

Mirvac Projects Pty Ltd Stormwater and Wastewater Management Plan

Locomotive Workshop Australian Technology Park, Eveleigh, NSW

> 30 August 2017 51142/110680 Rev 0 JBS&G Australia Pty Ltd

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1. Introduction

1.1 Introduction and Objective

JBS&G Australia Pty Ltd (JBS&G) was engaged by Mirvac Projects Pty Ltd (Mirvac, the client) to prepare Stormwater and Wastewater Management Plan (SWMP) for redevelopment of the Locomotive Workshop building within the Australian Technology Park (ATP) located at 2 Locomotive Street, Eveleigh, NSW 2015 (the Site, as shown on **Figures 1** and **2**).

Mirvac has acquired the ownership and redevelopment rights of the Site for adaptive reuse and proposed ongoing commercial land use excluding childcare facilities. Redevelopment works will include reconfiguration and refurbishment of the internal building layout with the heritage foundations and building exterior to be retained. All modern fixtures within the Locomotive Workshop are proposed to be removed to highlight the building architecture and antiquity.

Site redevelopment activities are proposed to occur in a staged manor over the coming months to years. Considering the overall timeframe and staged nature of the works program, it is likely that numerous contractors, in relation to water management, will be involved during the development works.

1.2 Purpose

This SWMP is intended to describe the known historical impacts to water and groundwater at the site and anticipated potential impacts to occur during redevelopment activities, as well as outline framework protocols for the management of groundwater, wastewater and surface water runoff which can be used as guidance for preparation of more specific plans for the various work stages.

This SWMP should be read in conjunction with the erosion and sediment control components of the Waste Management Plan prepared for the Site.



2. Summary of Site Setting

The following present a summary of the Site condition and setting.

2.1 Site Identification

This Site is covered by the heritage Locomotive Workshop building, which is currently used for commercial land use purposes, i.e. offices. The Site is located approximately 5 km south of the Sydney CBD, 8 km north of Sydney airport and within 200 m of Redfern Railway Station. The site is legally identified as Lot 4000 in Deposited Plan (DP) 1194309, occupies an area of approximately 2.7 hectares (ha) and is located within the City of Sydney LGA.

The Site is bound to the north by a railway easement, east by Innovation Plaza, south by Locomotive Street and to west by State Rail Operation Facilities (Large Erecting Shed).

The location of the Site is shown in **Figure 1**, the current Site layout is shown in **Figure 2**. Site details are summarised in **Table 2.1**.

Table 2.1 Summary Site Details

able 2.1 Sulfilliary Site Details			
Lot Numbers (as shown on Figure 3)	Lot 4000 in DP 1194309 (previously Lot13 DP 1136859)		
Street Address	Australian Technology Park, 2 Locomotive Street, Eveleigh, NSW, 2015		
Site Area	Approximately 2.7 ha		
Local Government Authority	City of Sydney		
Geographic Coordinates (MGA 56)	Please refer to Figure 3		
Zoning	SEPP Major Development 2005 under the City of Sydney Local Environment Plan 2012		
Previous Land Uses	Locomotive building and repairs		
Current Land Uses	Commercial land use		
Proposed Developable Land Uses	Adaptive reuse for ongoing commercial land uses		

2.2 Site Description

The Locomotive Workshop commenced construction in 1887 and consists of a very large brick building divided into 16 bays running north-south. Each bay was originally used for one or more trades required to repair or manufacture locomotives and their components. Bays 1 to 4, at the east end, contained trades such as blacksmithing and boiler making, while Bays 5 to 15 contained the machining, tooling and assembly areas.

The building is of masonry construction with a concrete floor and metal roof and presents as a two-storey structure. A series of small annexes have been built along the southern side of the building. Internally, the building is supported on a steel frame and metal roof trusses. Items of heritage machinery have been placed on display throughout the bays of the building. Only Bays 1 and 2 at the east end of the building are substantially original, with the remaining bays having been converted to commercial office space, function and exhibition areas in a variety of styles.

2.3 Surrounding Land Uses

The surrounding land uses have been identified as comprising:

- North The Site is bound to the north by a railway easement and in turn mixed land use comprising heritage (Carriage Works) renewal (commercial land use - art centre, restaurant/bar and markets), residential allotments and the University of Sydney campus facilities;
- East The Site is bound to the east by Innovation Plaza, the Innovation Centre and Cornwallis Street, across which are mixed land uses comprising residential and commercial allotments;



- South The Site is bound to the south by Locomotive Street, Lot 12 ATP and the Channel 7 building, which are of commercial use; and
- West The Site is bound to the west by a railway easement and associated State Rail
 infrastructure (RailCorp Depot) and the Large Erecting Shed, which are used to commercial /
 industrial land uses.

2.4 Geology and Soils

Reference to the 1:100 000 Geological Series Sheet for Sydney (DMR 1983¹) indicates that the Site is largely underlain by Ashfield Shale of the Wianamatta Group and Quaternary sediments, although limited in extent and skeletal in nature. Ashfield Shale, typically comprises black to dark grey shales with laminate.

Based upon the Sydney 1:100,000 Soil Landscape series (DLWC 1989²) the Site is located within the Blacktown soil landscape group overlying Ashfield Shale. The landscape is generally characterised by gently undulating rises on Wianamatta Group shales, local relief to 30 m and slopes usually <5%, broad rounded crests and ridges with gently inclined slopes, cleared eucalypt woodland and tall, open forest (dry sclerophyll forest).

Soils are characteristically shallow to moderately deep (<100 cm) hard setting mottled texture contrast soils, red and brown podzolic soils and crests grading to yellow podzolic soils on lower slopes and in drainage lines. Limitations of the Blacktown group include moderately reactive, highly plastic subsoil, low soil fertility and poor soil drainage.

Previous investigations within the broader ATP site, not specifically the Locomotive Workshop Site, have identified fill materials across the entire ATP site with minor exceptions, ranging from a skeletal fill soil profile to 7.6 m in depth. In general, the vertical extent of fill is reported to be greatest within the northern site extent, adjacent the Locomotive Workshop. Fill materials are considered resultant from a combination of Site activity (waste products) and importation of fill materials to establish Site levels.

2.5 Acid Sulfate Soils

Review of the *Acid Sulfate Soil Risk Map for Botany Bay*³ indicates that the Site is located within an area of 'no known occurrence of Acid Sulfate Soils'. Acid sulfate soils (ASS) are not known or expected to occur in areas having this classification.

Notwithstanding the aforementioned, previous investigations have reported potential for ASS/potential acid sulfate soils (PASS) associated with the occurrence of Quaternary sediments.

With due consideration to the geological and soil characteristics of the Site (i.e. peat material), in addition to historical information, management of development activities should consider the potential for ASS/PASS if development activities involve excavation of natural soils beneath the water table.

An Acid Sulfate Soil Management Plan (ASSMP) has been prepared for the broader ATP Site.

2.6 Topography

A review of the 1:25,000 Botany Bay Topographic Map (9130-3-S) indicates that the Site lies at an elevation of between approximately 10 m and 20 m above Australian Height Datum (AHD). The Site is reported to slope gently to the south west.

Sydney 1:100 000 Geological Series Sheet 9130 (Edition 1). Department of Mineral Resources, 1983 (DMR 1983)

² 1:100 000 Sydney Soil Landscapes Map Sheet 9130 Edition 1, Department of Land and Water Conservation, Published 1989

Acid Sulfate Soil Risk Map – Botany Bay, Edition 2, 1997 1:25 000 Ref: 91 30S3. NSW DLWC



The Site is situated within an area of gently undulating rises associated with Ashfield Shale to the north and east and Quaternary sediments to the south. In the vicinity of the Site, regional ground levels fall gently toward the south generally toward Shea's Creek, located approximately 600 m to the south east of the Site and Alexandra Canal located approximately 1.4 km to the south of the Site.

2.7 Hydrology

The nearest surface water receptor is the Alexandra Canal, located approximately 1.4 km to the south of the Site. Alexandra Canal flows into the Cooks River, located approximately 4.5 km to the south west of the Site which discharges into Botany Bay approximately 6 km to the south west of the Site.

Existing pavements occupy almost 100% of the Site and as such, rainfall within the Site is anticipated to generally be controlled by the current storm water system and then into the regional storm water system. It is understood that regional storm water flow occurs via below ground infrastructure to the Alexandra Canal.

For any unsealed areas, rainfall is expected to infiltrate the relatively permeable sandy fill soils, with the remainder of rainfall becoming surface water run off toward the Site boundary and then the regional storm water system.

2.8 Hydrogeology

Based on local topography, geology and reported depths to groundwater, groundwater flow is anticipated to be to the south, towards Shea's Creek/Alexandra Canal. Shallow groundwater at the Site is anticipated to occur perched at the base of the fill/sand materials and at the interface with the much less permeable shale/sandstone following rain fall events. Within the underlying bedrock, groundwater is expected to be confined to zones of relatively higher permeability (i.e. faults, fractures and weathered seams of clay and sandy clay within the bedrock) and therefore limited in extent.

Previous assessments within the broader ATP site have identified groundwater at depths of approximately 16.8 m AHD within the northern site extent.

A review of the Botany Groundwater Management Zones map (DNR 2009⁴) indicates that hydrogeologically downgradient areas are located within, Zone 2 of the Botany Sands Aquifer Embargo Area. The DNR indicate that the Embargo Area "incorporates localities with known or suspected contamination from past industrial activity". Residents of properties situated within this zone are advised that groundwater use is now banned, especially for drinking water, watering gardens, washing windows and cars, bathing or to fill swimming pools. Industrial users are required to test the bore water at least annually and provide the results to the NSW Department of Primary Industry - Water (DPI) and the Office of Environment and Heritage (NSW OEH).

Botany Groundwater Management Zones map, www.water.nsw.gov.au/water-management/water-quality/groundwater/botany-sand-beds-aquifer/Botany-Sands-Aquifer/default.aspx NSW Department of Natural Resources (DNR 2009)



3. Environmental Status

3.1 Summary of Known Fill/Soil Contamination Status

Although the broader ATP Site has been the subject of over one hundred contamination investigations over a period of 22 years, as the building footprint covers almost the entire Site, very limited testing and characterisation of the soil/fill materials underlying the Locomotive Workshop Site has been completed.

In general, fill materials across the broader ATP site with minor exceptions, range from a skeletal fill soil profile to 7.6 m in depth. Fill materials were noted to comprise gravelly sandy, silty sands, clayey sands, peat with inclusions of railway ballast, glass, ash, metal, ceramic, brick, slag, sedimentary clast and construction rubble. Fill materials across the broader ATP site have been shown to contain elevated concentrations of heavy metals (principally copper, zinc and to a lesser extent lead), semi to non-volatile total petroleum hydrocarbons (TPHs)/total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAHs) (including concentrations of carcinogenic PAH compounds as benzo(a)pyrene TEQ) and, in parts, asbestos.

No significant amounts of volatile contaminants have been detected in fill materials at the ATP.

3.2 Summary of Known Groundwater Contamination Impact

Groundwater has been assessed across the entire ATP site and no groundwater remediation is considered to be required.

Identified historical groundwater contamination issues underlying the Site, incorporating but not necessary directly applicable to the ATP site, include:

- Elevated concentrations of heavy metals (principally zinc and copper) in groundwater identified in various parts of ATP site;
- Light non-aqueous phase liquid (LNAPL) historically reported (in the 1990s) within the northern Site extent and to the north west of the ATP site; and
- Dissolved phase concentrations of TRH in groundwater related to the presence of LNAPL and in localised areas likely associated with other TRH sources (e.g., UST(s) and/or historical site activities).

No known LNAPL sources have been reported during recent groundwater sampling events and TRH (and other organic COPC) concentrations have generally been below the laboratory limit of reporting (LOR) or only marginally exceeding the laboratory LOR.

3.3 Receiving Water Body

As discussed in **Section 2.6**, the nearest surface water receptor is the Shea's Creek/Alexandra Canal located approximately 1.4 km south of the Site. Alexandra Canal is Sydney's first inbound waterway. It stretches 4 km from the inner Sydney suburb of Alexandria, flowing through the suburbs of St Peters and Mascot, past Kingsford Smith Airport to the Cooks River at Tempe, which eventually discharges into Botany Bay. The canal is approximately 60 m wide, increasing to approximately 80 m at its mouth.

Alexandra Canal is a highly urbanised stormwater system. The canal is noted to contain both freshwater (headwaters) and marine (tidal zone) ecosystems, with the majority of the water body containing brackish to saltwater ecosystems. The initial receiving waters of Sheas Creek (concrete stormwater conduit) are freshwater/brackish in nature before discharging into Alexandria Canal (marine ecosystems). As such, for the purpose of this of this plan and future potential discharge to stormwater, disposal to stormwater is required to be compared to marine water ecosystems.



The 1997 New South Wales State of the Environment report summarised all data available on the water quality of the Alexandra Canal and its sediments. It was concluded in this report that the chemical composition of the canal water and sediment resulted in a poor habitat for aquatic life, as defined by the ANZECC/ARMCANZ guidelines (2000⁵). Review of Alexandria Canal Catchment Stormwater Reuse Scheme, reports an estimated 240 mega litres of stormwater from a consistent dry weather flow from 220 ha area (residential, commercial and industrial properties) of the Shea's Creek sub-catchment is discharged in Alexandria Canal per annum.

National Water Quality Management Strategy. Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000.

Australian and New Zealand Environment and Conservation Council. Agriculture and Resource Management Council of Australia and New Zealand (ANZECC/ARMCANZ 2000)



4. Preliminary Risk Assessment

As discussed in **Section 1.1**, Site development activities are proposed to occur in a staged manner over the coming months to years. Site development activities will likely comprise an Early Works program and a Main Works program which typically consist of the following:

4.1 Early Works Program

The Early Works package may include, but not be limited to, one or more of the following:

- Site establishment, enabling works and preparation; and/or
- Hydraulic diversion and service decommissioning; and/or
- Site excavation/grading activities to reach construction basal levels; and/or
- Stockpiling of fill materials/soils; and/or
- Installation of new foundations, footings and fixtures including services; and/or
- Decontamination of plant and equipment; and/or
- Off-Site disposal of soils surplus to construction/development requirements; and/or
- High impact rolling; and/or
- New pavements/ground surface treatments.

4.2 Main Works Program

The Main Works package may include, but not be limited to, one or more of the following:

- Construction works; and/or
- Landscaping works; and/or
- New pavements/ground surface.

4.3 Risk Rating

The following table (Table 2.1) provides some background on when these activities/scenarios are likely to occur during various work stages.

Table 2.1: Site Identification

Works Phase	Activity	Surface Water/Stormwater Contact with Fill	Groundwater Contact	Potential for Contaminated Water
	Site establishment, enabling works and preparation; and/or	Yes	No	Yes
	Hydraulic diversion and service decommissioning (i.e. trenching); and/or	Yes	No	Yes
Early Works	Site excavation/grading activities to reach construction basal levels; and/or	Yes	No	Yes
	Stockpiling of fill materials/soils; and/or	Yes	No	Yes
	Installation of new foundations, footings and fixtures including services; and/or	Yes	Yes	Yes
	Decontamination of plant and equipment; and/or	Yes	No	Yes



Works Phase	Activity	Surface Water/Stormwater Contact with Fill	Groundwater Contact	Potential for Contaminated Water
	Off-Site disposal of soils surplus to construction/development requirements; and/or	No	No	No
	High impact rolling; and/or	Yes	No	Yes
	New pavements/ground surface.	No	No	No
	Construction upgrade works; and/or	No	No	No
Main Works	Landscaping works; and/or	No	No	Yes
	New pavements/ground surface.	No	No	No

ASS/PASS have not been addressed within this assessment but have been included in the Acid Sulfate Soils Management Plan (ASSMP) prepared for the broader ATP Site.



5. General Management Approach

The main principles governing water management include:

- Surface water must be managed by the Principal Contractors or the Principal Contractors agents in proxy to ensure clean water does not enter contaminated areas and become contaminated;
- No contaminated water shall be discharged to the stormwater system or any other water body;
- No sediment laden or contaminated water shall leave the Site; and
- The Principal Contractor or the Principal Contractors agents in proxy is responsible for all Site surface water, stormwater and sediment control.

5.1 Surface Water Runoff

There is a potential for surface water run-off to be contaminated mainly during the Early Works program, but also to a lesser extent during the Main Works program. This may result from poor water management practices and/or ineffective/insufficient erosion and sediment control.

Potential impact arising from poor management of surface water run-off include:

- Contamination of uncontaminated soil/fill; and/or
- Degradation of receiving water bodies.

The potential for contamination of surface water will be minimised by controlling contact between surface water, exposed surfaces and areas or stockpiles of contaminated materials. Accordingly, measures will be implemented to ensure surface water coming onto the Site is directed away from known contaminated areas, and generally from low lying areas, pits and/or stockpiles. This will largely be achieved through the use of controls presented in the Erosion and Sediment Control Measures included in the Waste Management Plan prepared for the Site, however, as a minimum:

- Sediment control devices will be installed and maintained at surface water features during Site establishment and maintained for the duration of works;
- Site pavements/surface treatment including vegetation will be maintained to the extent practicable, minimising the area of exposed fill/soil;
- A designated stockpile management/staging area for any contaminated material will be
 established. All contaminated material stockpiles will be placed upon hardstands or other
 appropriate surface to ensure cross contamination does not occur and the potential for
 migration of contaminants has been minimised to the extent practicable. If stockpiles are
 left for a period greater than 24 hours, then the material shall be covered or an appropriate
 seal created to mitigate potential impacts to surface water run-off;
- Sediment control devises will be installed and maintained around designated contaminated material stockpiles management/staging area; and
- Surface water accumulation may occur in areas of open excavations and/or areas of Site contouring to reach the required construction basal levels. Water management measures presented in **Section 5.2** should be implemented.



5.2 Groundwater

Whilst Site development activities are largely on grade, excavation will be required for the installation of foundations, footing and fixtures associated with the built form and/or services. Given the relatively shallow groundwater table, potential remains for the water table to be intercepted and/or for surface water to accumulate within excavations. In the event that groundwater is intercepted or surface water accumulation occurs, the following measures will be implemented:

- The excavation works will be stopped and the Principal Contractor or Principal Contractor's agent informed immediately; and
- The Principal Contractor, Principal Contractor's agent and/or the environmental consultant will discuss means of dealing with the encountered groundwater and agree on the most appropriate approach. This may include evaluation of groundwater quality for disposal to stormwater with reference to ANZECC/ARMCANZ (2000) guidelines and the receiving water body (Section 3.3), or identification of other alternate disposal options including but not limited to application for a Trade Waste Agreement (TWA) with Sydney Water.

5.3 Development Derived Wastewater

Relatively small volumes of contaminated wastewater could be generated during Site remedial and development activities (i.e. wheel wash etc.).

Such liquids will be contained on-Site and maintained by the Principal Contractor or Principal Contractor's agent ensuring that the surrounding environment including underlying soils and groundwater are not adversely impacted. Options for management include application of flocculants to remove sediment to acceptable levels prior to discharge to stormwater or off-Site disposal to an appropriately licensed disposal facility.

The Principal Contractor or Principal Contractor's agent in consultation with the environmental consultant will discuss means of dealing with the liquid and agree on the most appropriate of these approaches or an alternatively approach.

5.4 Hazardous Materials

Hazardous materials and dangerous goods, including but not limited to, lead paint waste, fuels and hydraulic oil will be stored and handled in designated area within the Site compound area. Handling and management of hazardous materials will be necessary during the following key activities:

- Lead paint and lead dust removal works;
- Maintenance of plant/vehicles; and
- Delivery of minor fuel/oil supplies to Site.

Potential impacts arising from poor management practices may include:

- Contamination of uncontaminated soil/fill;
- Degradation of surface water and receiving surface waters; and
- Contamination of groundwater.

In order to mitigate impacts, the following management protocols shall be implemented by the Principal Control or Principal Contractor's agent during Site remedial and development works:

- Control and handling of all lead waste must be undertaken in accordance with the Lead Removal Plan prepared for the Site;
- Bunded areas will be used for storage of oils, chemicals, toxic substances, flammable and combustible liquids and potentially hazardous or contaminating activities. The bunded area



will be large enough to hold the contents of the largest container stored inside the bund, plus 10% of it's volume;

- All storage areas for hazardous materials will be located an adequate distance away from watercourses, geomorphic features such as swales and berms and entry points to the stormwater system;
- Spillages will be contained and collected for disposal;
- Appropriate controls will be put in place for all hazardous and potentially contaminating activities to prevent contamination of watercourses; and
- Ensure warning signs for all hazardous materials are adequate and clearly visible.



6. Department Requirements and Monitoring

To fulfil the Development Consent conditions, the following monitoring and compliance requirements are noted/required.

6.1 Disposal or Re-Use of Surface Water / Groundwater

Should Site development activities identify surface water, leachate or groundwater requiring off-Site disposal to achieve the development objectives, an evaluation of groundwater quality for disposal to stormwater with reference to ANZECC/ARMCANZ (2000) guidelines and the receiving water body (Section 3.3) is required. Based on the results of the assessment one of the following is required:

Disposal to Stormwater

If the assessment of groundwater quality identifies surface water, leachate or groundwater as suitable for disposal to stormwater, then the environmental consultant will issue formal written advice documenting the assessment and suitability of disposal to stormwater.

Prior to discharge to stormwater, the Principal Contractor or Principal Contractor's agent is required to obtain acceptance from the relevant regulatory authority (i.e. Council being the receiving bodies asset owner).

Should disposal of surface water or ground water be required to stormwater, twice daily compliance monitoring of suspended sediments and pH is required. Based on the results of the initial evaluation of groundwater quality, other organic and inorganic contaminants may require monitoring, initially at a frequency of twice weekly for the first two weeks, then weekly thereafter.

Contaminated Surface Water or Groundwater

Should surface water, leachate or groundwater be identified as not suitable for disposal to stormwater an alternate disposal options including but not limited to application of a TWA with Sydney Water may be required. Should disposal of surface water or ground water be required under a TWA with Sydney Water, then the sampling, analytical and reporting regime will be undertaken as per the negotiated licensed conditions.

Contaminated water will not be used/re-used on Site for dust suppression or other activities without prior treatment.

Should contaminated water be identified and require off-Site disposal, any water treatment plant must be designated to remove all relevant contaminants to levels agreed by the Site Auditor. Untreated water must be held until results from monitoring are available for review and it is agreed by the Site Auditor the water is suitable for re-use or discharge.

6.2 Water Monitoring

The Principal Contractor or the Principal Contractor's agent shall regularly inspect the condition and integrity of all soil, water and hazardous material management controls at a frequency not less than:

- Prior to the commencement of each works day;
- At regular intervals throughout major storm events; and
- Prior to the re-commencement of work following cessation due to rainfall.

The monitoring of ambient waters (**Section 6.1**) must include an up and down gradient sample location.



7. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

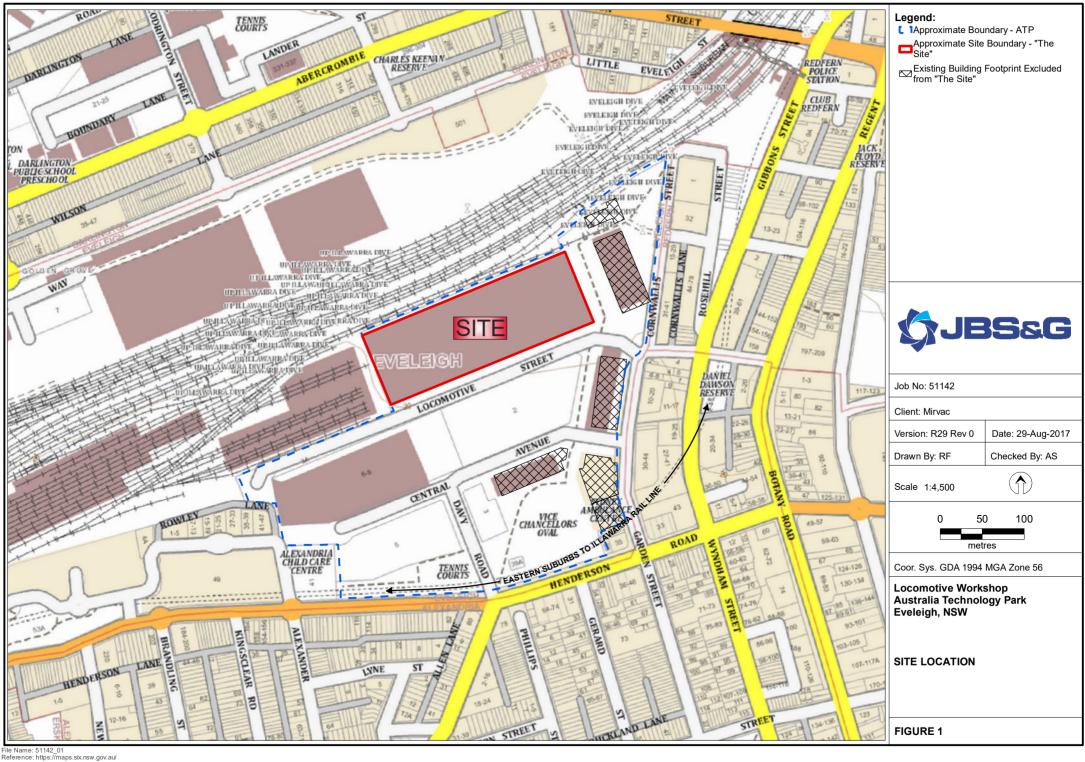
Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

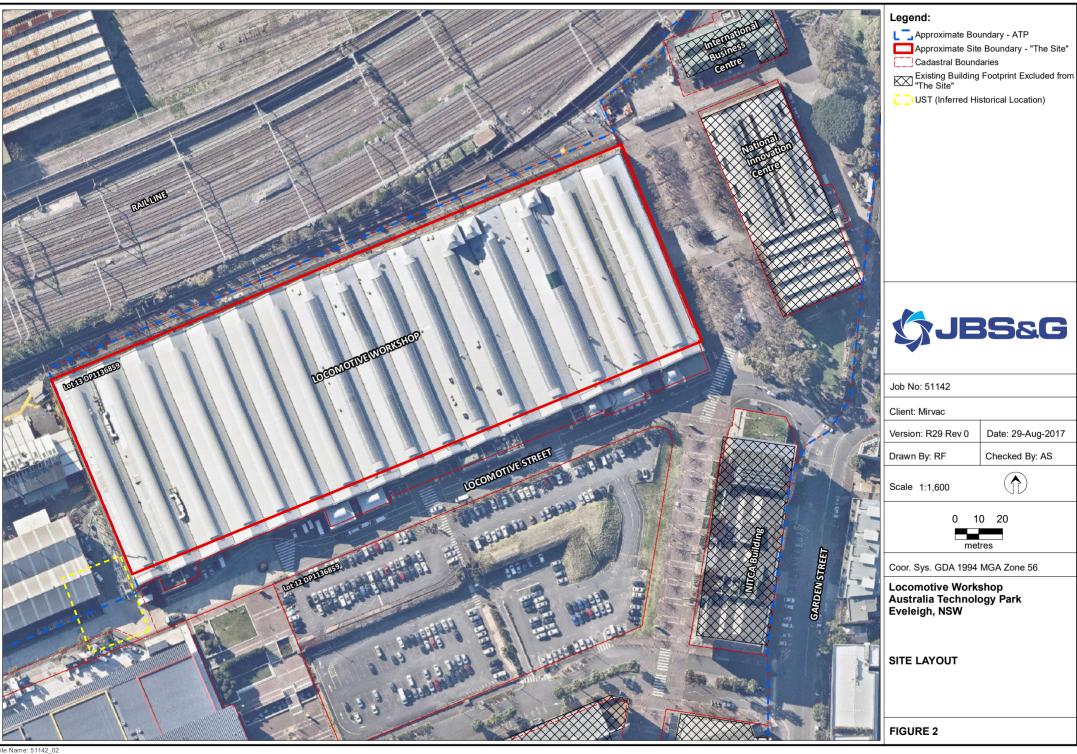
Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

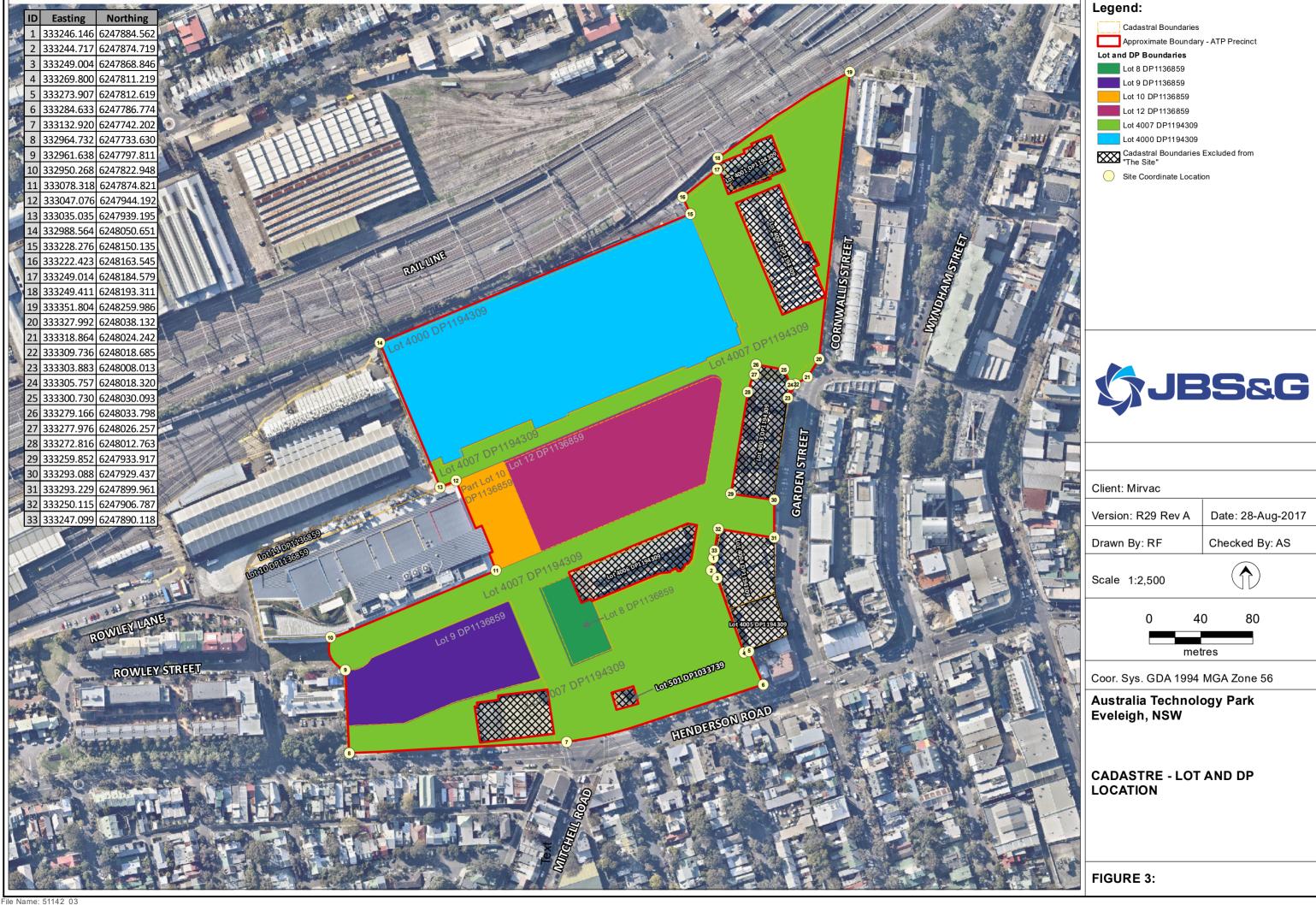
This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review



Figures







File Name: 51142_03 Reference: Imagery - www.nearmap.com: Cadastre Boundary -maps.six.nsw.gov.au



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