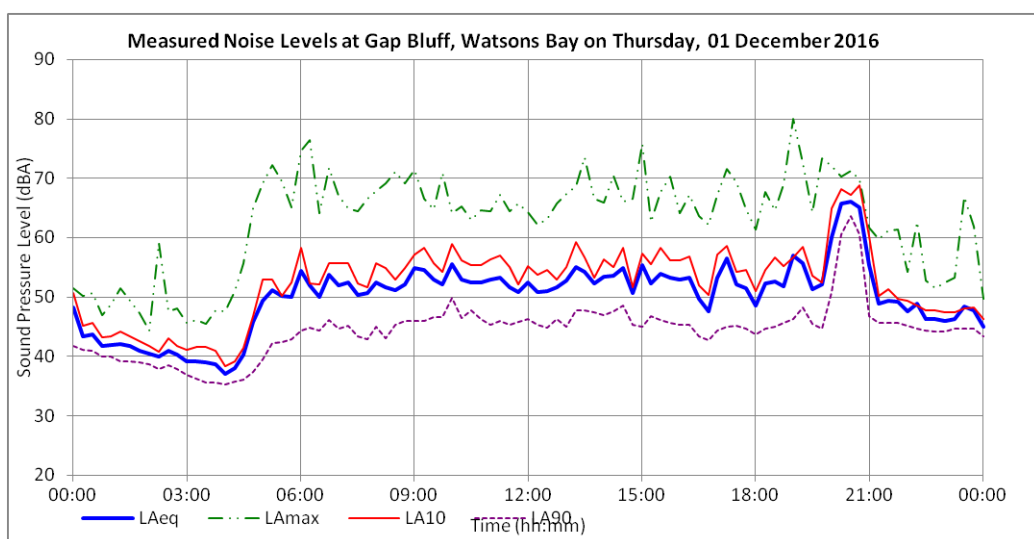
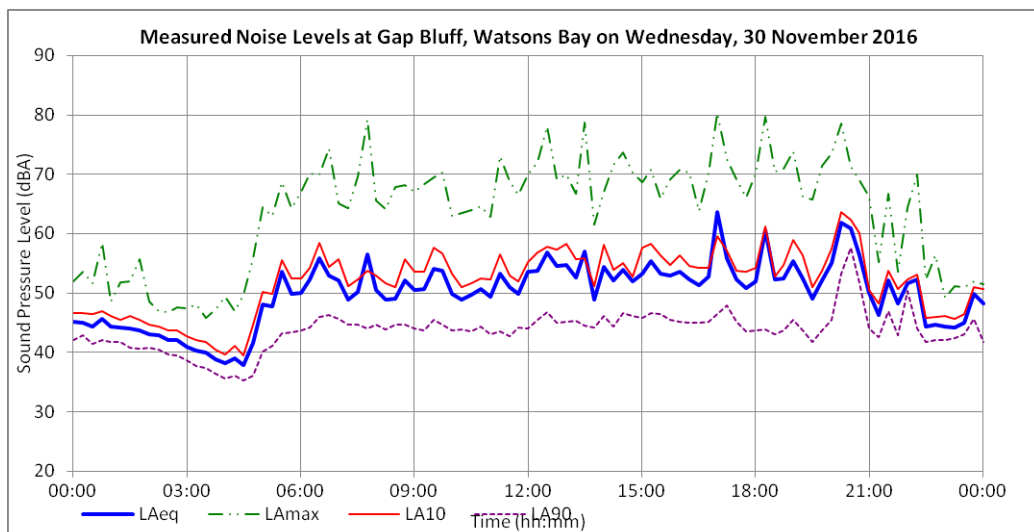
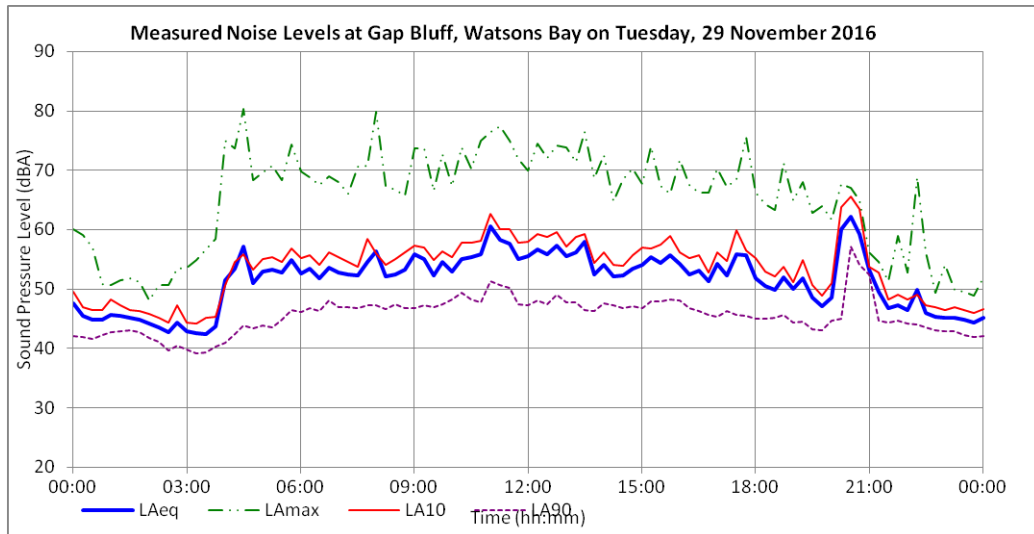
Office of Environment and Heritage Comment	Response
<p>Use of the NSW Industrial Noise Policy is not appropriate to assess patron and entertainment noise emission. It should only be used to set noise emission criteria for mechanical plant and aspects of the commercial operation such as on-site traffic.</p> <p>The report should be amended for clarity and technical correctness.</p>	<p>Noise criteria in the MDA assessment reflect the OEH comments.</p>
<p>The Acoustic Report is currently complicated by assessment against the acoustic provisions of Woollahra Council Heritage Conservation Area (HCA) Development Control Plan (DCP) (including assessment of octave band background plus L_{eq} criteria). It is considered that discussion of the DCP criteria should be included in the report but not directly assessed in the results table. Rather a statement should be included to the effect that the OLGR criteria would address the intent of the DCP criteria. In this regard it should be noted that the difference between the energy average noise level (L_{eq}) and average maximum noise level (L_{10}) of patron and music should be adjusted to five decibels (Note: add one decibel to all patron and entertainment noise emission predictions). This will simply the presentation of results and the assessment.</p>	<p>Noise criteria in the MDA assessment reflect the OEH comments.</p>
<p>A calibration certificate for the NTI sound level meter used for the assessment should be provided to demonstrate that the equipment was within calibration at the time of monitoring.</p>	<p>A calibration certificate is provided for additional modelling conducted for the MDA assessment.</p>
<p>In assessing the proposed short stay residential uses, a simpler overall 'Background plus 5 dB(A) assessment' would be more appropriate than the detailed octave band noise assessment presented. When exceedances are predicted specific noise control measures should be identified.</p>	<p>Noise criteria in the MDA assessment reflect the OEH comments.</p>
<p>Noise modelling from the Armoury should include totals for the combination of all noise sources. As currently presented both indoor and outdoor upstairs and downstairs operations have been modelled however no total emissions have been presented and compared with octave band criteria.</p>	<p>Modelled scenarios reflect combined noise output from concurrent functions in the Armoury, Officers Mess ground and upper level function areas.</p>
<p>Patron numbers for the Officer's Mess used in the acoustic report are not consistent with the numbers identified in the REF. Further there are some irregularities in the OLGR criteria and specifically labelling of the daytime and night-time criteria. These anomalies should be amended. Low frequency music noise emissions also appear to be incorrect and should be checked.</p>	<p>Patron numbers in the MDA assessment reflect numbers identified in the revised REF.</p> <p>L&GNSW (previously OLGR) criteria have been established consistently for Day, Evening and Night periods throughout the assessment.</p> <p>A revised assessment of the noise emission has been undertaken addressing noted anomalies of predicted low-frequency noise emission levels.</p>

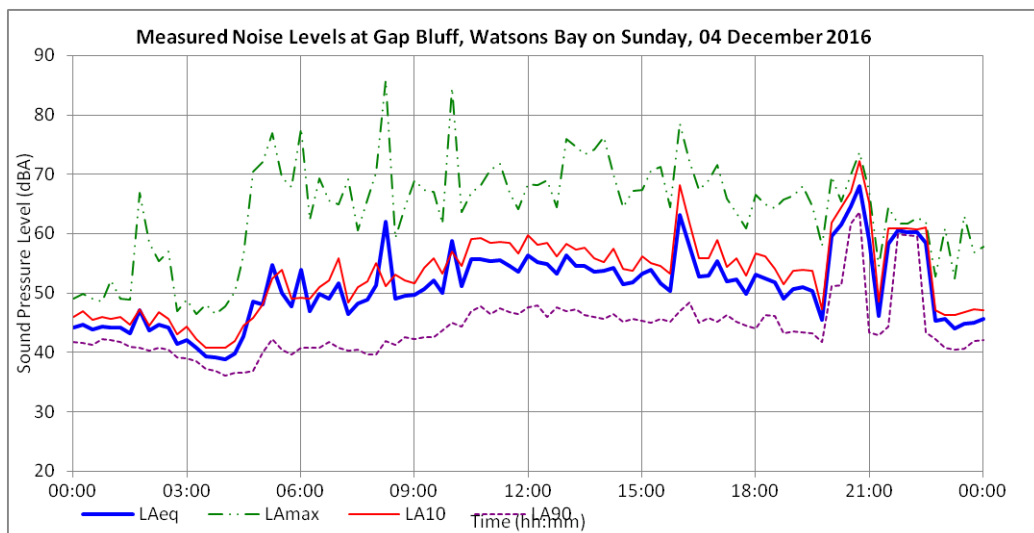
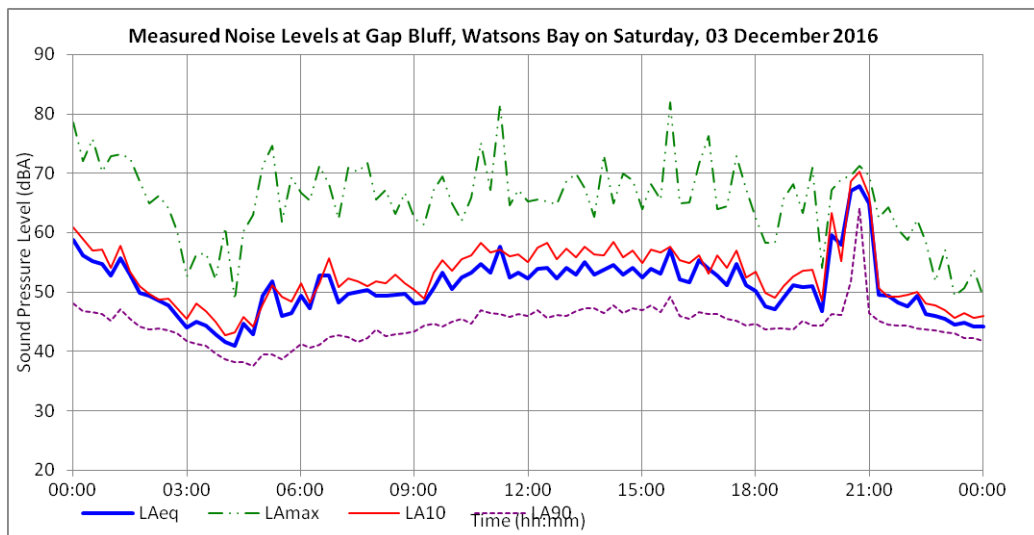
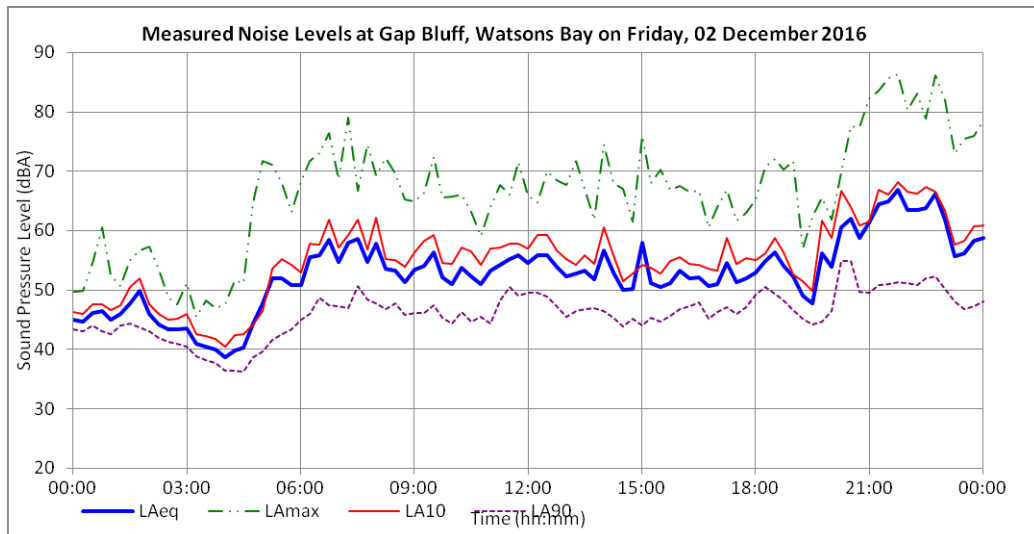
Office of Environment and Heritage Comment	Response
<p>Further consideration should be given to traffic access arrangements particularly in light of potential noise impacts.</p> <p><u>Action:</u> The assessment and revised REF should address the above specific technical matters.</p>	<p>A traffic assessment has been conducted of the noise emission from vehicle traffic within the Gap Bluff Precinct to NSW INP criteria and on the local road network to NSW RNP criteria.</p>

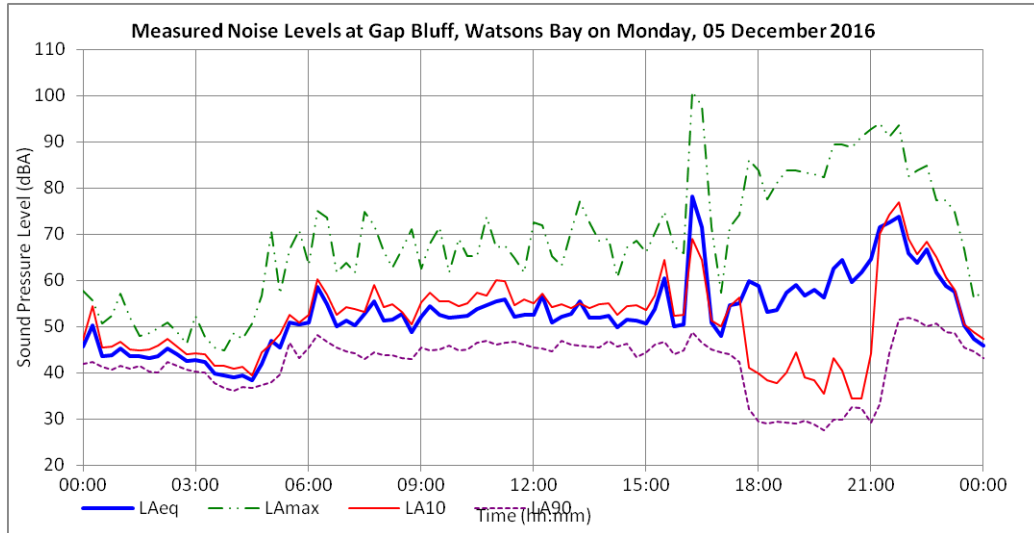
APPENDIX A GLOSSARY OF TERMINOLOGY

Octave Band	A range of frequencies where the highest frequency included is twice the lowest frequency. Octave bands are referred to by their logarithmic centre frequencies, these being 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, and 16 kHz for the audible range of sound.
Ambient	The ambient noise level is the noise level measured in the absence of the intrusive noise or the noise requiring control. Ambient noise levels are frequently measured to determine the situation prior to the addition of a new noise source.
dB	<u>Decibel</u> The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of $P_r=20 \mu\text{Pa}$ i.e. $\text{dB} = 20 \times \log(P/P_r)$
dBA	The unit of sound level which has its frequency characteristics modified by a filter (A-weighted) so as to more closely approximate the frequency bias of the human ear.
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
$L_{Aeq}(t)$	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
$L_{A90}(t)$	The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
$L_{A10}(t)$	The A-weighted noise level equalled or exceeded for 10% of the measurement period. This is commonly referred to as the average maximum noise level. The suffix "t" represents the time period to which the noise level relates, e.g. (8 h) would represent a period of 8 hours, (15 min) would represent a period of 15 minutes and (2200-0700) would represent a measurement time between 10 pm and 7 am.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.

APPENDIX B NOISE LOGGER MEASUREMENTS







APPENDIX C NSW INDUSTRIAL NOISE POLICY

In NSW, the EPA's *Industrial Noise Policy* (INP) is the guideline for assessing noise emissions to nearby noise sensitive receivers. Noise level criteria from the INP are called project specific noise levels and are derived from an analysis of the ambient noise environment and zoning information.

The ambient noise levels for this project are summarised in Table 40 below. In the INP, the background noise level is called the Rating Background Level (RBL).

Table 40: Industrial Noise Policy time periods and ambient noise levels

Period	Time Period	Gap Bluff Centre		1 Victoria Street	
		RBL, dB LA90	dB LAeq	RBL, dB LA90	dB LAeq
Day	0700-1800hrs	40.5	51	39.5	52.5
Evening	1800-2200hrs	39.5	51	38	55.5
Night	2200hrs-0700hrs	33	46	33.5	46

Intrusiveness criteria

The intrusiveness noise assessment is based on knowledge of the background noise level at the receiver location. The intrusiveness criterion is the background noise level at the nearest noise sensitive receiver location plus 5dB. Therefore the noise emissions from the premises are considered to be intrusive if the A-weighted source noise level ($L_{Aeq, 15mins}$) is greater than the background noise level (L_{A90}) plus 5dB.

Based on the data summarised in Table 40, noise limits for intrusiveness have been calculated in accordance with the INP and are presented in Table 41 below.

Table 41: Calculated intrusiveness criteria

Period	Gap Bluff Centre		1 Victoria Street	
	Rating Background Level, dB LA90	Intrusiveness Criterion (RBL + 5dB), dB LAeq,15mins	Rating Background Level, dB LA90	Intrusiveness Criterion (RBL + 5dB), dB LAeq,15mins
Day	40.5	45.5	39.5	44.5
Evening	39.5	44.5	38	43
Night	33	38	33.5	38.5

It should be noted that the intrusiveness criterion is only applicable to residential receivers.

Amenity criteria

The Amenity criteria are designed to prevent industrial noise continually increasing above an acceptable level. The initial stage in determining the Amenity Criteria is to correct the acceptable noise levels set for the appropriate amenity area with the baseline noise monitoring.

A review of the noise levels measured indicates that the noise environment at the receivers is typical of a suburban area. The acceptable and recommended maximum noise levels for residential receivers in a suburban area are detailed in Table 42 below.

Table 42: Recommended L_{Aeq} noise levels from industrial noise sources in a suburban area

Period	Recommended Noise Level, dB L_{Aeq}	
	Acceptable	Recommended Maximum
Day	55	60
Evening	45	50
Night	40	45

Source: Table 2.1 NSW Industrial Noise Policy

As per the INP, based on the acceptable levels presented in Table 42, the L_{Aeq} values from Table 41 are adjusted in order to determine the Amenity Criteria using the published correction factors provided in the INP (Table 2.2).

However, as there are no other industrial noise sources in the area surrounding the development, the acceptable noise limit in Table 42 will be the Amenity criterion for this development.

Determination of Project Specific Noise Levels

The final process in determining the operational noise limits for the development, called the *project specific noise levels*, is to select the more stringent of either the Intrusiveness or Amenity criteria that have been derived. In this case, the intrusiveness criteria is more stringent and hence is the limiting criteria for this development.

Table 43: Project specific noise levels

Period	Gap Bluff Centre		1 Victoria Street	
	Intrusiveness Criteria, dB L_{Aeq} , 15mins	Amenity Criteria, dB L_{Aeq} , period	Intrusiveness Criteria, dB L_{Aeq} , 15mins	Amenity Criteria, dB L_{Aeq} , period
Day	45.5	55	44.5	55
Evening	44.5	45	43	45
Night	38	40	38.5	40

APPENDIX D CORRECTION FOR THE WIND DIRECTION

Nearest wind direction and magnitude measurements to the Gap Bluff Precinct are at the Sydney Harbour (Wedding Cake West), shown in Figure 9.

The most unfavourable condition is from the north-eastern and a (to a lesser extent) eastern direction. The percentage breakdown of wind from the north-east direction by wind speed for the 3pm measurement is shown in Table 44. Greyed out values in Table 44 refer to periods where wind speeds are within the standard ISO 9613-2 conditions.

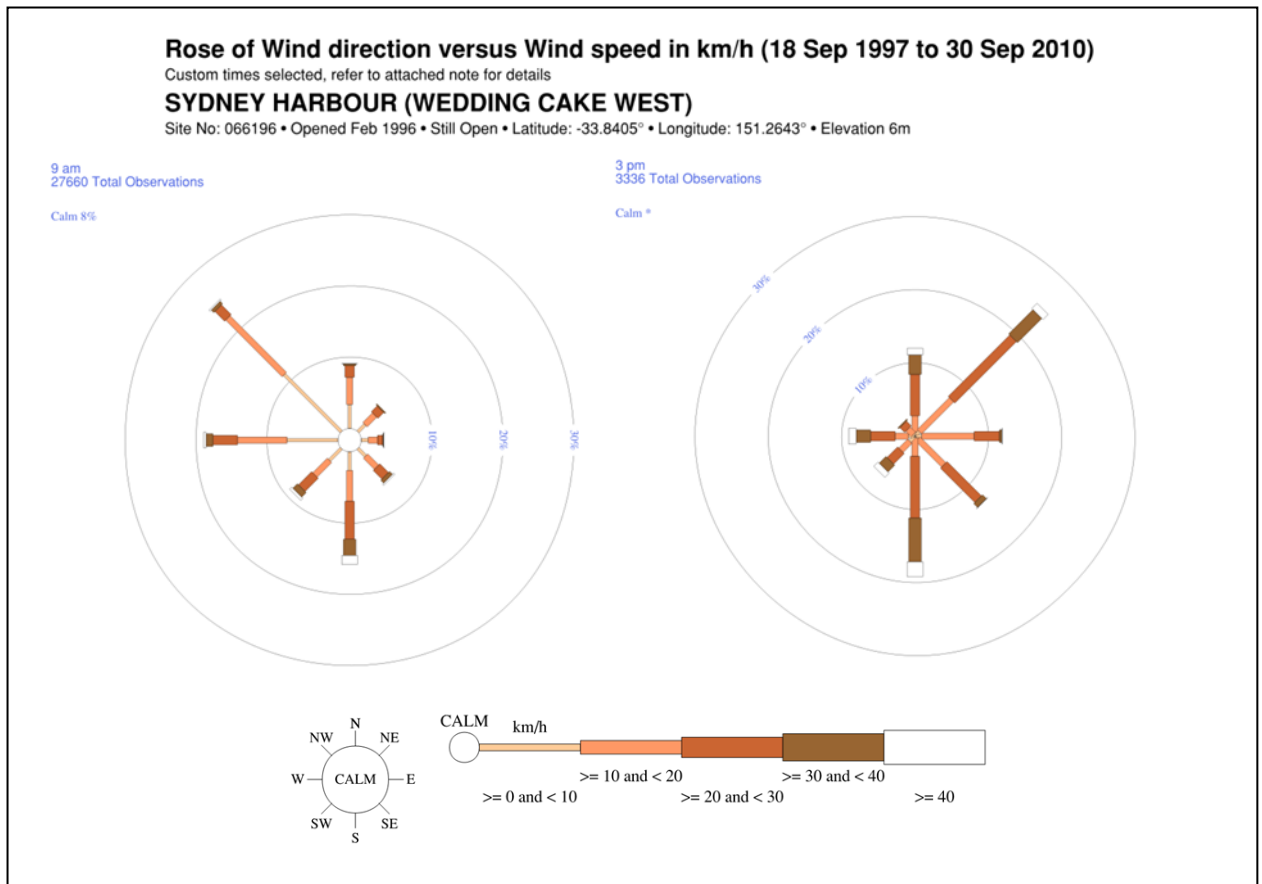


Figure 9: Wind conditions

Table 44: Historical summary, wind from the NE direction, 3pm

Wind Speed Range (kph)	% from NE
0 – 10	0.6%
10 – 20	6.4%
20 – 30	12%
30 – 40	4.6%
40+	0.8%

Correction for meteorological effects (C_{met}) in ISO-9613-2 is via the site specific local meteorological effects (C_0), corrected for the source and receiver height and propagation distance. A summary of correction terms at nominated receiver locations is shown in Table 45.

Table 45: Meteorological factor correction terms at nominated receiver locations

Receiver Location	Correction to C_0
Watsons Bay Hotel	-
2 Cliff Street	-
5-7 Cliff Street	-
11 Cliff Street	0.5
15 Cliff Street	1.5
1 Short Street	1
6 Pacific Street	1.5
HMAS Watson	-
27 Military Road	0.5

Values indicated as (-) are where ISO 9613-2 denotes the C_0 correction to be 0

ISO 9613-2 clause 22 notes the following;

Experience indicates that the values of C_0 in practice are limited to the range from zero to approximately +5dB and values in excess of 2dB are exceptional.

For the purposes of the assessment, C_0 is conservatively assumed to be at the upper typical range of +2dB.

APPENDIX E LOGGER CALIBRATION CERTIFICATE



CERTIFICATE OF CALIBRATION

Certificate Number: 1293

NATA Accreditation No: 15841

Customer: Marshall Day Acoustics
4/46 Balfour Street,
Chippendale,
NSW 2008
Nicholas Lynar

Test object:	Manufacturer:	Test object:	Serial no:	ID:
Sound level meter	01dB	Duo	10419	1293
Microphone:	GRAS	GRAS40CD	144377	1293
Preamplifier	01dB	Included	-	-
Calibrator	None	-	-	-
Wind screen	01dB	Duo-small	-	1293
		Duo-Integrated	-	1293

Environmental conditions:	Pressure:	Temperature:	Relative humidity:
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Conditions before measurement:	101.95 ±0.03 kPa	24.1 ±0.4 °C	51.3 ±2.8 %RH
Conditions after measurement:	101.96 ±0.03 kPa	24.0 ±0.4 °C	46.3 ±2.8 %RH

The measurements are performed according to the IEC 61672-3:2006 Sound level meters - Part 3: Periodic tests, DIN 45657 Sound Level Meters - Requirements for Special Applications and IEC 61260 Electroacoustics - Octave-band and fractional-octave-band filters.

The expanded uncertainty of measurement is reported at approximately 95% confidence level with a coverage factor k, of 2.

Accredited for compliance with ISO/IEC 17025.

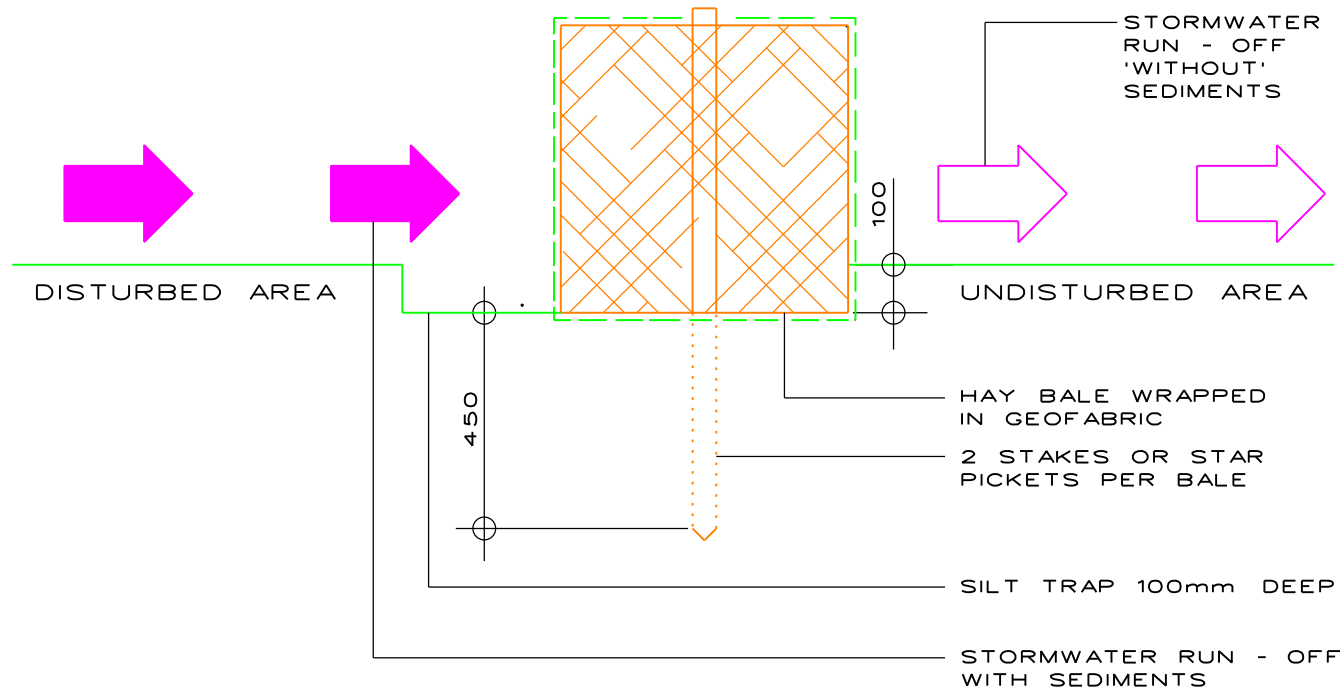
Date of calibration: 14/06/16
Date of issue: 14/06/16
Authorised Signatory

Claire Richardson

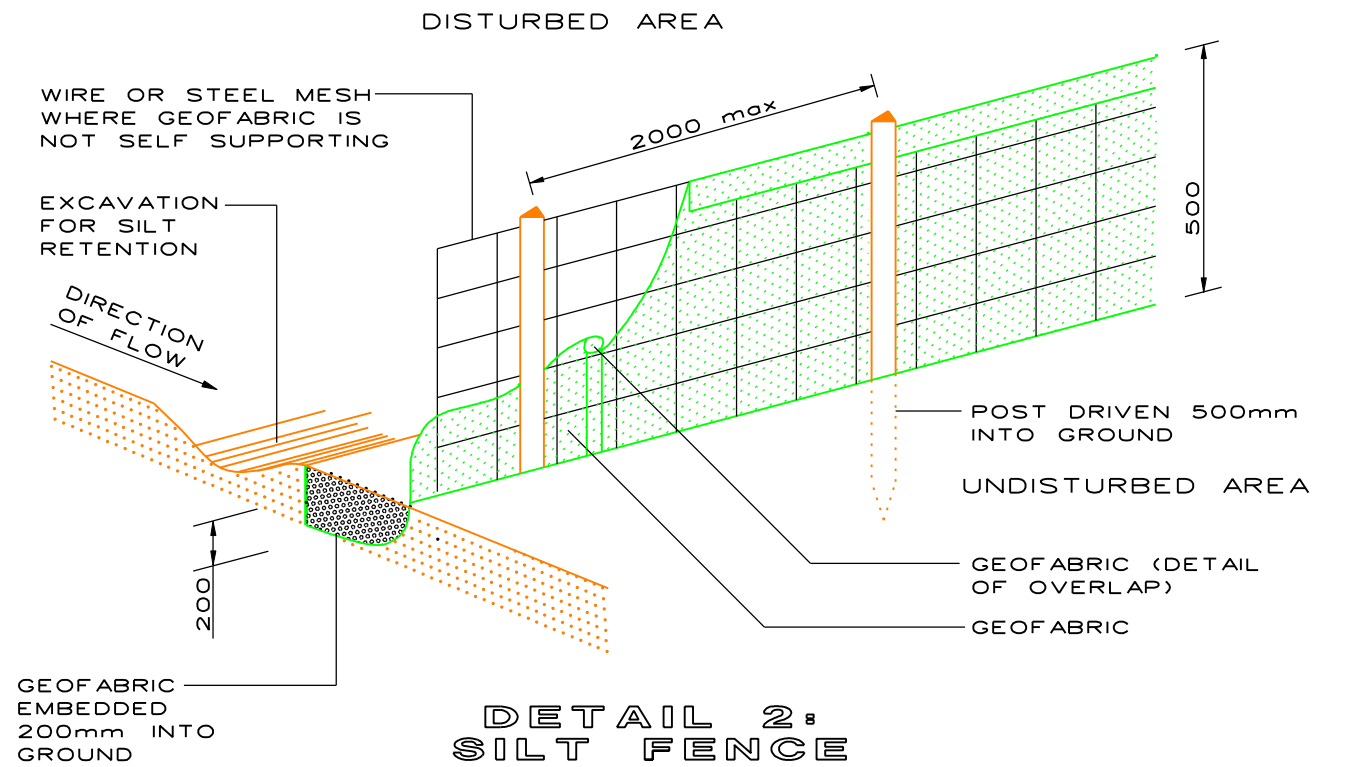
APPENDIX F RECEIVER LOCATIONS

MEASURES TO PREVENT UNCONTROLLED
RUN OFF ONTO NEIGHBOURING PROPERTIES.

INSTALL AS REQUIRED. LOCATION AND EXTENT
TO SUIT SITE SPECIFIC NEEDS AND
CONSTRUCTION PROGRESS.



DETAIL 1:
HAY BALE BARRIER
NTS



DETAIL 2:
SILT FENCE
NTS

			PROJECT GAP BLUFF AND CAMP COVE PRECINCTS	ARCHITECT RFA ARCHITECTS	DRAWING TITLE SEDIMENTATION CONTROL DETAILS
			itmdesign consulting hydraulic engineers unit 6 / 3 apollo st, warriewood nsw 2102 po box 1438 mona vale nsw 1660 tel (02) 9997 1566 fax (02) 9997 3266 email: markus@itmdesign.com.au	CONSTRUCTION MANAGER EXPERTISE BUILDING AND CONSTRUCTION	SCALE NTS
					JOB No 16 / 184
A	ISSUED FOR INFORMATION	23.12.16			DISCIPLINE HYD
REV	DESCRIPTION	DATE			DRAWING No H-SED
					REVISION A

0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150