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Soil, Water and Flooding Assessment

Prepared for:

Visy
112 Euston Road, Alexandria

31 October 2019



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Document Certification

This report has been developed based on agreed requirements as understood by SEEC at the time of investigation. It applies only to a specific task on the nominated lands. Other interpretations should not be made, including changes in scale or application to other projects.

Any recommendations contained in this report are based on an honest appraisal of the opportunities and constraints that existed at the site at the time of investigation, subject to the limited scope and resources available. Within the confines of the above statements and to the best of my knowledge, this report does not contain any incomplete or misleading information.

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31 October 2019

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1 INTRODUCTION

1.1 Project Description

Visy proposes to develop a Dry Recyclables Facility (DRF) at 112 Euston Road, Alexandria (the site) to service kerbside and commercial recyclable waste material collections. The operation will comprise a waste transfer station (TRF), cardboard baling (Baling) and material recovery facility (MRF) for up to 155,000 tpa of material.

1.2 Project Features

The site has an existing large building (formerly a warehouse), approximately 7,700 m², and an adjoining office building and car parking. The site also has road frontage to Burrows Road which is the proposed sole truck entry and exit to the operations building. Site car parking is accessed from Burrows Road.

An existing concrete stormwater channel runs adjacent to the northern boundary before transitioning to culverts under the bitumen carpark. The concrete channel is approximately 4m wide and 2.2m deep. The existing box culvert under the carpark is 4m wide x 2.4m high and is located within a drainage easement.

The existing site is shown in Figure 1 and a survey of the site is provided in Appendix A.

The existing warehouse and offices will remain in place with internal fit out and changes to the external façade only. No significant earthworks or changes to building, carpark, or yard levels are proposed. The proposed development will be undertaken in two stages as shown in Figures 2 and 3 and as described below.

1.3 Development

The Stage 1 construction includes all works for the proposed facility except the installation of the MRF and new substation kiosk on Euston Road. Works that are relevant to this assessment will include:

Stage 1

- Replacement of three existing roller doors that will no longer be used for access with fixed weather proof acoustic shielding louvres (two facing Euston Road and one facing Burrows Road);
- Remove one existing driveway that will no longer be used for access on Burrows Road and landscape and reinstate kerb and gutter;
- Install new inbound driveway from Burrows Road;
- Install rapid doors to truck entry and exit doors on Burrows Road;
- Install inbound and outbound weighbridges in pits with excavation to about 1 m deep and including sump pits; Install upgraded fire services, including ring main

and hydrant system, fire hose reels, fire services sprinkler system including internal sprinkler tank, sprinklers, fire water containment; and

- Flood protection measures including all electrical equipment which must remain waterproof is located above the 1%AEP level and all materials below the 1%AEP are flood compatible;
- Install pallet racking above 1% AEP along eastern wall for hazardous waste storage; and
- Seal all stormwater pits located within existing large building.

Stage 2

- Installation of a mezzanine level including support foundations and footings;
- Remove one existing tree on Euston Road setback frontage (to allow new substation); and
- Installation of L Type substation on Euston road.

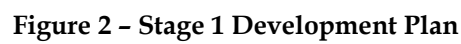
1.4 Purpose of This Report

The purpose of this report is to undertake a desktop assessment of the existing and proposed site to identify potential soil erosion, water and flooding impacts. In summary the report will:

- Describe water and soil resources, hydrology, drainage and waterways relevant to the site.
- Identify potential for flooding, salinity or acid sulfate soil and erosion impacts.
- Provide a water balance for the site including water supply security, rainwater harvest potential, waste water discharge, and water minimisation measures as applicable
- Assess stormwater, wastewater, detention and pollution containment systems for the site if required.



Figure 1: Site location and layout



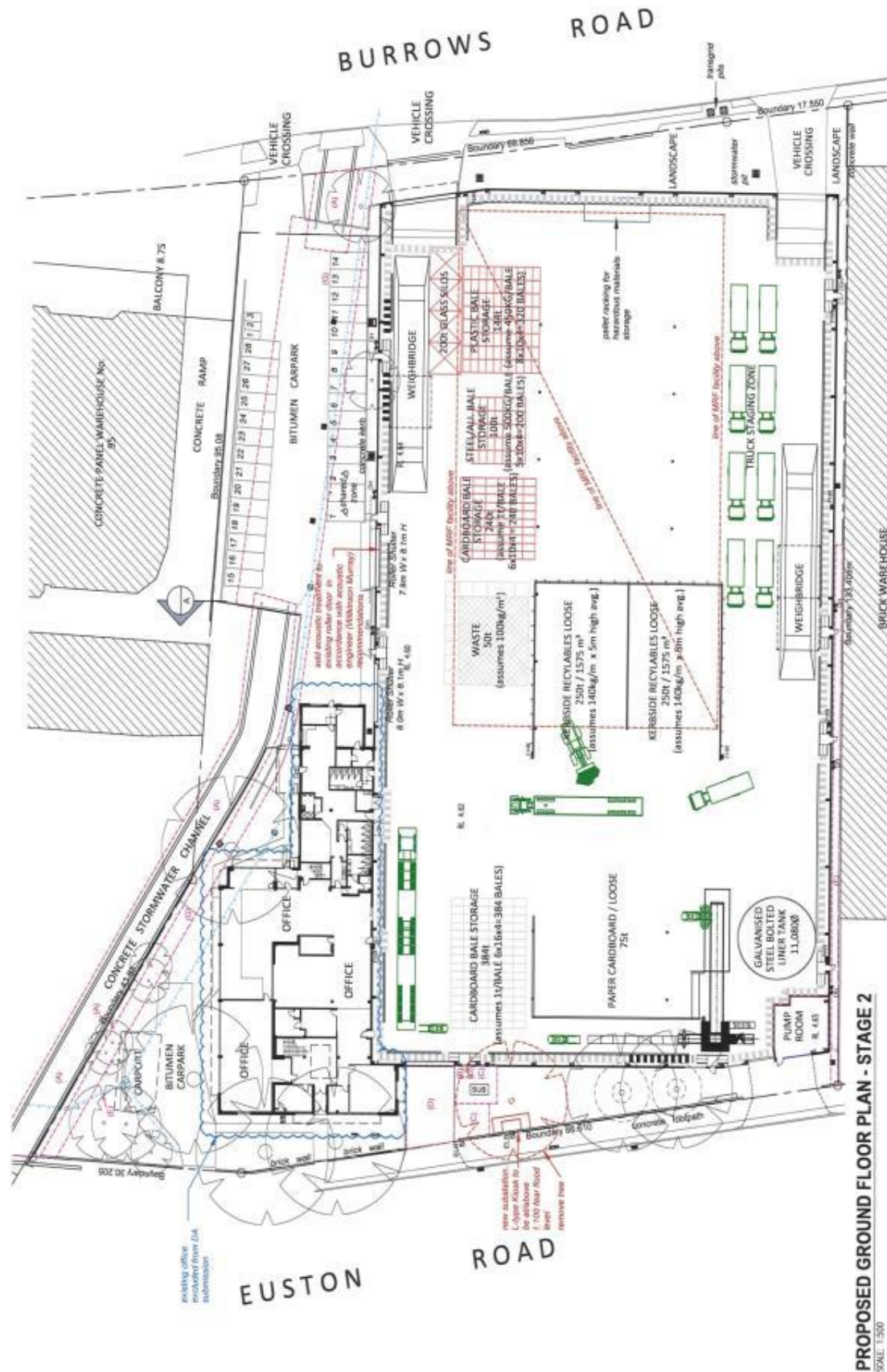


Figure 3: Stage 2 Development Plan

2 DATA SOURCES

2.1 Data and guidelines used for the study

The following data has been supplied by various organisations to allow the study to be completed.

- Alexandra Canal Model Conversion – Final Report – City of Sydney
- Alexandra Canal Model Conversion – TUFLOW model results
- Detail site survey – Boxall surveyors
- Existing and proposed site layout (stage 1 and stage 2)
- Proposed fire services layout
- City Of Sydney Interim Floodplain Management Policy
- Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2004) (the “Blue Book”);
- Australian Rainfall and Runoff Guidelines, 2016;
- E-Spade - State of NSW and Office of Environment and Heritage 2017;
- Council-provided GIS data
- Environmental Site Investigation – KPMG – 29 August 2019; and
- A site visit.

2.2 Site Visit

A site visit was undertaken by Jason Armstrong of SEEC on the 9th of September 2019. At the time of inspection the site was not in operation and with no visible signs of erosion or flooding. Euston Road was currently undergoing construction works for an upgrade as part of the WestConnex transport development plan.

The majority of the site is covered by the building and carpark (approx. 85% impervious). The roof and carpark stormwater drainage system were in good working condition at the time of inspection. The stormwater drainage canal that is located along the northern boundary and culverts under the carpark were clear of debris with some minor flow in the canal at the time of inspection. Photos 1 to 4 below show some of the sites existing drainage infrastructure.



PHOTO 1 - In northern carpark looking west towards Office Building showing building downpipes



PHOTO 2 - Existing grated drainage pits in Northern Carpark



PHOTO 3 – Looking South at side entry roller door and downpipes



PHOTO 4 – Stormwater Drainage Canal looking west

3 EXISTING ENVIRONMENT

3.1 Climate

Bureau of Meteorology rainfall statistics for Sydney Airport Station No. 066037 (3 km away) for the period 1929-2019 are contained in Table 1. The wet season extends from February to June with the driest month being September.

Table 1 - Monthly climate averages for Sydney Airport (BoM station 066037)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Rainfall (mm)	94.5	111.1	117.9	106.8	95.1	125.3	68.6	76	59.8	70.6	80.6	73.6	1081.1
Mean no of days with rain >1mm	8.1	8.6	9.4	8.4	8.3	8.9	6.6	6.8	6.8	7.9	8.3	7.8	95.9
Mean maximum temperature (°C)	26.7	26.5	25.4	23	20.2	17.6	17.2	18.4	20.7	22.7	24.2	25.9	22.4
Mean minimum temperature (°C)	19	19.1	17.6	14.3	11	8.7	7.3	8.2	10.5	13.3	15.5	17.6	13.5

Average annual evaporation is around 1500mm and tends to exceed rainfall except during intense rainfall events.

The Bureau of Meteorology reports the 2-year, 6-hour rainfall event as 11.3mm/hr for Alexandria based on the latest 2016 IFD rainfall intensity. This translates to a Revised Universal Soil Loss Equation (RUSLE) R-Factor of 2760 which is moderate.

The winds can be strong at any time of year in this location, sufficient to cause dust rise from exposed areas of soil.

Temperatures are warm enough that frost is unlikely to be an issue for revegetation of disturbed areas. Warm to hot temperatures in summer also translate to relatively high evapotranspiration rates, which can impact on rehabilitation.

3.2 Soils

Hazleton P.A. (1992) shows the site to be located just inside the boundary of the Disturbed Terrain Landscape and the Tuggerah landscape (Refer to Figure 4). Descriptions of these soil landscapes are included below.

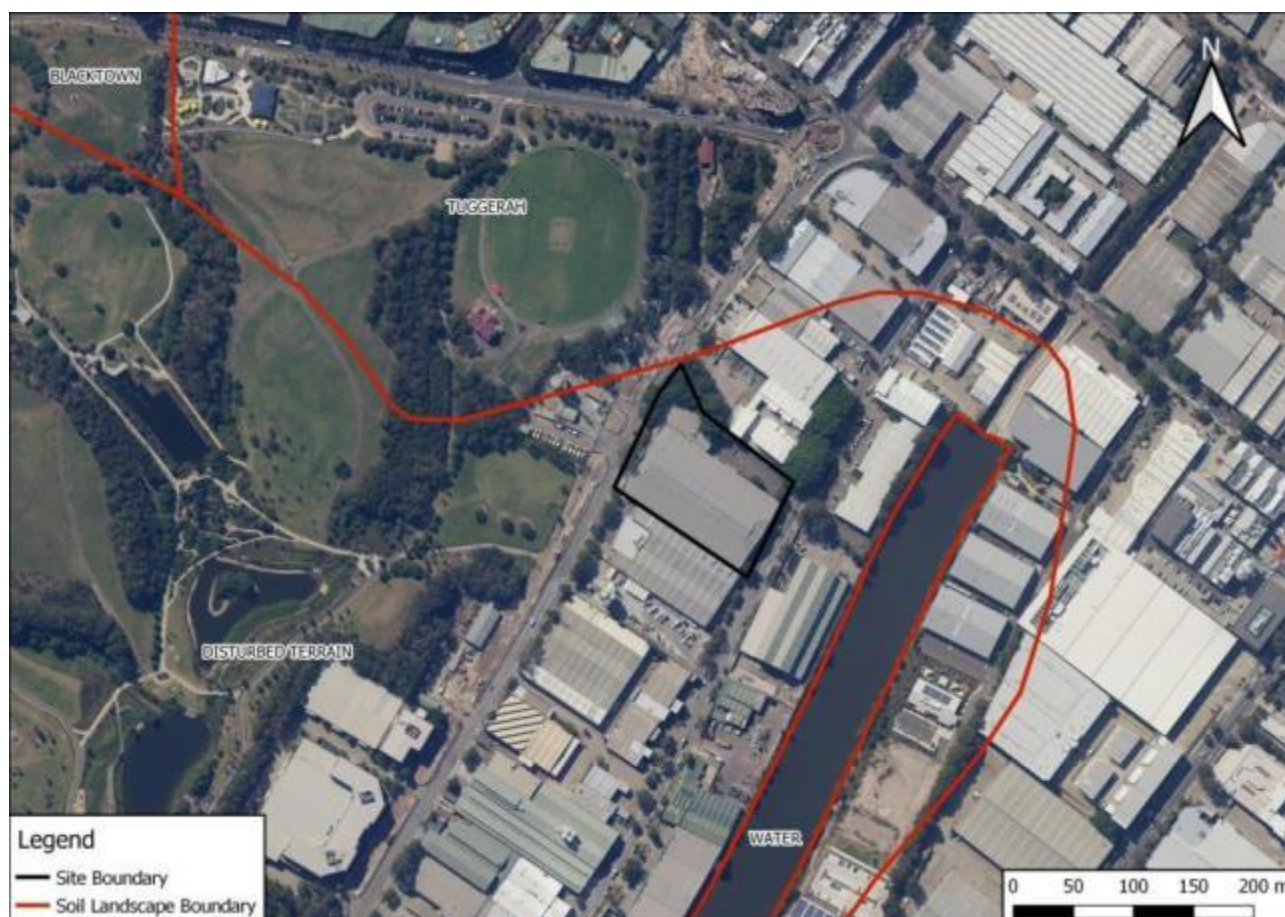


Figure 4: Soil Mapping (Source Hazleton P.A. (1992), NSW Spatial Services, 2019)

3.2.1 The Disturbed Terrain Landscape

The Disturbed Terrain Soil Landscape generally consists of level plain to hummocky terrain, extensively disturbed by human activity, including complete disturbance, removal or burial of soil. Landfill typically includes dredges estuarine sand and mud, demolition rubble, industrial and household waste, soil, rock, building and waste materials that is commonly capped with up to 40 cm of sandy loam or up to 60 cm of compacted clay over fill or waste materials.

Existing erosion varies markedly according to site characteristics including slope, aspect and exposure.

The expected dominant soil materials include:

- Loose black sandy loam – black loamy sand to loam-fine-sandy with loose apedal single grained structure and sandy fabric. The colour ranges from a dark brown to black or brown and is brittle when dry and crumbly when moist. It is often water repellent and a surface crust may be present. pH ranges from moderately acid (pH 5.0) to neutral (pH 7.5)
- Compacted mottled clay - mottled, compacted sandy clay loam to medium clay with an apedal massive to moderately pedal structure. It generally has been compacted to form an impermeable isolating cap over potentially hazardous buried

materials. Colour is highly variable and mottles are common. The pH is also variable, ranging from extremely acid (pH 3.5) to slightly alkaline (pH 8.0)

- Variable transported fill - This material is commonly referred to as fill and may consist of any type of soil or regolith material. It often includes demolition rubble and industrial and household wastes. Colour, texture, structure, fabric, degree of compaction, porosity and pH vary markedly
- Dark dredged muds and sands - dark dredged sands, sandy loams to silty clay loams and sandy clays with apedal single-grained to massive structure and sandy fabric. Colour varies from black to a yellowish brown. Charcoal, shells or shell fragments are commonly present. The material swells, is highly saline and neutral (pH 7.0) to moderately alkaline (pH 9.0) when first dredged, but with drainage and oxidation the salinity levels drop and acidity may increase dramatically.

Limitations are dependent on the nature of the fill material but can include mass movement hazard, unconsolidated low wet strength materials, impermeable soil, poor drainage, localised very low fertility and toxic materials.

Table 2 – Soil Landscape Limitations for the Disturbed Terrain Soil Landscape

Limitation	Occurrence
Mass Movement	Steep locations
Seasonal waterlogging	Localised
Erosion Hazard	Localised
Steep slopes	Localised
Non-cohesive soil	Localised
Rock Outcrop	Localised

Other relevant characteristics of the Disturbed Terrain Soil Landscape are:

- Fertility is low
- Low available water capacity
- Soils can be hardsetting
- Soils can be highly permeable
- Soils can have a low wet strength
- Soils may have acid sulfate potential

3.2.2 Tuggerah Soil Landscape

The Tuggerah Soil Landscape is gently undulating to rolling coastal dunefields. Local relief to 20 m, slope gradients generally 1-10%, but occasionally up to 35%. North – south oriented dunes with convex narrow crests, moderately inclined slopes and broad gently inclined concave swales. Extensively cleared open-forest and eucalypt/apple woodland.

No appreciable erosion occurs where slopes are low and a vigorous ground cover is maintained. Isolated blowouts caused by wind erosion occur in exposed areas where cover has been removed.

The expected dominant soil materials include:

- Loose speckled grey-brown loamy sand – grey brown speckled sand to loamy sand with apedal single-grained structure and porous sandy fabric. Colour ranges from brownish-grey to brownish-black or black with increasing organic matter. It is characteristically water repellent. The pH is slightly acid (pH 6.0) to neutral (pH 7.0)
- Bleached loose sand - This is bleached sand with apedal single-grained structure and porous sandy fabric. The surface condition is loose and the material is non-cohesive when dry and weakly coherent when moist. Dry colours are commonly bleached and moist colour ranges from light grey and greyish-yellow to dull yellow-orange. The pH ranges from moderately acid (pH 5.5) to neutral (pH 7.0)
- Grey brown mottled sand – mottled sand or loamy sand with apedal single-grained structure and loose sandy fabric. It is weakly coherent when moist and non-cohesive when either dry or saturated. Colours range from brownish-grey to greyish-brown. Faint grey mottles become increasingly common with depth. This material is seasonally waterlogged. The pH ranges from moderately acid (pH 5.5) to neutral (pH 7.0)
- Black soft sandy organic pan - black, soft, organic stained sand to loamy sand with apedal massive structure and sandy or, less commonly, earthy fabric. This material consists of quartz sand grains coated and weakly cemented with black organic compounds. Colour is commonly black or brownish-black. The pH ranges from moderately acid (pH 5.5) to neutral (pH 7.0). This material requires up to a moderate force to disrupt and is often hardsetting on exposure
- Brown soft sandy iron pan - brown soft iron stained sand to loamy sand with apedal massive structure and sandy or less commonly earthy, fabric. It is commonly known as coffee rock. This material consists of quartz sand grains coated and weakly cemented with yellow and red sesquioxides. Colour varies from bright yellowish- brown to brown. Dark brown and orange mottles are common. This material requires a moderate force to disrupt and is often hardsetting on exposure. The pH ranges from moderately acid (pH 5.5) to neutral (pH 7.0)
- Yellow massive sand - yellow-orange sand to clayey sand with apedal single-grained or apedal massive structure and sandy or earthy fabric. This material consists of clay-coated quartz sand grains that are compacted, but not cemented. Colour varies from light yellow to dull yellow-orange. The pH ranges from strongly acid (pH 4.5) to neutral (pH 7.0)

Limitations include extreme wind erosion hazard, non-cohesive, highly permeable soil, very low soil fertility, localised flooding and permanently high watertables.

Table 3 – Soil Landscape Limitations for the Tuggerah Soil Landscape

Limitation	Occurrence
Wind Erosion Hazard	
Waterlogging	Localised

Steep slopes	Localised
Flood Hazard	Localised
Non-cohesive soil	

Other relevant characteristics of the Tuggerah Soil Landscape are:

- Fertility is low to very low.
- Low available water capacity
- Soils can be hardsetting
- Soils can be strongly acidic
- Soils have a low Cation Exchange Capacity
- Subsoil is low erodible (K-Factor = 0.009 – 0.016) (Landcom, 2004)
- Soils are Hydrological Group B (Landcom, 2004). Runoff would occur infrequently with a low to moderate runoff potential
- Soils are Type C for the purpose of sediment control (Landcom, 2004); Coarse capture (Type C) sediment basins will be required.

3.2.3 Acid Sulfate Soils

Acid sulfate soil mapping conducted by the Department of Land and Water Conservation, Sydney (1998) places the site on Disturbed Terrain of an elevation >4m (Figure 5). All soils on disturbed terrain are assumed to have acid sulfate soil potential. The Sydney Local Environment Plan (LEP), 2012 has categorized the site as a Class 3 Acid Sulfate Soil (Figure 6). According to the Sydney LEP, 2012 part 7 division 4, clause 7.14, development consent must be sought for works more than 1 metre below the natural ground surface and for works by which the watertable is likely to be lowered more than 1 metre below the natural ground surface. Sub clause 3 states “Development consent must not be granted under this clause for the carrying out of works unless an acid sulfate soils management plan has been prepared for the proposed works in accordance with the Acid Sulfate Soils Manual and has been provided to the consent authority” (City of Sydney, 2012).



Figure 5: Acid Sulfate Soil Mapping (Source Department of Land and Water Conservation, Sydney, 1998)

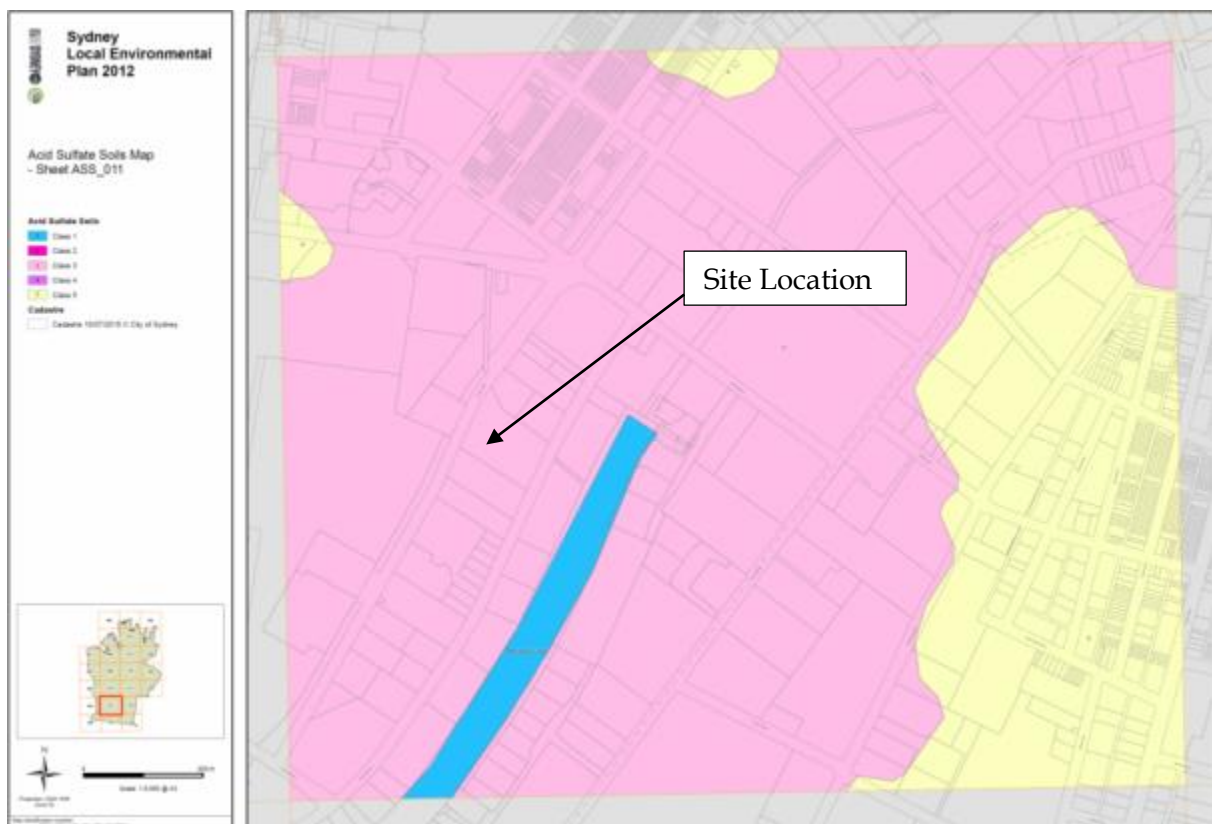


Figure 6: Acid Sulfate Soil Mapping (Source City of Sydney LEP 2012)

3.2.4 Salinity

There is currently no salinity mapping within the assessment area, therefore further assessment of the existing soils for salinity is recommended.

3.2.5 Prior contamination

KPMG undertook an environmental site investigation in August 2019 for the site owner. The purpose of the investigation was to assess for the presence and nature of chemicals of concern (COCs) in the soil as a result of previous activities on the site. Previous uses included industrial purposes since the 1910's with the most recent use comprising warehouses and adjoining offices constructed in the late 1970's which were used for the storage of documents and logistics purposes.

The investigation is described in detail in KPMG 2019, however a summary of the findings is provided below.

- Investigation include 23 soil investigation boreholes
- 38 soil samples were collected and analysed for a range of COC's
- The concentrations of COC's within all soil samples analysed were within the laboratory limit of reporting and/or below the adopted human health assessment criteria for commercial/industrial use. The concentrations of benzo(a)pyrene and heavy metals (copper and zinc) exceed the adopted ecological assessment criteria from commercial/industrial land use at isolated locations. The report stated that these criteria are not considered to be directly applicable to the investigated areas given their current condition and vegetation in areas investigated appeared to be in good health with no evidence of obvious stress
- The report concluded that based upon the findings of the investigation, the site is not adversely affected by COC's as a result of warehousing activities that would preclude the use of the site for continued commercial/industrial purposes.

3.2.6 Existing Soil Erosion

The site is completely covered with the building, hardstand and landscaped areas with no visible signs of erosion of existing soils. The existing stormwater drainage canal is completely lined with concrete due to the expected high velocities of flows along its surface.

3.3 Topography, Catchment Area and Natural Drainage

The site is located within the Alexandra Canal catchment (Figure 7). This catchment was included as part of an overall Flood Study, Flood Risk Management Study and subsequent Flood Risk Management Plan developed for the Alexandra Canal Floodplain discussed in further detail in Section 3.4 below.

The total catchment area to the Alexandra Canal is approximately 1,141ha and includes the suburbs of Alexandria, Rosebery, Erskineville, Beaconsfield, Zetland, Waterloo,

Redfern, Newtown, Eveleigh, Surry Hills and Moore Park. It is generally bounded by the Eastern Distributor and Moore Park in the east, Gardeners Road in the south, Sydney Park and Newton in the west and Albion Street in the north-east. The majority of the trunk drainage system is owned by Sydney Water, while the feeding drainage systems are primarily owned by Council.

Sydney Park is located to the west of the site on the opposite side of Euston Road. An existing watercourse flows through the north eastern corner of Sydney Park and then into box culverts under Euston Road. These box culverts discharge stormwater from Sydney Park into the stormwater canal located within the site from the west. The existing concrete stormwater canal is owned by Sydney Water and runs adjacent to the northern boundary before transitioning to culverts under the bitumen carpark and continuing under Burrows Road. The concrete channel is approximately 4m wide and 2.2m deep. The existing box culvert under the carpark is 4m wide x 2.4m high and is located within a drainage easement. The box culverts continue from the site under Burrows Road until they connect in with the Alexandra Canal approximately 65m past the site to the east. Alexandra Canal flows south-west into the Cooks River a further 3.9km downstream and then ultimately into Botany Bay, approximately 2.1km beyond this point.

As previously discussed, Euston Road is currently under construction works as part of an upgrade for the WestConnex Transport Plan. It is understood that the stormwater drainage within Euston Road had also been upgraded which will have a beneficial impact with regard to reducing stormwater inundation of the subject site. It is also understood that a future detention basin is planned in Sydney Park and amplification of trunk drainage upstream in Macdonald and Coulson Streets to further help mitigate localised flooding issues around Euston Road. This is described in the Flood Risk Management Plan prepared by Cardno (2014).

The site itself falls from the north-west from an elevation of 4.92m AHD towards the south east at an elevation of 3.39m AHD. 86% of the site is roof area or concrete hardstand/carpark. The remaining 14% is landscaping in the northern corner and two street frontage grassed setbacks. There is no exposed soil on site.

The site has a number of field inlets/grates that collect stormwater and direct flows to the adjacent culvert and open canal. Roofwater is collected via roof gutters, downpipes and a piped drainage system and discharges directly into the culvert or open canal.

3.4 Flooding

A detailed flood assessment of the Alexandra Canal catchment has been undertaken on behalf of the City of Sydney by BMT WBM. The study estimated the extent, depth and velocity of flood waters for various design events up to the Probable Maximum Flood (PMF) (the largest flood that could conceivably occur). The 1% Annual Exceedance Probability (AEP) event is used for purposes such as the setting of design standards for new dwellings, habitable floor levels and business or commercial floor levels while the

PMF is used for emergency management purposes. The study also reviewed the potential Flood hazard which is a function of flood depth and velocity and it is used to aid in evaluating areas where floodwaters pose a greater risk to life and property.

The estimated areas of inundation for the 1% AEP (100 year ARI) and the 50% AEP (2 year ARI) are provided in Figure 8 and Figure 9 respectively.

The BMT WBM flood assessment concluded that the adjacent channel had a high-medium provisional hydraulic flood hazard however the flow water around the building have been categorized as a low flood hazard for the 1% AEP flood. This is due to the relatively low flood depths of 0.3-0.4m and the low flood velocities of around 0.2 – 1.0m/s as shown in Figure 10 and Figure 11 respectively.

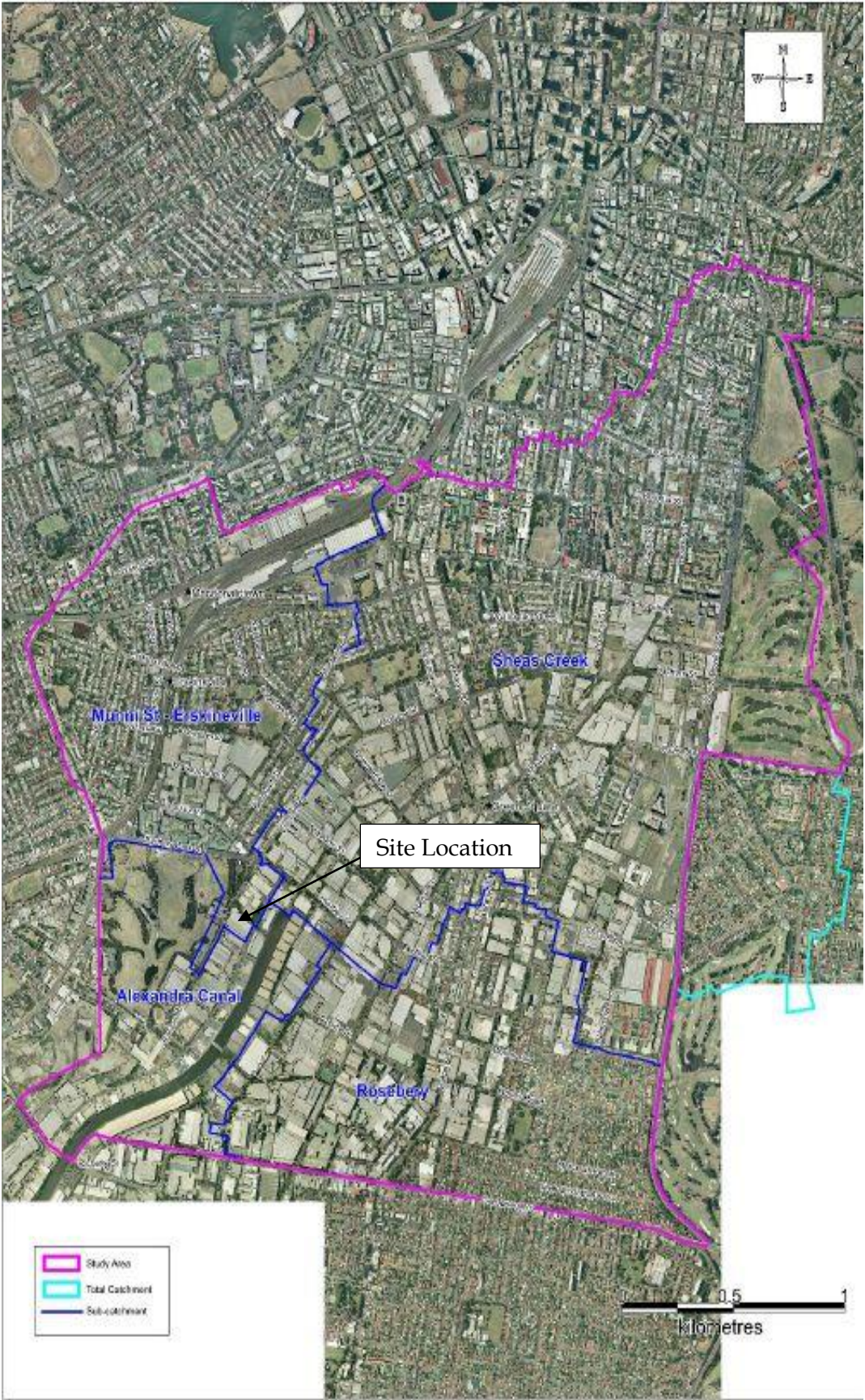


Figure 7 - Flood Study Area and Catchment Plan



Figure 8 - Flood Extents - 1% AEP



Figure 9 - Flood Extents - 50% AEP

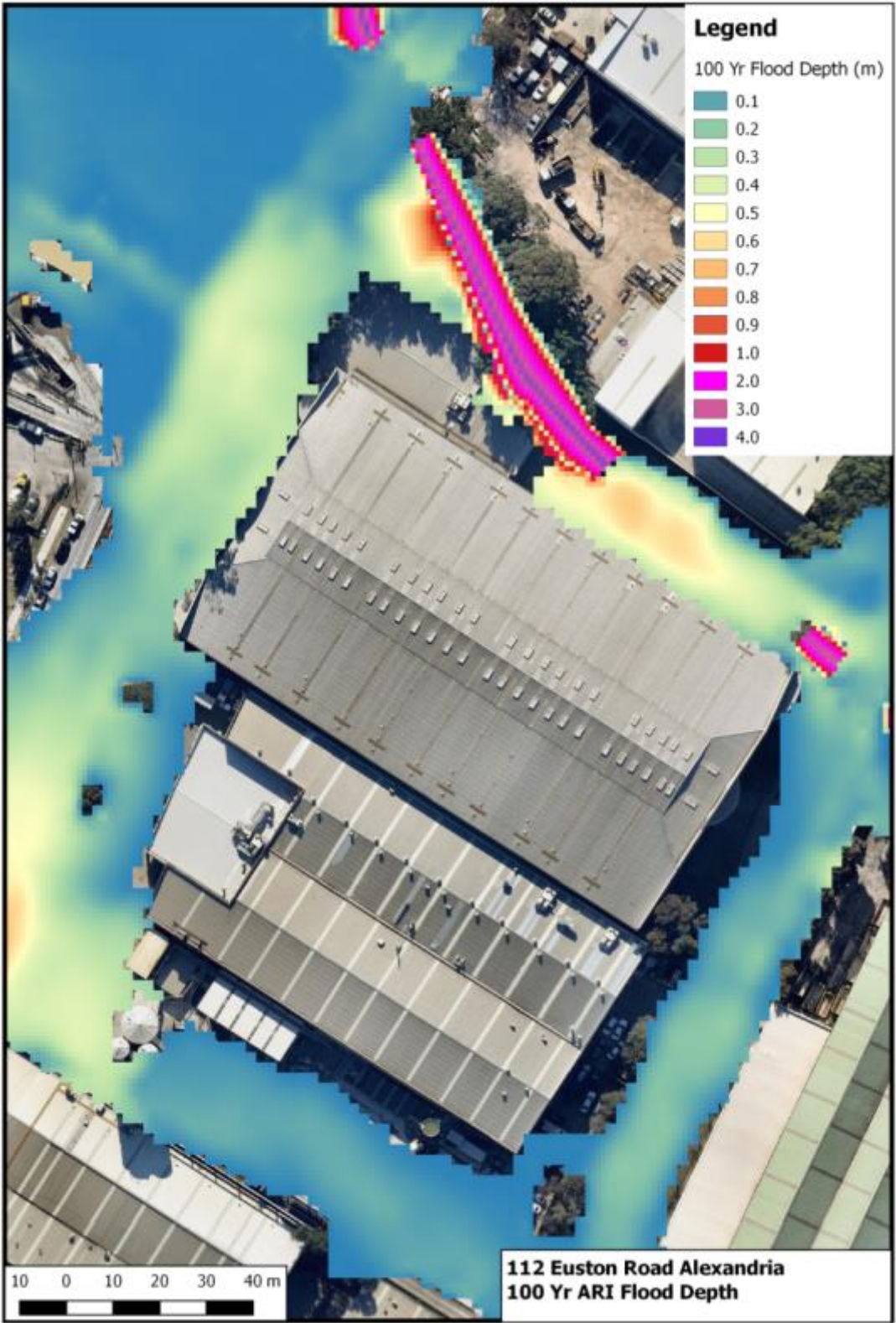


Figure 10 – Flood Depth – 1% AEP

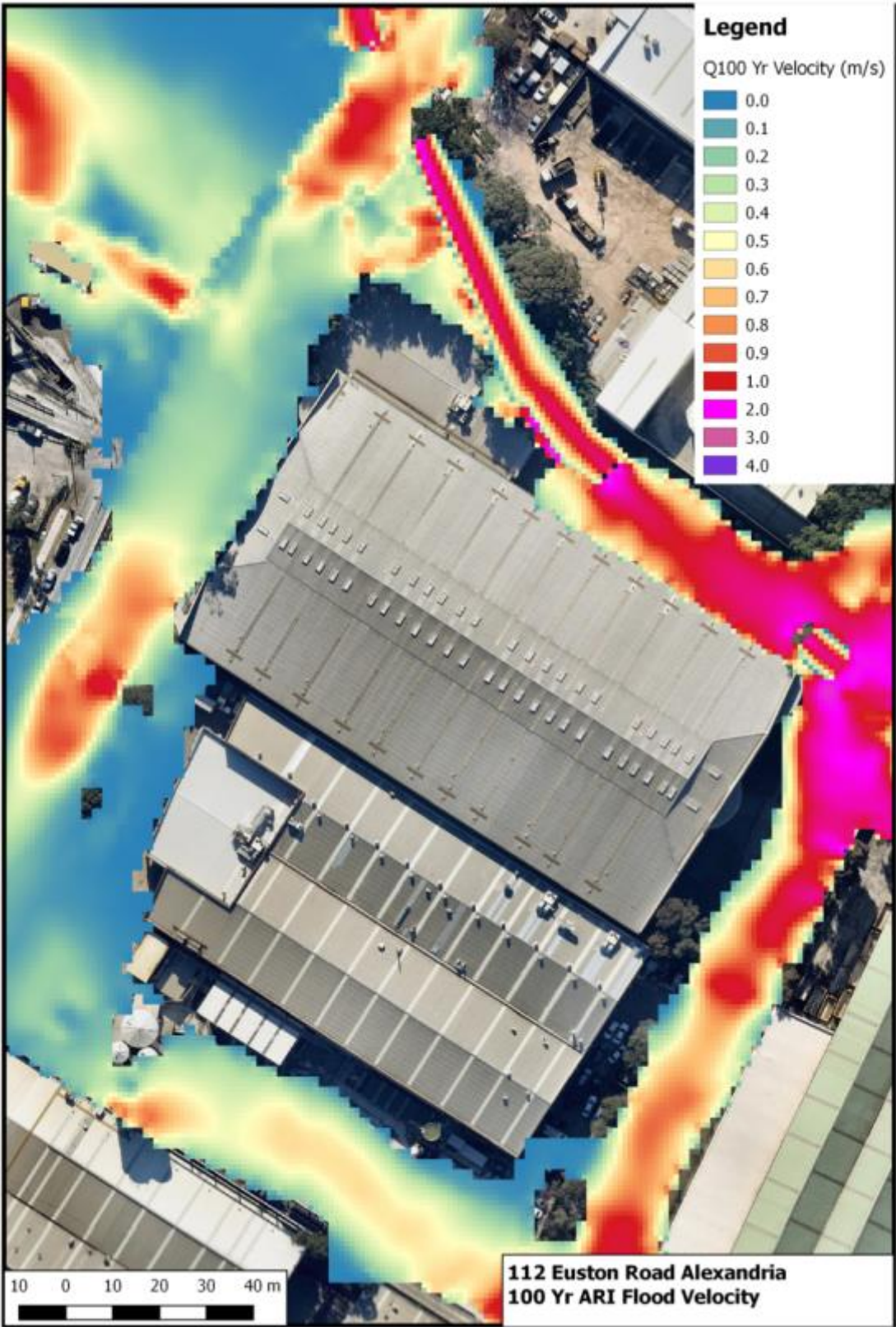


Figure 11 - Flood Velocities - 1% AEP

The flood modelling highlights that the 1% AEP flood is expected to inundate the existing office to 0.09 m and the warehouse from Euston Road to 0.35 m. The office is protected in the 50% AEP however the warehouse is expected to be inundated from Euston Road to 0.25 m. Inundation from Burrows Road is not expected. A summary of the results is provided in Table 4.

Table 4 - Summary of flood modelling results

Location	Existing Floor Level (m AHD)	50% AEP Flood Level (m AHD)	50% AEP Depth of Inundation (m)	1% AEP Flood Level (m AHD)	1% AEP Depth of Inundation (m)
Office - Euston Road	4.91	4.9	N/A	5.0	0.09
Warehouse - Euston Road	4.66	4.9	0.24	5.0	0.34
Warehouse - Burrows Road	4.61	4.2	N/A	4.3	N/A

3.5 Stormwater Network

The site is serviced by an existing stormwater drainage system consisting of the following:

- Roof gutters and downpipes collecting roof water and connecting directly into a below ground stormwater drainage system
- The stormwater drainage system consists of a series of surface inlets at select locations around the existing building
- The site stormwater drainage system discharges directly into the existing drainage canal located along the northern boundary of the site, which is part of the trunk drainage system owned by Sydney Water
- There are some drainage pits located within the warehouse area which are presumed to discharge to the stormwater drainage system but this has not been confirmed. These pits will be sealed off to ensure no connection between the internal processing area and the stormwater system.

There are no rainwater collection tanks or detention basins located within the development area. This will remain the case as it is not proposed to undertake any external modifications to the existing building that will increase roof area or increase the total impervious area of the site. The development of a new inbound driveway on Burrows Road is expected to be offset by the removal of an existing driveway and concrete apron on Burrows Road which will be landscaped.

Refer to Figure 12 for a plan showing the existing stormwater drainage infrastructure.

3.6 Water Quality

There are no existing water quality treatment devices located on site with regard to stormwater. This includes rainwater collection tanks, gross pollutant traps or other filter

devices. Generally, new developments that involve major alterations and additions to the existing footprint or greenfield developments would require water quality modelling using Council's MUSIC Link software. In this case, it is not proposed to change the external footprint of the existing site facility or impervious areas as part of the development. There is also no requirement to use water within the processing area therefore limiting the potential to generate stormwater pollutants and negating the need for additional water quality treatment facilities. This is discussed further in the Risk Assessment Section 5.4.

3.7 Water Utilities

Potable water is currently sourced from the Sydney Water main. Water will be required for the following activities:

- Fire water (Tanks and Hydrants),
- Office amenities,
- Toilets and showers.

The development will include a dedicated fire system to support fire sprinklers and fire hydrants (refer to fire services plans by Code Fire Safety). A dedicated fire sprinkler tank will be installed for the development with a capacity of between 0.522 ML and 1,044 ML of fire water for the sprinkler system will be required to be stored on site in a holding tank. This would be kept topped up by the water main. The proposed fire hydrants would access the water main directly.

Additional information on the expected water volumes required for the site is provided in Section 5.5.

3.8 Sewer and Waste Water Disposal

The site is serviced by an existing sewerage system that is to remain unchanged as there is proposed only a minor upgrade of additional toilets and shower facilities in the existing office building as part of the development.

The bathroom and shower facilities will be upgraded in line with Councils current standards but this work will not be undertaken as part of this development application and will be subject to a separate development application submission to CoS Council.

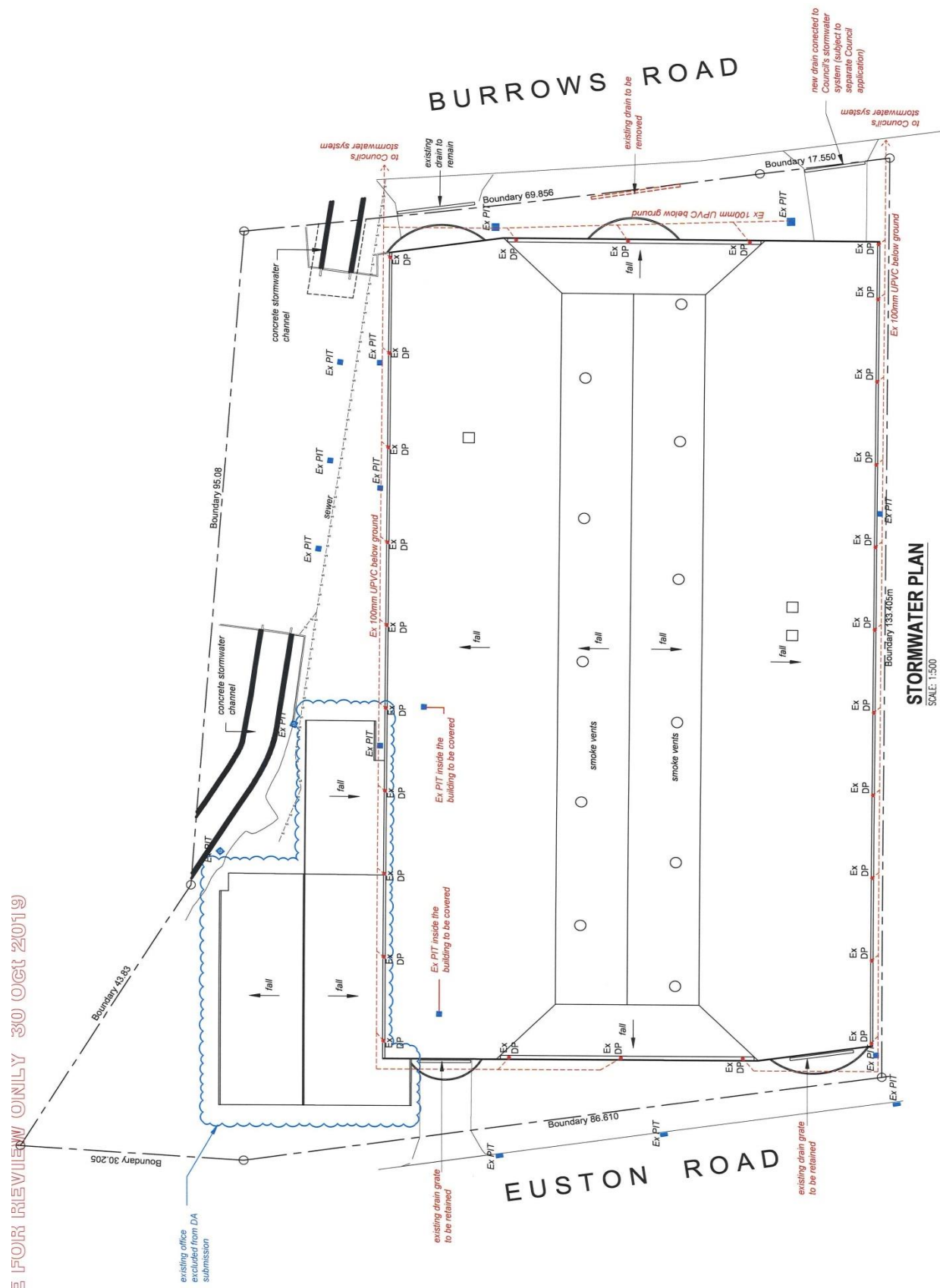


Figure 12 - Site Stormwater Drainage Plan

4 DEVELOPMENT REQUIREMENTS

4.1 SEARs

The Department of Planning, Industry and Environment has issued the Planning Secretary's Environmental Assessment Requirements (SEARs) for the preparation of the proposal's Environmental Impact Statement (EIS). The SEARS is accompanied by agency comments from relevant public authorities consulted in the preparation of the SEARs. The SEARs should be referenced for all requirements however the specific matters to address for soils and water are:

- an assessment of potential impacts to soil and water resources, topography, hydrology, groundwater, drainage lines, watercourses and riparian lands on or nearby the site, including mapping and description of existing background conditions and cumulative impacts
- a detailed site water balance including identification of water requirements for the life of the project, measures that would be implemented to ensure an adequate and secure water supply is available for the proposal and a detailed description of the measures to minimise the water use at the site
- characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality criteria (including details of the contaminants of concern that may leach from the waste into the wastewater and proposed mitigation measures to manage any impacts to receiving waters and monitoring activities and methodologies)
- details of stormwater/wastewater/leachate management system including the capacity of onsite detention system(s), onsite sewage management and measures to treat, reuse or dispose of water
- consideration of salinity and acid sulfate soils and impacts
- characterisation of the nature and extent of any contamination of the site and a description of proposed measures
- a description of erosion and sediment controls; and
- a detailed flooding assessment.

A checklist of the SEARs requirements and reference to the relevant sections of this report are attached in Section 7. The specific matter of contamination of the site is not addressed in detail in this report.

4.2 City of Sydney and Environment, Energy and Science agency comments

Agency comments that are addressed through this report include specifically the City of Sydney request that the development considers the City's Interim Floodplain Management Policy and Environment, Energy and Science comments around flooding, water and soils that are considered relevant to the development.

As per the City of Sydney's Interim Floodplain Management Policy (the policy), any new development must:

- Be compatible with the flood hazard of the land; and
- Not significantly adversely affect flood behavior resulting in detrimental increases in the potential flood affectation of other development or properties, and
- Incorporate appropriate measures to manage risk to life from flood, and
- Not significantly adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses, and
- Not result in unsustainable social and economic costs to the community as a consequence of flooding,
- Is consistent with the principles of Ecologically Sustainable Development, and
- Adequately considers the impact of climate change.

The policy does note that in some instances, relatively minor building additions will have minimal impact on the floodplain and will not present an unmanageable risk to life. Council will give consideration for some development that can be considered minor additions to existing developments. This includes Commercial and Industrial Uses of up to an additional 100 m² or 20% (whichever the less) of the Gross Floor Area of the existing building at no less than the same level as the existing adjoining approved floor level.

Clause 5 of the policy recommends the Flood Planning Level (FPL) for Industrial or Commercial businesses be adopted as the 1% AEP flood level. Above ground open car parks have a recommended FPL of the 5% AEP flood level.

Further discussions with Council (9/10/19) for the development concluded that based on the existing and proposed use that the existing floor level does not have to be raised above the 1% AEP flood level. However the following actions are required by Council to limit impacts from large flood events:

- All electrical equipment/machinery within the warehouse is to be raised above the 1% AEP flood level
- Any materials below the 1% AEP flood line is to be flood compatible
- Any risk and hazard areas or hazardous materials stored on site must be raised above the 1% AEP flood level plus 0.5m freeboard or have a bunding system that is no lower than the 1% AEP flood level
- Ensure that any stockpiled materials do not have an increased risk of being washed off-site.

5 RISK ASSESSMENT

5.1 Soil Impacts

As the proposed development will utilise the existing building, sealed floors, hardstand and carpark areas, there is limited external earthworks changes and therefore minimal areas of exposed soils. The limited civil works external to the building for construction activities are considered unlikely to cause erosion and generate sediment external to the building due to the small area of disturbance and because the existing subsoils are expected to have a low erodibility with a K-Factor of 0.009-0.016. Minor controls (e.g. sediment fences, protection of existing stormwater pits, covering any temporarily exposed surfaces etc.) are expected to be appropriate for construction activities and will be included in a site specific Erosion and Sediment Control plan as a component of the development's Construction Environmental Management Plan.

The soils mapping indicates the presence of Acid Sulfate Soils (refer to Section 3.2.3). Excavation works to about 1m will be undertaken for the weighbridges and baler conveyor pit, including for sumps within the warehouse. Any excavation works that exceed 1m will require an Acid Sulfate Soils Management plan. A detailed Acid Sulfate Soils investigation for the proposed development is recommended and should be used to inform the need for an Acid Sulfate Soils Management plan for construction.

The proposed operation of the site is considered unlikely to contaminate soils given that:

- No liquid wastes is received (and any such contamination is removed and stored in a designated area above 1% AEP and transported offsite for disposal as required)
- All received waste and recovered recyclable material is contained within the building in dedicated storage areas, including glass in silos
- Loose kerbside recyclable waste material is onsite for typically less than 24 hours and at most up to 48 hours
- Fire water containment is designed
- No process water is used onsite
- Spill kits are located throughout the site for immediate use if required
- No additional structures requiring stormwater drainage will be built.

The operations building floor, access driveways and site carpark are sealed, so there is little opportunity for the soil to be exposed. The removed driveway and concrete apron will be replaced with landscaped grass setback frontage and suitable vegetation.

5.2 Flood Risk Assessment

5.2.1 Existing Flood Risk Assessment

The development has been assessed in accordance with City of Sydney Councils 'Interim Floodplain Management Policy'. The Floodplain Management Policy provides direction with

respect to how floodplains are managed within the Local Government Area. The Policy provides controls to facilitate a consistent, technically sound and best practice approach for the management of flood risk within the City's LGA. In forthcoming years the City will complete Floodplain Risk Management Plans and then integrate outcomes from these plans into planning controls. Once this process is completed this interim policy will be withdrawn.

As discussed in Section 3.4, BMT WBM undertook a flood assessment that predicted, flood levels, velocities and hazard categories (BMT 2016). The site is located mainly within a Low Risk Flood Precinct, with the areas either side of the drainage canal being within Medium Hazard. The canal is a High Hazard Flood Precinct. The flood risk map is shown in Figure 13.

It is also noted that the stormwater drainage within Euston Road had also been upgraded as part of the Westconnex Transport Upgrade works that will have a beneficial impact with regard to reducing stormwater inundation of the subject site. It is also understood that a future detention basin is planned in Sydney Park and amplification of trunk drainage upstream in Macdonald and Coulson Streets to further help mitigate localized flooding issues around Euston Road. This is described in the Flood Risk Management Plan prepared by Cardno (2014).

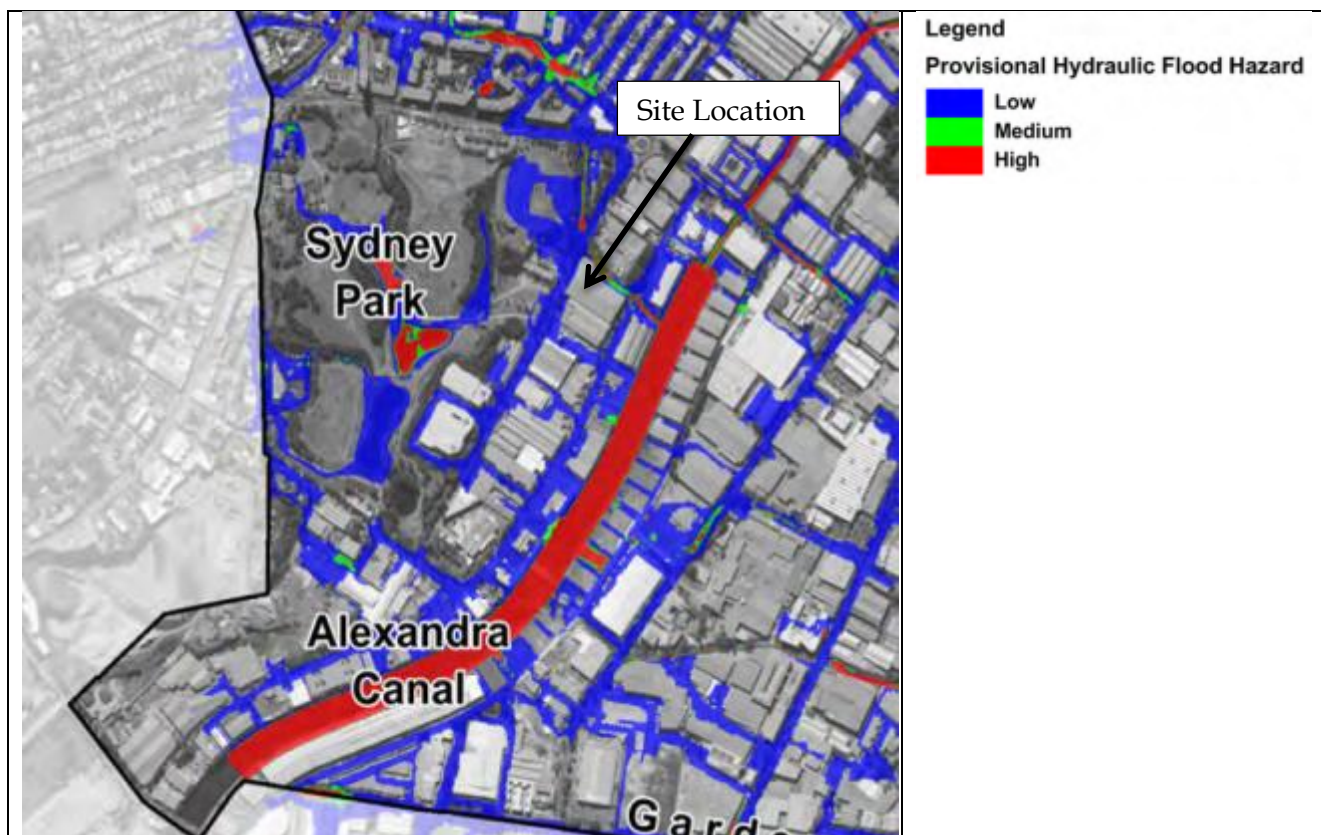


Figure 13 - Provisional Hydraulic Hazard 1% AEP (100 yr ARI) (BMT 2016)

5.2.2 Impact on Flood Behaviour

The proposed development utilises the existing warehouse and office buildings with no external changes to the existing building, roof area or hardstand areas. Therefore post development flood modelling is not required as there will be no impact to flood volumes, velocities, frequencies or peak flow rates as a result of the proposed development. As there is no change, there are no expected changes to upstream or downstream waterways, bed or bank lowering, siltation, erosion etc.

The site is to remain the same Industrial zoning as the previous use for the facility and is therefore still compatible with the established flood hazard category for the site.

5.2.3 Building Components

The existing building is constructed in accordance with the following –

- The Main Warehouse – Steel portal frame construction with horizontal pebblecrete reinforced concrete infill panels for the external walls and reinforced concrete slab floor. The roof material is colorbond steel
- The Office Building – Double brick walls on reinforced concrete slab with colorbond steel roof
- Fencing – Chain wire fencing is provided around the existing drainage canal so as not to impede flood flow. Brick and steel fencing is provided along the Euston Road frontage
- Electrical Equipment – raised above the flood level where required.

The current layout allows floodwater from the 1% AEP to enter the building from Euston Road, flow through the building and discharge to Burrows Road. Any building materials up to 0.3-0.4m high will be inundated. If the materials are not flood compatible, they will be damaged.

5.2.4 Flood Forces and Impact on Structures

The existing buildings have been in place for decades and have remained undamaged and in place during previous flooding events. As there is no change to the building an assessment of structural soundness during potential floods of the following impacts including hydrostatic pressure, hydrodynamic pressure, impact of debris and buoyancy forces have not been addressed.

5.2.5 Car Parking and Driveway Access

The existing northern carparking area is located within the flood flow path and its levels set below the existing 1% and 50% AEP flood levels. Parked vehicles could potentially block the overland flow path if they are not removed early as part of the evacuation procedure from the site prior to a flood event. Parked vehicles, bicycles or outdoor furniture could also be washed downstream potentially blocking drainage structures

exacerbating flood levels upstream. The existing car park from Euston Road will not be used for vehicles as there is no access allowed to the site from Euston Road.

5.2.6 Operations equipment and Waste

As previously outlined in Section 5.2.3 the existing building will be subject to flooding due to the floor levels being below the 1% and 50 AEP flood levels. This has the potential to damage any stationary or mobile machinery and electrical equipment. Floodwater flow through the building also has the potential to wash any loose waste materials from within the building outside the building and downstream, depending on their size, weight and buoyancy.

5.2.7 Impact of Climate Change

The CoS Interim Floodplain Management Policy states that a freeboard or factor of safety should be provided above the design flood level to compensate for uncertainties in the estimation of the flood level which includes changes in rainfall patterns as a result of climate change. The policy requires development to consider climate change by the following requirements.

- For those developments which have a lifespan of more than fifty years the impact due to sea level rise and impacts due to increased rainfall intensities shall be considered;
- Meet the allowances for sea level rise as recommended in the NSW Government Coastal Planning Guideline: Adopting Sea Level Rise 2010 (recently withdrawn from publication). Specifically, this shall include an allowance of 40cm by 2050 and a 90cm by 2100 from the 2009 Mean Sea Level;
- Where in the opinion of the City the proposed development is of reasonable impact to regional or catchment trunk drainage, the drainage system design shall allow for a minimum of 10% increased rainfall.

Council's flood study included an assessment for climate change with increases to rainfall intensity and sea level rise. Flood levels were typically found to increase by around 0.1m for the 10% increase in rainfall intensity, however they could increase by 0.3m for a 30% increase in rainfall intensity. The change to sea level did not appear to influence the flood levels at the site as much as the increase to rainfall intensity. Maps showing impacts for the various scenarios are provided below.

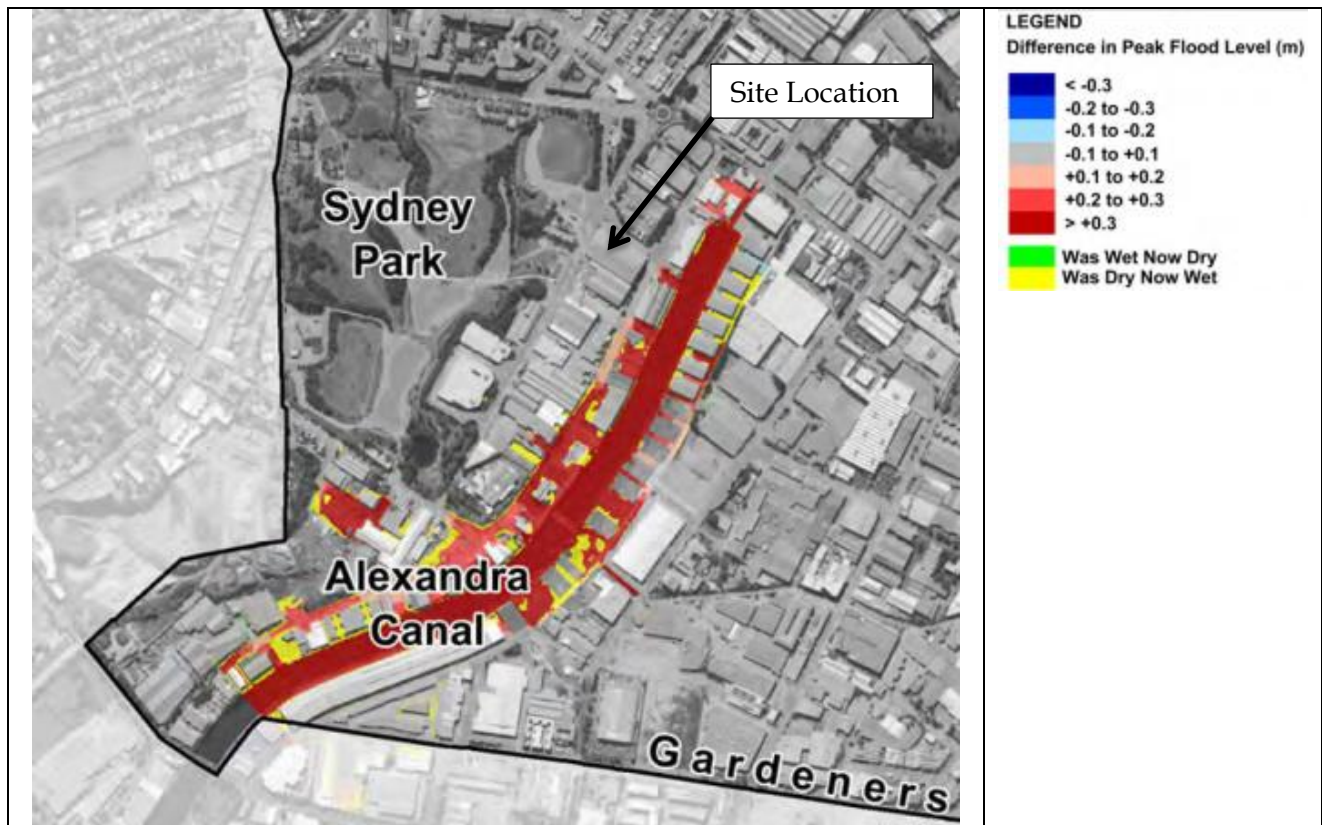


Figure 14 - Climate Change Impacts - 2100 Ocean 1% AEP (100 yr ARI) (BMT 2016)

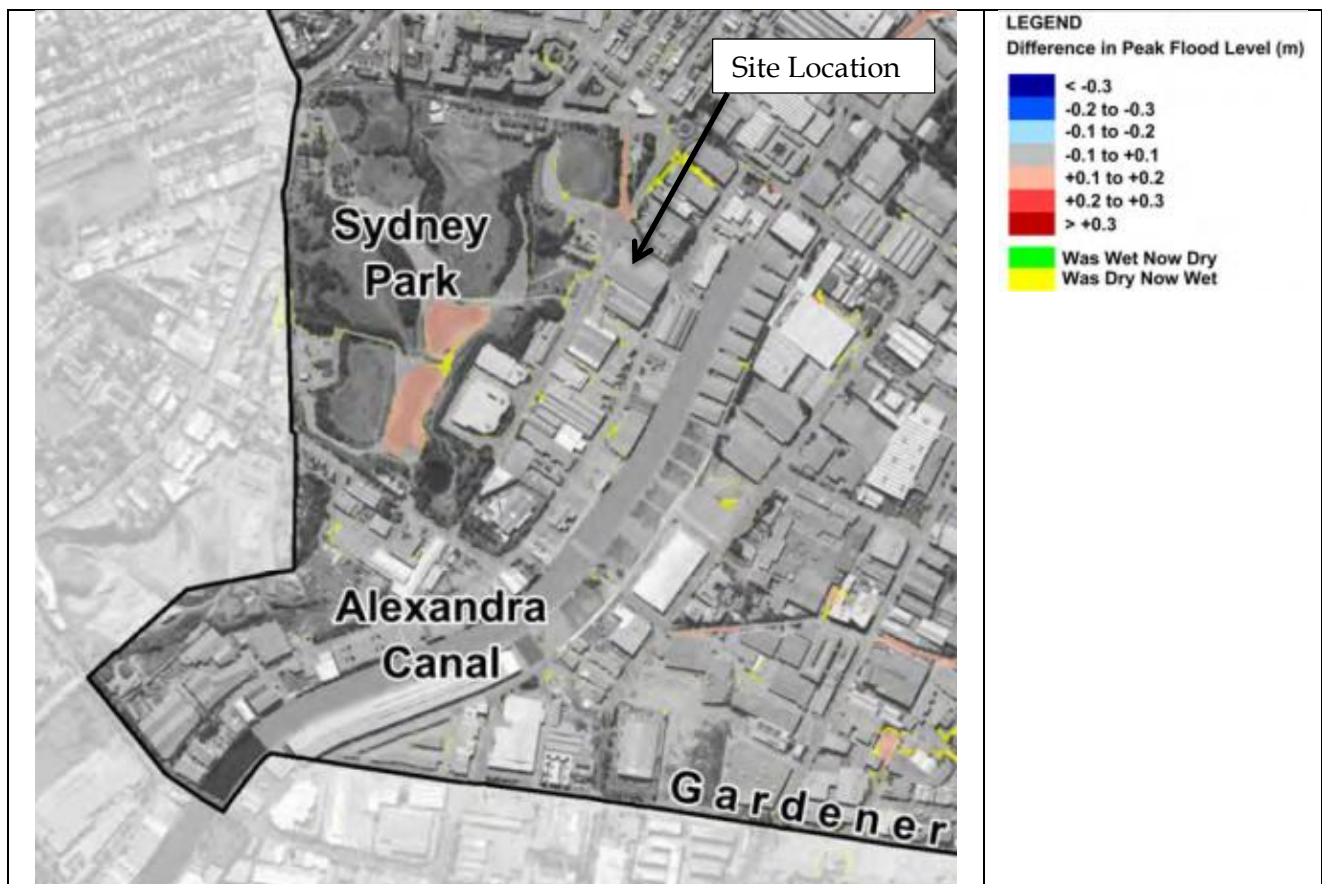


Figure 15 - Climate Change Impacts - 10% Rainfall 1% AEP (100 yr ARI) (BMT 2016)

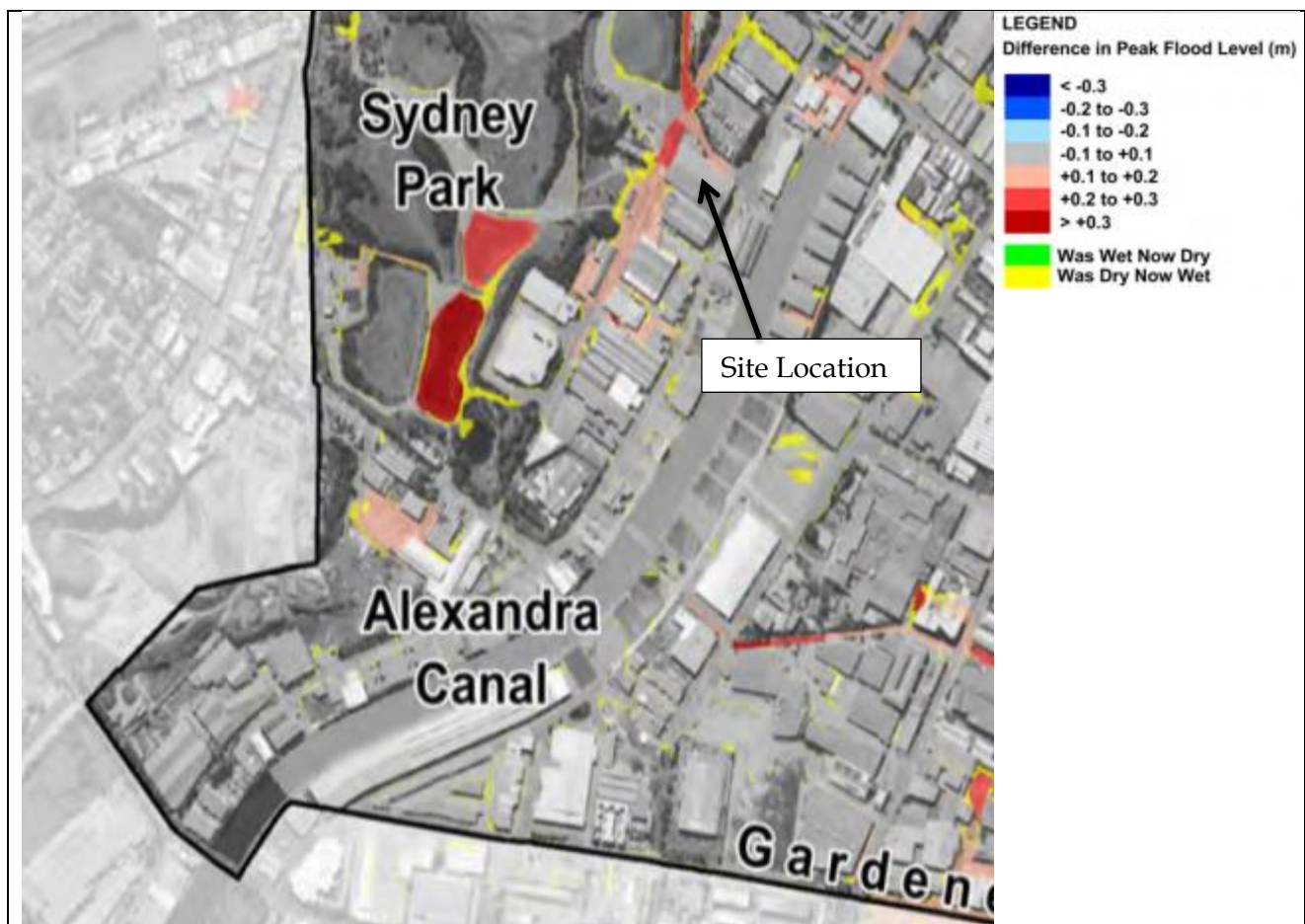


Figure 16 – Climate Change Impacts – 30% Rainfall 1% AEP (100 yr ARI) (BMT 2016)

While the expected lifespan of the development does not warrant consideration of climate change and it will not impact catchment trunk drainage, it is noted that the hazardous material storage will be located 0.5m above the predicted 1% AEP flood level. This freeboard is well above the minimum required for climate change (10% increase in rainfall intensity). The 0.5m could also incorporate the predicted impact of an increase in rainfall of up to 30% or the predicted sea level rise in the year 2100 and is considered appropriate for the development.

5.3 Stormwater Quantity

The level of imperviousness for the site is not expected to increase as there are no proposed changes to the external site layout except the driveway works. The addition of a new inbound driveway on Burrows Road is expected to be offset by the removal and landscaping of an unused driveway and concrete apron on Burrows Road. Stormwater quantity discharged from the site will remain unchanged after the development, therefore there is no expectation of increased or decreased stormwater flows.

There are existing drainage pits within the warehouse building that are thought to drain to the existing stormwater drainage system and into the drainage canal. The sealing of these drainage pits will prevent any flooding in the canal that is higher than the floor level backflowing into the warehouse. Sealing the pits will also address the discharge for any fire flow/water and potential contaminants from the operations building into the stormwater system and canal.

5.4 Stormwater Quality

The proposed development does not include any changes to the external footprint of the existing buildings or carpark areas on the site. The changes to driveways as described in 5.3 and landscaping mean no net change in impervious area for the site. Therefore the potential to generate additional stormwater pollutants that drain directly to the stormwater system is unlikely.

As discussed in Section 3.6, water quality modelling using Council's MUSIC Link software to estimate impacts and the assessment of appropriate mitigation measures is not required as the external footprint of the existing site facility and level of impervious areas is not changed as part of the development. There is also no requirement to use water within the processing area therefore negating the need for additional water quality treatment facilities.

There is the potential for the trucks coming into the warehouse to bring in some sediment on tyres, oils and greases from engine and hydraulics, heavy metals associated with brake linings, and general litter from loose waste items.

In the event of floodwater inundation that does run through the operations building, there is potential for litter to be washed out of the building and carried downstream and into the stormwater system. However the outer metal roller doors will be shut prior to a large flood event as part of the flood evacuation plan, limiting the potential for any recyclables / litter to be washed out of the building during a flood.

The proposed fire system includes multiple sprinklers that can deliver a large volume of water over a short period as well as fire hydrants. While clean water will be used in the fire system, once deployed, the fire water has the potential for contamination from products of combustion of plastic and paper. In addition, fire water has the potential to

wash materials stored in the warehouse plus any fire impacted materials/contaminants into the stormwater system. The development includes bunding of the operations building to contain fire water in the event of a fire. Contained water will be tested for contamination and an appropriate disposal method determined.

5.5 Water Use

A detailed site water balance has not been undertaken as the development does not use any process water and will have limited water demand. Water requirements for the project are identified below.

5.5.1 Potable Water

Potable water will be used on the site for employee purposes only, including bathroom, shower and kitchen facilities. The demand volumes have been estimated based on expected staff numbers of:

- 28 employees overall for stage 1 Monday to Friday with each employee onsite for 8 hours per day;
- 38 employees overall for stage 2 Monday to Friday with each employee onsite for 8 hours per day;
- 2 employees onsite across Saturday and Sunday both stages, including night-time.

Adopting 25% of employees showering for 10 minutes at 6 litres/minute, 4 bathroom visits each with 11 litre toilet cisterns and a typical sink flow rate of 7 litres a minute, the maximum daily demand for potable water is expected to be around 4,000 litres per day. This equates well to the Sydney Water average daily water use of 2.27 litres per square metre of office space which results in a daily water use of 4,130 litres per day.

All potable water will supplied by the Sydney Water main.

5.5.2 Fire Water

Fire water is required to be stored within a tank located within the south-western corner of the warehouse to accommodate fire sprinkler demand/use of 145 litres/second. The sprinkler system time capacity has not yet been established but could be either 60, 90 or 120 minutes. The quantity of fire sprinkler water could be up to 1.044 ML in order to supply 120 minutes of continuous fire sprinkler water. The stored water will be clean/potable and poses no impact to quality while stored.

This quantity of sprinkler water could be coupled with the volume of water required from the fire hydrants (20 l/s for up to 4 hours) during a fire and would equate to a total volume of water up to 1.332 ML. Bunds are proposed to capture and retain this volume of fire water as it can become contaminated with whatever material is on the ground of the warehouse and products of combustion.

6 MANAGEMENT AND MITIGATION MEASURES

6.1 Soils

6.1.1 Acid Sulfate Soils Management Plan - ASSMP and salinity

Additional site investigation is currently being undertaken by Douglas and Partners to determine if the site contains acid sulfate soils and salinity. If the results of this investigation conclude that acid sulfate soils and/or salinity are present then an ASSMP will need to be developed for the removal, treatment and disposal of these soils during the construction process.

6.1.2 Erosion and Sediment Control

With regard to Erosion and Sediment Control Design:

- The estimated rainfall erosivity (R-factor) is 2,760
- The soil erodability (K-Factor) is 0.009-0.016 (low)
- Slope gradients are relatively flat around 0.4% increasing up to 5% for the car park area
- Soils are Hydrological Group B (Landcom, 2004). Runoff would occur infrequently with a low to moderate runoff potential
- The site will have a low erosion hazard (Figure 4.6 in Landcom, 2004)
- The Revised Universal Soil Loss Equation (RUSLE) estimates the soil loss at this site would be 39 t/ha/yr (Soil Loss Class 1, Very Low) on a 5 percent slope¹

Some changes to the existing driveways in Burrows Road will be required as discussed previously but will not result in any increase in impervious area for the site.

An erosion and sediment control plan (ESCP) will be developed for these minor external works as part of the Construction Environmental Management Plan (CEMP) and should incorporate the following generic principles (Landcom, 2004):

- The upslope catchment length of exposed soil areas would be kept below 80 m. Any slope length exceeding 80 m would have a berm installed to intercept flow
- Disturbed lands will be progressively and rapidly rehabilitated, rather than leaving it to the end of works
- Diversion berms would be used to divert “clean” runoff from upslope of any construction areas away. Discharges are to be either onto a stabilised, well-vegetated area or into the existing stormwater system
- Any acid sulfate soils found on site would need to be managed in accordance with an Acid Sulfate Soils Management Plan.

¹ Based on slope length 80 m, P-factor of 1.3, C-factor of 1.

The requirements of an ESCP would be implemented until at least 90 percent of the work areas were stabilised with vegetated or hard surfaces.

6.2 Flooding

A detailed post development flood assessment is not required for the development due to there being no external modifications to be undertaken to the existing building and surrounding grounds that would warrant this to be undertaken. Refer to Section 5.2 – Flood Risk Assessment for details relating to the management of site during times of flood

6.2.1 Floor Level (Equipment and Stored Items)

Section 5 of Councils 'Interim Floodplain Management Policy' states that the minimum floor level of Industrial or commercial developments should be set (as a minimum) at the 1% AEP flood level. Through consultation with Council about the flooding assessment, it has been concluded that a different strategy is appropriate given the existing use, current flood regime and the proposed development. Council stated the following – *"It should be noted that the floor level is subject to flooding and hence increased risk – it would be preferable to protect the existing floor level from flooding via bunding, however flood barriers, such as flood gates are not acceptable to Council. Since the building is not changing from its initial zoning of industrial, it is recommended that emergency evacuation plans be put in place to cover the flooding and specialised equipment raised above flood level so as to minimise this risk"*.

Therefore the following actions are required to limit impacts from large flood events:

- All electrical equipment/machinery which cannot withstand water inundation within the warehouse or externally are to be raised above the 1% AEP flood level
- Any materials below the 1% AEP flood line is to be flood compatible
- Any risk and hazard areas or hazardous materials stored on site must be raised above the 1% AEP flood level plus 0.5m freeboard, bunding is not preferred
- Ensure that any stockpiled materials do not have an increased risk of being washed off-site.

6.2.2 Building Components

All the building components are to be flood compatible in accordance with Section 6 of the 'Interim Floodplain Management Policy'.

6.2.3 Flood Forces and Impact on Structures

The development does not include any additions/extensions to the existing building. The existing buildings construction has remained undamaged and in place during previous flooding events. No structural changes are proposed for the building.

6.2.4 Car Parking and Driveway Access

As part of the Flood Evacuation and Emergency Plan, vehicles are to be removed within the overland flow path to minimise the risk of increased flood levels upstream. A preliminary plan is provided in Appendix B of this report.

6.2.5 Flood Warning and Evacuation Plan

As the existing and proposed finished floor level will be lower than the 1% AEP flood level, the following evacuation measures are recommended to be implemented:

- Prepare a flood warning/evacuation plan and ensure employees are aware and inducted into the plan
- Obtain literature on flood liable land from Council
- Display flood evacuation plans in all buildings at appropriate locations.

A preliminary Flood Evacuation and Emergency Plan is provided in Appendix B of this report.

6.3 Stormwater Quantity

The proposed development is not expected to increase stormwater flows. The existing drainage pits within the warehouse building that are thought to drain to the existing drainage canal will need to be sealed off so that all potential contaminants from the processing area or in the event of a fire emergency, fire water is contained within the building. In addition to this, external bunding, waterproofing of external walls up to the required containment level and the installation of sump pumps are to be constructed as part of the Stage 1 development. This will allow for the capture and removal of any incident water captured in the building.

There will only be some minor modifications required to external stormwater drainage pits and driveways that will include –

- The existing southern most driveway in Burrows Road is to be removed and relocated further south (Figure 2). This will require the removal of the existing grated trench drain and a new grated trench drain to be installed on the boundary line within the new driveway.

These proposed changes are shown on the Site Stormwater Drainage Plan (Figure 12).

6.4 Stormwater Quality

The proposed development is unlikely to increase stormwater pollutants discharged from the existing site caused by rainfall and stormwater external to the building. Therefore no additional stormwater quality improvement infrastructure is proposed.

There is the potential for the trucks coming into the warehouse to bring in some sediment on tyres, oils and greases from engine and hydraulics, heavy metals associated with brake linings, and general litter from loose waste items. It is proposed to sweep the floors regularly and dispose any sediment or litter collected from the floor. Spill kits located strategically throughout the building will be used in the event of any minor spills from vehicle movement.

The proposed fire system includes multiple sprinklers that can deliver a large volume of water over a short period. Any pollutants within the warehouse will be trapped by the proposed bunds which are designed to capture the entire fire water volume. The bunds will be impermeable and be able to withstand the expected flood flow velocities. Any collected firewater can be collected and discharged appropriately to minimise any environmental harm

In the event of floodwater inundation that does run through the warehouse, there is potential for litter to be washed out of the building and carried downstream and into the stormwater system. All hazardous materials will be stored above the 1% AEP flood level. Any general litter will be prevented from leaving the building as the roller doors will be shut prior to a large flood event as documented in the flood evacuation plan.

6.5 Water Use

6.5.1 Potable water

Potable water is to be supplied by the existing Sydney Water main. The expected demand quantities are in line with the average daily water use for an office and are expected to be catered by the existing mains.

6.5.2 Fire Water Containment and Removal

The total volume of fire water that could be released in the event of a fire is 1.332 ML (Section 5.5.2). This comprising of 120 mins of continuous sprinkler release, and the fire hydrant water (Fire & Rescue NSW waste management facility guidelines). To contain this full hydraulic load within the building would require a containment bund of 172mm plus freeboard (approximately 30% additional volume). This fire containment bunding would be required to be constructed at all openings of the building including waterproofing of the existing walls up to this level as well. Pump sumps will be constructed within the weigh bridge recesses to pump fire water after an incident for appropriate disposal.

The deluge capacity of the sprinkler system and fire water containment bund height will be determined through the Fire Engineering Brief process with Fire and Rescue NSW. Figure 17 below shows the locations of the proposed fire containment bunding required.

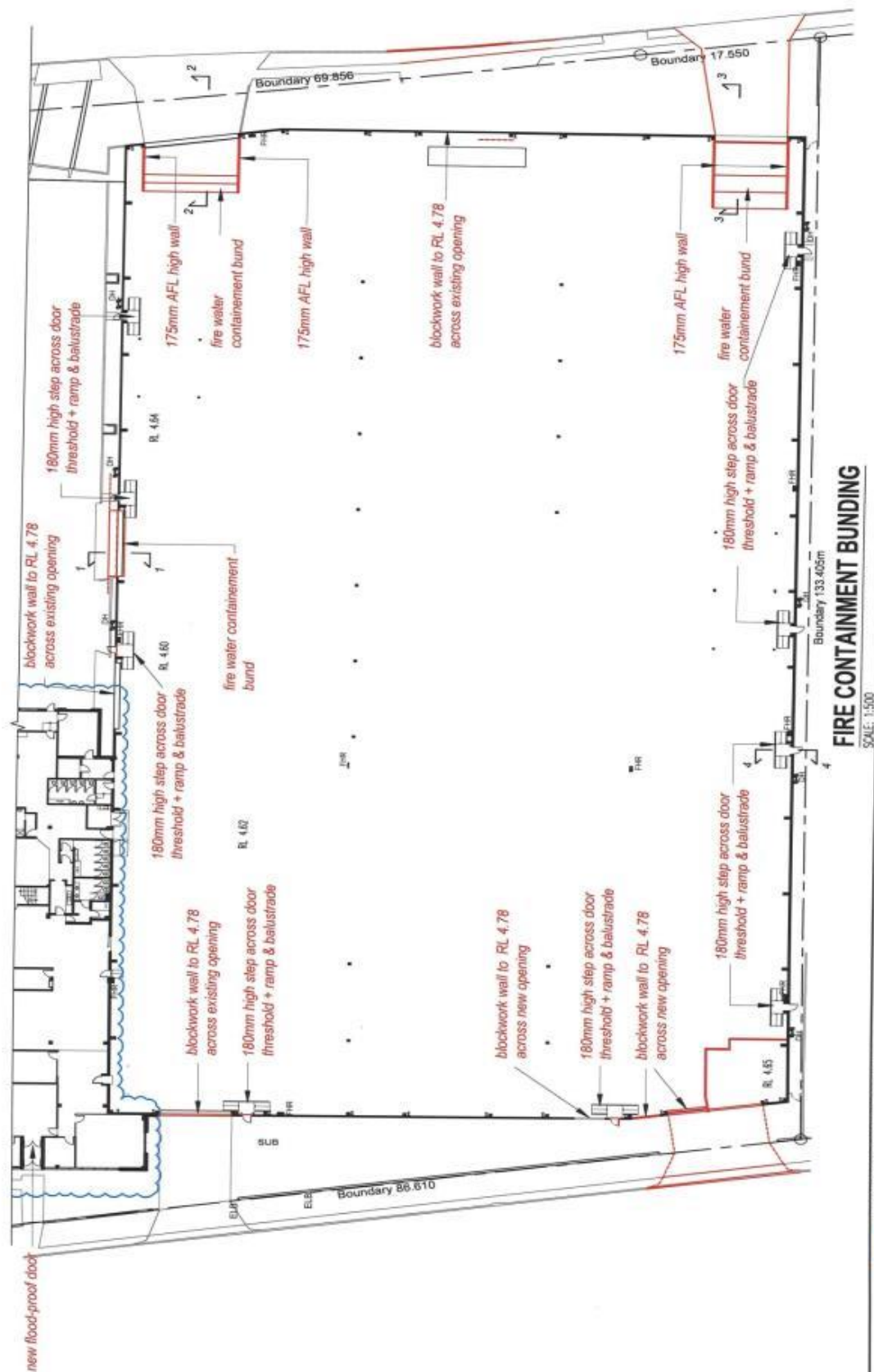


Figure 17 - Fire Water Containment Bunding

7 SEARs Checklist Requirements Relevant To This Report

Table 5 – SEAR SSD - 10364: Key Issues related to Soil & Water

Requirement	Relevant Section(s)
Soils and Water	
An assessment of potential impacts to soil and water resources, topography, hydrology, groundwater, drainage lines, watercourses and riparian lands on or nearby the site, including mapping and description of existing background conditions and cumulative impacts	5
A detailed site water balance including identification of water requirements for the life of the project, measures that would be implemented to ensure an adequate and secure water supply is available for the proposal and a detailed description of the measures to minimise the water use at the site	5.5, 6.5
Characterisation of water quality at the point of discharge to surface and/or groundwater against the relevant water quality criteria (including details of the contaminants of concern that may leach from the waste into the wastewater and proposed mitigation measures to manage any impacts to receiving waters and monitoring activities and methodologies)	3.6, 5.4, 6.4
Details of stormwater/wastewater/leachate management system including the capacity of onsite detention system(s), onsite sewage management and measures to treat, reuse or dispose of water	6
Consideration of salinity and acid sulphate soils and impacts	3.2, 5.1
Characterisation of the nature and extent of any contamination of the site and a description of proposed measures	5, 6
A description of erosion and sediment controls	6.1
A detailed flooding assessment.	3.4

Table 6 – Environment, Energy and Science Group (EES)

Requirement	Relevant Section(s)
Water and Soils	
8. The EIS must map the following features relevant to water and soils including: a. Acid sulfate soils (Class 1,2, 3 or 4 on the Acid Sulfate Soil Planning Map). b. Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method). c. Wetlands as described in s4.2 of the Biodiversity Assessment Method d. Groundwater e. Groundwater dependent ecosystems f. Proposed intake and discharge locations.	3.2.3, 3.3
9. The EIS must describe background conditions for any water resource likely to be affected by the development including: a. Existing surface and groundwater. b. Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations. c. Water Quality Objectives (as endorsed by the NSW Government) including groundwater as appropriate that represent the communities uses and values for the receiving waters. d. Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government. e. Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions.	2, 5.4
10. The EIS must assess the impacts of the development on water quality, including: a. The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the development protects the Water Quality Objectives where they are currently being achieved, and contributed towards achievement of the Water Quality Objectives over time where they are not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction. b. Identification of proposed monitoring of water quality. c. Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan).	5
11. The EIS must assess the impact of the development on hydrology, including: a. Water balance including quantity, quality and source. b. Effects to downstream rivers, wetlands, estuaries, marine waters and flood	5.3

Requirement	Relevant Section(s)
plain areas. c. Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems. d. Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge. e. Changes to environmental water availability such as volumes, flow rates, management methods and re-use options. f. Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options. g. Identification of proposed monitoring of hydrological attributes.	
Flooding and Coastal Hazards	
12. The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including: a. Flood prone land. b. Flood planning area, the area below the flood planning level. c. Hydraulic categorization (floodways and flood storage areas. d. Flood Hazard.	3.4, 5.2
13. The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 5% Annual Exceedance Probability (AEP), 1% AEP, flood levels and the probable maximum flood, or equivalent extreme event.	3.4
14. The EIS must model the effect of the proposed development (including fill) on the flood behavior under the following scenarios: a. Current flood behavior for a range of design events as identified in 13 above. This includes the 0.5% and 0.2 AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.	3.4
15. Modelling in the EIS must consider and document: a. Existing council flood studies in the area and examine consistency to the flood behavior documented in these studies. b. The impact on existing flood behavior for a full range of flood events including up to the probable maximum flood, or an equivalent extreme flood. c. Impacts of the development on flood behavior resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories. d. Relevant provisions of the NSW Floodplain Development Manual 2005.	3.4, 5.2

Requirement	Relevant Section(s)
16. The EIS must assess the impacts of the proposed development on flood behaviour, including: a. Whether there will be detrimental increases in the potential flood affection of other properties, assets and infrastructure. b. Consistency with Council floodplain risk management plans. c. Consistency with any Rural Floodplain Management Plans. d. Compatibility with the flood hazard of the land. e. Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land. f. Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site. g. Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or water courses. h. Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council. i. Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council. j. Emergency management, evacuation and access, and contingency measures for the development considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES. k. Any impacts the development may have on the social and economic costs to the community as a consequence of flooding.	5.2, Appendix B

Table 7 – NSW EPA Requirements

Requirement	Relevant Section(s)
Water Management (Including fire water management)	
<u>The Proposal – Water</u> - Provide details of the project that are essential for predicting and assessing impacts to waters including: - the quantity and physio-chemical properties of all potential water pollutants and the risks they pose to the environment and human health, including the risks they pose to Water Quality Objectives in the ambient waters (as defined on http://www.environment.nsw.gov.au/ieo/index.htm, using technical criteria derived from <i>the Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i>, ANZECC 2000) - the management of discharges with potential for water impacts - drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal. - Outline site layout, demonstrating efforts to avoid proximity to water resources (especially for activities with significant potential impacts e.g. effluent ponds) and showing potential areas of modification of contours, drainage etc. - Outline how total water cycle considerations are to be addressed showing total water balances for the development (with the objective of minimising demands and impacts on water resources). Include water requirements (quantity, quality and source(s)) and proposed storm and wastewater disposal, including type, volumes, proposed treatment and management methods and re-use options.	3.6, 5.4, 6.5
<u>The Location – Water</u> Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity/significance from a public health, ecological and/or economic perspective. The Water Quality and River Flow Objectives on the website: http://www.environment.nsw.gov.au/ieo/index.htm should be used to identify the agreed environmental values and human uses for any affected waterways. This will help with the description of the local and regional area.	3.3
<u>The Environmental Issues – Water</u> - Describe existing surface and ground water quality baseline conditions. - Assess the impacts of the development on water quality and quantity. - Describe Management and Mitigation measures.	5.5
<u>The Environmental Issues – Soils and Contamination</u> - Describe baseline conditions. Provide any details that are needed to describe the existing situation in terms of soil types and properties and soil contamination. - Identify any likely impacts resulting from the construction or operation of the proposal, including the likelihood of: - disturbing any existing contaminated soil - contamination of soil by operation of the activity - subsidence or instability - soil erosion - disturbing acid sulfate or potential acid sulfate soils. - Describe and assess the effectiveness or adequacy of any soil management and mitigation measures during construction and operation of the proposal including: - erosion and sediment control measures - proposals for site remediation – see Managing Land Contamination, Planning	3.2, 3.3, 6.1, 6.2

Requirement	Relevant Section(s)
Guidelines SEPP 55 Remediation of Land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998). c. proposals for the management of these soils – see <i>Acid Sulfate Soil Manual</i> (Acid Sulfate Soil Advisory Committee 1998) and <i>Acid Sulfate Soils Assessment Guidelines</i> (Acid Sulfate Soil Advisory Committee 1998).	

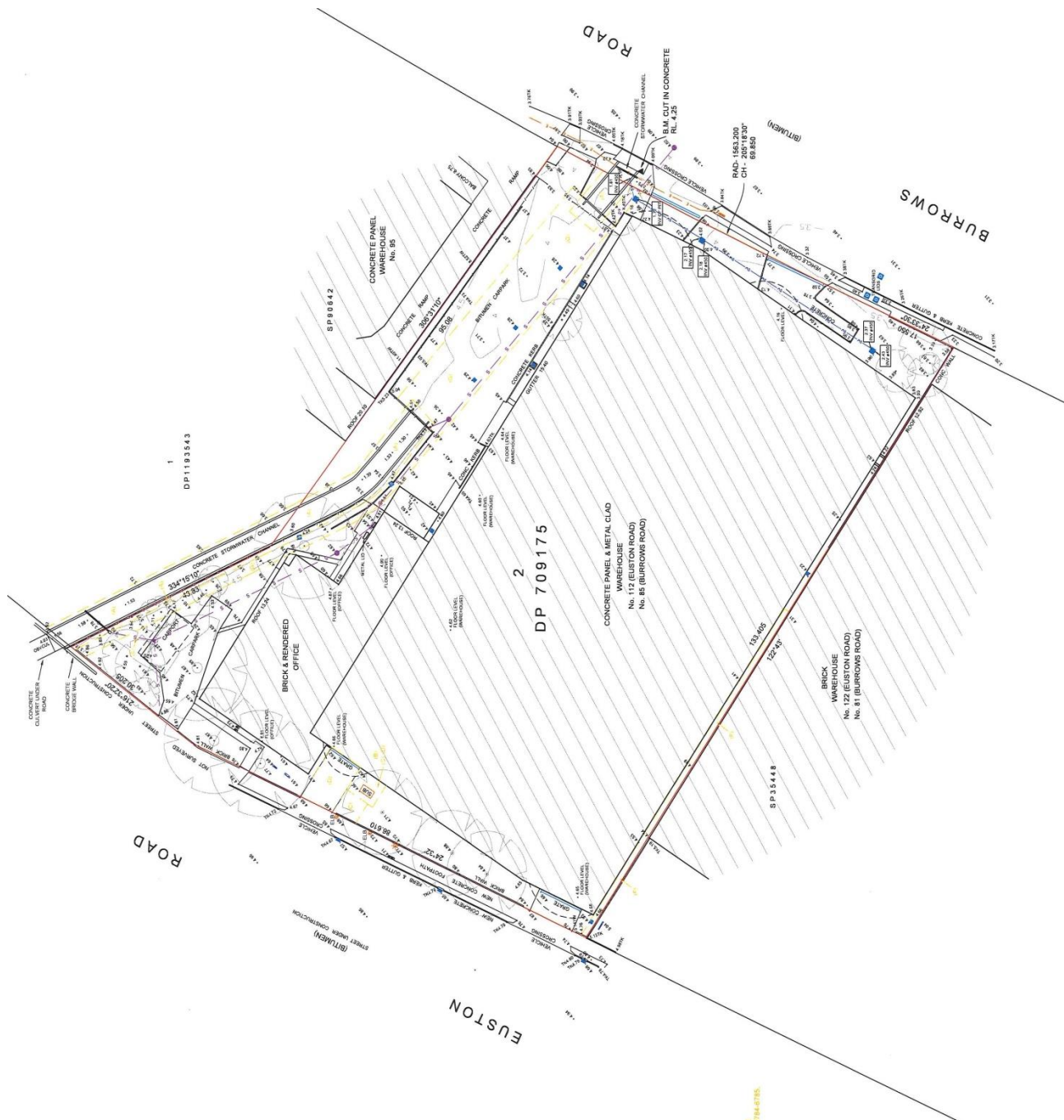
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9 APPENDICES

9.1 APPENDIX A – Site Survey Plan

(Overpage)



- [illegible]

NOTES:

- NOTES: 1. ALL SURVEYING SURVEY INFORMATION SHOWN HEREON IN RELATION TO BOUNDARIES ARE DIAGRAMMATIC AND NOT TO SCALE.
2. ONLY SURVEYS WHICH WERE VISIBLE & ACCESSIBLE AT THE TIME OF THE SURVEY ARE SHOWN. FULL DETAILS OF SETNER AND OTHER SERVICES SHOULD BE OBTAINED FROM THE RELEVANT AUTHORITIES BEFORE YOU DIG (PH 011 000 or www.dalnetenergydig.com.au).
3. CONTOURS ARE APPROXIMATE ONLY. PREFERENCE TO BE GIVEN TO SPOT HEIGHTS.
4. MAJOR TREES SHOWN ONLY.
5. DIMENSIONS AND AREA ARE SUBJECT TO SURVEY.
- THIS PLAN HAS BEEN PREPARED FOR THE SOLE PURPOSE OF LOCATING THE BOUNDARY OF THE PROPERTY SHOWN. IT IS NOT TO BE USED FOR ANY OTHER PURPOSE WITHOUT THE EXPRESS PERMISSION OF BOWALL SURVEYORS PTY LTD.

9.2 APPENDIX B – Flood Evacuation & Emergency Plan

(Overpage)



SEE C

Flood Evacuation & Emergency Plan

Prepared for:

Visy
112 Euston Road, Alexandria

31 October 2019



SEEC

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Document Certification

This report has been developed based on agreed requirements as understood by SEEC at the time of investigation. It applies only to a specific task on the nominated lands. Other interpretations should not be made, including changes in scale or application to other projects.

Any recommendations contained in this report are based on an honest appraisal of the opportunities and constraints that existed at the site at the time of investigation, subject to the limited scope and resources available. Within the confines of the above statements and to the best of my knowledge, this report does not contain any incomplete or misleading information.

Jason Armstrong AMIEAust
Senior Civil Designer
SEEC

31 October 2019

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Version	Date	Author	Reviewer	Notes	Other
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Draft 01D	30/10/19	JA	BJ	Final issue for Draft EIS submission	
Final 01D	31/10/19	JA	BJ	Final issue for Draft EIS submission	

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1 INTRODUCTION

SEEC have been commissioned by VISY to provide this Flood Evacuation and Emergency Plan for their proposed Recycling Facility located at 112 Euston Road, Alexandria. This report is a requirement of the City of Sydney Council and forms part of the flood risk management strategy for the site.

The proposed facility is to be development over two stages within the sites existing 7,700m warehouse and separate office block. Stage 1 will comprise the relocation of an existing Visy recyclable material transfer facility (TRF) and cardboard and paper baling (Baling) operation from 6-10 Burrows Road South, St Peters to the site. Stage 2 of the proposed facility will comprise a Materials Recovery Facility (MRF) anticipated to occur within a few years as dictated by market and business needs.

The site is affected by flooding from the adjacent stormwater drainage canal with the majority of the site located within a Low Risk flood precinct. Sections of the site along and within the stormwater drainage canal are affected by Medium Risk and High Risk flood precincts.

This plan has been written in accordance with the guidelines set out in the City of Sydney Councils '*Sydney Development Control Plan (2012)*', '*Interim Floodplain Management Policy (2014)*' and generally in accordance with the NSW Governments '*Floodplain Management Manual: The Management of Flood Liable Land*' (January 2001).

2 FLOOD EVACUATION & EMERGENCY PLAN

The NSW SES is responsible for the emergency management of floods and storms in NSW.

This Flood Evacuation and Emergency Plan is specifically targeted to these events but the advice can be useful for other hazards.

Being prepared now can significantly reduce:

- Loss of life
- Loss of property
- Loss of possessions
- Being prepared now can also help you respond better and recover faster when these events happen.

2.1 Possible Hazards

- Storms
- Flash Floods
- Floods

These hazards can have devastating impact on people working at the facility and the facility itself. Even if you are not directly impacted by floods or storms you may still be affected by these events, as roads may be damaged or flooded, access to areas may be restricted, amenities may be lost, you may become isolated, areas you are planning to travel to may be impacted and family or friends may be affected.

2.2 We Are Responsible for the Following People

The following people could be attending the facility at any one time:

- People you have employed or that live on your property that could include;
- People with low or no vision
- People with low or no hearing
- People with restricted mobility
- People having difficulty in learning or understanding
- People taking medication
- People from culturally and linguistically diverse (CALD) backgrounds

3 PREPARE NOW

Here are eight things you can do now to prepare for floods and storms, as well as for other disasters:

3.1 Know Your Risk

- Know if you could be at risk from floods, storms as well as other disasters.
- Know your flood risk.
- Find out about your local flood history and visit the NSW SES FloodSafe website www.floodsafe.com.au and read the FloodSafe Guides relevant to your area.
- Talk with neighbouring businesses and people who have lived in the area for a while about the local flood history.
- Know the heights to which your area is affected by floods. CITY OF SYDNEY COUNCIL may be able to provide you with specific information on how floods affect your property.
- Be aware of the natural signs of flooding such as heavy rainfall and rushing or pooling water.

3.2 Know Where to Go

Familiarise yourself with the evacuation plan attached in APPENDIX A.

3.3 Know Your Plan

- Use this Flood Evacuation & Emergency Plan to document what you will do before, during and after flood or storm.
- Practice and update your plan regularly.

3.4 Get your kit together

- Put together an emergency kit

3.5 Check your insurance

- Check insurance policies and ensure they are current.

3.6 Prepare now to act early

- Know the triggers for what you need to do and when you need to do it.
- Practice this Emergency Plan regularly and keep it up-to-date.
- Maintain a sufficient level of supplies in case you become isolated.
- Know what to do if you have no amenities.

3.7 Listen to local radio

- Know the local radio station you need to listen to for information, updates and advice.

- Know the ABC radio frequency in your area (702 AM ABC SYDNEY).
- Know your other local radio stations:

2CH 1170 AM
2DAY FM 104.1 FM
2GB 873 AM
2ME 1638 AM
2SM/GORILLA 1269 AM
2UE 954 AM
702 ABC SYDNEY 702 AM
C91.3 FM 91.3 FM
MIX 106.5 106.5 FM
NOVA 96.9 FM
RADIO 2MORO 1620 AM
RADIO 2RDJ 88.1 FM
SBS RADIO 97.7 FM
SYDNEY'S 95.3 95.3 FM
TRIPLE M 104.9 FM
WFSM 101.7 FM

3.8 Know who to call

Keep a list of emergency numbers near your phone, on your mobile or in clearly displayed areas:

NSW SES	132 500
Life-threatening emergencies	000 (triple zero)
NSW SES Facebook	www.facebook.com/nswses
NSW SES twitter	https://www.twitter.com/nswses

Name: CITY OF SYDNEY COUNCIL

Phone: Phone: 02 9265 9333

Website: <https://www.cityofsydney.nsw.gov.au/>

VISY Alexandria Evacuation Coordinator

Name: Jake Luschwitz

Mobile: 0499 986 272

3.9 Get your kit together

An emergency kit can help save precious time in an emergency situation. It provides items you might need if you lose power or need to leave the facility in a hurry.

Your emergency kit contents

- Portable radio with spare batteries
- Torch with spare batteries
- First aid kit
- Candles and waterproof matches
- Important papers including emergency contact numbers
- Copy of any Site Emergency Plans
- Waterproof bag for valuables

When leaving or evacuating the property, place in your emergency kit

- A good supply of required medications
- Any special requirements and supplies for the disabled, infirm and/or elderly
- Appropriate clothing and footwear
- Fresh food and drinking water

Keep your emergency kit in a waterproof storage container.

There may be other items you need to place into your emergency kit depending on what risks there are in your area.

Check your emergency kit on a regular basis and remember to check use-by dates on batteries and gloves. Re-stock any items if you need to.

4 WHAT CAN BE DONE NOW

4.1 Storms

- Maintain your property
- Trim overhanging trees and branches around your property
- Clear leaves and other debris from gutters and downpipes and stormwater pits etc.
- Check that walls, eaves and roofs are secure and in good repair

Storms can also cause flash flooding, which can be very dangerous. It is safer not to be in an area if flash flooding is a possibility. Be aware of the natural indicators of flash flooding:

- Very heavy rainfall
- Rushing or quickly pooling water

4.2 Floods

- Know the triggers for what you need to do and where you need to go when it floods.
- Talk with your local NSW SES members about being FloodSafe.
- Be aware of the natural signs of flooding such as heavy rainfall and rushing and pooling water.
- Talk with employees about organising a safe place to stay outside flood affected areas.
- Know the safest route to travel if you need to evacuate (Refer to Figure's 1, 2 & 3, Appendix A).

4.3 People with low or no vision

- Make audio recordings of emergency plans and provide a method of broadcasting it.

4.4 People with low or no hearing

Note these numbers in your plan:

- If you are in a life threatening situation call 106 (a Text Emergency Call or TTY).
- The National Relay Service [133 677 (TTY) or 1300 555 727 (speak and listen)] can connect you to other emergency services.

4.5 People with restricted or no mobility

- Consider placing mobility devices in handy locations so that access to them is easier in an emergency.
- Plot an accessible evacuation route(s) Figures 1, 2 and 3.

- Think in advance about what might need to be done if access ramps were unusable or lifts in buildings were not operating.

4.6 Employees

- Make sure where you work has a business continuity plan which includes what to do in an emergency situation for flood and storm. The Business FloodSafe Toolkit can help businesses plan for floods www.floodsafe.com.au
- Practice emergency plans at work.
- Make sure work plans fit with personal plans and talk with employees/employers about this.
- Make sure planning includes people leaving early for personal or safety reasons.

4.7 People from Culturally and Linguistically Diverse (CALD) Backgrounds

- Check on the NSW SES websites for translated information on:
FloodSafe - www.floodsafe.com.au
- StormSafe - www.stormsafe.com.au

5 BEFORE ALL EMERGENCIES

Warnings are issued by the Bureau of Meteorology for floods, severe weather, thunderstorms, tropical cyclones and tsunamis through their website www.bom.gov.au. If a warning is issued;

- Activate this emergency plan.
- Listen to your local radio station for information, updates and advice.
- Locate and check your emergency kit(s).
- Follow all advice and instructions given to you by emergency services.

It is safer to be away from areas that are going to be impacted by these events.

When flash flooding is likely, the best action to take is to leave low-lying areas (evacuation) well before it happens, but only if it is safe to do so. If you are trapped by rising floodwater, seek refuge in the highest part of a sturdy building. Stay there and call 000 (triple zero).

Contact care support person(s) if you have previously organised to do this and prepare to respond as you have planned.

5.1 BEFORE Storms

When a Severe Weather Warning or a Severe Thunderstorm Warning is issued by the Bureau of Meteorology:

- Secure or put away any loose items from around your facility or property as it could become dangerous in storms.
- Stay indoors away from windows.
- Park vehicles under solid shelter away from trees and power lines where possible.
- If driving, pull over to the side of the road away from gutters, drains, trees and power lines.
- Reconsider non-essential travel.

5.2 BEFORE Floods

A Flood Watch may be issued by the Bureau of Meteorology when floods have the possibility of happening. A Flood Warning is issued by the Bureau when flooding is likely. Flood Warnings are issued on rivers that have flood gauges. Sometimes there can be little or no warning of storm activity.

5.3 Evacuating

Evacuation Warnings and Evacuation Orders are issued by the NSW SES for floods, storms and tsunamis through the NSW SES website www.ses.nsw.gov.au and local media.

When an Evacuation Warning is issued:

- Locate important papers and valuables. Put them in your Emergency Kit.
- Keep listening to your local radio station for information, updates and advice.
- Follow instructions given to you by emergency services.

When an Evacuation Order is issued, staying inside the facility, even if you think it is safe, may be dangerous. If you are warned to evacuate it is always safest to move to a location away from the affected area early:

- Turn off the electricity and/ or any machinery and gas (if applicable) at the mains before you leave and turn off and secure any gas bottles.
- Take your emergency kit.
- Never enter or travel through floodwater.
- Keep listening to your local radio station for information, updates and advice.
- Follow the Flood Emergency and Evacuation Plan (Evacuation Plan Appendix A) or Business FloodSafe Plan.
- Follow all instructions given to you by emergency services.
- Wear appropriate clothing.

You should leave well before roads and evacuation routes are cut off or closed. Stay with family or friends away from the affected area. Evacuation centres may also be established by welfare services in your area. Help may include:

- Temporary accommodation
- Financial help
- Personal support
- Refreshments and meals
- Clothing and personal needs
- Help in contacting family and friends
- Take enough medication with you to last at least a week.
- Have clean up supplies including litter bags, paper towels, wipes, sanitisers and garbage bags.

6 DURING ALL EMERGENCIES

- For emergency help in floods and storms call the NSW SES on 132 500.
- In life-threatening emergencies, call 000 (triple zero).
- Check that neighboring businesses have received all warnings and advice.
- Keep listening to your local radio station for information, updates and advice.
- Follow all advice and instructions given to you by emergency services.

6.1 DURING storms

- Stay clear of creeks, drains, causeways, gutters, streams, fallen trees, power lines and damaged buildings.
- If driving, put on your hazard lights and pull over to the side of the road, keeping clear of drains, causeways, streams, creeks, trees and power lines.
- If outdoors, seek secure shelter away from drains, causeways, streams, creeks, trees and power lines.

6.2 DURING floods

A Flood Warning is issued by the Bureau of Meteorology when flooding is about to happen and may be updated during floods.

A Flood Warning provides a predicted flood level on a river gauge and a time at which the river will reach that level.

- Never drive, ride or walk through floodwater.
- Never play in floodwater.
- Keep in contact with your neighbours.
- Be prepared to evacuate if advised.

Floodwater can be deeper and faster flowing than it appears. It can erode roadways and create deep pot holes.

Floodwater can also contain sewerage, debris, dead animals and contaminants such as oil and petrol.

7 AFTER ALL EMERGENCIES

If outside the impacted areas, do not enter these areas until an official 'All Clear' has been issued. If inside impacted areas:

- Be aware of health and safety issues.
- Keep listening to your local radio station for information, updates and advice.
- Check to see if your neighbours need help.
- Do not go sightseeing as this may hinder recovery efforts or put yourself and others at risk.

Animals may be distraught, frightened or disoriented after a disaster event.

7.1 AFTER storms

- Check your house or property for damage.
- Stay clear of creeks, drains, causeways, gutters, streams, fallen trees, power lines and any damaged buildings.

The NSW SES can assist with temporary measures to make your property safer. Any damage needs to be assessed and repaired by qualified tradespeople.

7.2 AFTER Floods

- Ensure the structural stability of your property before entering. Check for damage to windows, walls and the roof and be especially cautious of potential contaminants etc.
- Make sure the electricity and gas is turned off before going inside. Use a torch to carry out inspections inside buildings.
- If power points, electrical equipment, appliances or electrical hot water systems have been exposed to floodwater or are water damaged in any way, they must be inspected by a qualified electrician before use.
- Gas appliances and gas bottles that have been exposed to floodwater should be inspected for safety before use.
- Wear suitable protective clothing, including boots and gloves, when cleaning up.
- Be aware of any slip, trip or fall hazards.
- Never eat food which has been in contact with floodwater.
- Only use clean utensils and personal items.
- Have a supply of fresh drinking water.

The NSW SES will issue an 'All Clear' when it is safe to return to an area that has been evacuated.

8 RECOVERY

The aftermath of a natural hazard can affect people in different ways. Sometimes we may be exposed to things that are distressing. The NSW SES has developed a Recovery Guide to assist people recover from floods, storms. The guide is available from both the FloodSafe and StormSafe websites - www.floodsafe.com.au and www.stormsafe.com.au

Here are a few tips from the guide:

- If you can, contact family or friends to let them know that you are OK or if you need help.
- Follow all instructions given to you by emergency services.
- Update your plan with what you have learned from this disaster.

Talk to people in your community and help each other where possible. Seek out information and share it with those around you.

As part of the recovery from natural disasters, communities and Government are also supported by the non-Government sector. Community partners such as the Salvation Army, ADRA, Anglicare, St Vincent De Paul and the Red Cross provide a range of assistance to support people and communities in time of need.

Disaster Recovery Centres may be established following some disasters. Recovery centres may provide a range of welfare services including financial assistance, personal support, organising temporary accommodation and providing information and referrals. If you have been affected by floods and require assistance, contact Disaster Welfare Services on 1800 018 444

9 APPENDIX A – EVACUATION PLAN

Given the facilities 24hr operational time and potential risk to staff and employees that would occupy the facilities, the following evacuation measures are required to be implemented by the facilities manager:

- Prepare a flood warning/evacuation plan.
- Induct all existing and new employees in the flood evacuation plan.
- Obtain literature on flood liable land from Council.
- Locate signs around the site identifying the site as in a flood hazard area.
- Display flood evacuation plans in all buildings at appropriate locations.

9.1 Early Evacuation of the Site Facility

All site facility employees and staff are to be adequately trained to facilitate and coordinate the evacuation of employees in accordance with this plan before and during a flood event. It would be crucial to evacuate the facility early before flooding occurs along the evacuation route. Therefore staff should closely monitor NSW SES broadcasts and updates on their website as previously discussed. All cars are to be removed from the site early especially within the northern carparking areas as this is the main flood path through the site.

The most suitable evacuation route will be via Burrows Road heading North to Huntley Street. They would then turn left heading west and straight through the roundabout onto Sydney Park Road. This will provide access to the Princes Highway where turning left would provide access to the M5 Freeway. **Figure 1** shows the flood evacuation route.

There may be a small amount of inundation of Burrows Road and Sydney Park Road (approx. up to 0.2m – 1% AEP flood) but would not hinder the evacuation process. Burrows Road heading south towards the Campbell Road is inundated with flood water up to 0.3m deep and, therefore, would not be an acceptable evacuation route.

9.2 Evacuation of Staff/ Employees to Muster Location Above the PMF

As a last resort, an evacuation muster location for staff and employees will be provided within the first floor level of the office building at approximately 7.95m AHD. This is well above the predicted PMF level of 5.7m AHD.

Staff and employees should evacuate to this level from the ground floor facilities shown in **Figure 2**. **Figure 3** shows the location of the muster location on the first floor and the evacuation routes to be used.

9.3 Effective Warning Time

The Bureau of Meteorology operates a flood warning scheme for the Alexandria Canal catchment. The service aims to provide as much warning time as possible of impending floods, but due to the site location this could vary from 15 minutes to 2 hours depending on the intensity of the storm event. This will provide the occupants some assistance of when they will need to evacuate the facilities during major flood events. If a flood warning is issued then the need for evacuation should be carefully monitored.

Full evacuation of the site should occur if a major flood is predicated and the adjacent channel overtops (4.8m AHD or higher).



Figure 1 - Flood Evacuation Route From Site

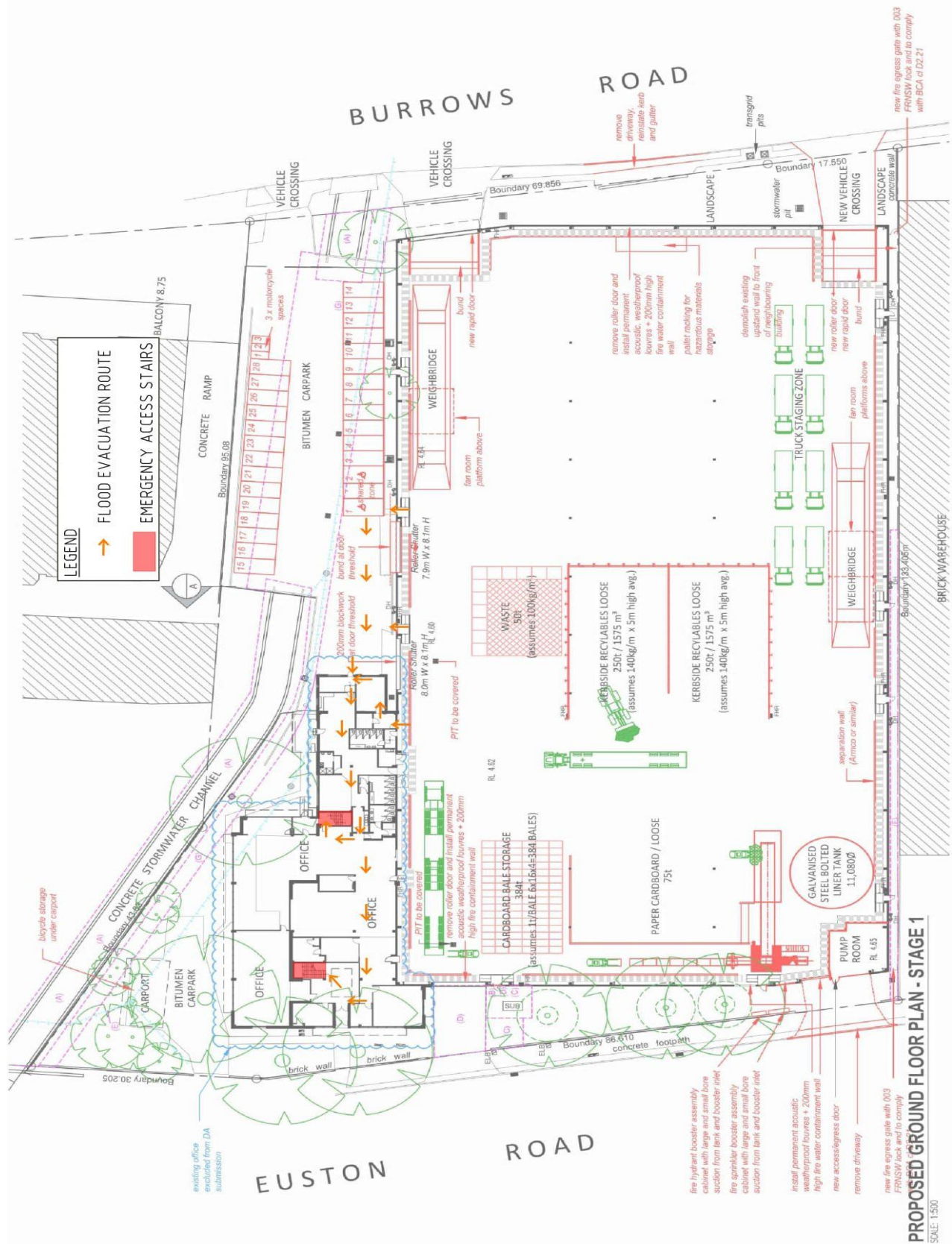


Figure 2 – Ground Floor Evacuation Route



Figure 3 – First Floor Evacuation Route & Safe Refuge Area

10 REFERENCES

NSW State Emergency Services Home Emergency Plan & Business Continuity Plan

NSW Government, January 2005. 'Floodplain Management Manual: The Management of Flood Liable Land'

City Of Sydney Council's 'Alexandria Canal Floodplain Risk Management Plan and Study Volumes 1 to 6' 2014.

City of Sydney Council's Development Control Plan 2012.

City of Sydney Council's Flood Level Maps for 112 Euston Road, Alexandria.