Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
State Significant Development Application

RESPONSE TO SUBMISSIONS

Prepared for VE Property Pty Ltd and Downer EDI Works Pty Ltd | November 2020



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STATE SIGNIFICANT DEVELOPMENT | RESPONSE TO SUBMISSIONS

Prepared for VE Property Pty Ltd and Downer EDI Works Pty Ltd
30 November 2020

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CHAPTER 1

INTRODUCTION

1 INTRODUCTION

This report provides a response to submissions (RTS) on the environmental impact statement (EIS) for the staged subdivision of the Central Sydney Industrial Estate on lands known as the Western Area of the former Shell Oil Refinery at Clyde. Stage 1 (Lot 6 of the subdivision) will be developed as the Downer Sustainable Road Resource Centre.

The project is subject to a State significant development (SSD) application (SSD 10459).

1.1 Overview

An EIS was prepared by Element Environment Pty Limited (Element) on behalf of VE Property Pty Ltd (VEP) for submission to the NSW Department of Planning, Industry and Environment (DPIE) to gain SSD approval for the following project:

1. subdivision and infrastructure works to create a new 35 hectare (ha) Central Sydney Industrial Estate (the Estate) on the site of the former Shell Clyde Refinery; and
2. development and operation of Downer's Sustainable Road Resource Centre as Stage 1 of the Estate (Stage 1).

DPIE placed the EIS report on public exhibition for a period of 28 days from Thursday 24 September 2020 to Friday 23 October 2020. In a letter dated 26 October 2020, DPIE requested a RTS in accordance with clause 85A(2) of the NSW Environment Planning and Assessment Regulation 2000 (EP&A Regulations).

Twelve submissions were received from government agencies and public organisations.

1.2 Purpose of the report

This RTS has been prepared in accordance with the DPIE's (2019) *Draft Guidance for State Significant Projects: Preparing a Submissions Report.* The purpose of the document is to consider and respond to government agency and public organisation submissions and provide clarification of project components where relevant.



CHAPTER 2

OVERVIEW OF THE EXHIBITED PROJECT

2 OVERVIEW OF THE EXHIBITED PROJECT

2.1 Key project components

2.1.1 Subdivision

VEP proposes the following:

- Staged subdivision of the site into eight lots that will form the Estate.
- Earthworks/filling to bench the lots to form a flat pad in the northern half of the site then gradually grading down towards the Duck River in the southern half of the site.
- Construction of a new public access road running south from an intersection with Devon Street, providing access to those lots that do not front Devon Street, in accordance with council specifications.
- Installation of an inter-allotment stormwater drainage system to provide a single stormwater connection point to each lot of the proposed subdivision. Temporary erosion and sediment controls will also be installed to manage water quantity and quality over the lots until they are sold and developed, when permanent stormwater management infrastructure will be installed within each lot.
- A 30 m riparian corridor along Duck River.
- Landscaping/planting:
    - Along the western side and cul-de-sac of the proposed access road.
    - Within the previously disturbed part of the proposed 30 m riparian corridor along Duck River in accordance with a vegetation management plan (VMP).
    - Provision of a 5 m landscape setback along/within the western boundary of Lot 6, which will be planted as part of the development of Stage 1.
    - Provision for a 5 m landscape setback along the Devon and Colquhoun streets frontage with landscape works/planting subject to future development applications.

Provision has been made for a 5 m easement for services along the northern site boundary adjacent Devon Street. The extension of the following key municipal services will likely be required to suit the needs of each of the lots:

- Potable water – potentially construction of a ring main linking the main under Colquhoun Street to the main under Durham Street (subject to separate approval by Sydney Water).
- Wastewater (sewer) – extension of the rising main along Devon Street and minor sideline extension of the gravity sewer along Colquhoun Street (subject to separate approval by Sydney Water).
- Electricity – supply may be required to each lot from the high voltage line along Devon Street (subject to separate approval by Endeavour Energy).

Development of the Estate for new industrial uses (in accordance with current zoning), other than Lot 6, will then be subject to future applications.

2.1.2 Stage 1

The Sustainable Road Resource Centre will be positioned in the southern part of Lot 6 and an elevated pad (front block) will form the northern part of the lot. The front block will be used as a laydown area during construction then possibly used by another Downer business unit, leased or sold. The final operational use of the front block would be subject to a future development application.

Asphalt plant

Downer owns and operates an asphalt plant at its 1A Unwin Street site, which will be decommissioned prior to transfer of ownership of that site to Transport for NSW. Downer proposes to construct and operate a new asphalt plant on Lot 6.

A fixed Ammann Universal HRT Stationary asphalt plant will be constructed on Lot 6, which will produce up to 550,000 tonnes per annum (tpa) of asphalt. The maximum height of fixed equipment will be 41 m. Approximately two thirds of the outside of the asphalt plant will be clad.

Reclaimed asphalt pavement facility

Downer operates a RAP facility on land it leases at the Camellia site (12 Grand Avenue). The lease is coming to an end and Downer proposes to relocate the RAP operations to Lot 6. Up to 250,000 tpa of RAP will be cold planed from pavements with specialist equipment and transported in tip trucks to the site. It will then be stored on gravel hard stand areas.

The RAP will be crushed and screened on an as required basis for use in the production of asphalt (as a substitute for aggregates and bitumen) or for pavement materials. The RAP plant will be inside an approximately 12 m high shed that will be enclosed on the north, west and south sides. The east side will be open in parts so the front-end loader can feed the RAP plant and remove the finished products.

Up to 90,000 tpa of RAP will be stored on site at any one time on a 10,000 m^2 stockpile area. Stockpiles will be a maximum 10 m high.

Bitumen products plant

A next generation, co-located emulsion plant is proposed on Lot 6, which will manufacture approximately 15,000 tpa using a purpose-built plant and will involve careful formulation of the products to produce chemically stable and well performing materials.

Reconomy

Downer owns and operates a Reconomy facility at its 1A Unwin Street site, which will be decommissioned prior to transfer of ownership of that site to Transport for NSW. Downer proposes to construct and operate a new Reconomy facility on Lot 6.

Downer's Reconomy facilities provide a recycling option for the following wastes which are traditionally landfilled:

- Street sweeper/stormwater pit waste.
- Non-destructive digging mud.
- Material recovery facility glass fines.

Reconomy uses a customised material screening and processing plant and water treatment to recover over 60% of the waste stream, which is used in the manufacture of asphalt and other road products. The facility will process up to 40,000 tpa of road sweepings, gully waste, mud from non-destructive excavation and crushed glass.

Material will be separated during the recovery process and temporarily stockpiled adjacent to the recovery plant at the separation points and removed as required. Up to 20,000 tpa of recovered aggregates, sand and washed glass will be beneficially reused almost immediately in the adjacent asphalt plant and will require temporary storage bays as a collection point prior to transport to the asphalt plant.

The types of applications where the recovered materials will be beneficially reused in asphalt include:

- Replacement of existing road surfaces.

- Construction of new roads and associated surfacing.
- Replacement of existing car park surfaces.
- Construction of new car parks and associated surfacing.

Hours of construction/operation and employment

Construction of Stage 1 will commence in January 2021. Subdivision civil works will commence in the second half of 2021 and will take approximately nine months. Installation of services will occur prior to this, likely in the first half of 2021. The subdivision and Stage 1 will generally be constructed between 6am-6pm Monday-Friday and 7am-1pm Saturday. Construction outside of these hours will be required on both weekdays and weekends including Sundays. Construction on public holidays will be avoided.

There will be up to 35 construction employees associated with the subdivision civil works on site at any time.

There will be a maximum of 85 personnel on site at one time during construction of Stage 1. Twenty-eight personnel will be employed in the day shift (5am-6pm), three in the afternoon shift (2pm-10pm) and 17 in the night shift (6pm-6am) during operations.

Vehicle generation

Construction of all aspects of the project will generate a peak of 105 heavy and 88 light vehicles per day.

Operation of Stage 1 will generate a peak of 189 heavy vehicles and 48 light vehicles per day. Given Stage 1 will be replacing existing nearby Downer operations, it will only generate one extra truck compared to existing truck generation.

The project is summarised further in Table 2.1.

Table 2.1 Project summary

Project element	Summary
Site area (subdivision)	35.068 hectares (ha)
Stage 1	6.998 ha
Maximum height	41 m
Annual production:	
Asphalt	550,000 tonnes per annum (tpa)
Reclaimed asphalt pavement	250,000 tpa
Bitumen products	15,000 tpa
Reconomy facility	40,000 tpa
Construction vehicles	Maximum 105 heavy vehicles per day, maximum 53 light vehicles per day
Operational vehicles	189 heavy vehicles per day, total 91 light vehicles per day
Construction hours	Construction will typically occur between 6am-6pm Monday-Friday and 7am-1pm Saturday. Construction will also take place at night-time and on Sundays when required. Construction on public holidays will be avoided.
Operating hours	24-hours
Construction employment	Total 120
Operational employment	Total 48
Capital investment value	AUS $ 77,618,188 (excl GST) (Stage 1: AUS $66,477,169; remainder: AUS $ 11,141,019)

2.2 Summary of environmental impacts

The impacts and residual impacts after management measures are applied assessed in the EIS are summarised in Table 2.2.

Table 2.2 Summary of environmental issues

Environmental issue	Comments	Residual impacts
Contamination	The site is being remediated under the Western Area Remediation Project (WARP) so that it is suitable for future industrial/commercial use. Previous contamination assessments determined there were 15 areas of environmental concern on the site.	The Stage 1 area can be made suitable for commercial/industrial land use upon successful completion of the remediation strategy. Remediation works in accordance with the Stage 1 remediation action plan (RAP) commenced in 2020 and the relevant Section A site audit statement, confirming the suitability of the site for ongoing commercial/industrial use, will be issued prior to the end of 2020. A detailed remediation scope has not been finalised for Stage 2 (the other areas of the site except Lot 6) and will be presented in a subsequent detailed RAP, scheduled to be provided for regulatory consultation in late 2020.
Noise	Construction noise will comply with criteria during standard construction hours at all sensitive receivers. The cumulative noise levels during the day, evening and night period for all construction activities will satisfy the noise management levels at all receiver locations with the implementation of good noise management practices during the evening and night periods. Compliance with noise trigger levels was predicted at all receivers during all time periods. No cumulative industrial noise impacts were predicted at the nearby residential receivers. Sleep disturbance by transient events will not exceed the maximum noise trigger level at any of the receivers. The additional traffic generated by the project will be negligible (ie <0.1 dB change) compared to the existing noise contribution from traffic along James Ruse Drive and Parramatta Road and will have no additional impact on road traffic noise levels.	Noise generated during construction of the project will not exceed NMLs at nearby receivers. Management measures will be implemented to further reduce the potential for construction noise impacts. Noise generated during operation of Stage 1 will not exceed project noise trigger levels at nearby receivers, with the proprietary noise reduction measures incorporated into the asphalt plant design.
Air quality	Particulate matter, or dust, is the main air pollutant of concern from earthmoving and resource recovery. Dust can be defined by the following sub-categories: ▪ total suspended particles (TSP), which comprises the total mass of all particles suspended in the air; ▪ particulate matter with an aerodynamic diameter of 10 µm or less (PM_{10}); ▪ particulate matter with an aerodynamic diameter of 2.5 µm or less ($PM_{2.5}$); and ▪ deposited dust, which is dust that has settled from the atmosphere onto surfaces. Other potential air pollutants are associated with the asphalt plant stack exhaust.	Dust, other pollutants and odour generated during the project will not exceed criteria at residential receivers. However, cumulative criteria will be exceeded for nearby industrial and commercial receivers. Industrial receivers are subject to workplace air quality standards and the approved methods criteria are not applicable. The exceedance at the commercial receiver is minor and people would not be in this commercial premises for long term periods (ie an annual period). The 24-hour average concentrations at the commercial premises will be below the short-term criteria.

Environmental issue	Comments	Residual impacts
	The project, in combination with other local emissions sources, will not result in exceedances of particulate matter and dust deposition criteria at any sensitive residential receivers. $PM_{2.5}$ and PM_{10} concentrations exceed criteria at some industrial receivers. However, these receivers are subject to workplace air quality standards and the approved methods criteria are not applicable. $PM_{2.5}$ concentrations exceed criteria during Scenario 1 and $PM_{2.5}$ and PM_{10} concentrations exceed criteria during Scenario 2 at one commercial receiver. These are minor exceedances and people would not be in this receiver for long term periods (ie an annual period). The 24-hour average concentrations at these places will be below the short-term criteria. The NSW EPA requires a more thorough assessment when the criterion is likely to be exceeded due to background levels, where the measured background level on a given day is added contemporaneously to the predicted incremental level using the same day's weather. The assessment predicted the project would not increase the number of days above the 24-hour average $PM_{2.5}$ and PM_{10} criterion at the residential receivers. The maximum contribution of other pollutants from the asphalt plant stack exhaust will be below criteria.	Management measures will be implemented to further reduce the potential for dust impacts during construction and operation of the project.
Odour	Odour concentrations are used and are defined in odour units. The number of odour units represents the number of times that the odour would need to be diluted to reach a level that is just detectable to the human nose. Therefore, odour less than one odour unit (1 OU) would not be detectable to most people.	The odour criteria applicable to the project range from 2-6 OU. The odour contribution from the project will be below criteria.
Greenhouse gas	Scope 1 and 2 GHG emissions will be generated by the on-site combustion of diesel and natural gas, consumption of oil and grease, and consumption of electricity. Scope 3 GHG emissions will be generated by consumption of diesel for transport of product from Stage 1. Dower is relocating the existing asphalt plant and Reconomy/RAP facilities to the site and the asphalt/Reconomy production rates will remain the same. The RAP facility production is proposed to increase from approximately 235,000 tpa to 250,000 tpa, which is an approximately 6% increase. The bitumen facility is the only new proposed process and would produce 15,000 tpa. The project will, therefore, result in an increase in production of 30,000 tpa, which is an approximately 4% increase on existing production.	Assuming there is direct correlation between annual production rate and GHG emissions, the project will generate an additional 4% of emissions relative to the existing approved operations. This is approximately 0.0004Mt CO2-e (Scope 1 and 2) which is 0.00007% of the Australian greenhouse emissions for the 2017 period and 0.00029% of the NSW greenhouse emissions for 2017.
Traffic	There will be 105 daily heavy vehicle trips and 88 light vehicle trips on the busiest day when construction occurs on all lots simultaneously. There will be 9–10 heavy vehicle movements per hour (or 1 trip every 6 minutes) on the worst-case	The project will likely generate one extra truck compared to current trucks, which equates to one extra inbound and one extra outbound trip. This is a negligible increase and will not impact roads and intersections.

Environmental issue	Comments	Residual impacts
	weekday. This will fall within the daily fluctuations of heavy vehicle traffic in the surrounding road network given the typical industrial land use of the area and will not contribute to any major traffic impacts. Operational traffic will only be generated by Stage 1. Traffic generated by future development of the other proposed lots will be assessed in the applications for those developments. The project will decrease the generation of light vehicles in the AM peak by 11 trips and increase in the PM peak by two trips compared to existing nearby Downer operations.	
Surface water and soils	Separate water management systems will be constructed and maintained for construction and operations in Lot 6 and construction on the remainder of the subdivision.	The proposed water management systems will reduce pollutant loads more than the Parramatta Development Control Plan 2011 objectives. This will ensure any variance in the final building layouts will not affect the overall outcomes of the proposed stormwater management system and will ensure overall pollutant reduction targets are met. No water quantity measures are proposed as there will be limited to no hydrological benefit in providing on-site detention for the project. The use of water tanks will reduce demand on reticulated water (for non-potable uses) by an average of 68%.
Flooding	The project will not increase flood levels (greater than 10 mm) outside the site up to the 0.2% annual exceedance probability (AEP) storm for both overland and mainstream flooding. In the PMF there will be an increase at the corner of Devon and Durham streets and in the Terminal of up to 0.05 m during the overland PMF and 0.2 m during the mainstream PMF.	Flood evacuation routes will not be impacted in storms up to the 0.2% AEP storm. In a PMF there will be some slight increase in peak depth and duration of flooding. Evacuation by road during the peak of a PMF will likely be impossible as floodwaters from the Parramatta River and Duck River will enter the site and much of the Rosehill/Camellia industrial precinct. Whilst the project will slightly increase the PMF depth and duration, a PMF has a probability of occurrence in any year of approximately 1 in 100,000. Commercial and industrial buildings will be inundated in a PMF and it is important that structures and areas be evacuated prior to inundation of roads.
Biodiversity	There is minimal vegetation on the site other than along the southern and western boundaries and in the north-west corner. None of the vegetation along the west or south is proposed to be disturbed, other than the introduced vegetation The riparian zone contains endangered ecological communities (EECs). Construction and operation of the project could generate sediments that could impact the aquatic habitat in Duck River.	The EECs will not be directly impacted by the project as they will be protected in a 30 m wide riparian corridor. The riparian corridor will be maintained and improved is accordance with a vegetation management plan. The construction and operation of the proposed stormwater outlets would not involve any direct impacts upon the mangroves. Indirect impacts may arise over time with the repeated flushing of stormwater form the pipes through the mangrove area, however this will be minimised by the proposed stormwater outlet design.

Environmental issue	Comments	Residual impacts
Aboriginal heritage	Previous assessments determined the site was grossly disturbed, held 'nil' archaeological potential and no Aboriginal items were identified during inspections. As the assessed areas cover the current site, it follows that the project will be on land that is grossly disturbed and has no archaeological potential. Therefore, it was determined that an Aboriginal cultural heritage assessment report is not necessary and an Aboriginal cultural heritage management plan will not need to be prepared.	There is always some risk that previously undiscovered Aboriginal items could be disturbed. Therefore, an unexpected finds protocol will be implemented during construction of the project.
Hazardous and offensive development	Class 8 dangerous goods (corrosive) will be stored and used during Stage 1. The preliminary hazard analysis (PHA) found that Class 8 corrosives do not have widespread exposure effects on people. The hazardous effects from corrosives are health and safety risks to workers from direct contact. If a spill occurs, burns and respiratory irritation may result. There will be no significant safety impact associated with these materials outside the immediate area of the spill. In accordance with *Hazardous industry planning advisory paper no 10* (HIPAP 10), where a development proposal involves a significant intensification of population in the vicinity of a potentially hazardous facility, the change in societal risk needs to be accounted for, even if individual risk criteria are met. The estimated population densities for both day and night populations associated with the project (four people per hectare day time, and up to three people per hectare during night time hours) are well below the base case population densities assessed over the project area (ie 29 people per hectare day time, and four people per hectare night time).	The PHA found that the potential for compounded risks associated with the Clyde Terminal are unlikely as: • The nearest hydrocarbon storage tanks at the Clyde Terminal will be more than 200 m from the site. • The site boundary was located to ensure that separation distances from the flammable and combustible tanks and bunds at the Clyde Terminal to any future off-site protected places (such as the project) will comply with the requirements of AS 1940:2017 (storage and handling of flammable and combustible liquids). • A detailed quantitative risk assessment study for the Clyde Terminal was used to inform the location of the site boundary.
Waste	The project will generate waste during construction of the subdivision and Stage 1 and operation of Stage 1. The RAP facility and Reconomy components of Stage 1 will also accept wastes from offsite and process these for disposal/recycling offsite and use in the asphalt plant. There is a contingency to import up to 30,000 m^2 of virgin excavated natural material (VENM) or excavated natural material (ENM) for site preparation. Downer proposes to supply asphalt in accordance with *The Downer bituminous pavement order 2020*, which permits Downer to produce asphalt containing Toner, crumb rubber and recovered glass sand/fines. Downer also proposed to continue incorporating RAP in the asphalt under *The reclaimed asphalt pavement exemption 2014* and will incorporate coal ash and steel furnace slag under *The coal ash exemption 2014* and *The steel furnace slag exemption 2019*.	Minimal quantities of general waste will be generated during construction and operation of the project, which will be managed in accordance with a construction and operational environmental management plan. Stage 1 will accept wastes from offsite, which will be processed, with some material re-used in onsite processes and the remainder reused, recycled or disposed offsite. Some waste materials processed offsite, will be used onsite in the production of asphalt. Material will be reused onsite to produce asphalt in accordance with the resource exemptions and orders.

Environmental issue	Comments	Residual impacts
	Downer proposes to operate the Reconomy facility under the existing *Downer recovered aggregate and sand order 2019*, which allows Downer to supply street sweeper waste, gully waste and hydro-excavated mud waste. This recovered waste will be supplied to the asphalt plant for use as asphalt aggregate. The *Downer recovered aggregate and sand order 2019* applies to the Rosehill site and Downer will apply to amend it to be applicable to the new site.	
Visual amenity	Potential visual impacts were assessed at five public and private viewpoints comprising: • Rosehill Racecourse (including Rydges Hotel) – (low-moderate impact) Stage 1 would constitute a minor component of the wider view, which might be missed by the casual observer or receptor. Awareness of Stage 1 would not have a marked effect on the overall quality of the scene when seen from viewpoints within the racecourse and similar views from the Rydges Hotel and apartments north of the hotel. • Residential apartments in Rosehill and Ermington – (low-moderate impact) Stage 1 would constitute a minor component of the wider view, which might be missed by the casual observer or receptor. Awareness of Stage 1 would not have a marked effect on the overall quality of the scene when viewed from the apartments. • Silverwater Bridge – (low-moderate impact) Stage 1 would constitute a minor component of the wider view, which might be missed by the casual observer or receptor. Awareness of Stage 1 would not have a marked effect on the overall quality of the scene when seen by the public from Silverwater Bridge. There would be a relatively high number of public viewers yet the view change would be small and likely not overly noticed by most transient observers using the bridge. • Patricia Street, Rydalmere – (low impact) only a very small part of Stage 1 would be discernible and/or at such a distance that it is scarcely appreciated. Consequently, it would have very little effect on the scene when seen from this viewpoint. Stage 1 would be evident, yet appear as a small additional element, set within the wider industrial zone.	The project would introduce new tall structures within the established industrial area of Rosehill/Camellia, which comprise a visual environment of lower scenic quality including a number of bulky and tall structures. There would be limited opportunity for publicly available views and no more than a low-moderate impact to public views. There would also be no more than a low-moderate impact to private views. Views from Rosehill Racecourse are predicted to be impacted to a low-moderate level, with valued city views remaining unaffected. Other private viewpoints would have no more than a predicted low-moderate impact. The project is consistent with the visual environment expected of this major heavy industrial zone which supports (historically and currently) substantial industrial elements visible from outside viewpoints. Although there would be an impact to some viewpoints, the overall visual impact would not be significant considering the visual context of the site.



CHAPTER 3

ANALYSIS OF SUBMISSIONS

3 ANALYSIS OF SUBMISSIONS

The EIS was publicly exhibited from Thursday 24 September 2020 to Friday 23 October 2020. Nine submissions were lodged with the DPIE during the exhibition period, including government agency, public organisation and various submissions from divisions within DPIE.

3.1 Submission matrix

A detailed matrix of the types of submissions received and submission themes is in Appendix A. The matrix notes which submissions are comments, which are in support and which are objections.

Comments, objections and support are summarised in Table 3.1.

Table 3.1 Overview of submissions

Position	Community	Government agency	Public organisation	Total
Comment	0	6	5	11
Objection	0	1	0	1
Support	0	0	0	0

3.2 Submission themes

The submissions matrix (Appendix A) lists the matters raised in the submissions, which are summarised in Table 3.2. Many submissions commented on multiple themes. The themes are grouped as shown in Table 3.2 in descending order of quantity of comments.

Each individual government agency and organisation (Sydney Metro West) submission is addressed in Chapter 6.

Table 3.2 Key submission themes

Key themes	Government agency	Public organisation	Total
Water	26	0	26
Waste	20	0	20
Other matters	12	9	21
Traffic/pedestrians	17	1	18
Biodiversity	16	0	16
Noise	13	0	13
Air quality	13	0	13
Hazards	6	6	12
Environmental management	8	0	8
Heritage	4	0	4
Visual amenity	2	0	2
Asphalt	2	0	2



CHAPTER 4

POST EIS ACTIVITIES

4 POST EIS ACTIVITIES

This section summarises engagement activities the proponent undertook after exhibition of the EIS.

4.1 DPIE

Various meetings were held with DPIE during preparation of this report to:

- provide clarification on various information presented in the EIS; and
- seek guidance on the approach to take in addressing certain submissions.

A detailed response to DPIE's submission is in Section 6.2.

4.2 Environment Protection Agency (EPA)

A meeting was help between DPIE, EPA and the proponent on Wednesday 4 November 2020 to:

- discuss the EPA's submission;
- provide further detail on certain components of the proposed development including environmental controls, particularly associated with noise and air emissions, stormwater quality and waste; and
- seek clarity on further information/assessment the EPA requires to address their submission.

A detailed response to the EPA's submission is in Section 6.8.

4.3 Parramatta City Council (PCC)

A meeting was requested with PCC to discuss the matters that formed the basis of their objection and to present to them the proposed approach to address all these matters in their entirety.

PCC advised that due to staff workload, they weren't able to meet and requested that their submission (including matters for objecting) is addressed in the response to submissions and that they will review the response to submissions report when requested to by DPIE.

A detailed response to PCC's submission is in Section 6.6.



CHAPTER 5

PROJECT CLARIFICATIONS

5 PROJECT CLARIFICATIONS AND REFINEMENTS

With the progression of project design from concept to detailed and to address submissions from government agencies, various refinements have been made to the project as presented in the exhibited EIS.

The following section describes the refinements made to the proposed industrial estate subdivision and associated access road, and the Stage 1 Sustainable Road Resource Centre site development plan.

5.1 Industrial subdivision

5.1.1 A 14 lot subdivision of the site over 3 stages (Stage 1 (1A/1B), 2 and 3).

Further market review and discussion with potential industrial users has identified the need for smaller lots and diverse lot sizing to attract various smaller industries that are attracted to the Camellia/Rosehill location. A 14 lot subdivision (over 3 stages - Stage 1 (1A/1B), 2 and 3) is therefore proposed, offering a range of smaller industrial sites, improving the diversity of lot sizes available for future industrial users.

The staged subdivision delivers the site (Lot 6) for the Downer Sustainable Road Resource Centre in Stage 1B (referred to as Stage 1 hereafter).

5.1.2 Public access road

Instead of offering a Voluntary Planning Agreement (VPA) for access through the site, VEP has agreed to construct the proposed new public access road through the length of the site to the new riparian corridor and offer PCC an easement to Duck River for a future bridge link to Carnarvon Street, to be constructed by others in the future. The new public access road has therefore been extended further to the south and provides a 21 m wide road cross section and a turning head at its furthest extent. Therefore, there is no need for a VPA.

5.1.3 A widened average 40 m riparian corridor to Duck River

The EIS noted a requirement under DPI Water's (2012) *Guidelines for Riparian Corridors on Waterfront Land* for a 30m wide riparian corridor, consistent with the Strahler Stream classification, and per the approach put froward and accepted in the WARP SSD consent.

Nevertheless, VEP has examined the opportunity to increase the width of the riparian corridor consistent with PCC's request and now propose an average 40 m riparian corridor along Duck River, consistent with the averaging rule set out in DPI Water's (2012) *Guidelines for Riparian Corridors on Waterfront Land*. Further discussion on the proposed 40 m riparian corridor and the application of the averaging rule is in Section 6.6.

The various project drawings including the subdivision staging plans, civil engineering/stormwater drawings and landscape plans have been updated to reflect the proposed 14 lot subdivision, extended public access road and the widened riparian corridor (refer Appendix B). These refinements to the Central Sydney Industrial Estate provide positive environmental, social and economic benefits by:

- Creating a wider riparian corridor along Duck River which through planting of native vegetation will provide further protection to the existing riparian vegetation, provide further

habitat and a wider corridor for native fauna and allow suitable space for PCC to create future shared access to the Duck River foreshore;

- Constructing a longer public access road right up to the riparian corridor with the land supplied by VEP and the road constructed by VEP and dedicated to PCC. Extending the length of the proposed public access road has no further environmental impacts than the shorter access road presented in the EIS. The stormwater management system has been reconfigured to capture runoff from the extended road and the stormwater discharges to the same stormwater outlet that was presented and assessed in the EIS;
- Creating a more diverse range of industrial lot sizes, increases the availability of heavy industrial lots where heavy industrial zoned land is in short supply. Increasing the industrial subdivision to 14 lots has no further environmental impacts than the eight lot subdivision presented in the EIS. The stormwater management system has been reconfigured to capture runoff from each of the new lots in the reconfigured subdivision plan and the stormwater discharges to the same stormwater outlet that was presented and assessed in the EIS.

5.2 Stage 1 (Lot 6) Downer Sustainable Road Resource Centre

The conceptual layout of the Downer Sustainable Road Resource Centre on the 6.998 ha Lot 6 was presented in the EIS. Since the exhibition of the EIS, Downer has progressed the detailed design of the Lot 6 site development plan and made various refinements.

The following figures present the refinements to the Lot 6 site development plan:

- Figure 5.1: revised site development plan for which Downer is seeking development consent.
- Appendix B2: conceptual layout presented in the EIS and revised site development plan overlain on the conceptual layout to clearly show changes.

The key refinements to the site development plan are outlined in the following sections. All of these refinements provide either positive or neutral environmental benefits.

Key changes to the Lot 6 stormwater management system are described in Chapter 2 of Appendix C.

5.2.1 General

The key general refinements to the site development plan include:

- 2 m verge added to the eastern boundary to accommodate various services and can also be used for pedestrian access.
- South east light vehicle carpark adjusted for new 2 m verge.
- Aggregate unloading hopper moved 1 m west.
- Driveway island widened to 1.2 m.
- Pedestrian refuge island added to driveway.
- Minor adjustments to various kerb lines to accommodate all heavy vehicle swept paths.
- Minor adjustments to weighbridge positions.
- Footpaths/walkway and pram ramp added at the light vehicle parking area at the site offices.
- Minor changes to dangerous goods storage areas (refer to Section 6.3.1).
- Internal layout added to control and production office and laboratory.
- 60kL diesel tank to be self-bunded and incorporation of a formalised diesel refuelling area comprised of an inward draining concrete apron with a rollover/driveable perimeter bund/kerb.
- Relocation of two of the three electrical substations proposed in the north-west of Lot 6 (east of the driveway entry lanes) to the preferred position adjacent (north) the RAP cold feeders or alternatively to the south-west corner of the Lot 6 front pad.

5.2.2 Asphalt plant

The key general refinements to the asphalt plant include:

- Asphalt plant virgin cold feeders have been moved the south of the aggregate storage silos where the processed RAP storage bunkers were. These bunkers have been removed and all processed RAP will be stored in the RAP processing and processed RAP storage shed.
- Refined configuration of the asphalt plant.
- An additional two 80 kl storage tanks, for the storage of bitumen used in asphalt production, are proposed in the tank farm immediately adjacent (east) of the asphalt plant. This tank farm now includes fourteen 80 kl bitumen and bitumen emulsion tanks.
- Removal of one of the seven 60 kl bitumen emulsion tanks in the tank farm adjacent (north) of the aggregate and sand silos.
- Removal of two of the sixteen 27 m high silos to store 7,200 t of aggregate and sand. There are now fourteen 27 m high silos that store 6,300 t of aggregate and sand.
- Extension of the asphalt plant weighbridge to 56 m long.

5.2.3 Bitumen products plant

The key general refinements to the bitumen products plant include:

- Relocation of the 60 kl kerosene tank from the emulsion additive store to the bitumen emulsion tank farm adjacent the aggregate and sand silos.
- Removal of the office and amenities from the emulsion additive store.
- Incorporation of a formalised bitumen and emulsion additive unloading and bitumen emulsion product loading area adjacent (east) of the bitumen emulsion tank farm/emulsion additive store. The unloading/loading area is comprised of an inward draining concrete apron with a rollover/driveable perimeter bund/kerb.

5.2.4 RAP stockpiling and processing

The key general refinements to the unprocessed RAP stockpile area and the RAP processing facility include:

- Change to the proposed base of the unprocessed RAP stockpile area from a gravel hard stand base to a sealed asphaltic concrete surface (refer to revised pavement layout in Appendix B2).
- Unprocessed RAP stockpiles will be restricted to the western and eastern sides of the RAP stockpile area reserving a roadway through the middle of this area for RAP delivery trucks to enter and exist.
- Permanent water sprinklers will be installed around the unprocessed RAP stockpile area, which will be used if there is visible dust generated in the area.
- Reduction in the RAP processing shed from 100 m to 76 m long.

5.2.5 Reconomy facility

The key general refinements to the Reconomy facility include:

- Refined plant configuration.
- Covered sweeper truck offload/dry stockpile area and non-destructive digging truck wet offload pit (refer to Drawing CO13919.02-AR200-A in Appendix B2 and Figure 2.3 in Appendix C). The enclosure of the Reconomy receivals area will comprise:
    - an approximately 10 m high roofed structure;

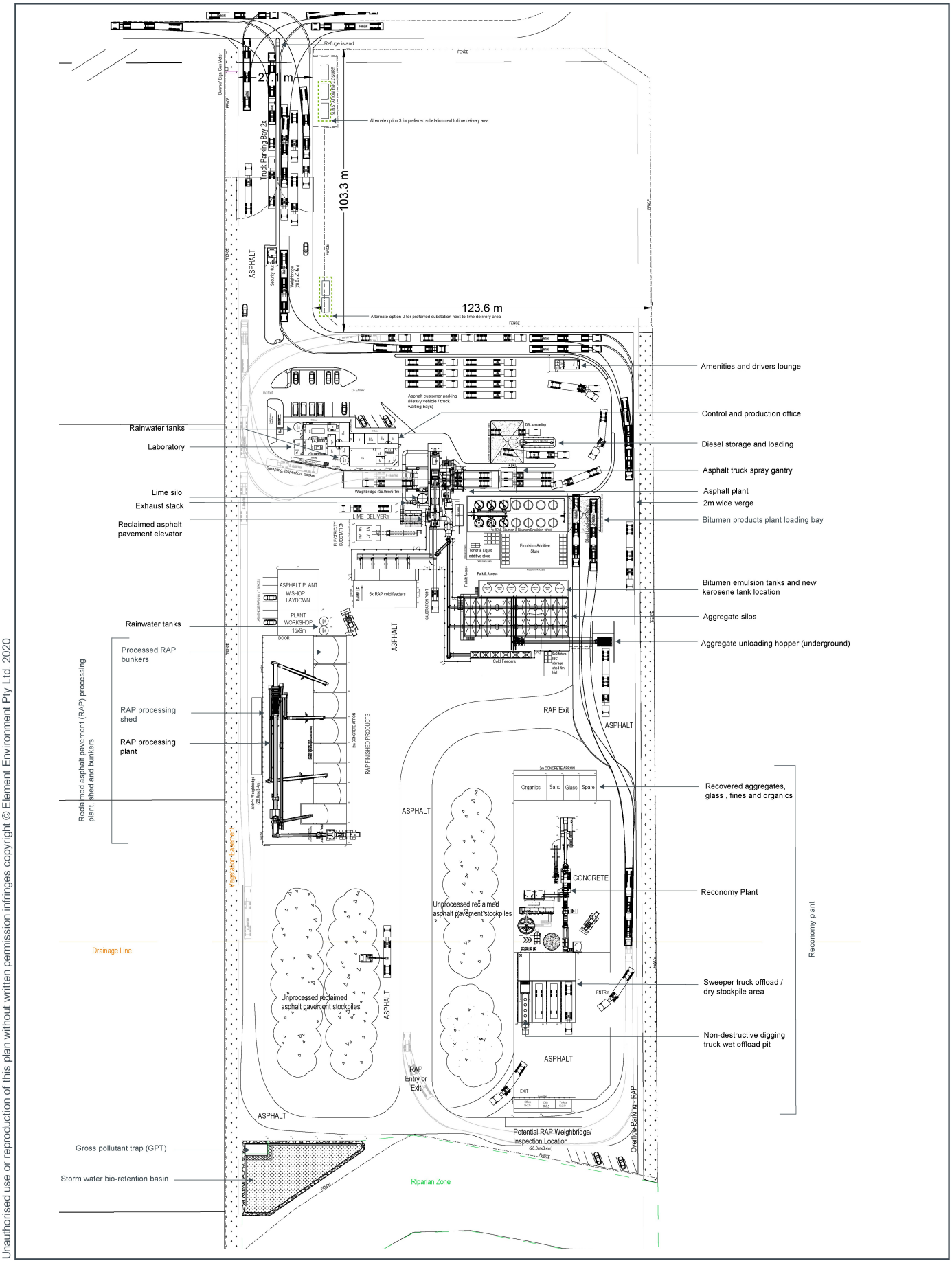
- enclosed on the western, northern and eastern sides;
- The northern portion of the eastern side will have an opening to allow front-end loader access to load material from the receivals area and transfer it to the Reconomy plant. The rear (northern) part of the receivals area slopes to the north-west so any driving rain from the east will be contained in the receivals area; and
- The southern side will have an opening 7 m high between the ground and the 3 m facia, where the trucks unload. The receival bays slope to the north so any driving rain from the south will be contained in the receivals area.

- Covered aggregates and organics bunkers for storage of recovered material as well as glass fines imported from off-site suppliers (refer to Drawing CO13919.02-AR200-A in Appendix B2 and Figure 2.3 in Appendix C). The enclosure of the Reconomy recovered materials storage bunkers will comprise:

  - an approximately 10 m high roofed structure;
  - enclosed on the western and eastern sides;
  - The southern side will have an opening 5.5 m high between the 1.5 m high back wall of the bunkers and the 3 m facia to allow front-end loader access to load recovered materials from the Reconomy plant to the recovered materials storage bunkers;
  - The northern side will have an opening 7 m high between the ground and the 3 m facia, where the front-end loader loads the recovered materials; and
  - A 2 m roof overhang on both the southern and northern side of the recovered materials storage bunkers to prevent driving rain from entering the bunkers.

Figure 5.1
Revised site development plan

Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
STATE SIGNIFICANT DEVELOPMENT - RESPONSE TO SUBMISSIONS



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CHAPTER 6

RESPONSE TO GOVERNMENT AGENCIES

6 RESPONSE TO GOVERNMENT AGENCIES

6.1 Introduction

The government agency submissions are addressed in this chapter. **Bold** text is an exact reproduction of the submissions received, while normal text is VEP/Downer's response to submissions.

6.2 NSW Department of Planning, Industry and Environment (DPIE) – general

6.2.1 Site Remediation

Status of current remediation within the development area?

Viva Energy Pty Ltd is remediating the Western Area in a staged approach in accordance with the WARP SSD 9302. Stage 1 of remediation was confirmed between DPIE and Viva Energy on 4th June 2020.

Viva Energy is progressing remediation works on Stage 1 under the guidance of a NSW EPA accredited site auditor. Physical works are underway on Stage 1 and are expected to be fully completed in November 2020 with the NSW EPA accredited site auditor indicating that the site audit statement will be issued in approximately mid December 2020.

Viva Energy has also been carrying out additional investigations on Stages 2 and 3.

6.2.2 Water management

Did the flooding assessment consider the heights of the 1% AEP event?

Overland flood

The peak 1% AEP overland flood depths during existing storms (assuming the stormwater network is unblocked) are shown on Figure B7 in Appendix G of the EIS. The figure comprises polygons showing 1 m and 0.2 m depth and contours intervals.

The predicted peak 1% AEP overland flood depths associated with the project (assuming the stormwater network is blocked) are shown on Figure B14 in Appendix G of the EIS. The figure comprises polygons showing the change in flood levels at existing potentially flooded areas, newly flooded areas and areas which will no longer be flooded.

Mainstream flood

The peak 1% AEP mainstream flood depths during existing storms are shown on Figure C1 in Appendix G of the EIS. The figure comprises polygons showing 1 m and 0.2 m depth and contour intervals.

The predicted peak 1% AEP mainstream flood depths associated with the project are shown on Figure B14 in Appendix G of the EIS. The figure comprises polygons showing the change in flood levels at existing potentially flooded areas, newly flooded areas and areas which will no longer be flooded.

Impacts

Potential impacts during the 1% AEP overland and mainstream flood impacts are summarised in Section 14.2.2 of the EIS, in summary:

- Part of proposed Lot 5 (now Lot 62) would be newly flooded, and part would no longer be flooded during the 1% AEP mainstream flood.
- Approximately the southern half and minor areas of the north of Lot 6 will be newly flooded and areas along the former pipe trenches would no longer be flooded during the 1% AEP storm overland flood.
- Other areas of the site will also be newly flooded including the northern area of Lot 3 (now Lot 59) and southern area of Lot 2 (now lots 54 and 55). Substantial areas of the site will no longer be flooded during the 1% AEP storm overland flood.

Will the stormwater outlets have a maximum discharge rate?

As described in Appendix C, the stormwater outlets will have discharge rates commensurate to the rainfall in the contributing catchments. Consultation with PCC has confirmed no on site detention is required due to the discharge from the site being consistent with pre-development conditions and into a tidally influenced water body and flood plain (where detention would be ineffectual in reducing peak flows or water levels in the water body if provided).

Preliminary estimates of peak flows from the Lot 6 stormwater outlet to Duck River doesn't include the influence of the proposed bio-retention basin, which would reduce the peak flows in Table 6.1, especially in low order storm events. During low order events, up to the 6-month annual recurrence interval (ARI) event, the site discharge rate would be limited to less than 1 L/s due to the extended detention and infiltration rate of the bio-retention filtration system.

Table 6.1 Peak flow estimates

Location	Q1 (m^3/s)	Q20 (m^3/s)	Q100 (m^3/s)
Outlet 1 - Stage 1 (Lot 6 - Downer)	0.860	1.900	2.580
Outlet 2 – Stage 2 and 3 (rest of the Estate)	2.730	6.180	8.330

Will the concentrated discharge of freshwater into Duck Creek impact on the health of the mangrove vegetation or marine life? Are there mitigation strategies for this?

Duck River is an estuarine environment subject to tidal influences. The Duck River catchment is heavily developed (significant amount of sealed surfaces) increasing the rate of freshwater stormwater runoff and dilution of Duck River during rainfall events. The local geomorphology of the river, being relatively narrow at this location, combined with the size and developed nature of the catchment, suggests that during periods of intense and/or prolonged rainfall the river would receive large amounts of freshwater inputs from the surrounding catchment. This existing situation would lead to a relatively dramatic variation in salt levels within the river over time.

As described in the WARP EIS, stormwater discharge from the Western Area to Duck River currently follows three main paths:

- The western extent of the Western Area drains to the vegetated council stormwater drainage channel along the western boundary of the site which then discharges to Duck River through the riparian vegetation and mangrove system;
- The southern fringe of the Western Area drains overland into Duck River through the riparian vegetation and mangrove system; and
- The remainder of the Western Area drains to the existing Clyde Terminal waste water treatment plant (WWTP), which then drains to Duck River via a formal outlet.

Therefore, the existing stormwater management system concentrates the majority of stormwater flows to two main discharge points along Duck River ie where the council stormwater drainage channel and Clyde Terminal WWTP discharge. Historically, an open discharge point was created at the WWTP discharge point to Duck River, however at the council stormwater drainage channel discharge point, where a significant volume of concentrated fresh water is discharged, the mangrove vegetation appears intact and not compromised by the freshwater discharge.

The project would create two additional stormwater discharge points that will spread the majority of the sites freshwater discharge across four discharge points rather than two, reducing the concentration of freshwater discharge at any one point.

Energy dissipators as discussed below will be provided at the proposed stormwater outlets to ensure stormwater is slowed down and spread laterally at the point of discharge so as not to scour the banks of the river, preventing impact to existing riparian vegetation, including mangroves as well as marine life in Duck River.

The stormwater discharge design includes rock scour and energy dissipation structures designed in accordance with Guidelines for Waterfront Land and NSW Department of Primary Industries 'Guidelines for Outlet Structures'.

Energy dissipators will reduce discharge velocity by greater than 75% of the piped velocity at the outlet of the pipe. The energy dissipators will result in flow velocity of less than 0.3 m/s for storms up to the 1 year ARI event, and less than 0.6 m/s for the design storm event and a low tailwater condition (ie low tide and Duck River/ Parramatta River not in flood).

The design velocities at the end of the dissipator are less than or equal to a moderately erodible clay-loam soil threshold of 0.6 m/s and below a vegetated bank with sparse ground cover of 1.0-1.5 m/s. Hence a rock rip-rap energy dissipator will be installed to reduce erodibility and erosion.

It is noted that when in 1% AEP flood conditions, the water level in Duck River will be 2.76 m above the outlet discharge invert. Velocity and scour potential noted above will be reduced if the local storm and regional flood conditions coincide.

Refer to drawing Co13919.00-DA46 of Appendix B3 and Section 2.2.4 of Appendix C for details on the proposed stormwater outlet structures.

Rainwater harvesting – are there any figures on anticipated total annual collection volumes and annual usage figures to support the conclusions of Table 13.5?

A water balance assessment has been included in Section 4.3 of Appendix C. The assessment includes estimates of total annual internal and external base water demands, and total annual collection volumes. The daily and yearly demands are based on industry best-practice values. Due to the lack of guideline from City of Parramatta regarding MUSIC modelling parameters for rainwater harvesting, typical industrial values such as the WSUD guidelines from Blacktown LGA have been adopted for the modelling. This includes 0.1kL/day/toilet or urinal for internal demand and 10 L/m2 for external irrigation demand.

6.2.3 Environmental management

Does the 2m deep inground pit intercept natural ground material or pose any Acid Sulfate Soil issues?

As described in Section 4.2.4 of the EIS, the majority of the top geological layer at Lot 6 comprises fill material (unit 1). This is a poorly compacted mixture of silt, clay and gravel, with localised areas of slag, furnace ash and concrete. This material was used to raise the level of the surface of the low-lying tidal swamp/mangrove area along the Parramatta and Duck rivers.

The average thickness of fill material within the Stage 1 area is 0.6 m. Fill material is underlain by high plasticity clay (alluvial sediments) across most of the Stage 1 area, which is a natural ground material. Therefore, it is likely the inground pit will intercept natural ground material.

According to section 3.3.1 of ERM (2020) *Clyde Western Area Remediation Project: Stage 1 – Detailed Remediation Action Plan*, no estuarine sediments have been identified in soil samples taken from this area. Therefore, given the absence of estuarine sediments across Lot 6, there is a low probability that acid sulphate soils or potential acid sulphate soils will be encountered.

Notwithstanding, an acid sulphate soils management procedure will be prepared and appended to/included in the Stage 1 construction environment management plan.

Were options considered to widen the riparian corridor?

The EIS noted a requirement under the *Guidelines for Riparian Corridors on Waterfront Land* for a 30 m wide riparian corridor, consistent with the Strahler stream classification, and per the approach put froward and accepted in the WARP SSD approval.

PCC has nevertheless requested that an average 40 m riparian corridor be provided. It is now proposed to provide a 40 m riparian corridor per the averaging rule in the *Guidelines for Riparian Corridors on Waterfront Land.* This proposal is set out further under the response to the PCC request for an expanded riparian corridor.

Section 18.3.3 – What happens if asbestos material is transported to the Downer operations? The controls assume it is not possible – this seems unrealistic?

RAP is highly unlikely to contain asbestos as it comprises aggregate and bitumen, with a minor portion of entrained road base. Aggregate sourced from quarries to construct the original road is highly unlikely to have encountered asbestos during extraction and processing. Recycled aggregate used to construct the original road would have needed to meet an engineering specification and therefore would not have contained contaminants such as asbestos.

Refer to Section 6.8.16 for further details on processes and procedures Downer will implement in the unlikely event that RAP does contain asbestos, to further reduce the chance of asbestos being received on site and appropriately manage it if it were to be received.

As discussed further in Section 6.8.16 the only potential for asbestos to be present in waste material received at the Reconomy facility is in the form of asbestos fibres. Any asbestos fibres as well as other fine components of the waste material (including silts and clays) will be cleaned from the waste and thickened to form a sludge, which is then dewatered (to form filter cake) and disposed to landfill as general solid waste.

6.2.4 Air quality

What is the current extent of existing annual PM10/2.5 exceedances in the locality?

As described in Appendix D, a review of the existing annual average PM_{10} and $PM_{2.5}$ levels are presented in Section 6.3.1 and 6.3.2 of the air quality impact assessment (AQIA). Ambient PM_{10} and $PM_{2.5}$ monitoring data recorded at the Parramatta North and Chullora air quality monitoring stations from 2015 to 2019 are reviewed in the AQIA.

The available data indicates the annual average PM_{10} levels were typically below the criterion of 25µg/m³ with an average level of approximately 19.8µg/m³ for 2015 to 2018. During 2019, the Parramatta North monitor recorded a level of 25.5µg/m³ and the Chullora monitor recorded a level of 24.6µg/m³. Persistent drought conditions and widespread bushfire events occurring later in the year is the likely cause behind the elevated level.

Annual average $PM_{2.5}$ levels are recorded at the criterion of 8µg/m³ for all years except for the Chullora monitor in 2017 and at both the Parramatta North and Chullora monitors in 2018 and 2019. The elevated $PM_{2.5}$ levels are found to be attributed to an increase in hazard reduction burns during the cooler months in these years compared to the previous years and also the widespread bushfire events which occurred in late 2019.

Did the air quality assessment give consideration to workers being onsite throughout the day at Receiver C1? It reads differently to the way the assessment considered the industrial receivers and that it applied impacts to visitors to the site and not workers. The EIS states there are no additional exceedance days due to the development but there is no evidence in the EIS to support this statement – for example Table 10.9 and 10.10 show increases at receiver C1 from compliant to an exceedance. Are there existing backgrounds levels available for the information in these two tables?

The assessment locations in the AQIA include residential, future residential, a public school, industrial, churches and community receptors. The industrial receptors and churches and community receptors are considered separately to the residential, future residential and public school receptors on the basis the workers and visitors at these location would not reside for more than 24-hours or for an annual period and hence the NSW EPA impact assessment criteria are not considered applicable. It is also noted that sensitive individuals such as the sick, frail, elderly or young who are most susceptible to harm would potentially be at residential, future residential and public school receptors for extended periods of time. However, these sensitive individuals are unlikely to be at industrial receptors, churches and community receptors for extended periods.

The AQIA and EIS present the modelling predictions at the industrial receptors and churches and community receptors however it has inadvertently not been set out clearly in the AQIA and EIS that the churches and community receptors (i.e. C1) are also not subject to the NSW EPA impact assessment criteria.

The background levels applied in Table 10.9 and 10.10 of the EIS (Table 8-1 and Table 8-2 of the AQIA) are summarised in Table 6-4 of the AQIA. The background levels are 7µg/m³ for annual average $PM_{2.5}$ and 21.6µg/m³ for annual average PM_{10}. It is noted that the modelling predictions for C1 in Table 10.9 and 10.10 of the EIS (Table 8-1 and Table 8-2 of the AQIA) indicate marginally elevated annual average $PM_{2.5}$ levels for Scenario 1 (0.5µg/m³ above the NSW EPA impact assessment criteria), Scenario 2 (0.6µg/m³ above the NSW EPA impact assessment criteria) and elevated annual average PM_{10} levels for Scenario 2 (0.6µg/m³ above the NSW EPA impact assessment criteria). As mentioned people are not expected to be present at this community receptor for an annual period of time and hence the NSW EPA impact assessment criteria does not apply.

It is also worth noting that Scenario 2 includes Stage 1 operating in conjunction with the subdivision earthworks occurring adjacent to Stage 1 and that the subdivision earthworks would only occur over a 9-month period. For the modelling assessment, the subdivision earthworks are assumed to occur over the entire modelling period (i.e. 12-months) and therefore is a conservative prediction of the annual dust level.

Are the exceedances in Table 10.9 and 10.10 pre or post mitigation measure as listed in Table 10.13?

The modelling predictions in Table 10.9 and 10.10 of the EIS includes the potential dust mitigation achieved through the design features and specific control factors outlined in Appendix C of the AQIA which include a control for the enclosure of the RAP processing activities and a control for water application on the RAP stockpiles.

The dust and odour management measures in Table 10.13 of the EIS (Table 9-1 of the AQIA) include a range of operational measures which would be applied to the actual operation of the site. The measures where a quantifiable control factor is available has been accounted for in the

modelling. However, for the other measures, these are dependent on a range of variables and conditions at the time of the actual operation and the level of control achieved cannot be quantified and as such the modelling results in Table 10.9 and 10.10 of the EIS are likely to be conservative.

Why is the road within the RAP area unsealed?

The surface of the RAP stockpiling area was proposed to comprise compacted road base, which would have been permeable. The permeability of the surface would have allowed rain that fell on the stockpiles to percolate into the groundwater. This would not have contaminated the groundwater with hydrocarbons in the bitumen contained in the RAP as the bitumen is a binding material and would not have dissolved and washed away in the rain.

Further, windblown and vehicle generated dust from the unsealed surface would have been controlled with sprinklers/water cart.

Notwithstanding the above, Downer commits to paving the RAP stockpiling area and access road with a sealed asphaltic concrete surface. This will prevent water from percolating into the groundwater and prevent dust generation. The access road to and through the stockpiles will be swept with a street sweeper to prevent minor quantities of sediments entering the water management system/becoming windblown/vehicle generated dust.

If EPA criteria doesn't apply to industrial sites why are the results being reported as non-compliances in the EIS?

The EIS and the AQIA have reported the modelling predictions for the industrial sites to provide an indication of the air quality levels at these locations. The predicted levels are compared to the NSW EPA impact assessment criteria to gauge the predicted level at these locations, however are not to be considered as non-compliances. As noted in the AQIA, the NSW EPA impact assessment criteria do not apply at these locations.

6.2.5 Clarifications

Confirm the recovery rate for the reconomy facility – page x states 60%, Section 2.4 states 95%?

The recovery rate of over 60% stated in Section 3.2.6 of the EIS is the total amount of materials recovered from the waste received at the Reconomy facility. The 95% referred to in Section 2.4 is saying that of the materials recovered from the waste received at the Reconomy facility, 95% of the materials are recycled/re-used while 5% are disposed to landfill.

Confirm intention of construction activities? Conflicting statements where EIS states that construction will essentially occur across a 24/7 period as required, other sections state construction within standard construction hours?

Downer's Unwin Street site is being compulsorily acquired by the NSW Government for construction of the Sydney Metro West and Downer will be required to vacate the site by 13 April 2022. Therefore, Downer must gain access to a new site and construct the Stage 1 components described in the EIS prior to this time. This is a short time frame in which to acquire a site, gain approvals and construct the project.

Given the above, the proponent is seeking flexibility in construction hours for Stage 1 of the project so that it can be constructed as efficiently as possible within the short time frame. It is intended Stage 1 will predominantly be constructed during standard construction hours. However, flexibility for out of hours construction is sought to account for work stoppages associated with inclement weather etc.

Downer will not provide blanket approval for out of hours work to its staff and contractors. Personnel and contractors will need to apply to the construction manager for approval to operate

outside standard construction hours. Personnel and contractors will need to demonstrate how they will manage noise emissions.

As described in Section 9.1.2 of the EIS, the iNoise three-dimensional model was used to predict construction noise at the receivers based on the sound power level for the plant and equipment listed in Table 16 in Appendix C of the EIS, operating simultaneously for 100% of the time over 11 months during the periods described below for the following scenarios:

1. Bulk earthworks to bench the site and provide level pads to the whole of the subdivision.
2. Construction of a new road from Devon Street.
3. Sealing/capping of Lot 6.
4. Construction/installation of plant on Lot 6.

The results were compared to noise management levels derived using the *Interim Construction Noise Guidelines* for:

- Day time.
- Out of hours period 1: 6-10pm Monday-Friday, 1-6pm Saturday, 8am-6pm Sunday.
- Out of hours period 2: 10pm-7am Monday-Friday, 6pm-7am Saturday/Sunday (8am Sunday).

As described in Section 9.2.1 of the EIS, construction noise will comply with criteria during standard construction hours at all sensitive receivers. The cumulative noise levels during the day, evening and night period for all construction activities (Scenario 1 to Scenario 4) will satisfy the noise management levels at all receiver locations with the implementation of good noise management practices during the evening and night periods.

Sleep disturbance by transient events was also predicted to not exceed the maximum noise trigger level at any of the receivers.

6.2.6 Clarifications requested from DPIE in email dated 29 September 2020

Confirm the lot size of what is shown as proposed Lot 3 (Stage 3 onwards)? I note the engineering drawings show this as 2.135 ha. This looks to be a labelling error as Lot 3 in Stage 2 is subdivided at Stage 3 into Lots 51-53.

As outlined in Section 5.1.1 the proposed subdivision has been changed from an eight lot to a 14 lot subdivision. Revised subdivision and staging plans are included in Appendix B1 and B2.

Could you also request from your traffic consultant a minor update to Fig 6 of the TIA Report to include the local road network in the immediate vicinity of the project, not just the State and Regional network roads.

Figure 6 of the TIA does show the local road network, the street names are just less prominent than the State and Regional network labels. Figure 3.19 of the EIS more clearly shows all the proposed access routes to the site with all local roads clearly labelled.

6.2.7 Additional Stage 1 employment query

The EIS states employment for Dower as 42 and 48 jobs in various places. Could you please confirm in the RTS as well as what the total additional jobs creation is?

Twenty-eight personnel will be employed in the day shift (5am-6pm), three in the afternoon shift (2pm-10pm) and 17 in the night shift (6pm-6am) during operations. This is a total of 48 employees.

The project will create an additional 10 jobs – six associated with the bitumen products plant and four associated with asphalt production, RAP processing and Reconomy.

6.2.8 Additional flood inquiry

Subsequent to the submissions on the EIS, DPIE requested that further detail be provided on the change in hazard for the PMF event between existing and design.

This information is provided on Figure 6.1 and Figure 6.2 below and in Appendix E (these were not provided in Appendix G of the EIS).

These figures show that there are only very minor changes in the hazard from existing to design beyond the extent of the site (within the site there are changes due to the siting of the proposed development). Being minor, these changes can only be seen by comparing the hazard mapping for existing and design.

6.2.9 Additional air quality inquiry – presentation of cumulative modelling predictions at receivers

Table 6.2 and Table 6.3 present the predicted cumulative particulate dispersion modelling results at selected receiver locations for Scenario 1 and Scenario 2 respectively. The modelling results are identical to the results presented in Table 8-1 and Table 8-2 of the AQIA with the inclusion of cumulative 24-hour average $PM_{2.5}$ and PM_{10} results.

For the assessment of cumulative 24-hour average $PM_{2.5}$ and PM_{10} concentrations, a Level 2 contemporaneous assessment was undertaken (refer to Section 8.2 of the AQIA) and the results presented correspond to the highest measured background level below the criteria with the corresponding predicted incremental level.

The cumulative particulate dispersion modelling results indicate the predicted levels would be below the relevant criteria for each of the assessed dust metrics at all receivers except for C1. The predicted levels for C1 are 1µg/m³ and 0.5µg/m³ above the criteria for 24-hour average and annual average $PM_{2.5}$ in Scenario 1, 1.1µg/m³ and 0.6µg/m³ above the criteria for 24-hour average and annual average $PM_{2.5}$ in Scenario 2 and 0.6µg/m³ above the criteria for annual average PM_{10} in Scenario 2.

Table 6.2 Cumulative dust modelling results for receivers – Scenario 1

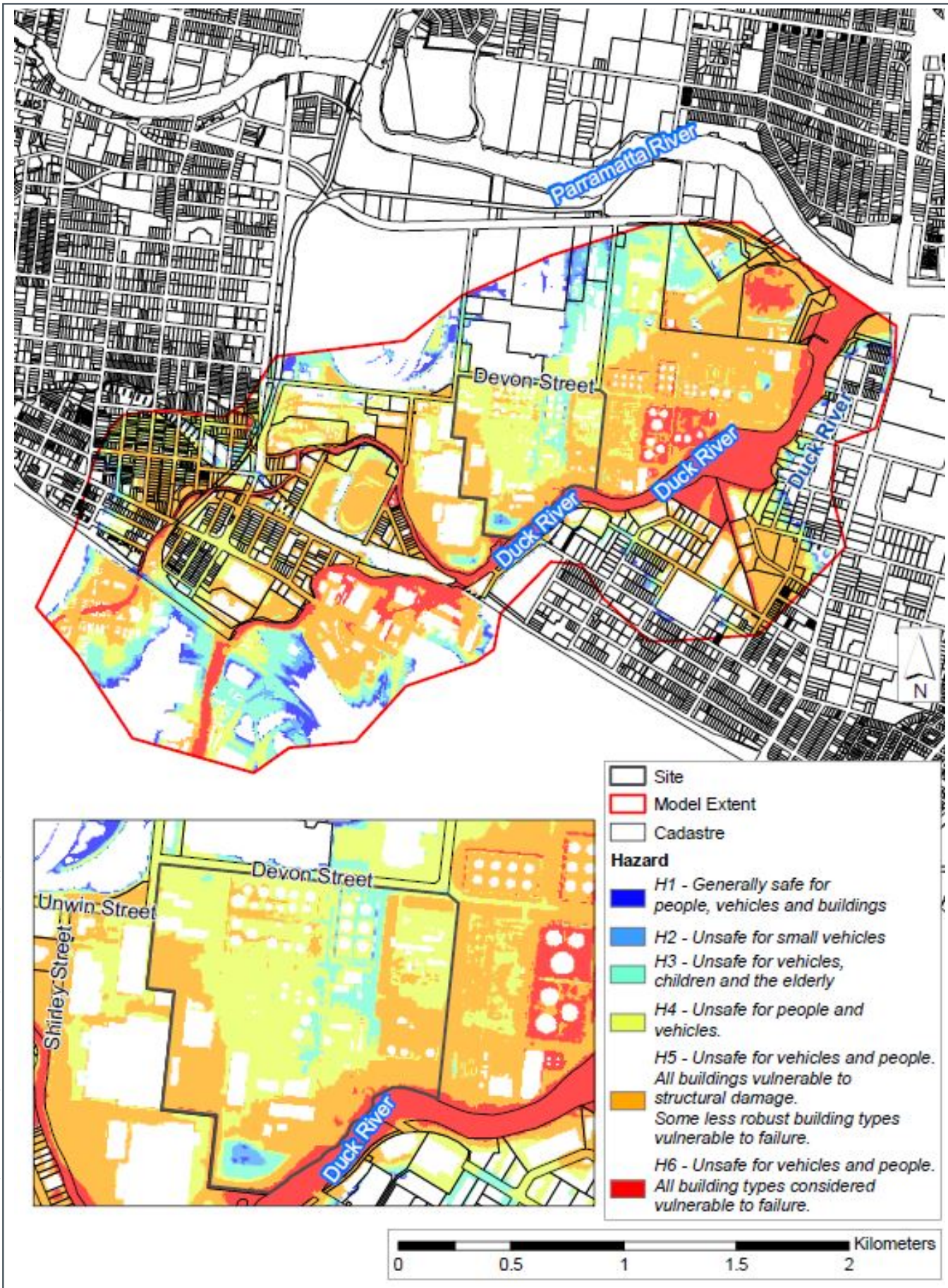
Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD* (g/m²/mth)
	Cumulative					
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria					
	25	8	50	25	90	4
R1A	23.5	7	44.1	21.7	77.9	3.5
R1B	23.5	7.1	44.0	21.7	77.9	3.5
R2A	23.8	7.3	44.0	22.2	78.8	3.5
R2B	23.7	7.2	43.9	22	78.4	3.5
R3A	23.6	7.1	43.7	21.8	78	3.5
R3B	23.5	7.1	43.7	21.7	77.9	3.5
FR01	23.5	7	43.9	21.7	77.9	3.5
Sch1	23.5	7	43.7	21.7	77.8	3.5
AR1	23.6	7.2	43.8	22.1	78.7	3.5
C1	**26.0**	**8.5**	46.0	25	84.7	3.6
Wor1	24.1	7.4	44.0	22.5	79.2	3.5
Wor2	23.9	7.2	44.0	22	78.5	3.5

Table 6.3 Cumulative dust modelling results for receivers – Scenario 2

Receptor ID	$PM_{2.5}$ ($\mu g/m^3$)		PM_{10} ($\mu g/m^3$)		TSP ($\mu g/m^3$)	DD* ($g/m^2/mth$)
	Cumulative					
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria					
	25	8	50	25	90	4
R1A	23.5	7.1	44.1	21.7	77.9	3.5
R1B	23.5	7.1	44.0	21.7	77.9	3.5
R2A	23.9	7.3	44.0	22.4	79.1	3.6
R2B	23.7	7.2	43.9	22.1	78.6	3.5
R3A	23.7	7.1	43.7	21.9	78.2	3.5
R3B	23.6	7.1	43.7	21.9	78.2	3.5
FR01	23.5	7.1	44.3	21.8	78	3.5
Sch1	23.5	7.1	43.7	21.8	78	3.5
AR1	23.7	7.5	44.6	23.1	80.2	3.7
C1	**26.1**	**8.6**	46.0	**25.6**	85.7	3.9
Wor1	24.1	7.5	44.0	22.7	79.6	3.6
Wor2	23.9	7.2	44.0	22.1	78.6	3.5

Figure 6.1
Hydraulic hazard PMF event existing case

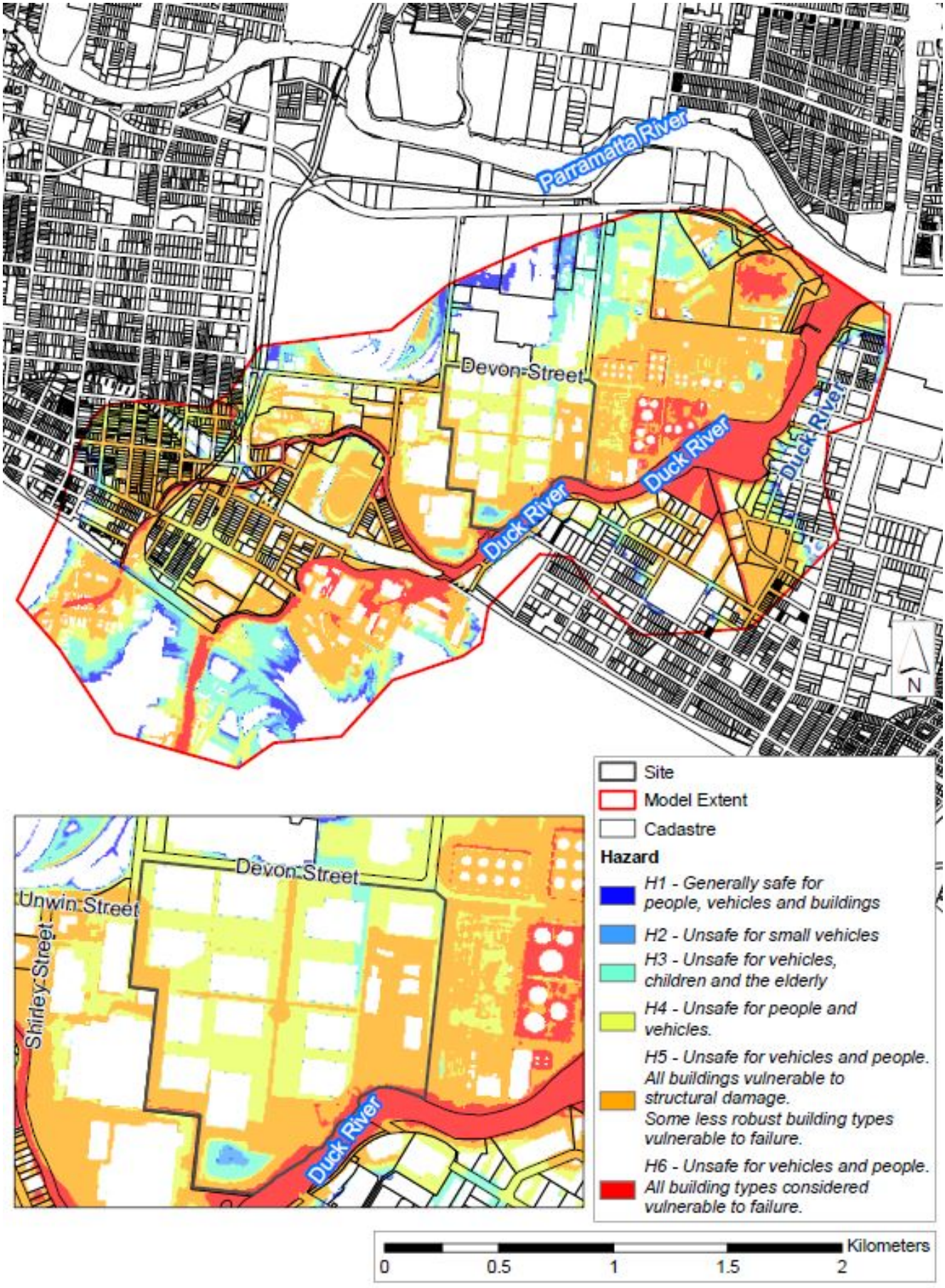
Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
STATE SIGNIFICANT DEVELOPMENT - RESPONSE TO SUBMISSIONS



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Figure 6.2
Hydraulic hazard PMF event proposed design

Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
STATE SIGNIFICANT DEVELOPMENT - RESPONSE TO SUBMISSIONS



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6.3 DPIE – Hazards

Further information is requested on the usage of kerosene and diesel in the bitumen manufacturing process. It is unclear in the submitted document that whether kerosene or diesel will be blended with the bitumen and subsequently lowering the flash point of the bitumen blend below 60 degrees Celsius in the blending tank and product tanks. Please clarify:

As described in Appendix F, diesel will only be used for refuelling trucks and other vehicles/plant/equipment. It is not used for bitumen blending/product formulation.

Kerosene will not be blended directly with bitumen in bulk. Kerosene will be pre-mixed into the soap line (aqueous phase). The soap/kerosene mixture is non-flammable due to the water component. This aqueous phase is then blended/emulsified with bitumen in the mill to produce bituminous emulsion products.

The bituminous emulsion product has a flash point greater than 60^{o}C throughout the process.

Whether kerosene will be blended with bitumen. If so, what is the percentage composition of kerosene bitumen mixture;

As noted above there is no direct blending of kerosene into bitumen. Typical bituminous emulsion product compositions are 10-15% kerosene, 20-25% bitumen and 60-70% soap/water.

In accordance with Applying SEPP 33, if C1 product is to store together with Class 3 material, the entire inventory will be considered as Class 3 material. It is noted that the storage of Class 3 and C1 is fairly separated from the submitted document. Refer to above point a, please clarify whether the process of bitumen manufacturing may potentially introduce Class 3 material in the system and thus deem the processing inventory (including those in the pipework) as Class 3, and update the PHA if necessary; and

Bituminous emulsion products are not dangerous goods and are not combustible. Due to the aqueous component blended with kerosene, the flashpoint of the product cannot drop below the bitumen flashpoint.

Therefore, the only Class 3 system is the kerosene storage tank and the small amount of piping leading to the soap line. The kerosene piping route to the soap solution area is separated from combustibles/bitumen locations.

Provide MSDS of the final bitumen products for Department's confirmation on its DG classification.

Refer to example safety data sheet (SDS) for bituminous emulsion products in Attachment A of Appendix F. These products are not DGs as per the SDS.

The SDS notes that although the material is non-combustible, evaporation of water from the mixture, caused by heat of a nearby fire, may produce floating layers of combustible substances.

It is noted that an existing High Pressure (HP) pipeline is running along Devon Street adjacent to the project site. Please clarify whether consultation or any agreed actions have been made with the pipeline operator to ensure the existing HP pipeline can continue comply with AS 2885.

Jemena has been contacted in regard to the secondary 250 ST 1050 Kpa gas line running along Devon Street. Jemena requires the following in relation to any excavations in the vicinity of their lines:

Prior to any excavations in this area, you must contact the High Pressure Response Coordinator on 1300 665 380. (Appointments will be coordinated with availability of a

Jemena Representative) to arrange a survey. For all works in the vicinity of High Pressure Gas Mains you must arrange for a Jemena Representative to attend and supervise all excavations. Charges apply for attendance of any works outside the hours of 7am to 4pm, Monday to Friday ("Standard Business Hours") and for any attendance during Standard Business Hours that is longer than 2 hours.

Jemena was consulted and Downer/VEP will comply with required Jemena practices in working near Jemena assets.

Based on the current site layout and acknowledgement that it is a preliminary design, it appears that the location of the kerosene storage, emulsion additives storage and site amenities may be tight for complying the requirements of AS 1940 (The Storage and Handling of Flammable and Combustible Liquids) and AS 3780 (The Storage and Handling of Corrosive Substances). This observation is brought to your attention as a note to ensure compliance with relevant standards can be achieved in the final design. No clarification is required on this.

Noted.

6.3.1 Hazards – general

Table 6.4 summarises the changes to the Lot 6 Sustainable Road Resource Centre site development plan (described in Chapter 5) as relevant to dangerous goods and associated SEPP33 screening/preliminary hazard assessment (PHA). Figure 6.3 shows the revised Lot 6 site development plan and Figure 6.4 the conceptual site development plan included in the EIS/PHA. DG locations are highlighted in colour as per the legend on both figures.

There has been minimal change to the total quantities of dangerous goods presented in Table 4.1 of the SEPP33/PHA report. As summarised in Table 6.5 the main change is that the kerosene storage volume has been slightly reduced and the self-bunded tank has been relocated from the Emulsion Additives storage area (ie close to corrosives and combustibles) to the bituminous emulsion product storage area (non DG, not combustible).

These changes do not affect the conclusions of the SEPP33/PHA and an update is not required.

Table 6.4 SEPP 33 hazardous material storage screening summary – comparison with EIS/PHA

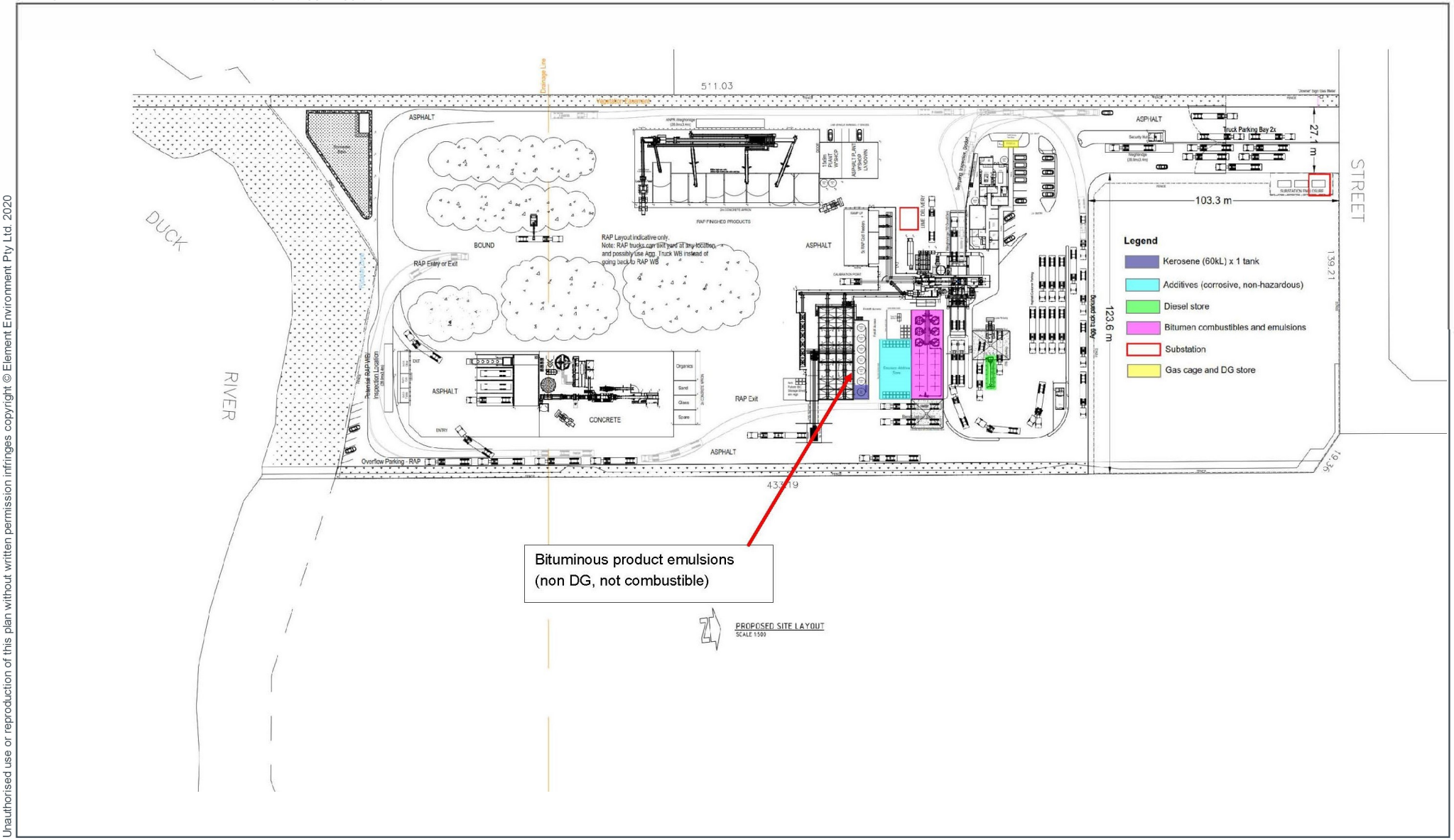
Dangerous good			Quantities (t)			Potentially hazardous?	Location changed?
Class	PG	Materials	Stored as per EIS (i.e. PHA Table 4.1)	Quantity change	Threshold in Applying SEPP 33 guideline, Ref Invalid source specified.		
2.1	-	Various, e.g. acetylene	0.035	No change	0.1[(a)]	No	Yes DG Store / gas cage relocated as per Figure 6.3
2.1	-	LPG	0.018	No change	10 [(b)]	No	
3	II	Various hydrocarbons	1.6	No change	5[(c)]	No	
3	III	Kerosene	48	45 (Reduced 65kL to 60kL tank size)	Quantity is 'potentially hazardous' if less than 8 m from site boundary. Separation distance is more than 25m from tank to boundary. [(c). (d)]	No	Yes Relocated self-bunded kerosene tank to bituminous emulsion product storage area as per Figure 6.3
8	II/III	Mixed corrosives, primarily caustic materials	62	No change	25[(e)]	Yes	No change (in Emulsion Additive Store)

Notes:
a. Class 2.1 - pressurised (excluding LPG)
b. Class 2.1 LPG aboveground
c. Class 3 PGII and PGIII not cumulated as PG III is in a different separately contained location (more than 50m away)
d. Flammables in self-bunded aboveground storage
e. Class 8 PGII is the most hazardous subclass. PGIII is stored in the same location as PGII, so PGIII quantity is cumulated with PGII and the total compared to PGII screening threshold.
f. Miscellaneous dangerous substances and articles, including environmentally hazardous substances (Class 9) are not considered to be hazardous.

Table 6.5 Layout changes – effect on SEPP 33 screening/PHA

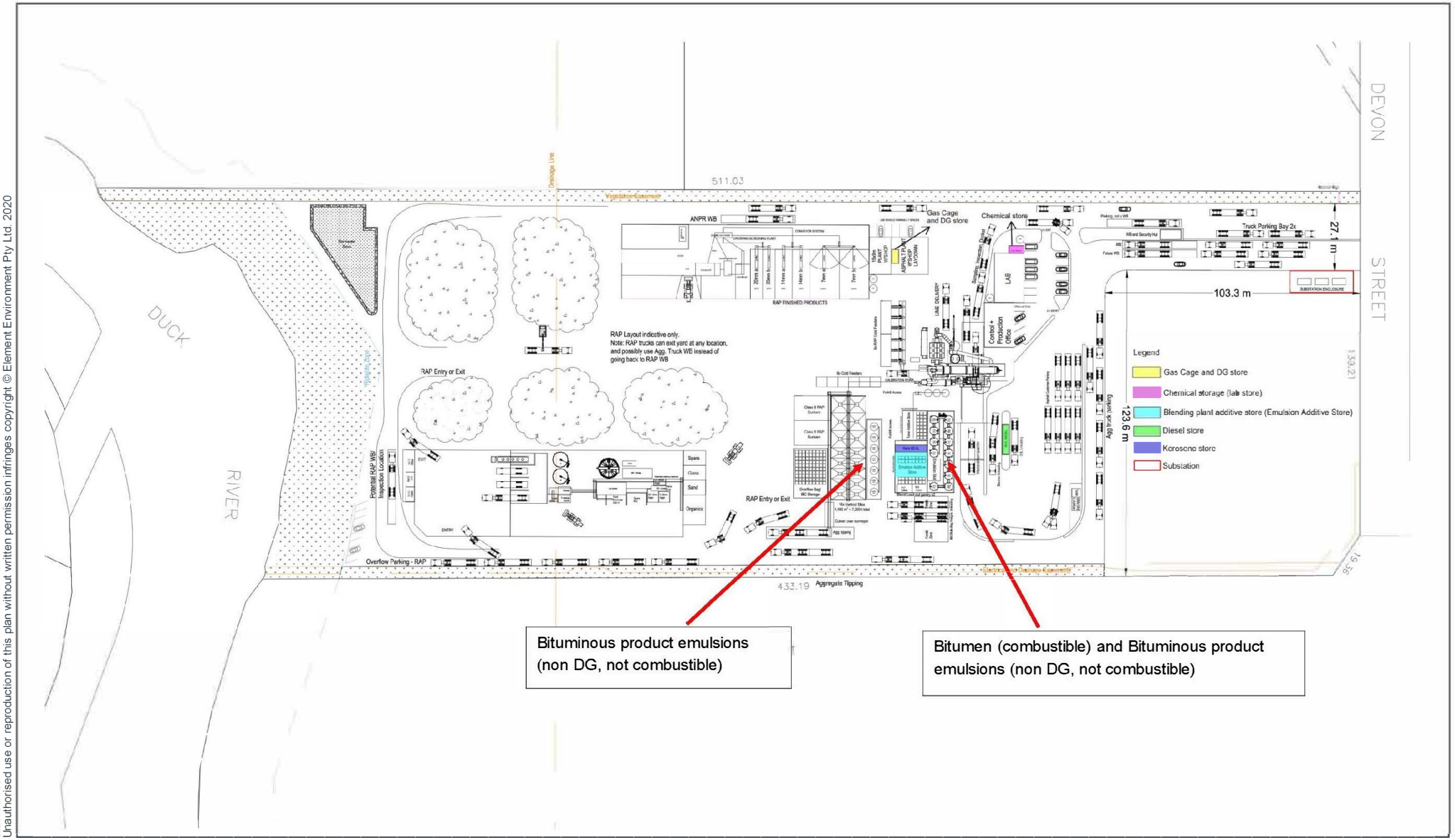
Change	Effect	Effect on SEPP 33 screening/PHA outcomes
Kerosene storage (60kL/45 tonnes) relocated from Emulsion Additive storage area to bituminous emulsion product compound (see 'kerosene (60KL) x 1 tank' on Figure 6.3). Kerosene tank will be vertical self-bunded design instead of horizontal self-bunded tank.	New location is approximately 28 m from the site boundary (compared to 40 m in previous design). This remains compliant with AS1940:2017 Table 5.4 separation distance to offsite protected place (8.5 m for 60kL). Increased separation from bitumen storage (combustible) further reducing any escalation risk. Kerosene is in self bunded tank. Adjacent bituminous emulsion products are non-combustible. Therefore, SEPP33 screening remains based on kerosene inventory only. Total Class 3PGIII exceeds SEPP33 threshold for evaluation however is separated by more than 8 m from site boundary as per Applying SEPP33 guideline Figure 9 so not potentially hazardous.	None
Small quantities of DG (gases, small packages) for laboratory (lab) use consolidated to new dedicated location to west of lab (see 'gas cage and DG store' on Figure 6.3) Lab store will be used for non DG substances.	Greater separation distance to lab. Reduced separation distance to western boundary (approximately 10 m rather than 20 m) but still meets AS1940 and AS3780 requirements (maximum is 5 m from AS9140 Table 4.1 for up to 4kL of Class 3 PGI or PGII).	None
Downer is discussing three options for the location of the three electrical substations required on the site. 1) Locate all three substations on the western edge of the front elevated pad at the northern end of Lot 6; or 2) Relocate two of the substations adjacent to the asphalt plant within the Downer site (between the RAP cold feeders and the lime delivery area) and retain one of the substations on the western edge of the front elevated pad at the northern end of Lot 6 (see 'substation' on Figure 6.3); or 3) relocate two of the substations to the south-western corner of the front elevated pad at the northern end of Lot 6.	New locations are well separated from DGs therefore: • No identified scenarios involving DG that could affect / damage the relocated substations. • Substations not an ignition source for Class 3 flammables.	None

Figure 6.3
Hazardous features of revised site development plan



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Figure 6.4
Hazardous features of conceptual site development plan from EIS SEPP33/PHA



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6.4 DPIE – Water

The proponent should evaluate if the pond required for the Reconomy facility will intercept the water table during construction. If it does, then the proponent should:

- **Determine the predicted volume of groundwater take; and**
- **Determine the appropriate licensing requirement as presented under options (a) and (b) as follows:**

  a. **Where less than 3 ML/yr of groundwater take is predicted, a licensing exemption is available under cl. 7 of Schedule 4 of the Water Management (General) Regulation. To exercise this exemption certain requirements must be met to ensure that less than 3 ML of water is taken. More information can be found at: https://www.waternsw.com.au/__data/assets/pdf_file/0007/155419/Exemptions-for-construction-dewatering.pdf.pdf**
  b. **Where greater than 3 ML/yr of groundwater take is predicted, consultation with NRAR is required to demonstrate adherence with licensing obligations under the *Water Management Act 2000.***

Groundwater levels around the proposed bioretention basin at the south-west corner of Lot 6 are variable, with a final water level of 4.2 m below ground level recorded at the nearest monitoring well (MW11/40) and 1.5 m below ground level at the next nearest monitoring well (MW11/42) (Appendix C of WARP EIS).

There is the potential to intercept groundwater during construction of the bioretention basin as well as other structures that require deeper excavations. Given the bioretention basin will only be approximately 1.5 m deep, it is assumed potential water take will be minimal and, therefore, an exemption will be claimed under the NSW Water Management (General) Regulation 2018.

If more than 3 ML/yr is predicted to be taken during construction of the project Downer/VEP will consult with NRAR regarding acquisition of a license under the NSW *Water Management Act 2000*.

Any other take of water from groundwater and/or surface water sources (including induced groundwater inflows) must be appropriately licenced under a water access licence (WAL) prior to the take of water commencing, unless exempt as per option (a) above.

Similarly to the above, if it is determined that the construction and operation of the project will intercept and take groundwater, an exemption will be claimed under the NSW Water Management (General) Regulation 2018 if quantities are predicted to be below 3 ML/yr, or Downer and/or VEP will consult with NRAR regarding acquisition of a license under the NSW *Water Management Act 2000*.

6.5 DPIE – Environment, Energy and Science Group (EES)

The Flooding Assessment (revision 3) prepared by WMA water dated 21 August 2020 has satisfactorily considered mainstream flooding from Duck River and Parramatta River and overland flooding for the full range of floods. In section 4.2 of Appendix G each of the DPIE EES Environmental Assessment Requirements has been addressed.

Due to the consequences of flooding from rare to extreme floods the flood assessment recommends a Flood Emergency Plan is prepared in consultation with the NSW SES. EES supports this recommendation. Although not stated it is expected that this Plan will include education and awareness of owners and occupiers of each lot.

Climate change due to rainfall increase has been investigated. Sea level rise impacts are not applicable. For overland flooding, this has been undertaken by considering a 10%, 20% and 30% rainfall increase. For mainstream flooding flood levels for the 0.5% and 0.2% AEP events have been adopted as a proxy. The proposed development has not been specifically designed to include a climate change rainfall increase as it is assumed that any increase in peak level would be within the freeboard allowance. EES considers that the freeboard should not be eroded to account for climate change impacts.

A Flood Emergency Plan will be prepared for each site (refer Section 6.6.3).

The issue of climate change due to rainfall increase and inclusion within the freeboard is discussed in Section 6.6.3.

6.6 Parramatta City Council (PCC)

Council officers have reviewed the application package and formally object to the proposal primarily on the following grounds:

Riparian Corridor (40m): The riparian corridor should be increased to be 40m rather than the 30m proposed corridor in line with the NSW Fisheries Guidelines and Natural Resource Access Regulator (NRAR);

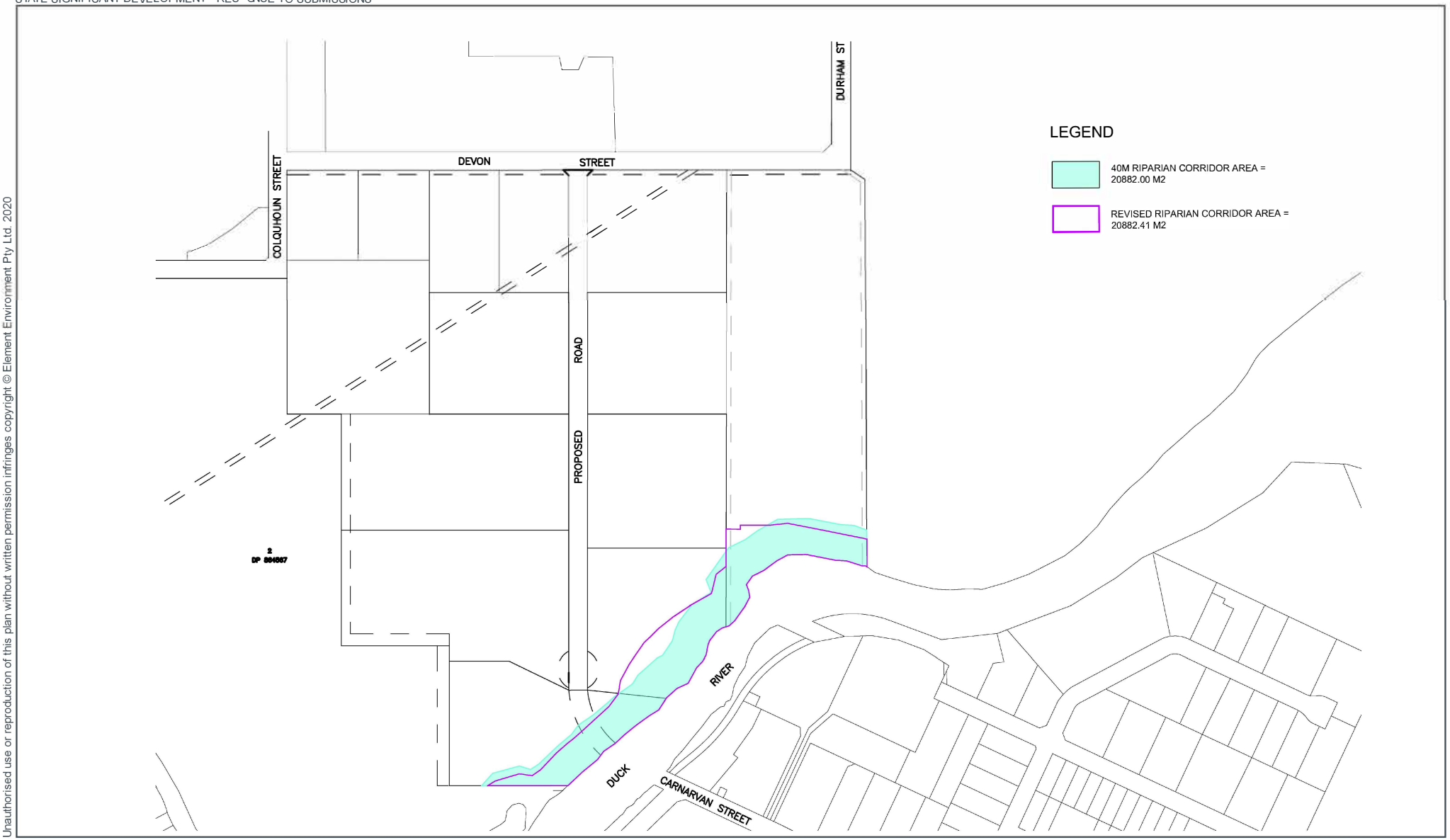
The EIS noted a requirement under the *Guidelines for Riparian Corridors on Waterfront Land* for a 30 m wide riparian corridor, consistent with the Strahler stream classification, and per the approach put froward and accepted in the WARP SSD approval.

Nevertheless, the opportunity to increase the riparian corridor consistent with PCC's request has been assessed and it is now proposed to provide a 40 m corridor consistent with the averaging rule as set out in the Office of Water, Guidelines for Riparian Corridors on Waterfront Land.

The averaging rule is described below:

> What is the averaging rule?
>
> Non riparian corridor works and activities can be authorised within the outer riparian corridor, so long as the average width of the vegetated riparian zone can be achieved over the length of the watercourse within the development site. That is, where appropriate 50 per cent of the outer vegetated riparian zone width may be used for non-riparian uses including asset protection zones, recreational areas, roads, development lots and infrastructure. However, an equivalent area connected to the riparian corridor must be offset on the site (see Figure 3) and the inner 50 per cent of the vegetated riparian zone must be fully protected and vegetated with native endemic riparian plant species.
>
> Bridges, cycleways, paths, stormwater outlets and other essential services do not need to be offset, but must comply with the requirements set out in the riparian corridor matrix (Table 2) and other relevant Office of Water controlled activities guidelines. Offline detention basins do not need to be offset so long as there is an equivalent VRZ for the corresponding watercourse and they are built in compliance with the Office of Water's *Controlled activities: Guidelines for watercourse crossings* and *Controlled activities: Guidelines for in-stream works*. If a proposed basin will not have an equivalent VRZ for the corresponding watercourse, it may still be built in the outer 50 per cent of the VRZ but must be offset.

Accordingly, it is now proposed that the riparian corridor be averaged as shown in Figure 6.5, ensuring that a minimum 30 m corridor is maintained as a minimum but that the corridor be expanded in areas to deliver a riparian corridor area that is consistent with an average 40 m width.



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The averaging approach is regularly supported by DPIE Water/Natural Resources Access Regulator and is supported by our project ecologist.

- **Contribution offsets: The new road and future bridge easement are offered on the basis that they will be offset against future contributions payable in relation to Lot 5. In addition, the riparian corridor is also proposed to be offset against Lot 5. This is not considered to be appropriate.**

The proposed staged subdivision to create the Central Sydney Industrial Estate provides PCC with the opportunity to deliver its future vision for the broader area by:

- providing an easement to enable PCC to construct a public footpath and cycleway along Duck River; and
- securing the land tenure required to enable PCC or others to, in the future, construct the proposed bridge link over Duck River connecting to Carnarvon Street, Silverwater.

PCC's position is that it is not appropriate to provide any offset against the future developer contributions payable in relation to Lot 5 in return for these significant public benefits. While VEP does not agree that this would be inappropriate, it accepts PCC's position that an offset will not be provided. Rather, the updated proposed staged subdivision plans make provision for:

- Stage 1A – public access easement along Duck River: provision of a variable width easement matching the average 40 m wide riparian corridor for public access along the Duck River frontage. This will grant PCC the right to construct, at its cost, a 2.5 m wide public pathway and cycleway along Duck River in the easement. The location of the easement is shown on the attached draft Stage 1A subdivision plan (Appendix B1). The terms of the proposed easement are contained in the attached draft Stage 1A Section 88B instrument (Appendix B5).
- Stage 3 – new road and future bridge link easement: Stage 3 includes:
  - New road: a new public road will be created mid-way along the Devon Street frontage of the property and will end towards the bottom of the site as shown on the attached draft Stage 3 subdivision plan (Appendix B1). The new road will be constructed in a 21 m wide road reserve and:
    - constructed at VEP's cost, to comply with the specifications for industrial roads in section 3.3.7 of Chapter 3 of the *City of Parramatta Public Domain Guidelines*; and
    - transferred to PCC at no cost on registration of the Stage 3 subdivision plan for dedication by PCC a public road under the *Roads Act 1993 (NSW)*.
  - Future bridge link easement: provision of a 21 m wide access easement, in favour of PCC from the end of the new public road over proposed Lot 64 in the location shown on the attached draft Stage 3 Subdivision Plan (Appendix B1). The terms of the proposed easement are contained in the attached draft Stage 3 Section 88B instrument which will be registered at the same time as the Stage 3 Subdivision Plan. If, in the future, PCC (or any other authority nominated by PCC) proposes to construct a bridge link over Duck River connecting to Carnarvon Street, Silverwater within the 21 m wide easement area, then the land within this easement area will then be dedicated, at no cost, to PCC (or any other authority nominated by PCC) to enable it to construct the future bridge link and dedicate it as a public road.

It is proposed that the above arrangements be formalised via appropriately drafted conditions in the State significant development consent granted for the project. Accordingly, a voluntary planning agreement is no longer required or offered by VEP.

Insufficient Information: Whilst the height non-compliance appears to demonstrate a low to moderate impact, an architectural plans package detailing RL levels of the height non-compliance as well as elevations and sections has not been provided to enable an accurate assessment of the proposal.

Figure 3.11 of the EIS included the elevations of the proposed Lot 6 Sustainable Road Resource Centre development. These elevations included the heights of all the key built elements in metres above ground level.

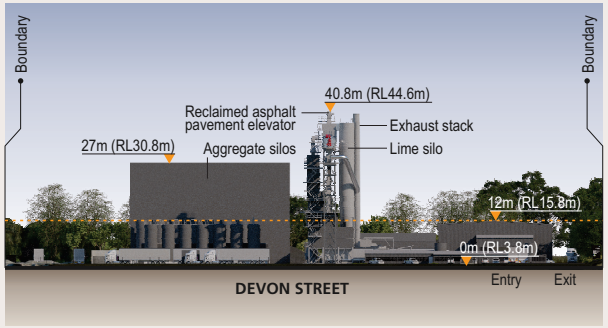
The elevation drawings have been reproduced (Figure 6.6) to address PCC's comment and now show:

- heights of all the key built elements in metres above ground level;
- RL levels of all the key built elements; and
- the heavy industrial zoning 12 m height limit for comparative purposes.

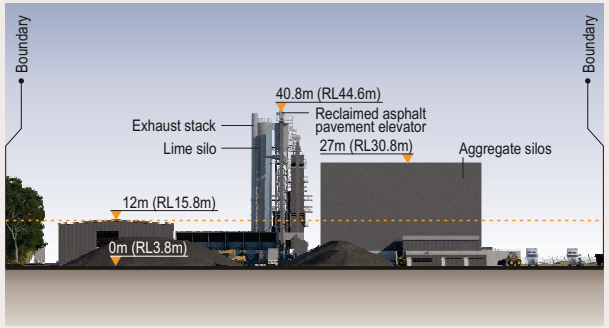
The perspective views presented in Figures 3.7 to 3.10 of the EIS demonstrate in 3D how the Lot 6 development is likely to look once built, while Figures 19.2 to 19.31 of the EIS provide an accurate indication of the likely visual impact of the project from key public and private viewpoints.

Figure 6.6
(Lot 6) elevations

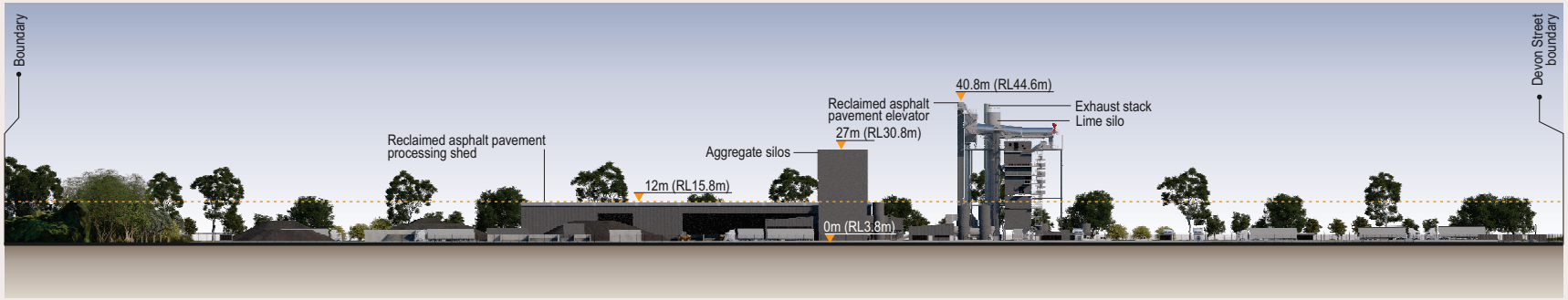
Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
STATE SIGNIFICANT DEVELOPMENT | RESPONSE TO SUBMISSIONS



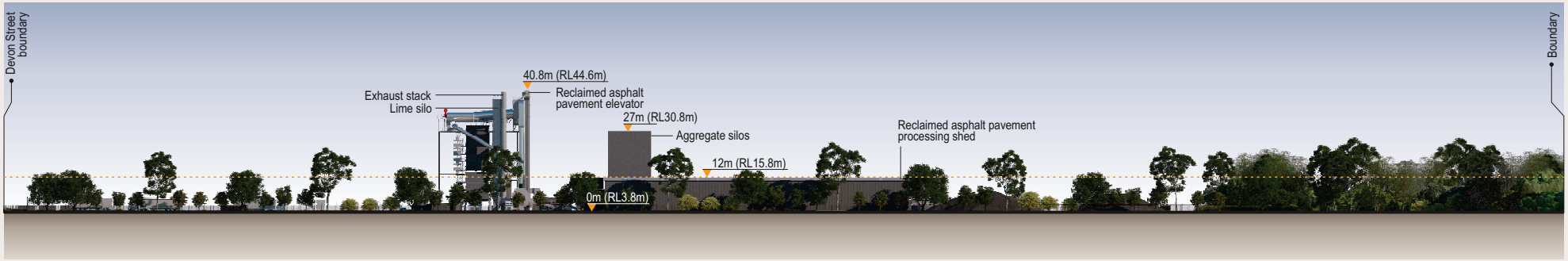
North elevation



South elevation



East elevation



West elevation

12m maximum building height

0 25 50m

CAMBIUM GROUP

Source: Downer (2020), Geoscapes (2020), Costin Roe (2020), Cambium Group (2020).

031196_RTS_F1_L6E_201112_v01

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6.6.1 Biodiversity and habitat

Biodiversity development assessment report (BDAR)

Whilst the site is largely devoid of native vegetation or other potential habitat outside the Duck River riparian corridor, there is a potential for indirect impacts from runoff and the location of the proposed new stormwater outlets on land included on the biodiversity values map. However, it is noted that both planning and environment agencies have determined that the proposed development is not likely to have any significant impact on biodiversity values and a BDAR is not required.

This statement is noted.

Flora and fauna assessment (FFA)

The FFA confirms that the majority of the site is significantly disturbed due to previous heavy industrial development, with Estuarine Swamp Oak Forest and Estuarine Mangrove Forest threatened ecological communities occurring along the southern boundary within the Duck River riparian corridor. The presence of mature canopy and mid-storey vegetation in the Duck River riparian corridor provides potential 'habitat and foraging resources for arboreal mammals such as microbats, megabats, gliders and possums. This vegetation is likely to provide occasional roosting and foraging opportunities for a variety of birds, including aquatic and marine birds that would interact with the brackish environment of Duck River and the Parramatta River/Sydney Harbour corridor more generally. Drainage channels within the Site may provide some habitat for reptiles, with lizards and snakes known to occur.' The establishment of a wider vegetated riparian corridor utilising a full stratum of indigenous species provides an important opportunity to increase the biodiversity value of the Duck River wildlife corridor.

Nocturnal species that utilise this corridor, particularly bats and birds, could be potentially impacted through increased light spill. This will need to be managed through the use of directional lighting that minimises the potential for overspill into the riparian corridor. The proposed two new stormwater outlets that are to be located on cleared land to the rear of the mangroves also have the potential to result in erosion and scouring through the concentration of flows following high rainfall events. Any new stormwater outlets are to be directed downstream and designed consistent with the Department of Primary Industries 'Guidelines for Outlet Structures' to provide for a smooth transition between constructed drainage and natural flow regimes as well as minimising the potential for impacts on the biodiversity values of the Duck River riparian corridor.

The development proposes the use of directional lighting in accordance with the Australian Standard for outdoor lighting that minimises the potential for overspill into the riparian corridor.

As described in Section 2.2.4 of Appendix C, the new stormwater outlets will be directed downstream and designed consistent with the Department of Primary Industries 'Guidelines for Outlet Structures' to provide for a smooth transition between constructed drainage and natural flow regimes as well as minimising the potential for impacts on the biodiversity values of the Duck River riparian corridor.

Vegetated riparian zone

The applicant proposes a minimum 30m wide (from top of bank) vegetated riparian zone along Duck River consistent with the 'foreshore building line' and as approved for the Western Area Remediation Project on the subject site. Whilst this is consistent with the Natural Resource Access Regulator (NRAR) *'Guidelines for controlled activities on*

***waterfront land'* for a third order stream, these guidelines recommend a minimum width of 40m for 'estuaries, wetlands and parts of rivers influenced by tidal waters' as follows:**

Watercourse type	VRZ width (each side of watercourse)	Total RC width
1st order	10m	20m + channel; width
2nd order	20m	40m + channel width
3rd order	30m	60m + channel width
4th order and greater (includes estuaries, wetlands and parts of rivers influence by tidal waters	40m	80m + channel with

Duck River is tidal in this location, as evidenced by the presence of mangrove forest, which is also mapped as Coastal Wetlands. It is also mapped as Key Fish Habitat that typically requires a 50-100m buffer zone under NSW Fisheries guidelines. An increased average minimum width of 40m is therefore considered to be more appropriate and consistent with NRAR and NSW fisheries guidelines. This would provide greater capacity for the riparian corridor to accommodate a shared pedestrian cycleway without encroaching into the 30m core vegetated zone, with the cycleway to be located along the landward edge to maximise ecological functionality.

The proposed increase in the width of the riparian corridor is discussed in Section 6.6 and is now proposed as an average 40 m. The proposal now includes an offer for an easement for access in the riparian corridor for PCC to construct a shared pedestrian cycleway as they see fit in the future.

Vegetation management plan/landscape design plan

It is noted that a controlled activity approval is not required and that a Vegetation Management Plan (VMP) has been prepared to ensure best-practice management of the Duck River riparian corridor. This VMP currently utilises sub-canopy species characteristic of Swamp Oak Floodplain Forest, however lacks the provision of canopy species required to maximise habitat value and foraging resources within the corridor. This is inconsistent with the Landscape Design Report that recommends the use of *Eucalyptus tereticornis* (or similar species) to achieve a canopy cover of 60%.

The riparian corridor proposes to retain a 30m corridor of Coastal Wetlands along Duck River with the aim of protecting the existing areas of Mangrove Forest and Swamp Oak located along here which is supported. The Riparian Corridor Planting schedule has specified most of the species listed on the Swamp Oak Floodplain Forest Revegetation species list within the VMP report, however some species do not correlate and these should be replaced with species that are found on the list. Species to be replaced include: *Eucalyptus tereticornis* (replace with *Melaleuca quinqueneruia* for example), *Melaleuca decora* tree, *Bursaria spinosa* and *Indigofera australis* shrubs and *Ficinia nodusa* grasses.

Updated landscape plans have been prepared (Appendix B4) with *Eucalyptus tereticornis* to be substituted by *Melaleuca quinquenervia*. *Bursaria spinosa* removed, *Indigofera* removed, *Melaluca decora* removed. *Myoporum acuminatum* added. Grasses removed include *Ficinia nodusa* and *Themeda triandra*.

New grasses and sedges introduced to the swale and bioretention basin include: *Imperata cylindrica var. major*, *Dianella caerulea*, *Lomandra longifolia*, *Baumea juncea* and *Isolepis inundata.*

The VMP also lacks a planting layout and the minimum densities required to achieve the objectives within each of the specified management zones. It should also identify weeds of national significance (and those of state and regional priority under the Greater Sydney Regional Strategic Weed Management Plan) that are present within the site and require priority treatment.

The VMP was prepared according to the Office of Water's Guidelines for vegetation management plans on waterfront land (Office of Water, 2012). It was prepared in conjunction with the project's landscape architect (Geoscapes) and sought to implement vegetation appropriate to the area in a manner that achieves optimum ecological, landscape, visual and surface water management value for Duck River, the riparian corridor and the project itself. Planting layouts and densities have not been specified within the VMP as they are outlined within the Landscaping Plan for the riparian corridor.

Whilst specific weeds within the site have not been identified in the VMP, numerous controls have been put in place to manage this issue as part of the implementation. These include erosion control, stabilisation of soils, controls on access by people, vehicles and machinery, direct treatment and ongoing monitoring. It is expected that vegetation management contractors will be able to easily identify priority weeds and weeds of national significance and treat them accordingly.

Biodiversity and habitat recommendations

All headwall outlets are to incorporate flow velocity reduction and filtration controls (i.e. bedded boulders and native sedges / rushes) to provide for a smooth transition between constructed drainage and natural flow regimes, and minimise scouring impacts and nutrient loads to Duck River as per NSW Department of Primary Industries 'Guidelines for Outlet Structures'.

Proposed stormwater outlets have been designed in accordance with the *NSW Department of Primary Industries 'Guidelines for Outlet Structures.*

The proposed outlets allows for flow velocity reduction and filtration controls (i.e. bedded boulders and native sedges/rushes) to provide for a smooth transition between constructed drainage and natural flow regimes, and minimise scouring. Nutrient control is provided through the nominated water quality treatment train for the Downer development (including a bioretention basin, gross pollutant traps, filter baskets) and future Stage 2 and 3 subdivision land.

Refer drawing Co13919.00-DA46 of Appendix B3, which confirms details and specifications and Section 2.2.4 of Appendix C for the outlet structures noted above.

Increase the width of the Duck River vegetated riparian zone to 40m from top of bank consistent with the Natural Resource Access Regulator 'Guidelines for controlled activities on waterfront land (Riparian Corridors)' for tidal waters.

See response at item 6.3.

Amend Vegetation Management Plan to address the following:

Supplement Swamp Oak Floodplain Forest species with *Eucalyptus tereticornis* (or similar endemic species) to maximise habitat value and foraging resources within the Duck River corridor;

See above response.

Specify planting densities and layout for revegetation species; and

Planting densities are shown on the landscape plans. A density for tree planting has also been added.

Identify weeds of national significance and state/ regional priorities under the Greater Sydney Regional Strategic Weed Management Plan.

Whilst specific weeds within the site have not been identified in the VMP, numerous controls have been put in place to manage this issue as part of the implementation. These include erosion control, stabilisation of soils, controls on access by people, vehicles and machinery, direct treatment and ongoing monitoring. It is expected that vegetation management contractors will be able to easily identify priority weeds and weeds of national significance and treat them accordingly.

Land use planning

The EIS has acknowledged that Council and DPIE expressed concern that the maximum structure height of 41 m will exceed the LEP limit of 12m. Council's previous comments to DPIE dated 19 May 2020 requested a comprehensive Visual Impact Analysis to be carried out to justify the proposed height non-compliance - "considering impacts from the broader context of the surrounding area, including any potential visual impacts to the future residents of the potential Camellia Town Centre, and public domain areas, including the Parramatta and Duck rivers."

The EIS has assessed the potential visual impact from five public and private viewpoints including the following:

- **VP1: Rosehill Racecourse Members Stand.**
- **VP2: Residential apartments, James Ruse Drive, Rosehill (indicative view from Rosehill Racecourse stable area).**
- **VP3: Residential apartments (indicative view Allambie Street foreshore, Ermington).**
- **VP4: Silverwater bridge, Silverwater.**
- **VPS: Patricia Street, Rydalmere.**

Land Use Planning Officers have reviewed the assessment and consider that the impact on the visual amenity of the off-site viewpoints is considered low to moderate. It is noted however the visual impact analysis, does not include visual impact assessment from the potential future Camellia Town Centre. It is also noted from our last meeting with the applicant, that more proximate views such as the view from along/across the river (Carnarvon Street) may be significant - if nothing else as a wayfinding and skyline/night-lighting features recreating the industrial aesthetic of the former refinery.

As, described in Appendix G, the VIA site investigation determined that there would be no views of Stage 1 from Carnarvon Street, Silverwater, or from other ground-level viewpoints in this general area. Additional analysis undertaken in preparing this response to submissions (through checking via cross-sectional assessment) has confirmed that views would be prevented by the existing dense trees along both sides of Duck River, combined with a visual separation distance of over 600 m (to Carnarvon Street).

It is noted that the EIS has addressed the potential impacts regarding the visibility within Camellia by describing that any visual change associated with the staged subdivision and earthwork would result in a minimal visual impact without having completed any views analysis to demonstrate this.

The VIA did not illustrate viewpoints from within the Rosehill/Camellia industrial area as such viewpoints are not generally considered visually sensitive. Views from sensitive locations, such as public roads, recreational reserves and residential areas, are generally regarded as a higher priority in terms of potential visual impact.

Regardless, the VIA provides analysis of the potential for views from within Camellia industrial area (i.e. the surrounding industrial area), including for the staged subdivision and earthworks, and states that (refer VIA, pages 26):

> As the industrial area does not have through roadways, potential viewers are generally limited to those on private industrial properties that border the project site or those customers or workers using the roadways to access the industrial area.
>
> Devon Street is the closest location within the industrial area from where there would be views possible. There would also be some potential views along the north-south orientated streets of Durham Street and Colquhoun Street, and the east-west orientated Unwin Street, yet views would be partially obstructed by existing structures and street trees.
>
> *5.2.1 Staged subdivision and earthworks*
>
> The subdivision and earthworks would result in only minor visual changes due to most works occurring at grade to existing ground level. The new public road proposed within the centre of the Central Sydney Industrial Estate, west of Stage 1, is planned to have street trees which would increase the visual amenity of this part of the industrial area. Rehabilitation works are also planned along Duck River which would improve the visual value of this area.
>
> Overall, visual changes associated with the staged subdivision and earthworks would cause minimal visual change and have therefore not been further assessed in any detail. The proposed landscape and rehabilitation works would represent an improvement to the natural and visual environment.

To clarify further, development of the lots for new industrial uses (in accordance with current zoning), would be the subject of future applications and is not within the scope of the VIA. The visual changes that would occur for the staged subdivision are limited to:

- Earthworks/filling to bench the lots to form a flat pad in the northern half of the site then gradually grading down towards Duck River in the southern half of the site.
- Construction of a new public access road running south from an intersection with Devon Street (in accordance with PCC specifications).
- Implementation of erosion and sediment controls and necessary municipal services.

In addition, relevant components of the project's landscape plan and VMP would be implemented during the staged subdivision and earthworks phase, including:

- Preserving and retaining street trees along Devon Street wherever possible and strengthening visual character of the estate through the use of street trees along the new access road.
- Maintaining a 5 m landscape setback along Devon Street and Colquhoun Street (planting design within this setback is subject to a future approval).
- Creating a visual buffer along the western boundary of the Lot 6 Downer site, with a dense mix of native evergreen tree and shrub planting.
- Managing stormwater by planting the swale along Lot 6's eastern boundary, the bioretention basin and the stormwater outlet rip-raps with suitable native grass and other groundcover species.
- Protecting and enhancing the existing ecological character by revegetating areas identified within the riparian management zone. Tree canopy cover to constitute at least 60% of revegetation area and include species that have been listed in the VMP and landscaping plan.

It is understood that the site's previous use as a refinery meant that there were no or few native trees within the bulk of the site. The VIA provides photographs illustrating the existing industrial

character (which overall has relatively low landscape planting and street trees - refer Figure 6.7) and existing views along Devon Street opposite the site showing some trees along that street (refer Figure 6.7).



Figure 6.7 Nearby industrial area and Devon Street

With redevelopment, new industrial lots require a minimum of 10% landscaped area to comply with the PCC DCP, in addition to street trees along the proposed new access road and rehabilitation/revegetation along Duck River. The result would mean increased vegetation and improved visual aesthetics of the industrial area over time.

Although photomontages of views from locations within the industrial area were not prepared, the VIA includes four perspectives (figures 2-4 to 2-7 on pages 9-12, reproduced in Appendix G) that show Stage 1, the proposed new road and the landscape and rehabilitation works that form part of the staged subdivision and earthworks.

Those perspectives further clarify the general look of the project in relatively close proximity (such as would be seen from within the industrial area) and that the project is broadly consistent with the visual context of this major industrial landscape.

The Planning Proposal for 181 James Ruse Drive, Camellia (part of the future Camellia Town Centre) seeks to have residential buildings up to 40 storeys (126m) and is currently with DPIE for finalisation. Whilst this Planning proposal is still yet to be gazetted by DPIE, and is currently awaiting State Government decision on Camellia, it is requested that a visual impact assessment be carried out from 181 James Ruse Drive site as an viewpoint from the potential Camellia Town Centre from the upper levels. This is consistent with Council's previous advice.

VP6 represents views from the upper residential levels of the proposed building at 181 James Ruse Drive, Rosehill, as part of the future Camellia town centre. The proposed building is 40 storeys and 126 m high. The location of VP6 is identified on Figure 1 in Appendix A of Appendix G.

Appendix A of Appendix G also includes a set of simulated images (based on LIDAR data) to aid the assessment of the viewpoint, with those being:

- Existing view.
- An ‘historic massing’ image – illustrating major elements of the Clyde Refinery demolished between 2015 and 2020.
- A combined ‘project massing and historic features’ image - illustrating a block model of the proposed tallest structures of Stage 1, as well as the major elements of the Clyde Refinery demolished between 2015 and 2020.
- A ‘project massing model’ – showing visual massing and the general outline of the project.
- A ‘detailed photomontage’ - a detailed realistic image of the final project based on 3D modelling of the concept design.

A detailed assessment of VP6 is presented in Table 6.6 and shows the overall predicted impact level to future viewpoints from the upper levels of 181 James Ruse Drive is Low-moderate.

Table 6.6 Visual impact assessment of VP6 – 181 James Ruse Drive, Rosehill

Item	Description
Viewpoint characteristics	This viewpoint represents the view from the upper residential level of the proposed building at 181 James Ruse Drive, Rosehill (40 storeys and 126 m high), as part of the future Camellia town centre.
Potential viewers	Potential viewers are future residents of this proposed building, approximately 1.7 km away from the site.
Existing visual sensitivity (refer Figure 2, Appendix A of Appendix G)	The assessed sensitivity of this viewpoint was determined with regard to: • Stage 1 site is approximately 1.7 km away. • Existing views comprise industrial uses in the foreground, including warehouses and open industrial storage areas with shipping containers, and extensive views over Rosehill Racecourse (approximately 400 m away) on the right-hand side (i.e. in a south-easterly direction). • In the mid-ground (approximately 5 km away) are seen the tall commercial buildings and main stadium of Sydney Olympic Park. • In the far distance (approximately 17 km away) can be seen the skyline of the Sydney Central Business District (CBD). • Currently the project site is not distinguishable from the surrounding industrial area.
Magnitude of change (refer images in Appendix A of Appendix G illustrating historic massing and particularly Figure 7 - predicted views from VP6 (upper levels of 161 James Ruse Drive))	The predicted magnitude of visual change is (refer Figure 6 and 7, Appendix A of Appendix G): • Minor in scale, with Stage 1 evident and appearing to the right-hand side of the view (i.e. south-eastern side) as an element of comparable scale to other structures seen such as buildings with Sydney Olympic Park (seen in the background approximately 5 km away). • The tallest components of Stage 1 (i.e. upper parts of RAP elevator (40.8 m), exhaust stack, lime silo, aggregate silos and some associated infrastructure) would be higher than the nearest industrial elements, however, overall Stage 1 would not be particularly visually obvious in the overall scene. The low-lying nature of the site, and extensive industrial area, have a relatively high capacity to absorb such change. • From the upper level of 181 James Ruse Drive the tallest components of Stage 1 would not be seen against the skyline, therefore the structural form would not visually contrast with the sky or obstruct more distant views. • There would be no obstruction of valued views of the distant Sydney CBD skyline (approximately 17 km away) from any levels of 181 James Ruse Drive where such city views would be available.
Level of predicted visual impact	Low-Moderate - Stage 1 would not been seen against the skyline from the upper levels of 181 James Ruse Drive nor obstruct Sydney CBD views from any levels. Stage 1 would constitute a minor component of the wider view, which might be missed by casual observers and visual awareness of it would not have a marked effect on the overall quality of the scene when seen from 181 James Ruse Drive.

VP6 – Effect on VIA conclusions

The VIA included in the EIS presents a summary of the visual impact to five viewpoints at Table 5-6, page 37. The assessment of VP 6 (181 James Ruse Drive) has been added to that table and is shown in Table 6.7.

Table 6.7 Summary of predicted visual impact to representative viewpoints (revised Table 5-6 from VIA)

Representative viewpoint		Assessed visual impact
VP1	Rosehill Racecourse (also representative of Rydges hotel to west and apartments to north of Rydges)	Low-moderate
VP2	Residential apartments south of Rydges hotel, James Ruse Drive, Rosehill	Low-moderate
VP3	View from residential apartments, River Road/Allambie Street, Ermington	Low-moderate
VP4	View from Silverwater Bridge	Low-moderate
VP5	View from Patricia Street, Rydalmere	Low
VP6	View from 181 James Ruse Drive, Camellia	Low-moderate

The conclusion within the VIA summarises the overall predicted impact of the project. The text from that conclusion is reproduced below (VIA, page 40), with additional text in regard to the new VP6 shown in bold text. Overall, there is no change to the overall predicted level of impact as made in the VIA.

> The project would introduce new tall structures within the established industrial area of Rosehill/Camellia – a visual environment of lower scenic quality which includes a number of bulky and tall structures. Yet overall, there would be limited opportunity for publicly available views and no more than a low - moderate impact to such views, with the clearest public views from Silverwater Bridge.
>
> There would also be no more than a low-moderate impact to private views. Views from Rosehill Racecourse ***and from the upper residential levels of the proposed 181 James Ruse Drive, in the future Camellia town centre,*** are predicted to be impacted to a low-moderate level, with valued city views remaining unaffected. Other private viewpoints would have no more than a predicted low-moderate impact.
>
> The project is consistent with the visual environment expected of this major heavy industrial zone which supports (historically and currently) substantial industrial elements visible from outside viewpoints. Although there would be an impact to some viewpoints, the overall visual impact would not be significant considering the site's visual context.

Developer contributions

The proposal will require the payment of developer contributions in accordance with the City of Parramatta S94A Development Contribution Plan (Amendment No.5). A cost of development works calculated in accordance with Clause 25J of the EPA Regulation 2000 should be prepared by a suitably qualified quantity surveyor.

A cost of development works calculated in accordance with Clause 25J of the EPA Regulation 2000 has been prepared by a suitably qualified quantity surveyor and has been provided to PCC by email on 25 November 2020.

Further, it is noted that Council Officer's previous comments regarding proposed offset to future Contributions still stands. Council's position is that no offset should be considered. Public foreshore access should be provided as part of any redevelopment especially given the FSR would have been extracted from this land as part of redevelopment. Further, the proposed public access easement is located within the foreshore riparian corridor (40m riparian zone along the length of Duck River) which means that the portion of the site is undevelopable.

It is confirmed that contributions per City of Parramatta S94A Development Contribution Plan (Amendment No.5), will be attributable to the project. No VPA or offset is now proposed.

Consistencies with the Draft Camellia Town Centre Masterplan

The proposed development is consistent with the Draft Camellia Town Centre Masterplan 2018 as the project will facilitate some of its objectives (https://www.planningportal.nsw.gov.au/draftplans/under-consideration/draft-camellia-town-centre-master-plan) by providing a public road which could link Camellia to Silverwater via a future bridge over Duck River and the riparian zone along the Duck River foreshore for a pedestrian/cycle path.

Noted. Council has acknowledged that the proposal is consistent with the *Draft Camellia Town Centre Masterplan 2018*.

6.6.2 Additional matters to be addressed

Landscape and tree protection

The proposal was referred to Council's Tree and Landscape Officer who provided the following comments to be addressed:

Clarification is required whether the intent is to have a footpath proposed on both sides of the Access Road. The typical street section shows the footpath on one side only, however, the street tree planting details show a footpath adjacent to the trees;

A shared path is only proposed on the eastern side of the proposed public access road. The shared path has been increased to 3.0 m per PCC's request within an overall cross section of 21 m. The typical street section has been corrected to reflect this (refer to Drawing SSD-04 in Appendix B4).

An increase to the swale species diversity from the limited 3 x species proposed of grasses and rushes to include at least a 8 - 10 species mix as listed in the revegetation species list should be provided within the VMP report;

The species mix has been increased to a minimum of eight species as shown on updated landscape plans (Appendix B4). These have been taken from the Swamp Oak Floodplain Forest community.

An increase in the bioretention basin planting mix from the limited 5 x species proposed of grasses and rushes to include at least a 8 - 10 species mix as listed in the Revegetation species list is requested to be provided within the VMP report;

The species mix has been increased to a minimum of eight species as shown on updated landscape plans (Appendix B4). These have been taken from the Swamp Oak Floodplain Forest community.

The engagement of a AOF Level 5 Arborist ('Project Arborist') to provide a Tree Impact Assessment, Tree Protection Plan and Tree Management Specification to incorporate specific tree protection measures to the street trees located along Devon Street, in accordance with AS4970-2009 (Protection of Trees on Development Sites) and a Tree Removal Plan for any trees proposed to be removed;

The landscape plans in the EIS indicate the street trees to be retained and the trees to be removed to allow the new access road. The revised landscape plans (Appendix B4) continue to show trees to be retained and trees to be removed.

However, it is noted that whilst it is intended to maintain most of the street trees (VEP is willing to obtain arborist advice on their protection during works prior to a construction certificate), it is noted that the installation of new services along Devon Street (in particular a new Sydney Water water main in the verge) may necessitate their removal. If the removal of some trees to install new services is unavoidable, VEP will replace them with suitable street trees according to PCC requirements.

Similarly, existing trees in the north western corner of the site are also proposed for removal.

In accordance with Table 3.1.3.15 of the Parramatta Development Control Plan 2011, sites within an Industrial zone should demonstrate 10% landscaped area.

VEP is aware of the provisions with the Parramatta DCP and in particular the requirements of table 3.1.3.15 - Industrial Zones. The landscape area on proposed Lot 6 for the Downer Sustainable Road Products Centre is 9267.74 m^2. This represents approximately 13% of the site being landscaped, exceeding the 10% requirement in the DCP.

Transport planning

The proposal incorporates a 2.5m wide deco gravel maintenance path that has been provided at the south of the site within the riparian corridor which is considered inadequate. Council is investing in separated walking and cycling along the Parramatta River as a 3m wide shared path is considered inadequate for the speeds and volumes of pedestrians and cyclists on the path.

For an overview of Pedestrian and Cyclist Counts of Parramatta River please refer to the following link:

https:parracity.maps.arcgis.com/apps/opsdashboard/index.html#/68a46defcc5249c3b 86eb233734d574d

Given the inadequacies that a 2.5m path may impose it is requested that the proposal provide the following:

A separated walking (2m) and cycling (3m) path in concrete within the 40m from top of bank along the full extent of Duck River frontage. For areas where this is either ecologically or topographically challenging, this can be in the form of a boardwalk.

As set out in the response in the introduction to Section 6.6, PCC is offered a right of access over the proposed riparian corridor (averaged at 40 m width). That right is supported by a draft 88b instrument in favour of PCC which can be discussed and agreed with PCC post approval.

That right allows PCC to construct footpaths and cycle ways within the riparian corridor to suit its requirements into the future.

It is not proposed to construct the cycle path or pedestrian path as this is an item that has no nexus to the current proposal and is a matter for PCC into the future as it will not currently link with any existing adjoining paths.

It is therefore proposed that PCC will have the right to enter and construct the pathways at some stage in the future when the pathways are able to connect to adjoining lands.

Council shall be granted an easement for ongoing public access of this path. It is noted that no subdivision plans for approval have been provided and details of Council's role within the easement. Further detail must be provided to ensure Council are satisfied with the easement.

As set out in contribution offsets, a draft of the 88b instruments including easements in favour of Council is included in Appendix B5, which can be discussed and agreed with PCC post approval.

The above requirements are consistent with the Future Transport (Principle Bicycle Network) and Sydney's Cycling Future (Strategic Bicycle Corridor) that require separated walking and cycling facilities. Please refer to the following:

Future Transport (Principle Bicycle Network)

https:future.transport.nsw.gov.au/plans/future-transport-strategy/future-network

Sydney's Cycling Future (Strategic Bicycle Corridor)

https:Uwww.transport.nsw.gov.au/sites/default/files/media/documents/2017/sydney s-cycling-future-web.pdf

In addition, the Central District Green Grid Priorities C13 and C16 highlights Duck River within the top 2 priorities:

A continuous walking and cycling north-south link between Parramatta, Camellia, Granville, Auburn, Regents Park to Bankstown. Enhancing and expanding the existing open space assets will establish the corridor as regional open space with improved recreational space, habitat for ecological communities and better treatment of stormwater.

The proposed new road will become a Council Asset. As part of the road, a shared path (3m wide) connection along the eastern verge and along the eastern edge of the future road alignment should be provided. In this regard, street trees are to be provided on the eastern side between carriageway and shared path (this can be in the parking lane if required, or the reservation can be widened).

A shared path is only proposed on the eastern side of the proposed public access road. The shared path has been increased to 3.0 m per PCC's request within an overall cross section of 21 m. The typical street section has been corrected to reflect this (refer to Drawing SSD-04 in Appendix B4).

Consideration should also be given to incorporating a shared path on the southern side of Devon Street.

The verge to Devon Street is narrow and includes existing street trees. It is noted that new services installation on Devon Street may necessitate removal and replacement of street trees along the Devon Street frontage and the possibility remains that a standard 1.2 m wide footpath could be installed along the frontage to suit the existing carriageway. This can be discussed with PCC during detailed design post approval.

Urban design and amenity matters

Preliminary discussions were held between Council and the applicant pre-exhibition of the EIS. At this time it was established that the visual impact assessment provided was rigorous and thorough.

The following comments were also provided at pre-exhibition which require further consideration in the assessment of the SSDA:

The subdivision plan provided for the site recognises the need for the bridge crossing at Duck River connecting with Carnarvon Street, which meets an objective of the structure plan, however the subdivision plan does not address other broader objectives that the structure plan would address including:

- **Public access along Duck River with a 40m corridor set out from top of bank;**
- **Connections through and around the site so that in the long term the site does not 'block' access to:**

- **The confluence of the Duck and Parramatta Rivers in the east**
- **Camellia Town Centre and school in the north.**

These matters are addressed above.

The subdivision plan provides for a 20m wide road, with future connection to a future bridge crossing connecting to Carnarvon Street. Using a structure plan, this road width should be tested to ensure the proposed minimum width fits in with the broader road hierarchy and is appropriate for the future development and user demands.

Parramatta City Council Public Domain Guidelines, July 2017, set out required street cross sections for different environments. In the case of industrial roads, the Guidelines require a 19.3 m wide road reservation. However, bearing in mind the potential of the road to connect through to Silverwater, advice has been sought from the traffic and civil engineers who have indicated that to cater for the future role of the road as a connector through to Silverwater, the road cross section has been increased by 1.7 m to 21 m.

It is noted that the existing road cross sections throughout Camellia and the reservation of Carnarvon Street in Silverwater is 20 m, so the proposed 21 m wide road reservation should be adequate to make connections to these other roads.

A structure plan depicting the proposed road and pedestrian connections was included as Figure 5.1 in the original EIS.

A bicycle path at the new road and the riparian corridor be included. Using a structure plan, the bicycle path location and connections at the broader scale should be tested and shown.

As described in Appendix H, VEP is offering a right of way along the riparian corridor to allow for the construction of a shared path by PCC in the future when required.

Further, VEP has amended the public access road to include a 3 m wide shared path on the eastern side as requested by PCC.

PCC's Public Domain Guidelines provide typical cross sections of typical industrial streets that would ordinarily apply to the project. Figure 6.8 has been extracted from the Public Domain Guidelines showing the typical street cross section of an industrial street.

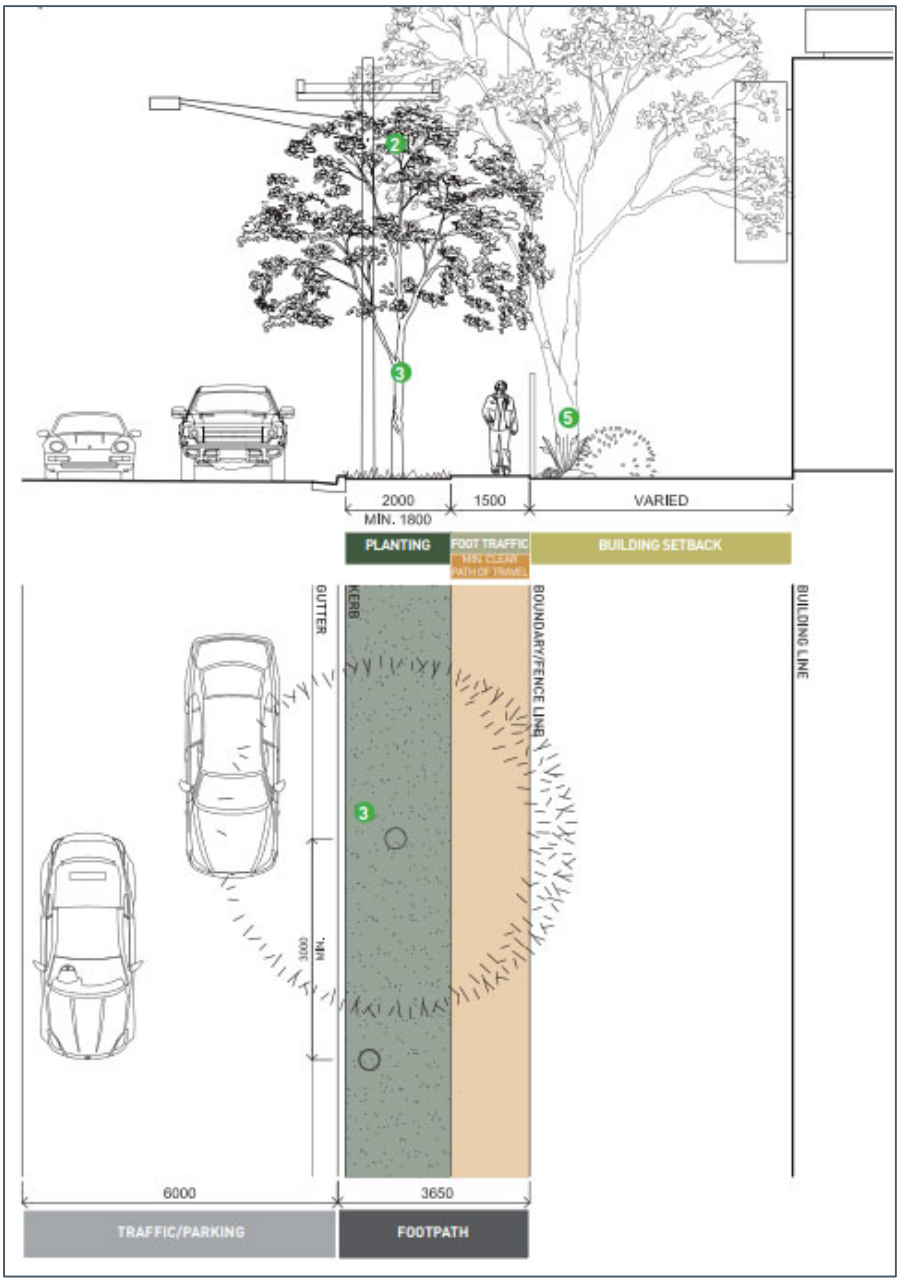


Figure 6.8 Typical street type – industrial (Source: Public Domain Guidelines, Parramatta City Council)

It is observed that a typical cross section of an industrial street consists of a trafficable area with parking permitted and a footpath which includes area for planting. From the above, assuming a 6000 mm trafficable carriageway width, 150 mm kerb, 2000 mm planting area and 1500 mm pedestrian walkway, the minimum required road reserve will be 19300 mm.

PTC has considered the standard 19.3 m cross section in the context of this development acknowledging the future possible role of the new road as a connection through to Silverwater. Bearing in mind the potential need for the link and the existing road cross sections at Carnarvon Street and in Camellia, it was determined that the standard industrial cross section should increase to 21 m. To also accommodate a shared path of 3.0 m on the eastern verge, the proposed road will have a road reserve of 21000 mm.

The proposed road cross section is therefore shown in Figure 6.9 and Appendix B4.

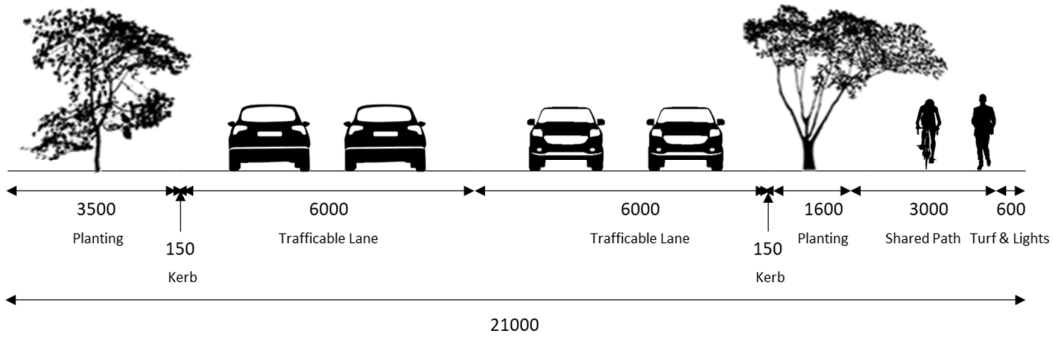


Figure 6.9 Proposed street layout

Recommendations:

- **A structure plan is to be prepared with the subdivision. The structure plan is to show:**
  - **Devon Street on the northern boundary**
  - **A 40 metre riparian corridor along Duck River**
  - **Fully considered road network and hierarchy options with proposed road located so that it aligns with the midpoint of:**
    - **Colquhoun Street in the north south direction**
    - **Durham Street in the north south direction**
    - **Option to extend Unwin Street connecting through to Durham Street**
  - **Where streets straddle a boundary, a 'paper road' 10 metres wide be provided on both sides of that boundary, other than the riparian setback boundary where the road should be within the site boundary.**
  - **In the paper road zone no buildings or permanent heavy infrastructure are to be located.**
  - **Minimum road easement width be 20m that allows for variation of road cross section set up informed by road hierarchy and the structure plan.**

A structure plan depicting the proposed road and pedestrian connections was included as Figure 5.1 in the original EIS and remains applicable.

In response to some of the suggested strategic corridors the following is noted:

- An average 40 m riparian corridor is now proposed along Duck River.
- The access road corridor is shown with a cross section of 21 m exceeding PCC's Engineering requirements for an industrial road. A 20 m road cross section is common throughout the Camelia Peninsula and Carnarvon Street in Silverwater has a 20 m road reserve.
- Additional road corridors:
  - Colquhoun Street in the north south direction – the extension of Colquhoun Street in the north south direction requires land not forming part of this SSD application. It affects the land to the west.
  - Durham Street in the north south direction – an extension of Durham Street in principle is not proposed and supported due to land use risk consideration. Introducing a new public link in this area will promote public access into an area adjoining the Viva Energy Clyde Terminal and add public access into an area affected by land use risk contours from the Terminal. VEP does not support a road or pedestrian access on this alignment for this reason.

- A connection between a prolongation of Colquhoun Street and Durham Street would only be separated from Devon Street by 100 m. A new road in this location would simply match the capacity of Devon Street and would create a narrow strip of land between the two roads that would not suit efficient industrial subdivision of the land.

Stormwater and catchment management

Council's Senior Catchment and Development Engineer has reviewed the 'Flood Impact Assessment Report' prepared by WMA Water, Appendix G updated 21 August 2020 and the 'Surface Water Impact Assessment and Civils Report' Appendix F (also titled Civil Engineering Report incorporating Water Cycle Management Strategy) by Costin Roe Consulting Rev A dated 17 Sept 2020.

Low and high volume stormwater and overland flows

Consultation was held between Council and the applicant prior to the exhibition of the EIS. As part of this advice it was requested that the low and high volume stormwater and overland river flows be dealt with together within a Flood and Water Management Strategy. It is noted that this has not been provided within the SSDA submission.

Overland flooding has been addressed in WMA Water's report in Appendix G of the EIS (refer Section 3.2.1 and Appendix B of that report) and incorporated within the design of the works. The design of the site in conjunction with preparation of a Flood Evacuation and Flood Emergency Response Plan (refer below) adequately provides a Flood Management Strategy compatible with best practice.

A Water Management Strategy is provided in the stormwater management report (Appendix C).

Management of flood flows

The report supplied by WMA has provided flood modelling output maps for both overland flow and for the river flooding from Duck Creek (and at higher levels, Parramatta River). These reaffirm that the site is severely affected by flooding in 1% AEP and PMF events both from overland flow and from the river system. This includes a large area of 'high hazard' flooding. However, the documentation does not provide detailed information about how the site would be designed to manage these flood flows with the necessary degree of safety.

As described in Appendix E, TUFLOW modelling has demonstrated the extent of both mainstream and overland flooding across the site for existing conditions. The existing conditions 1% AEP overland depths and hazard are shown in Image 1 and the 1% AEP mainstream depths and hazard are shown in Appendix G of the EIS – Figures B7 & B9 and C1 & C5).

Overland flooding refers to flooding due to runoff from the small upstream catchment entering the site and from within the site itself. Mainstream refers to flooding from Duck River overtopping its northern bank and entering the site.

The 1% AEP overland flooding indicates a high percentage of the site is inundated; however, the hazard is predominantly H1 (lowest category). There are two reasons why overland flow "appears" to cover the entire site. Firstly, the overland modelling has been undertaken using the "Rainfall on the Grid" or "Direct Rainfall" approach (refer Section 2.3.4 of Appendix G of the EIS).

This approach means the entire study area is "wet" in TUFLOW (as it is in reality). However, for clarity, depths below 50 mm have been eliminated in all figures. This means that large parts of the site have depths of say 50 mm to 100 mm which will typically occur throughout Sydney in large open space areas in a 1% AEP event.

Secondly, the existing site contained many low lying and bunded areas around tanks, this meant that water would pond across the existing site more than expected across similar large urban lots which were designed to accommodate overland flooding.

In design, the approach to management of overland flows has been achieved by directing runoff along roads and defined water conduits through effective grading of the site (i.e directs runoff downstream towards Duck River). A sub surface drainage system will also be constructed (which has not been included in the design modelling as a requirement of Parramatta City Council was to assume all stormwater pipes are blocked – refer Point 7, Page 6 of Appendix G of the EIS), and will further reduce overland flow. The design therefore allows development to occur in a manner compatible with the overland flows from upstream.

WMA's view is that the existing site is not severely affected by flooding in the 1% AEP overland flow event and is typical of all large areas of gently sloping land with an upstream catchment in a 1% AEP event. Overland flow can be managed but can never be eliminated from such a large site with an upstream catchment.

The 1% AEP mainstream flooding is on the perimeter of Duck River and in excavated pipe channels in the north east part of the site. Development is not proposed in the 1% AEP floodplain on the perimeter of the Duck River, thus in a 1% AEP mainstream event there will be no increase in flood level, re-direction of flow or velocity on other 1% AEP floodplain users and nor will the proposed development be affected in a 1% AEP event.

The north east part of the site is only shown as inundated as these were pipe channels (as part of the previous oil refinery works) filled by water entering along other low-lying pipe channels. These will be filled to prevent inundation in this way. However, the total volume of temporary floodplain storage across the entire site remains the same for existing and design. WMA's view is therefore that the future land use is not on land severely affected by 1% AEP mainstream flooding in existing or design conditions. In larger mainstream events the site will be affected as shown in Appendix G of the EIS (Figures C2, C3 & C4).

A Flood Evacuation and Flood Emergency Response Plan will be prepared for each land use activity on each lot (refer Page 25 of Appendix G of the EIS), however, it is agreed that this advice should have been clearly stated in the main section of Appendix G of the EIS. This plan can presently only be undertaken for the Downer site (Lot 6), as the use of the other sites is unknown.

Flooding in events greater than the 0.2% AEP

In addition to this, increased flooding is expected at Devon, Colquhoun and Unwin Streets due to the proposed development and the impact to surrounding properties for larger flood events above 0.2% AEP up to the PMF event. Further consideration should be applied for flood events greater than 0.2% AEP given the significant depth of flooding for the PMF is reported to be 2m above ground surface levels.

As described in Appendix E, a 0.2% AEP (or 1 in 500 year ARI event) is a very rare event. It is unknown in which design event (rarer than a 0.2% AEP) the proposed development will increase flood levels (outside the subject property) by greater than 10 mm. Any development within the mainstream PMF floodplain will constrict flow paths and reduce the temporary floodplain storage, thus increasing flood levels, unless built on piers above the PMF level. As far as WMA are aware, no council in Sydney requires building floors (except critical facilities) to be built on piers with floors above the PMF level.

This development has nil flood affectation in events up to the 0.2% AEP and beyond (as noted above WMA do not know the design event which will first create an impact greater than 10mm outside the property – it could be a 1 in 1,000 year event or rarer). This is a much greater standard (0.2% AEP) than most councils in Sydney which only require nil impact in the 1% AEP.

In a PMF mainstream event the increase in depth is of the order of 0.2 m (refer Figure C16A from Appendix G of the EIS). This increase in depth occurs as land above the mainstream 1% AEP flood level has been filled and large buildings placed on each lot. Thus, the flow path across the site in the PMF has been constricted. To eliminate any increase in level in the PMF, all buildings would have to be on piers approximately 2 m above the existing ground.

This would make use of the site for commercial/industrial developments impractical and the land could only be used for flood compatible uses, such as recreation or open space. All buildings on all floodplains (e.g the Hawkesbury River floodplain), which have floor levels above the 1% AEP flood level will restrict flow paths and result in an increase in the PMF flood level.

It is agreed that 2 m depth of water in the PMF over large parts of the site represents a significant increase in hazard to that experienced in the 1% AEP event (effectively nil depth in mainstream flooding). However, similar and greater depths will be experienced in the Parramatta CBD and on the Hawkesbury River floodplain much greater depths will be experienced in a PMF.

The PMF event will cause significant damage and loss of life wherever it occurs in an urban (or rural) area. All-natural hazards (bush fires, tsunami, cyclones) of similar rarity to a PMF will cause similar levels of devastation.

To eliminate the flood risk in the PMF in the Parramatta CBD would require no further development. The proposed construction of the Power House Museum on the foreshore of the Parramatta River in the CBD has faced similar flooding issues, however WMA understand it is proceeding.

In summary, best practice floodplain management has reduced the risk to life and property in these areas to what is considered reasonable. However, it is unrealistic to expect that urban development can be eliminated from affectation by floods or any of these other natural hazards.

Management of flooding for individual lots

It appears the report defers much of the management of the impact of flooding to future development applications for individual lots. The flood report should provide detail in designing the whole precinct to manage the severe flood conditions and flood waters to meet current standards - if this is possible. In addition, there is minimal information about overland flow paths on both the roads and swales and how the large volumes of displaced floodwaters will be accommodated.

It is not entirely correct to say that the management of the impact of flooding has been deferred to future DAs, as the management of overland flow and mainstream flooding across the site have been addressed.

The proposed earthworks for the entire industrial estate have been designed to ensure the Downer development on Lot 6 and all future development on the rest of the industrial lots, will not be affected by, or will affect the 1% AEP mainstream or overland flood event on others. Thus, all future owners of the remaining land can develop with the full knowledge that mainstream and overland flooding matters have been adequately addressed.

These owners would then only need to ensure that their works comply with the appropriate PCC flood planning requirements and include a Flood Evacuation and Flood Emergency Response Plan (refer under *Management of flood flows*) for their development.

WMA would also not describe the site as “severe flood conditions”. Yes, overland flow crosses the site but as mentioned above, this will occur in all similar sites and the risk to life and consequent damages due to overland flow (even in a PMF) is manageable.

Figure C15 from Appendix G of the EIS indicates that in a 0.2% AEP event, the majority of the proposed site is unaffected, thus in WMA’s view the site does not experience “severe flood

conditions". In a PMF the entire site would be inundated, as would the entire Parramatta CBD and large parts of Sydney CBD. It is impossible to implement flood management measures to eliminate or even reduce mainstream or overland design flood levels across the site.

Overland flow will be accommodated within dedicated swales and along roadways, as it is in all urban areas. These are acceptable means of managing overland flow. Further details of the design of these overland flow paths are available in Appendix C.

Evacuation and a flood emergency response plan

The report prepared by WMA recommends that evacuation should be undertaken prior to inundation of the road network. As part of preliminary comments with Council it is noted that the Applicant was requested to liaise with SES as it was considered that an Evacuation and a Flood Emergency Response Plan should be established for this high hazard flood site.

WMA agree that a Flood Evacuation and Flood Emergency Response Plan is required and will be prepared and submitted to DPIE prior to the commencement of operation of Downer's Stage 1 development on Lot 6 and prior to the operation of all future developments on the remainder of the proposed industrial lots.

Again, WMA disagree for the reasons provided above, that this is a high hazard flood site or should be referred to as exhibiting "severe flood conditions". In a PMF event these conditions will apply, as they do in the Parramatta CBD and across Sydney. However, the risk to life and damages in events up to the 0.2% AEP are minimal (if not zero - refer Figure C15 from Appendix G of the EIS) and thus this site is more suited to development than many other flood liable (as defined by the PMF extent) sites in the Sydney basin.

There is a risk to life and potential for damages on all flood liable land (as defined by the PMF extent), society must therefore agree upon what is an acceptable level of risk as they do for all other natural disasters. With the implementation of a Flood Evacuation and Flood Emergency Response Plan, all personnel will either be evacuated from the industrial estate well in advance of flood waters along the local road network or undertake "shelter in place", thereby significantly reducing the risk of loss of life in a flood greater than a 0.2% AEP event.

H4 and H5 hazard

In addition, Figure C8 within the WMA Report showcases hydraulic hazard conditions for the proposed developed area to be predominantly H4 and HS. This indicates it is unsafe for people and vehicles and where structural damage to buildings and building failure is possible.

Figure C8 and Figure C21 from Appendix G of the EIS shows the hazard in a PMF event for pre-development and design conditions respectively. Buildings and other structures or works on the Downer Lot 6 are set at the appropriate PCC flood planning level.

As noted previously, a PMF event which has a probability of occurrence in any year of rarer than 1 in 100,000 (comparable probability of occurrence of say the South East Asia tsunami of December 2004 hitting Sydney) it is agreed that there will be risk to life issues and damage to buildings and equipment. However, this risk cannot be negated unless society prohibits development within the PMF extent. To do so would sterilise a large proportion of the urban area within the Sydney Basin.

Water sensitive urban design

Similarly the surface water impact assessment does not address Council's pre-exhibition comments. Further detail is required concerning the site as a whole given the scope of the

project. There are diagrams for erosion control sediment basins and the like, but no overall WSUD concept for this large tract of land that drains directly into the river.

The WMA Water report also states that only increase rainfall subject to climate change has been considered and that "The proposed design has not specifically considered a climate change rainfall increase as any increase can be accommodated within the freeboard allowance for building floors." This is not considered an acceptable approach. The freeboard of 500 mm is intended to consider unknown impacts and acts as a factor of safety. Given that there are recommended guidelines for future change in climate it is recommended that this should be considered on top of the 500 mm freeboard requirement.

It is accepted that there are guidelines for rainfall increase in AR&R2019, however, as indicated in Appendix G of the EIS (Page 11) all modelling has assumed AR&R1987 rainfall and temporal patterns. Reasons were provided in Appendix G of the EIS why AR&R2019 was not adopted.

WMA's main reason for not including a separate anthropomorphic climate change rainfall increase in the freeboard for the Downer Lot 6 is that Appendix G of the EIS indicates that the adoption of AR&R2019 methodology (as will be undertaken in the current Parramatta River Flood Study) will lower flood levels provided in Appendix G of the EIS due to reduced rainfall intensities of up to 20% (refer Image 3 from Appendix G of the EIS).

WMA's recommendation is that for all future developments on the remaining lots in the Estate, the freeboard above the 1% AEP level should include a separate anthropomorphic climate change rainfall increase determined using the AR&R2019 methodology, with the 1% AEP design flood levels taken from the to be completed Parramatta River Flood Study being prepared by Cardno for Parramatta City Council (this study should be completed early in 2021).

Recommendations of Parramatta City Council

It is recommended that the following matters are also addressed:

- **A Flood and Water Management Strategy be developed for the site including overland flow, riverine flooding and Water Sensitive Urban Design; and**
- **An Evacuation and Flood Emergency Response Plan be provided in consultation with SES; and**
- **Implementation of Council's preliminary comments which were incorporated in the SEARs request and further comments dated 4.09.2020.**

A Water Management Strategy is provided in the civils and stormwater report (Appendix C), this addresses WSUD and the management of overland flows.

The Flood Management Strategy is in summary:

- to not develop land below the existing 1% AEP flood level;
- to not increase flood levels outside the site in events up to (and beyond) the 0.2% AEP; and
- to undertake a Flood Evacuation and Flood Emergency Response Plan for each property.

A Flood Evacuation and Flood Emergency Response Plan will be prepared and submitted to DPIE prior to the commencement of operation of Downer's Stage 1 development on Lot 6 and prior to the operation of all future developments on the remainder of the proposed industrial lots.

Traffic matters

The information submitted by the application is not clear regarding what agreement will be in place regarding the possible easement/right of way from the proposed road to Duck River to allow for a future link to Carnarvon Road, Silverwater. This is to be clarified with appropriate information submitted to Council for review.

The new public access road is now proposed to be extended further to the south towards Duck River. This will be constructed to a width in excess of PCC standards for industrial roads as a 21 m wide road reserve and dedicated as a public road.

The easement for access through to Duck River and a future bridge link to Carnarvon Street (by others), is now offered to PCC. Draft terms for that access right are attached (Appendix B5) and an agreement on these terms with PCC can take place post approval.

The proposed 27.1m wide driveway for Stage 1 is considered excessive. This can be hazardous for pedestrians as they will have to travel a long distance within an area where there will be reasonable truck movements. Accordingly, the design of the driveway is to be revised so that it does not exceed what is necessary to allow access for a 26m long B Double vehicle.

Swept path analysis indicate the proposed 27.1 m wide driveway is necessary for a 26 m long B Double vehicle to safely enter and exit the site.

Drawings have been revised to include a median refuge island to allow staged pedestrian crossing at the driveway (Attachment 1 of Appendix H).

The detailed design plans of the proposed new road are to be submitted to Council's Traffic and Transport Manager for consideration of the Parramatta Traffic Committee and approval by Council prior to construction. Accordingly, a condition of consent should be imposed should any approval be recommended.

VEP is happy to accept a condition of approval requiring detailed plans for the new 21 m wide road to be submitted to PCC for review prior to the issuance of a construction certificate.

6.7 NSW Department of Primary Industries – Fisheries

DPI Fisheries seeks clarification on the specific extent of marine vegetation disturbance. Any harm to marine vegetation (including harm to mangrove pneumatophores or salinity inundation regime) to SEPP (Coastal Wetlands) 2018 mapped vegetation is Designated Development.

No marine vegetation will be disturbed and the project is already SSD.

The VMP is not a comprehensive document and it is difficult to see how it will facilitate 'improvement' in the riparian corridor. Further clarification is sought regarding the species planting list and ratios, concentration of plantings, maturity of plantings, and ground works or levelling required. The plantings should as closely as possible reflect the existing PCT. Weed removal should form part of the care for the whole riparian corridor and not stop halfway. The existing fence in the middle of the riparian corridor should be removed. Success criteria should include erosion and sediment control measures. Please clarify what is considered a 'suitably qualified and experienced' person to compile annual reports. DPI Fisheries request that the annual VMP reports be sent to this office for consideration in addition to supplying them to the proponent.

The species planting list within the VMP has been prepared based upon a review of the relevant PCT and in consultation with landscape planners. In certain cases species within the PCT are not widely available commercially and as such were substituted for closely related species that were more readily available. This species list has now been reviewed and revised (refer landscape plan and report in Appendix B4) to more closely align the species list to the PCT where possible.

The densities and locations of plantings have been specified within the landscape plan. This includes species, pot size, and maturity. Groundworks within the riparian corridor are generally not required, with the exception of the proposed stormwater management structures and the

deco-gravel maintenance path. This work will include erosion and sediment control as per all other elements of construction of the main site.

No additional erosion or sediment control within the riparian corridor is considered necessary. No groundworks are proposed specifically for the purposes of landscaping or the VMP more generally.

Weed removal is proposed across the full riparian corridor, as covered by the VMP.

The existing fence will be removed and a new fence erected along the edge of the riparian corridor.

A 'suitably qualified and experienced' person with regard to compiling annual reports would be expected to be someone with qualifications and experience in environmental compliance, consent compliance, ecological assessment or landscape planning.

A 2.5m road proposed through the riparian corridor negates the effectiveness of the corridor as an environmental mitigation. DPI Fisheries does not support the road through the riparian corridor. DPI Fisheries also seeks further information about the extent and purpose of the retaining wall adjacent to the riparian corridor. Generally, retaining walls have a negative effect on the environmental value of a riparian zone.

The 2.5 m wide access track is an important element of the proposed riparian corridor in that it:

- Provides access for primary planting and weed control activities, and then ongoing access for maintenance.
- Provide access for infrastructure inspection and maintenance, particularly stormwater structures, ensuring drainage regimes are properly maintained and vegetation is not placed at risk.
- Is consistent with a request by PCC to provide for future public access to the site. The presence of this track will allow landscaping to be developed appropriately and will avoid the need to remove substantial amounts of vegetation in the future.

It should be noted that the proponent has, at the request of DPI and PCC, expanded the width of the riparian corridor to an average of 40 m across the frontage of the site to Duck River. Further, the maintenance track is located on existing disturbed ground, within the outer 50% of this expanded corridor (refer landscape plans in Appendix B4), reducing the potential for impacts to the more sensitive areas closer to the water's edge.

The proposed retaining wall along the southern edge of Lot 6 is required to elevate the lot above the 1% AEP flood levels in accordance with PCC requirements. The use of a retaining wall in this location prevents the need for a batter, which would occupy a greater footprint, extending into the outer part of the riparian corridor. As Lot 6 will be developed for industrial use, the movement of fauna onto this lot from the adjacent riparian corridor should be discouraged. A retaining wall will provide a much better inhibitor to fauna access onto the industrial site than a batter.

DPI Fisheries requests the engineering specifications and expected flow rates of the Duck Creek outlets to assess the impact on existing protected mangrove forests. The outlet that services the retention pond is directly adjacent the widest part of the existing riparian vegetation. DPI Fisheries request that this outlet be moved to an area that is of a lower ecological value.

Preliminary assessments for the peak flows at the two outlets are as follows (Table 6.1). The preliminary review of peak flows does not include the influence of the proposed bioretention system in the Stage 1 stormwater outlet, which would reduce the peak flows noted below, especially in low order storms. During low order events, up to the 6 month ARI event, the site discharge rate would be limited to less than 1 L/s due to the extended detention and infiltration rate of the bioretention filtration system.

Reference to 6.2.2 should be made in relation to the drainage discharge design arrangement and conformance with the *NSW Department of Primary Industries 'Guidelines for Outlet Structures'*.

The concept location noted for the stormwater outlet is based on the suitable location confirmed on site and via the survey, noting that the outlet structure is proposed clear of existing vegetation and mangroves.

The discharge configuration includes rock scour and energy dissipation structures designed in accordance with *Guidelines for Waterfront Land* and *NSW Department of Primary Industries 'Guidelines for Outlet Structures'*.

Energy dissipators will reduce discharge velocity by greater than 75% of the piped velocity at the outlet of the pipe. The energy dissipators are expected to result in flow velocity of less than 0.3m/s for storms up to the 1 year ARI event, and less than 0.6m/s for the design storm event and a low tailwater condition (ie low tide and Duck River/ Parramatta River not in flood).

The design velocities at the end of the dissipator are less than or equal to a moderately erodible clay-loam soil threshold of 0.6m/s and below a vegetated bank with sparse ground cover of 1.0-1.5m/s. Hence mitigation measure relating to erodibility and erosion has been provided in the form of a rock rip-rap energy dissipator.

The energy dissipators will be designed to ensure no impact to the existing riparian vegetation with maximum velocities to mitigate the risk of scouring of the existing mangroves. It is noted that the outlet/energy dissipator which services the Lot 6 bioretention basin is located adjacent to the widest part of the existing riparian vegetation.

This will provide additional dissipation of the discharge stormwater runoff prior to reaching the banks of Duck River while not exceeding the erodibility of the existing ground cover. As such, relocation of the outlet to an area which is of a lower ecological value is not necessary.

Table 6.8 Flow estimates

Location	Q1 (m^3/s)	Q20 (m^3/s)	Q100 (m^3/s)
Outlet 1 – Phase 1 (Downer)	0.860	1.900	2.580
Outlet 2 – Phase 2	2.730	6.180	8.330

6.8 Environment Protection Agency (EPA)

6.8.1 Noise

The EPA does not support the following assertion in the NIA: "Furthermore, in satisfying the relevant criteria, it is anticipated that there would be no cumulative industrial noise impacts at the nearby residential receivers"

Noted, this sentence was based on the project site in isolation achieving the amenity criteria and, therefore, no additional consideration of cumulative noise would be required. Following our meeting with the EPA on 4 November 2020, the criteria approach going forward has changed and this statement is no longer applicable. Cumulative noise emissions have been included in subsequent responses below.

The EPA requires the Applicant to address the following:

The NIA at S.3.1.1 identifies "typical" construction hours of 6am to 6pm Monday to Friday and 7am to 1pm Saturday, and also notes that "construction outside these hours will be required on both weekdays and weekends including Sundays". The Interim Construction

Noise Guidelines (ICNG)(DECC, 2009) outlines standard construction hours (i.e. Monday to Friday –7am to 6pm and Saturdays 8am to 1pm) and a need to justify construction outside these hours. The Proponent must outline the nature and extent of out of standard hours construction and the justification for it in accordance with the ICNG.

As described in Appendix I, the 1A Unwin Street site on which Downer's existing asphalt plant and Reconomy facility operate is subject to compulsory acquisition by the NSW Government for use by the Sydney Metro West project. Assuming development consent for SSD-10459 is granted at the end of 2020, Downer will have a little over 12 months to construct the entire Sustainable Road Resource Centre, before being required to vacate the Unwin Street site.

This is an extremely demanding construction program and although Downer intends to construct the development within standard construction hours, it requires flexibility to undertake construction works outside of standard construction hours in the event of program delays due to inclement weather, COVID related supply chain delays etc. Therefore, the exact nature and extent of out of standard hours construction cannot be determined at this time.

Notwithstanding, noise modelling for the construction of the project which was an absolute worst-case assessment, with multiple plant operating simultaneously identifies that noise emissions would satisfy the relevant noise management levels (NMLs) for any activities completed outside standard construction hours.

Furthermore, the proponent has committed to preparing a construction environmental management plan for the works that will guide, manage, quantify and control noise emissions throughout the construction process (see Section 8.1 of the NVIA).

Both operational and construction noise criteria are in part informed by prevailing background noise levels. The NIA has adopted Rating Background Noise Levels (RBLs) from a previous assessment (i.e. SSD-9302 – Viva Energy Clyde Western Area Remediation). The Proponent must ensure that adopted background noise data are reviewed and a statement provided that the data conforms to the requirements of the Noise Policy for Industry (NPfI)(EPA, 2017).

The historic data has been reviewed and conforms to the requirements of the Noise Policy for Industry (NPI) (EPA, 2017).

Project Amenity Noise Levels: The NIA notes on page 29 that exceptions to the standard approach to deriving "project amenity noise levels" (i.e. NPfI, Section 2.4) exist. One of the exceptions relates to proposed developments in major industrial clusters. This current proposal will potentially result in the development of eight new industrial noise sources in an area with existing industrial noise sources. Therefore, the approach to developing operational "project amenity noise levels" (PANL) for Lot 6 (and remaining lots) needs to consider the NPfI Section 2.4.2. This approach effectively shares the "project amenity noise level" across the eight lots. For example, based on the night-time derived PANL of LAeq,15minutes 43dB, the level for Lot 6 isolation would be LAeq,15minutes 34dB. This approach is designed to manage cumulative noise impacts which is a SEARs requirement. The assessment must be amended to consider the adjusted PANL applicable in this situation.

It is important for the project to limit cumulative changes to offsite amenity noise levels (ie limit background creep), in particular at the nearest catchment of Silverwater. Therefore, this response provides further detail and analysis on the amenity noise levels for the Silverwater catchment taking into account data to develop reasonable criteria based on a contemporary data set.

Current ambient noise levels, Silverwater NSW.

The noise criteria for operation of the project are based on amenity noise levels (ie the limiting criteria).

The unattended noise monitoring location adopted for Silverwater catchment for the noise assessment was 101 Asquith Street, Silverwater, NSW (R2) from 2017 (Wilkinson Murray, 2017).

This location has been reviewed and the resultant ambient LA_{eq} noise metrics are considered slightly conservative as it is shielded by neighbouring industrial buildings to ambient industrial and road noise.

To gain a more comprehensive understanding of ambient noise levels in the area (between March and July 2019), data obtained as part of the Sydney Metro West Environmental Impact Statement (2020) (Westmead to The Bays, 2020) for 10 Carnarvon Street Silverwater, NSW (Attachment A of Appendix I) has been reviewed. The 2019 monitoring location has a similar offset to the M4 Motorway compared to the R2 (2017) assessment location, although slightly closer to Silverwater Road which may result in slightly elevated ambient levels compared to Asquith Street (R2).

It is noted that assessment location R2 is geographically situated between the two monitoring locations. Considering the respective measured ambient noise levels and their relevant offset to major noise sources (industry, road) it would seem reasonable to adopt the logarithmic average of the two data sets (Asquith Street & Carnarvon Street) as representative of receivers in the Silverwater catchment.

Table 6.9 provides a comparison of both data sets, along with the logarithmic average to provide context around ambient LA_{eq} amenity noise levels for the Silverwater area.

Table 6.9 Comparison of ambient noise levels, Silverwater

Monitoring location	Period	Measured RBL, dB $LA_{90(period)}$	Measured ambient dB $LA_{eq(period)}$	Measured ambient dB $LA_{eq(15min)}$
101 Asquith Street, Silverwater	Day	42	55	58
	Evening	41	51	54
	Night	38	48	51
10 Carnarvon Street, Silverwater	Day	46	60	63
	Evening	44	57	60
	Night	41	55	58
Logarithmic Average (Intermediate Amenity)	**Day**	**N/A**	**58**	**61**
	Evening	**N/A**	**55**	**58**
	Night	**N/A**	**53**	**56**

Consideration of the cluster approach

It is understood that limiting cumulative noise emissions from industry within residential communities is a priority. However, applying the (NPI) industry cluster approach based on urban amenity noise levels is not a reasonable approach for this particular project site. There are several justifications for this:

- The nearest surrounding residential receivers are currently exposed to elevated levels of ambient noise from a combination of sources (eg road noise and industry) that are unlikely to decrease.
- The potentially most affected residential receivers are in the Silverwater catchment. Between these receivers and the project site is approximately 750 m of general industrial development.
- The timing for development of future industrial lots in the proposed industrial estate is uncertain at this time.
- The project is now proposed to be subdivided into 14 lots, with Downer occupying one lot; a cluster approach would restrict lots to a night criteria of 32 dB $LA_{eq(15min)}$ per lot which is considered prohibitive for IN3 heavy industrial zoning.

- The type of industry that will be established on the remaining lots is unknown at this stage, hence applying an industry cluster based approach may not be reasonable as some lots may be occupied by operations that do not generate significant noise emissions eg storage warehouse/transport logistics depots and will operate significantly below a night criteria of 32 dB $LA_{eq(15min)}$, while other lots may be occupied by operations that are typical heavy industrial uses that won't be able to operate below a night criteria of 32 dB $LA_{eq(15min)}$ even when applying reasonable and feasible noise mitigation.
- The site is zoned IN3 heavy industrial which is in very limited supply in Sydney. Application of an overly restrictive acoustic approach to the land (a very restrictive noise criteria (ie night criteria of 32 dB $LA_{eq(15min)}$ per lot) would make the site less attractive and unusable for typical heavy industrial uses, further limiting the availability of usable heavy industrial land in Sydney.
- While typically only applied to existing operational industrial sites, the urban industrial interface approach could be a reasonable application in this instance, as the current ambient environment for residential receivers are already elevated from exposure to existing industrial and road traffic noise that is unlikely to reduce in the future.

The proponent seeks to obtain a noise criteria for the project site that achieves a balance between adopting a reasonable PNTL commensurate to the projects end use (ie IN3 heavy industrial), while minimising off-site cumulative noise increases, particularly during the more sensitive evening and night periods.

The section below provides two options for consideration in deriving criteria for the project site. The first consideration was to adopt a PNTL based on the urban industrial interface approach. The key metric of the analysis was to minimise the overall offsite ambient noise levels as much as possible and avoid background creep from industrial noise sources whilst limiting the overall noise emission from the project site as a whole. Where the urban industrial interface approach is not supported, an alternative approach is proposed which restricts the project criteria to minimise offsite cumulative noise level increases.

Urban industrial interface approach

A comparison of measured ambient $LA_{eq(15min)}$ noise levels and a maximum PNTL based on an urban industrial interface is summarised in Table 6.10.

The change column shows the overall increase in decibels within the Silverwater catchment based on the project site achieving the maximum allowable PNTL. It is noted that a change in noise level of 2 dB would be just perceptible to most humans, notwithstanding, a minimal change in cumulative levels within residential catchments is preferred.

The overall change in offsite noise levels taking the urban industrial interface approach (refer Table 6.10), using the (proposed) intermediate amenity noise levels (refer Table 6.9) would result in a 4.1 dB increase in daytime offsite industrial noise levels (1.2 dB increase in the evening and 0.6 dB increase in the night period) in the Silverwater catchment.

Therefore, a more stringent alternative criteria has been considered to minimise residual industrial noise within the community (see Table 6.11).

Table 6.10 Cumulative noise emission comparison – urban industrial interface approach

Monitoring location	Period	Existing ambient dB $LA_{eq(15min)}$	Urban industrial interface PNTL dB $LA_{eq(15min)}$	Cumulative (total) noise (existing + project) dB $LA_{eq(15min)}$	Change dB
101 Asquith Street, Silverwater	Day	58	63	64	6.2
	Evening	54	53	57	2.5
	Night	51	48	53	1.8

Monitoring location	Period	Existing ambient dB $LA_{eq(15min)}$	Urban industrial interface PNTL dB $LA_{eq(15min)}$	Cumulative (total) noise (existing + project) dB $LA_{eq(15min)}$	Change dB
10 Carnarvon Street, Silverwater	Day	63	63	66	3.0
	Evening	60	53	61	0.8
	Night	58	48	58	0.4
Receiver R2[1] (Intermediate Amenity)	Day	**61**	63	65	4.1
	Evening	**58**	53	59	1.2
	Night	**56**	48	57	0.6

Proposed project PNTLs

Table 6.11 presents proposed PNTLs to be considered by regulators for this particular project, the proposed PNTL have been selected to minimise changes to offsite industrial noise levels.

The approach seeks to achieve a balance between adopting a reasonable PNTL that is commensurate to the projects end use, while minimising off-site cumulative noise increases, particularly during the more sensitive evening and night periods.

Adopting this approach would be akin to applying 35 dB $LA_{eq(15min)}$ to all 14 lots, however, would be applied as a cumulative total to all lots in the development. This would allow the flexibility needed to permit a range of types of industries/occupants (some louder and some quieter) operating at the project site.

Table 6.11 Proposed PNTL and cumulative noise emission comparison

Monitoring location	Period	Existing ambient dB $LA_{eq(15min)}$	Proposed project PNTL dB $LA_{eq(15min)}$	Cumulative (total) noise (existing + project) dB $LA_{eq(15min)}$	Change dB
101 Asquith Street, Silverwater	Day	58	58	61	3.0
	Evening	54	50	55	1.5
	Night	51	46	52	1.2
10 Carnarvon Street, Silverwater	Day	63	58	64	1.2
	Evening	60	50	60	0.4
	Night	58	46	58	0.3
Receiver R2[1] (Intermediate Amenity)	Day	61	58	63	1.8
	Evening	58	50	59	0.6
	Night	56	46	56	0.4

To manage noise emissions from the site, future development of each lot would be subject to a separate approval and would require a noise assessment to be completed to demonstrate cumulative emissions from the project site (ie all 14 lots) do not exceed the PNTL at offsite receivers.

It is noted that the formula in Section 2.4.2 contains a typographical error and should be read as follows:

> **Individual project amenity noise level = 10Log ($10^{((ANL\ -5\ dB)/10)}$/N). Note: the 3dB conversion factor between LAeq, period and LAeq,15min applies to this process.**

Noted. The correct formula has been used in calculations where required in the NIA and this response.

The NIA at Table 12, Note 2, identifies application of the "industrial interface' provisions in the NPfI. While this does not appear to be adopted in the assessment, the EPA advises that it would not support the application of the industrial interface provisions in this case and the Proponent should ensure this is reviewed.

Refer to earlier response.

The NPfI requires that prevailing meteorological conditions be considered in noise assessments which include the occurrence of light winds and temperature inversion conditions. The NIA presents an analysis of the occurrence of light winds in Section 6.2.1. The assessment has not undertaken an analysis, or considered the occurrence and effect of temperature inversion conditions. The assessment must be amended to consider the occurrence of temperature inversion conditions in accordance with Fact Sheet D of the NPfI. If temperature inversions are considered to be a feature of the area they must be taken into consideration in the noise modelling scenarios adopted.

Analysis by Todoroski Air Sciences (TAS) who conducted the air quality impact assessment for the project identifies that percentage occurrence of F class stability during winter nights is 9%, and hence temperature inversions are not a feature of the area.

The NIA has reported use of the ISO9613 noise modelling algorithms implemented through the iNoise modelling package. The NIA, Table 18, presents the meteorological parameters considered in the assessment. Modelling these parameters would require the augmentation of the ISO9613 model. The assessment needs to fully outline the noise modelling approach used and justify its accuracy.

Muller Acoustics Consulting (MAC) confirms that DGMR (iNoise, Version 2020.0) (a single calculation method (ISO9613-2) modelling software based on B&K predictor) noise modelling software was used to quantify noise emissions from typical construction activities and operations.

iNoise augments meteorological parameters via CONCAWE meteorological algorithms by replacing the *C*met variable in the ISO9613 calculation as shown in Figure 6.10. These were used in the modelling assessment for the project.

Calculation Formula

Based on ISO 9613 - 1/2, Predictor calculates the noise level as follows:

$$L_{lt,per} = L_{dw} - C_{m,per} - C_{t,per} \quad (1)$$

$$L_{dw} = L_W + D_c - A \quad (2)$$

$L_{lt,per}$	Long-term average octave (or 1/3-octave) SPL during the evaluation period in dB
L_{dw}	Equivalent continuous downwind octave (or 1/3-octave) SPL in dB
$C_{m,per}$	Meteorological correction during the evaluation period in dB
$C_{t,per}$	Correction for the active time of the source during the evaluation period in dB
L_W	Sound power level in dB(A) per octave (or 1/3-octave), re 1 pW
D_c	Directivity correction in dB
A	Attenuation (octave-band) in dB per octave (or 1/3-octave)

Figure 6.10 Calculation formula

The model calculation method used to predict noise levels was in accordance with ISO 9613-1 'Acoustics – Attenuation of sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere' and ISO 9613-2 'Acoustics – Attenuation of sound during

propagation outdoors. Part 2: General method of calculation' including corrections for meteorological conditions using CONCAWE[1].

The ISO 9613 standard from 1996 is the most used noise prediction method worldwide. Many countries refer to ISO 9613 in their noise legislation. However, the ISO 9613 standard does not contain guidelines for quality assured software implementation, which leads to differences between applications in calculated results.

In 2015 this changed with the release of ISO/TR 17534-3. This quality standard gives clear recommendations for interpreting the ISO 9613 method. iNoise fully supports these recommendations. The models and results for the 19 test cases are included in the software.

The model incorporated a three-dimensional digital terrain map giving all relevant topographic information used in the modelling process. Additionally, the model uses relevant noise source data, ground type, attenuation from barrier or buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers.

The NIA, Table 20, identifies the expected noise attenuation from noise mitigation measures considered for the asphalt plant. The expected noise reductions are significant and in one case up to 26dB. The NIA must outline whether the stated noise attenuation levels are achievable and the notional design parameters needed to achieve them.

The noise attenuation levels are those specified by the Ammann Group (manufacturers of the RAH100 asphalt plant). Attenuation levels of up to 30 dB is not unrealistic for sources that contain broadband or high frequency components (in this case, ventilation fans and stack outlets).

Standard noise mitigation options as provided by the asphalt plant supplier Ammann shall be implemented. The measures and expected noise reductions are summarised in Table 6.12.

Table 6.12 Noise mitigation for asphalt plants

Noise source	Noise reduction as indicated by supplier	Description
Cold Feed System with Drive	3dB	Rubber liners in feeders
Burner Devices	6dB	Frequency drive
Ventilation Fan with Drive	26dB	Sound protection walls plus frequency drive
Stack Outlet	20dB	Silencer
Hot Elevator with Drive	10dB	Insulated head station
Proportioning Machine with Drive	3dB	Rubber liners in feeders
Transfer Chute Drum	3dB	Insulated chute

The NIA has not considered potentially annoying characteristics of noise in accordance with Fact Sheet C of the NPfI. A detailed assessment in accordance with the provisions of the NPfI is required.

Modifying factors in accordance with Fact Sheet C of the NPI were analysed and are not applicable. Additionally, key tonal sources from the project are associated with reverse alarms. Section 8.1 of the NIA recommends that both a CEMP and OEMP are completed for the project

[1] Report no. 4/18, "the propagation of noise from petroleum and petrochemical complexes to neighbouring communities", Prepared by C.J. Manning, M.Sc., M.I.O.A. Acoustic Technology Limited (Ref.AT 931), CONCAWE, Den Haag May 1981

to investigate alternatives to tonal reverse alarms. Downer would apply broadband reversing beepers to all mobile plant on site.

6.8.2 Enclosure of facilities and material

The EPA notes that the SEARs advised that the EPA expects facilities at the Road Resource Centre to be enclosed and that all waste and material handling activities including receival, sorting, processing, sampling, quarantine, storage, and loading must be conducted within an enclosed building. This is best practice for all new facilities to ensure the minimisation of pollution and to improve environmental outcomes. However, the Proposal in its current form proposes for a number of activities to be conducted outside. The EIS does not provide any justification or explanation for why the Proposal does not include the complete enclosure of all facilities and why all waste and material handling activities are not proposed to be conducted internally as required by the SEARs.

The EPA notes that a licensed Reconomy facility is currently operating at 1A Unwin Street, Rosehill. The EIS states that the current Reconomy facility is proposed to be replicated at lot 6 of the Premises. However, the Reconomy facility located at 1A Unwin Street operates within a fully enclosed building and the Reconomy facility at lot 6 is proposed to be outside. As a result, the proposed facility will be decreasing its environmental performance by removing environmental controls which is in direct opposition to the objects of the POEO Act.

The Applicant must revise the Proposal to ensure all facilities are fully enclosed and no waste or material activities are conducted externally. If this is not feasible, the Applicant must provide detailed justification for each proposed external activity and how, for each activity and the overall site, the Proposal will achieve similar environmental outcomes to all facilities and waste and material handling activities being conducted inside fully enclosed buildings.

Downer does not propose to fully enclose the RAP facility for the reasons described in Section 6.8.7. In summary, RAP is a bound material with an average of 4.5% bitumen and further 2-3% moisture. RAP particle size distribution tests by Downer indicate that only a very small component (approx. 4-6%) of RAP is of an approximately 0.5 mm particle size. These particles can still become mobile, however, due to their size are not able to be significantly entrained in the atmosphere and typically fallout soon after lift-off.

Notwithstanding, permanent dust suppression water sprinklers will be installed around the RAP stockpiling area, which will be used if there is visible dust generated in the area.

Additionally, housing the RAP stockpiles in a large industrial warehouse is unrealistic, impractical and problematic. The risk of plant and trucks hitting and damaging the warehouse walls or posts whilst tipping, loading and navigating in an enclosed space is of significant concern to Downer as any non-single span structure creates risk of possible building collapse if damaged.

6.8.3 Unsealed hardstand

It was detailed within the SEARs that all the external haulage areas and roads at the site must be sealed hardstand and any unused external surfaces must be sealed hardstand or vegetated. The EPA understands that a large area of the Road Resource Centre is proposed to be unsealed hardstand. It is not clear from the EIS or site plan exactly which areas of the Road Resource Centre site are proposed to be sealed and which are proposed to be unsealed. No justification has been provided for any area of the site to be unsealed.

The EPA expects that the Road Resource Centre site will be sealed hardstand (aside from unused vegetated external surfaces) as is advised within the SEARs and as is best practice

for all new facilities. Unsealed hardstand areas can cause the migration of pollutants into groundwater.

As described in Section 6.2, the RAP stockpiling area and associated road are now proposed to be a sealed asphaltic concrete surface.

6.8.4 Site plan

The site plan provided for the Road Resource Centre with the EIS does not meet all the requirements of the SEARs and is lacking in detail. The SEARs required the site plan to identify at minimum:

- **Locations of the proposed facilities;**

  The location of the proposed facilities are included in Figure 3.6 of the EIS. The revised site development plan with all key features labelled is included as Figure 5.1 in this report.

- **Traffic flows and directions;**

  Traffic flows and directions are included in the swept path analyses in the traffic impact assessment in Appendix E of the EIS. Due to refinements to the site development plan since the exhibition of the EIS, these swept path analyses have been redone and are included in Appendix H of this report.

- **Haulage;**

  Internal traffic flows and directions are included in the swept path analyses in the traffic impact assessment in Appendix E of the EIS as are the main haulage routes to and from the site. The main haulage routes to and from the site are also in Figure 3.19 of the EIS.

  Due to refinements to the site development plan since the exhibition of the EIS, the internal swept path analyses have been redone and are included in Appendix H of this report.

- **Materials and waste receival, processing, storage, and loading (for each waste and material type);**

  The location of the main waste (RAP and street sweepings/non-destructive diggings) receival, processing, storage and loading areas are shown in Figure 3.6 of the EIS and the concept design in Appendix N3.

  The revised site development plan with all of these key features labelled is included as Figure 5.1 in this report.

  The minor waste streams used in asphalt production that will come from 3rd party suppliers and where they are stored is outlined below and shown on Figure 5.1:

  - Glass fines/sand: received and stored at the concrete bunkers at the northern end of the Reconomy facility. The glass fines are then loaded by front-end loader into the asphalt plant cold feeders;
  - Coal ash/fly ash (or other suitable ash products): received at the lime delivery area and loaded by closed system pumping into the split silo tower (as described in Section 3.2.3 of the EIS). The coal ash/fly ash (or other suitable ash products) is then delivered pneumatically directly into the asphalt plant;
  - Toner: received at the loading bay adjacent the emulsion additive store and stored in the toner additive store in bulk bags. An overhead hoist crane lifts the toner bags and transfers the toner to one of the fibre additive hoppers in the asphalt plant;
  - Crumbed rubber tyres: received at the loading bay adjacent the emulsion additive store and stored in the emulsion additive store in bulk bags. An overhead hoist crane lifts the

crumbed rubber bags and transfers the rubber to one of the fibre additive hoppers in the asphalt plant.

- **Quarantine;**

  The Sustainable Road Resource Centre will not process any materials that require quarantining. Downer has strict inspection protocols for all waste received at the site, in particular RAP and all road maintenance wastes received at the Reconomy facility. These include:

  - Verification by the supplier of the waste (if not Downer), that it meets the relevant waste classification;
  - Prior to tipping the waste at the site, the load is visually inspected;
  - The load is then tipped at the relevant waste receival area and visually inspected again. When the waste is tipped, that load is kept separate from the other already tipped material so that it can be quarantined/reloaded into a truck and taken to an appropriate waste facility if it doesn't meet the required waste classification.

- **Infrastructure for environmental controls including dust, noise, water, odour, and wheel wash;**

  By the description of all the environmental controls, revised site development plan and other images and figures in this report, the details and location of these environmental controls can be easily understood.

- **Weighbridges;**

  The location of the proposed weighbridges are included in Figure 3.6 of the EIS. The revised site development plan included as Figure 5.1 in this report also shows all proposed weighbridges.

- **Site boundaries;**

  The Lot 6 site boundary is clearly shown in Figure 3.1 and 3.6 of the EIS. The revised site development plan included as Figure 5.1 in this report also shows the site boundary as do the revised subdivision/staging plans in Appendix B1.

- **Stormwater drainage areas; and**

  The Lot 6 stormwater drainage system/areas is shown on Figure 3.20 and Appendix N4 of the EIS. The revised stormwater management system/areas is included in Appendix B3.

- **Unused stabilised areas.**

  Since submission of this EIS the pavement design has been amended to now have all the trafficable and storage areas sealed, including the unprocessed RAP stockpile area. The revised pavement layout is in Appendix B2.

The Applicant must provide an updated site plan for the Road Resource Centre which includes the identification of all of the above as well as the other notable infrastructure/areas listed below:

- **Site offices;**

  The proposed site offices are shown in Figure 3.6 of the EIS. The revised site development plan included as Figure 5.1 in this report also shows the site offices.

- **Laboratory;**

  The proposed laboratory is shown in Figure 3.6 of the EIS. The revised site development plan included as Figure 5.1 in this report also shows the laboratory.

- **Workshop;**

  The proposed workshop is shown in Figure 3.6 of the EIS. The revised site development plan included as Figure 5.1 in this report also shows the workshop.

- **Stormwater management infrastructure;**

  The Lot 6 stormwater drainage system is shown on Figure 3.20 and Appendix N4 of the EIS. The revised stormwater management system is included in the civil and stormwater drawings in Appendix B3 and described and assessed in Appendix C.

- **Electrical substation area;**

  There are three proposed electrical substations to service Lot 6, originally proposed in the north-west of Lot 6, east of the driveway entry lanes as shown in Figure 3.6 of the EIS. Two of these substations are required to service the Downer Sustainable Road Resource Centre and the third is to service future development on the front (northern) pad of Lot 6. As shown on the revised site development plan, the two electrical substations to service the Sustainable Road Resource Centre are proposed to be relocated to a preferred position immediately adjacent (north) of the asphalt plant RAP cold feeders, with a second alternative option in the south-west corner of the Lot 6 front pad.

- **Any areas relevant to the standards for managing construction waste including tip and spread area and inspection checkpoints;**

  Addressed above.

- **Diesel storage area and diesel unloading bay**

  The proposed diesel tank and unloading bay are shown in Figure 3.6 of the EIS. The revised site development plan included as Figure 5.1 in this report also shows the diesel tank and unloading bay.

- **Kerosene storage area;**

  The proposed kerosene storage area is shown in Figure 3.6 of the EIS. The revised site development plan included as Figure 5.1 in this report shows the proposed new location of the kerosene tank, which is assessed from a risk perspective as described in Section 6.3 and Appendix F.

- **Gas storage area;**

  The proposed gas storage area is shown in Appendix I of the EIS. The revised site development plan included as Figure 5.1 in this report and in Appendix F shows the proposed new location of the gas storage area, which is assessed from a risk perspective as described in Section 6.3 and Appendix F.

- **Other chemical/hazardous waste storage areas;**

  The proposed chemical and hazardous material storage areas are shown in Appendix I of the EIS. The revised site development plan included as Figure 5.1 in this report and in Appendix F shows the proposed chemical and hazardous material storage areas, which is assessed from a risk perspective as described in Appendix I of the EIS and Section 6.3 and Appendix F of this report.

- **Refuelling, fuel decanting, and vehicle maintenance areas;**

  Refuelling is to be conducted in the aforementioned diesel storage area.

  Any mobile plant maintenance and repairs will be conducted offsite.

- **Spill response kits;**

  Spill response kits are not depicted within the site development plan, but will be located near any fluid storage area and other appropriate locations on the site.

- **Rainwater tanks;**

  The rainwater tanks are shown on Figure 3.6 of the EIS. The revised site development plan included as Figure 5.1 in this report shows the proposed rainwater tanks. The revised stormwater management system which includes the rainwater tanks is included in the civil and stormwater drawings Appendix B3 and described and assessed in Appendix C.

- **Processing equipment;**

  The location and layout of processing equipment is shown in various figures in the EIS including figures 3.6 – 3.10 and 3.16. All processing equipment is shown on the revised site development plan included as Figure 5.1 in this report

- **Heavy vehicle parking areas;**

  Permanent heavy vehicle parking will not be encouraged on the site, however as noted in the EIS and explained in Appendix H of this report, there is sufficient space on site for in excess of 18 heavy vehicles to safely park while waiting to unload or load. As shown on the revised site development plan in Figure 5.1 and on the swept path drawings in Appendix H, of this report, there is a large area to the north of the asphalt plant for asphalt trucks to park temporarily, as well as an associated driver lounge and amenities. Additionally, the surrounding “one way ring road” is 13 m-15 m in width and can cater for trucks waiting on the outside kerb lane and allow passing traffic if required.

- **Other (light vehicle) parking areas;**

  Light vehicle parking is shown on Figure 3.6 and Appendix F of the EIS. The revised site development plan included as Figure 5.1 and Appendix H in this report also show the light vehicle parking areas.

- **Machinery storage areas;**

  The fixed machinery will maintain their permanent positions as per the site development plan, while mobile plant such as forklifts and front-end loaders, when not in use, will predominantly be parked under cover in their primary loading bay locations (e.g. RAP loader parks blade down in the covered RAP loading area, forklift parked on the IBC store area.

- **Infrastructure/equipment for all proposed facilities; and**

  Refer to scaled site development plan and engineering drawings in Appendix B2.

- **Dimensions for proposed facilities/infrastructure.**

  Refer to scaled site development plan and engineering drawings in Appendix B2.

6.8.5 Waste management

The SEARs provided by the EPA required a detailed assessment of the waste and management material processes to be undertaken for the proposed Road Resource Centre. This included at minimum but was not limited to:

Details of the sources of waste/materials to be received (this includes the source of each type of waste and material for each of the proposed facilities);

Refer to Table 6.13.

Details of the types and quantities of each type of waste/materials to be received;

Refer to Table 6.13.

Details of the maximum volume of each waste/material to be stored at any one time;

Refer to Table 6.13.

Details of the maximum annual throughput of each waste/material to be processed;

Refer to Table 6.13.

A detailed description of processing procedures for each waste and material type;

Refer to the sections of the EIS identified in Table 6.13 where the processing procedures are described for all waste to be processed at the site. Further information on the waste processing procedures as they relate to other comments from the EPA are included in various parts of Section 6.8.

A description of how the EPA's record-keeping and reporting requirements will be met, including weighing material in and out;

Downer currently operates a RAP stockpile and processing facility at 12 Grand Avenue, Camellia and a Reconomy facility at 1A Unwin Street, Rosehill. Both of these facilities operate under environment protection licenses (EPL). Waste levies and various resource recovery exemptions and orders also apply to the facilities.

Downer is required to weigh every load on receival and dispatch and keep the following records of the material received on site:

- weight;
- description;
- origin;
- licence plate of truck.

These records are used to meet all reporting obligations under the respective EPLs and waste levy requirements.

Downer will operate the RAP and Reconomy facilities at the Sustainable Road Resource Centre in the same way.

Details of the type and quantities of materials to be produced and their intended fate;

Refer to Table 6.13.

The intended fates of all other waste and materials received/produced on site which are not suitable for re-use;

Refer to Table 6.13.

Details of any materials produced under a Resource Recovery Order, and the controls/procedures in place for meeting the conditions of that order; and

Refer to Table 6.14 for details of resource recovery orders and exemptions that apply to the waste materials, recovered and reused on the site.

As discussed elsewhere in this report, Downer currently operates a RAP stockpile and processing facility at 12 Grand Avenue, Camellia and a Reconomy facility at 1A Unwin Street, Rosehill. Various resource recovery exemptions and orders also apply to the facilities.

Downers current RAP work instruction for their existing RAP processing facility and their current environmental management plan for their existing Reconomy facility (both of which can be provided to EPA if required), include various controls/procedures that are implemented to meet the conditions of relevant orders. The RAP work instruction and Reconomy environmental management plan will be amended to reflect the proposal and all controls/procedures required to be implemented to meet the conditions of existing and any new site specific or general resource recovery exemptions and orders.

A description of procedures for dealing with non-conforming waste and materials (i.e. waste not permitted to be received).

As summarised in Table 6.14, toner, crumbed rubber, coal ash/fly ash (or other suitable ash products) and steel furnace slag waste will be received from third party suppliers for use in the asphalt plant. Downer will only accept these wastes if they're accompanied by a written statement of compliance certifying that all the requirements set out in their respective resource recovery orders have been met.

RAP is sourced from roads and is not likely to be contaminated with non-conforming wastes unless the road was constructed of contaminated material, which is unlikely given road products must conform to client technical specifications. Notwithstanding, Downers current RAP work instruction for their existing RAP operations (can be provided to EPA if required) includes various procedures and controls to prevent non-conforming waste from being delivered to their RAP facility as well as to identify, quarantine, manage and appropriately dispose of non-conforming waste if it was received at the facility. The current RAP work instruction for Downer's existing RAP operations will be amended as required to reflect the proposal and include any additional procedures/controls for dealing with non-conforming waste.

Downers current Reconomy environmental management plan (can be provided to EPA if required) includes various procedures and controls to prevent non-conforming waste from being delivered to their Reconomy facility as well as to identify, quarantine, manage and appropriately dispose non-conforming waste if it was received at the facility. The current Reconomy environmental management plan will be amended as required to reflect the proposal and include any additional procedures/controls for dealing with non-conforming waste.

In general, the Sustainable Road Resource Centre will not accept or process any waste and materials that are non-conforming. Downer will have strict inspection protocols for all waste received at the site, in particular RAP and all road maintenance wastes received at the Reconomy facility. These will include:

- Verification by the supplier of the waste (if not Downer), that it meets the relevant waste classification;
- Prior to tipping the waste at the site, the load is visually inspected;
- The load is then tipped at the relevant waste receival area and visually inspected again. When the waste is tipped, that load is kept separate from the other already tipped material so that it can be quarantined/reloaded into a truck and taken to an appropriate waste facility if it doesn't meet the required waste classification.

The Applicant has not provided sufficient information regarding each of the above points and as such the EPA is not able to assess the environmental impacts of the waste/material. The EPA notes that a waste management plan has not been provided with the EIS. The EPA requires the Applicant to provide detailed information for each of the above listed points and the proposed waste management measures.

Refer to above points.

As part of the proposed asphalt plant process, the inside of truck bodies will be sprayed with a bitumen release agent. The EPA requires the Applicant to provide information regarding what is in the release agent proposed to be used.

Refer to Ultraslip safety data sheet in Appendix J.

The EPA notes that the proposal involves 7 x 60kL and 6 x 80kL bitumen emulsion tanks. It is unclear as to why the facility requires two different types of bitumen emulsion tanks. The Applicant should clarify why this is necessary.

Bitumen is one of the key raw materials used in asphalt production. Some of the tanks (as described in Section 3.2.3 of the EIS) are used to store bitumen products used in on site asphalt production).

As described in Section 3.2.5 of the EIS a bitumen products plant is also proposed as part of the Sustainable Road Resource Centre. This plant will produce bitumen emulsion products primarily for use by external customers such as local councils in road repair/maintenance and construction. Therefore, the other tanks are associated with storing raw materials and finished products associated with the bitumen products plant.

The EPA also notes the following regarding waste/material:

The EIS states the recovered organic material from Reconomy will be transported to a composting facility for reuse. This material cannot be reused and must be disposed of at landfill.

All organic material, currently recovered from Downer's 1A Unwin Street Reconomy facility is disposed of to landfill. The new Reconomy facility at the Sustainable Road Resource Centre will initially continue to dispose of recovered organics to landfill, but intend to ultimately transport recovered organics to an appropriately licenced compost facility, once relevant resource recovery exemptions and orders are in place.

Glass is not a waste type which is permitted to be received at the current licensed Reconomy facility in Rosehill and is not included with the current site-specific resource recovery order and exemption.

Table 3.2 of the EIS states that glass fines will be received and processed at Reconomy. This was an error in the EIS and no glass fines are proposed to be received and processed at Reconomy.

Glass fines are proposed to be received from a third-party supplier for use as a sand substitute at the asphalt plant. Downer will only accept this waste if deliveries are accompanied by a written statement of compliance certifying that all the requirements set out in *The recovered glass sand order 2014* have been met.

The EIS states that recovered plastics and oil from the Reconomy facility will be incorporated into the production of asphalt, replacing filler and/or aggregate. This is not permissible under the current site-specific resource recovery order and exemption.

Section 3.2.7 of the EIS states "Recovered plastics and oil from the Reconomy facility will be incorporated into the production of asphalt, replacing filler and/or aggregate." This was an error

in the EIS. Oil is not recovered in Reconomy. Plastics are recovered along with general trash and will be transported off site for disposal in landfill or recycling by a third party waste management facility.

The EPA notes the facilities proposed to operate at the Road Resource Centre will be utilising a number of different general and specific resource recovery orders and exemptions in the production of material. Separate applications may be required to be made to the EPA regarding the proposed use of specific resource recovery orders and exemptions.

Downer is aware of this, with the resource recovery orders which will likely apply to Stage 1 summarised in Table 6.14.

6.8.6 Waste and material types

The SEARs required that the EIS include detailed information regarding waste and material types which are intended to be received at the Road Resource Centre. This information included:

For each waste/material type, the physical and chemical content of the waste/material, the types of pollution which may result from the storage and processing of that waste/material and mitigation measures for managing any such impacts;

Results of analysis of the waste received at the Unwin Street Reconomy facility are summarised in Section 18.2.5 of the EIS.

The assessment chapters of the EIS identified potential pollutants that could be generated by the receipt, processing and storage of wastes proposed to be accepted at Stage 1. As described in this report, these assessments have been revised post-EIS as necessary to respond to project changes and agency submissions.

Regarding waste collected from street sweepings, stormwater gullies, and mud from non-destructive excavation, information on the source and type of pollutant to be collected and details of the types of catchments where the gross pollutant traps are located as pollutants found in residential areas would differ to those found in industrial areas. Consideration was to be given to the potential change in pollutant source and type of pollutant which may occur as a catchment develops or is redeveloped;

The information requested above was provided and discussed in Section 18.2.5 of the EIS.

Downer has demonstrated through testing of received waste and the recovered material (after passing through the Reconomy plant) that the pollutant types and loads don't differ substantially from different sources. Downer will continue to monitor pollutants of the recovered materials and any substantial change in pollutant types and loads will be investigated.

The identification of the types of waste that to be received at the waste facilities, with reference to the EPA's Waste Classification Guidelines and the definitions within the POEO Act; and

The RAP proposed to be received and processed at the RAP facility will be 'general solid waste (non-putrescible)'.

As described in Downer (2019) *Hydro-excavation mud waste recovery application* the street sweeping and gully pit waste proposed to be received and processed at Reconomy will be 'general solid waste (non-putrescible)' and the hydro-mud from non-destructive digging will be 'liquid waste'.

Where waste is being received and is wet and will require dewatering – the EIS must demonstrate whether it is classified as liquid waste, or not.

As described above, Downer (2019) *Hydro-excavation mud waste recovery application* identifies the hydro-mud from non-destructive digging as 'liquid waste'.

The EIS has not included sufficient information regarding the waste and material types to be received at the Road Resource Centre and has not adequately addressed the above points. The EPA requires the Applicant to provide detailed information regarding each of the waste and material types proposed to be received at the Road Resource Centre including the information required within the above points.

Refer to above points.

Table 6.13 Waste summary

Facility	Waste received onsite	Source	Receival (max. tpa)	Storage		Recovered material and storage (any one time)	Fate	Quantity to be reused (tpa)	Quantity to be disposed offsite (tpa)	Method of offsite disposal	EIS section describing process
				Any one time (t)	Annual (tpa)						
RAP facility	RAP	Road maintenance/ construction	250,000	90,000	250,000		Reuse in asphalt	180,000	0	NA	3.2.4, 18.2.4 and 18.3.2
							Reuse in road construction	70,000			
Reconomy	Street sweeper/ stormwater pit waste (spadable)	Road maintenance	40,000	300	40,000	Water (100 m^3 tank)	Disposal to sewer (trade waste)	1.2 ML (retained in Reconomy plant)	12 ML (disposed to on-site sewer)	Disposal to sewer (trade waste)	3.2.6, 18.2.5 and 18.3.3
						Aggregates (100 m^3) and sand (100 m^3)	Reuse in asphalt	12,000	0	NA	
						Organics (250 m^3)	Disposal	0	10,400 tpa	Initially landfilled, future recycled (composted)	
	Non-destructive diggings/ stormwater pit waste (wet)			250		Trash inc. plastic (10 m^3)	Disposal	0	3,600 tpa	Recycled	
						Metal (5 m^3)	Disposal	0	800 tpa	Recycled	
Asphalt plant	Glass fines	3rd party supplier	15,000 – 30,000	100 m^3	15,000-30,000	NA	Reuse in asphalt	30,000	0	NA	3.2.6, 18.2.5 and 18.3.3
	Toner		1,500	100	1,500			1,500	0	NA	3.2.7 and 18.2.3

Facility	Waste received onsite	Source	Receival (max. tpa)	Storage		Recovered material and storage (any one time)	Fate	Quantity to be reused (tpa)	Quantity to be disposed offsite (tpa)	Method of offsite disposal	EIS section describing process
				Any one time (t)	Annual (tpa)						
	Crumbed tyres		500	10	500			500	0	NA	3.2.7 and 18.2.3
	Coal ash/fly ash (or other suitable ash products)		300	23	300			300	0	NA	3.2.3, 3.2.7, 18.2.3 and 18.3.4
	Steel furnace slag		15,000	3,000	15,000			15,000	0	NA	3.2.7, 18.2.3 and 18.3.4

Table 6.14 Resource recovery orders and exemptions

Material	Source	Processing facility	Reuse facility	Fate	Resource recovery exemption	Resource recovery order
RAP	Road maintenance/ construction	RAP processing facility	Asphalt plant	Asphalt	*The Downer bituminous pavement exemption 2020*	*The Downer bituminous pavement order 2020*
			RAP processing facility	Road base	*The reclaimed asphalt pavement exemption 2014*	*The reclaimed asphalt pavement order 2014*
Water	Street sweeper/ stormwater pit waste. Non-destructive digging mud.	Reconomy	NA	Disposal to sewer (trade waste)	NA	NA
Aggregates and sand			Asphalt plant	Asphalt	*Downer recovered aggregate and sand exemption 2019*	*Downer recovered aggregate and sand order 2019*
Organics			NA	Disposal	NA	NA
Trash incl plastic			NA	Disposal	NA	NA

Material	Source	Processing facility	Reuse facility	Fate	Resource recovery exemption	Resource recovery order
Metal			NA	Disposal	NA	NA
Glass fines	3rd party supplier	NA	Asphalt plant	Asphalt	*The recovered glass sand exemption 2014*	*The recovered glass sand order 2014*
Toner					*The Downer bituminous pavement exemption 2020*	*The Downer bituminous pavement order 2020*
Crumbed tyres					*The Downer bituminous pavement exemption 2020*	*The Downer bituminous pavement order 2020*
Coal ash (or other suitable ash products)					*The coal ash exemption 2014*	*The coal ash order 2014*
Steel furnace slag					*The steel furnace slag exemption 2019*	*The steel furnace slag order 2019*

6.8.7 Air

Management and control of fugitive gaseous emissions

Principal air toxics

Bitumen and asphalt production processes result in the emissions of principal air toxics (such as benzene). Emissions of principal air toxics could occur from:

- **Asphalt plant dryer discharge;**
- **Asphalt loading to trucks;**
- **Bitumen storage, handling or transfer tanks. Particular when tanks are required to be heated to enable handling of bitumen;**
- **Emulsion production, where bitumen is handled, stored or transferred.**

As per Section 6.2.1 of the Approved Methods for Modelling and Assessment of Air Pollutants in NSW, principal toxic air pollutants must be minimised to the maximum extent achievable through the application of best-practice process design and/or emission control. The AQIA does not benchmark the proposal against best practice, hence it has not been demonstrated that principal air toxics have been minimised to the maximum extent achievable.

As described in Appendix D, the project proposes to replace the old existing asphalt facility and equipment located at 1A Unwin Street, Rosehill with a new modern asphalt facility equipped with improved emissions controls and which is also located further away from sensitive residential receptors. This is considered a best practice approach and would minimise air emissions and reduce impacts in the surrounding environment.

The proposed RAH100 asphalt plant that will be erected at the site is designed and manufactured by Ammann Group in Switzerland. Ammann specialise in the design and manufacture of state-of-the-art asphalt plants that meet strict European noise, dust and odour standards and are also energy efficient. As outlined in the EIS, Downer considered the installation of a 41 metre (m) full vertical design asphalt plan vs a 26-32m split design. Downer selected the 41m Ammann RAH100 asphalt plant as it:

- is more energy efficient;
- produces significantly lower CO_2 emissions;
- costs less to build, run and maintain;
- has greater production and storage capacity;
- can incorporate up to 90% RAP;
- has improved stack emissions dispersion resulting in improved air quality.

In addition to the above, the proposed asphalt plant demonstrates a best practice approach to minimise the extent of air pollutants associated with asphalt production as the design and emission controls associated with the asphalt plant include:

- A 40m high dryer stack to disperse air emissions generated from the asphalt mixing and drying. The air emissions are passed through a dust filter prior to discharge in the stack.
- A partially enclosed asphalt loadout area equipped with a bitumen vapour evacuation system to capture any fugitive emissions associated with the loadout process (refer to odour response below for further discussion on the proposed asphalt plant bitumen vapour evacuation system).
- An encapsulated skip for reducing air emissions during mixing prior to the loadout phase.
- Bitumen is stored in individual storage silos and pumped to the asphalt plant in a closed system when required. Feedstock bitumen is supplied to the storage silos at approximately 150-160 degrees Celsius (ºC) and transferred from tankers via a suction process. Excess air

within the storage silos are vented from a breather pipe at the top and passed through a carbon filter prior to discharge to air.

- Bitumen emulsion is the combination of bitumen, water and other additives which are pumped to emulsion tanks and stored at a lower temperature compared to the bitumen, at approximately 80^{o}C. The emulsion tanks are sealed with a breather pipe at the top of the tank with minimal discharge (water vapour) to air.

It is noted that the modelling predictions for the air pollutants associated with the asphalt plant are well below the respective NSW EPA impact assessment criteria and thus demonstrates that the air emissions generated and the range of air emissions controls incorporated into the asphalt plant are effective.

Odour

The AQIA predicts a maximum ground level odour concentration of 6 Odour units (OU) which is above the 2 OU impact assessment criteria applied in urban areas.

Fugitive odour emissions from loading asphalt to the trucks is the highest fugitive odour emissions accounted for in the assessment. The asphalt loading accounts for approximately 88 % of modelled ground level fugitive odour emissions. Ground level fugitive emissions have potential to impact offsite at a greater degree than point source discharges. As such the predicted offsite ground level concentrations for odour are likely to be heavily influenced by the asphalt loading emissions.

Other asphalt plants in NSW have incorporated enclosed truck loading areas with fugitive emission capture. As such there are measures available to mitigate the impacts caused by fugitive odour from asphalt plants. Fugitive odour capture would also assist in minimising potential ground level fugitive emissions of principal air toxics.

The EPA requires the Applicant to benchmark the proposed design against best practice and revise the AQIA incorporating all feasible and reasonable best practice mitigation measures to:

- **Demonstrate principal air toxic emissions are minimised to the maximum extent achievable; and**
- **Demonstrate compliance with the odour impact assessment criteria.**

Section 5.2.2 of the AQIA defines an applicable odour criterion of 2OU for the residential areas as they are representative of an urban area. For the other assessment locations as they are within an existing industrial precinct an odour criterion of 6OU is applied.

The location of the odour impact is important in defining the context in which it occurs. Generally, there is a higher expectation of odour amenity in the residential areas and that industrial areas are not considered to be odour sensitive locations and the odour amenity expectations in these areas are much lower than that for residences; odour from industry in these areas is not considered to be out of place.

The expectations for what may be reasonable interference with the comfort and repose of a person working in an industrial area is obviously going to be less, relative to a person taking respite in their own home. This difference needs to be considered when determining the offensiveness beyond the boundary of a premises. The nature of the odour beyond the boundary of the premises under normal operation cannot be considered offensive odour that could unreasonably interfere with the comfort or repose of any reasonable person in the neighbouring industrial areas.

The predicted odour levels for the Project show compliance with the applicable odour criteria for the location.

Proposed asphalt plant bitumen vapour evacuation system

Downer is proposing to build a state of the art Ammann RAH100 asphalt plant that incorporates a fully cladded loadout area for asphalt truck loading (see Figure 6.11 to Figure 6.14). Downer has worked closely with the plant manufacturer Ammann to incorporate this European technology over a number of years to assist and define industry best practice.

The Ammann RAH100 asphalt truck loading features incorporate:

- A fully cladded loadout area for asphalt truck loading;
- Extended roof cover design on truck entrance and exit; and,
- Bitumen vapour evacuation system.



Figure 6.11 Fully clad loadout area at another Downer asphalt plant

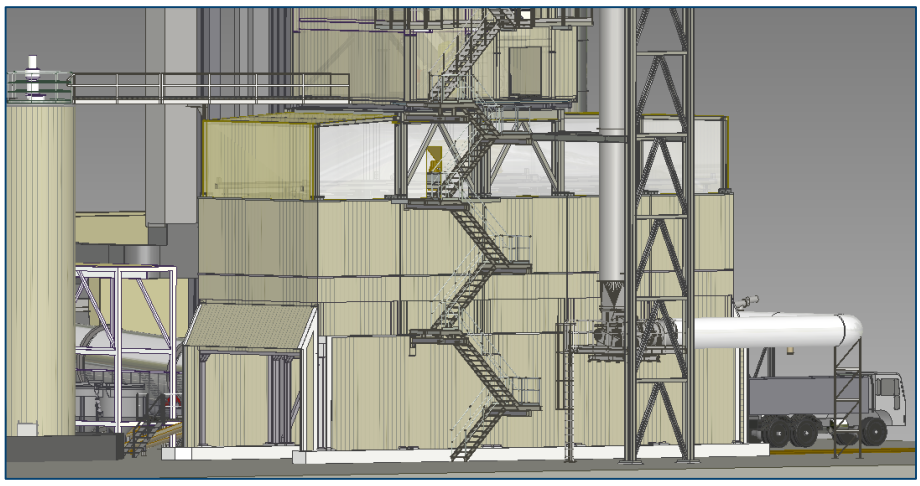


Figure 6.12 Ammann RAH100 asphalt plant proposed for Stage 1 showing enclosed asphalt loadout area

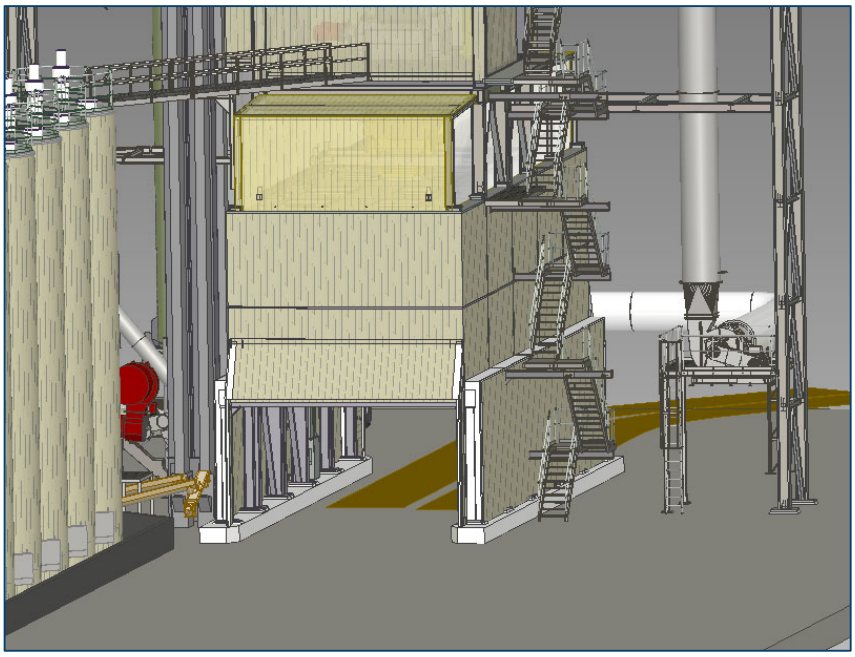


Figure 6.13 Truck entrance to RAH100 asphalt plant loadout area

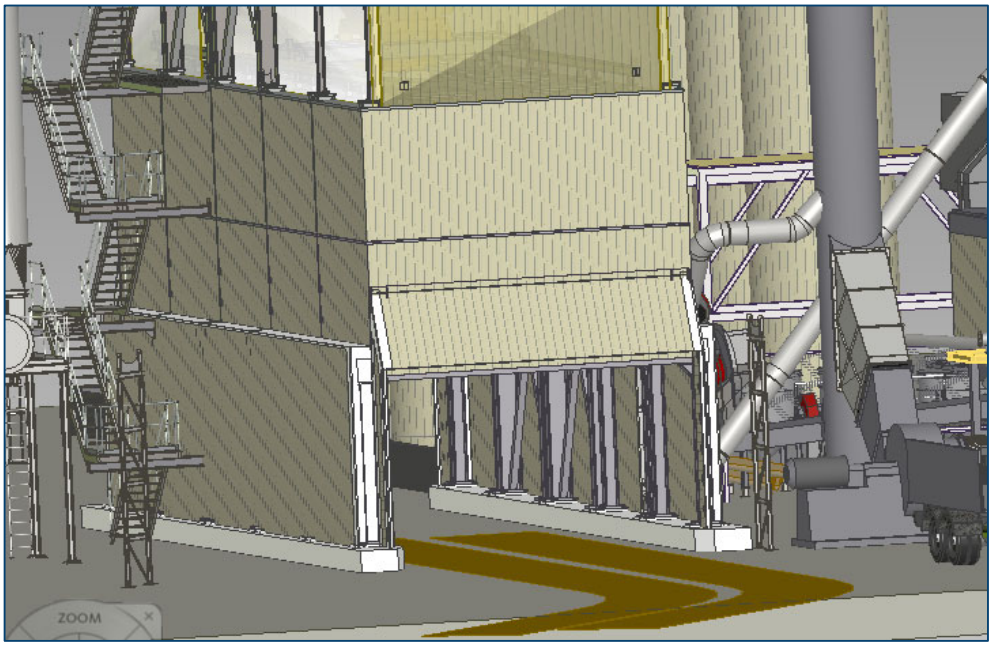


Figure 6.14 Truck exit from RAH100 asphalt plant loadout area

The bitumen vapour evacuation system is designed to extract bitumen vapour steam (created during discharging/loading asphalt into trucks) within the enclosed loadout area of the plant.

The evacuation system utilises a high suction (negative pressure) fan, which extracts bitumen vapour via specifically designed ducting within the ceiling of the plant loadout area (the 'rangehood' principle).

Figure 6.15 to Figure 6.17 present the design of the bitumen vapour evacuation system fitted to the asphalt plant loadout area.

The bitumen vapour evacuation system consists of:

- High capacity 20,000 Nm³/h extraction blower for evacuation;
- Suction pipe divided into two lines, one to the discharge flaps and one to the discharge chute on the skip level;
- Stainless steel ducting for corrosion resistance; and
- Extraction exhaust line equipped with electro-pneumatic flaps to duct captured exhaust fumes and Volatile Organic Compounds (VOCs) from the loadout asphalt area to the plant filter system.

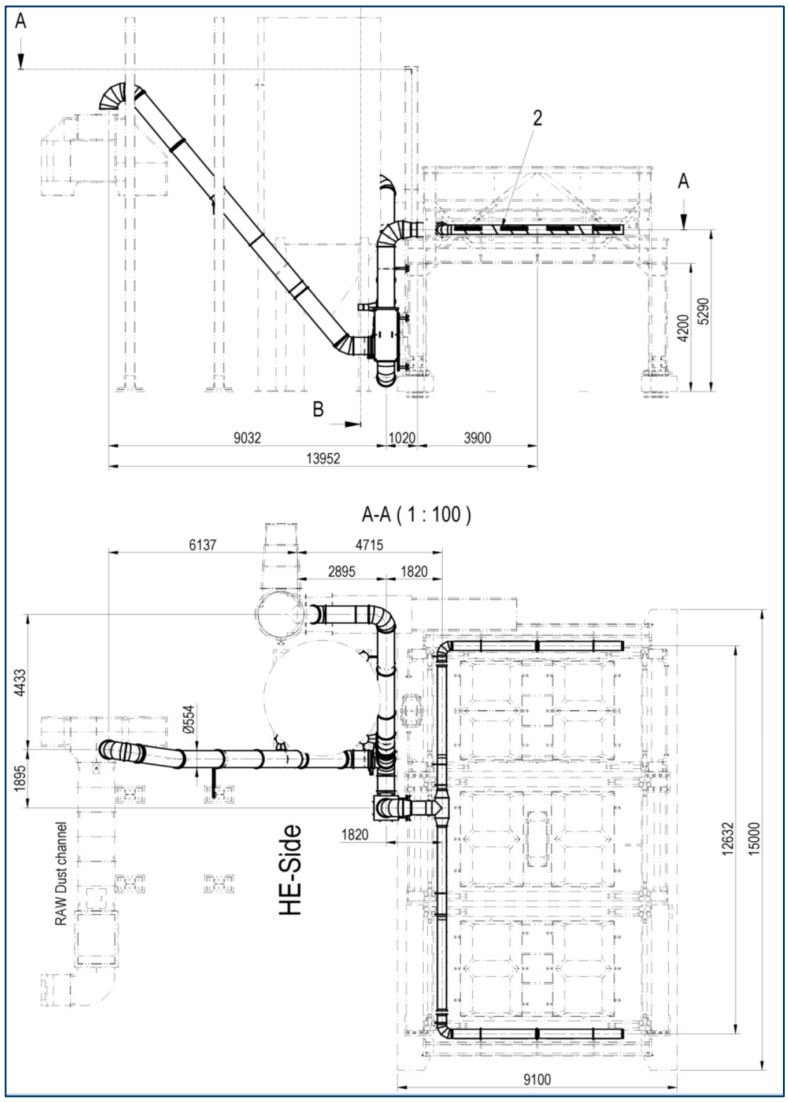


Figure 6.15 Elevation and plan view of bitumen vapour evacuation system fitted to the asphalt plant loadout area

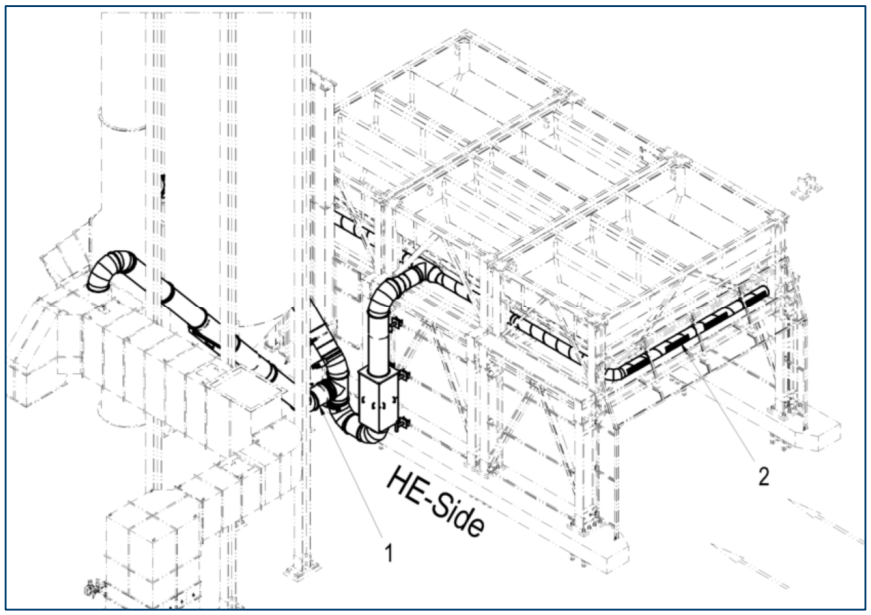


Figure 6.16 Oblique view of extraction exhaust line to duct exhaust fumes and VOCs from asphalt plant loadout area to the plant filter system

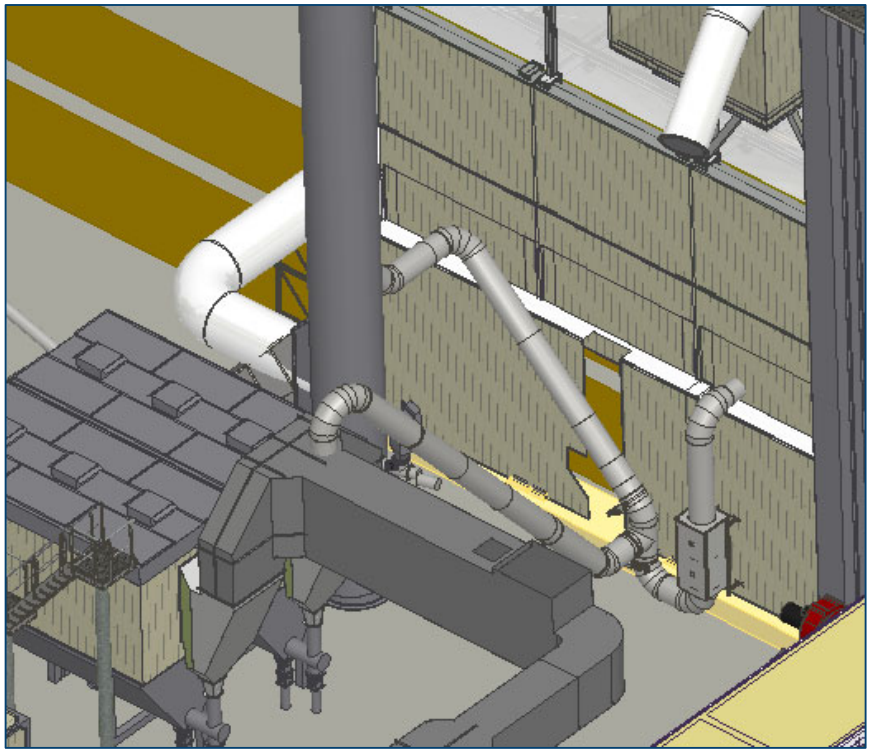


Figure 6.17 Isometric view of extraction exhaust line to duct exhaust fumes and VOC's from the asphalt plant loadout area to the plant filter system

It should be noted that the AQIA did not take into consideration the air emission control associated with the proposed bitumen vapour evacuation system. The fugitive emissions associated with the asphalt loadout were assumed without control and the predicted odour levels are conservative.

The level of control achieved by the bitumen vapour evacuation system is estimated by the amount of air extracted and the potential flow through the asphalt plant loadout area when a truck is being loaded.

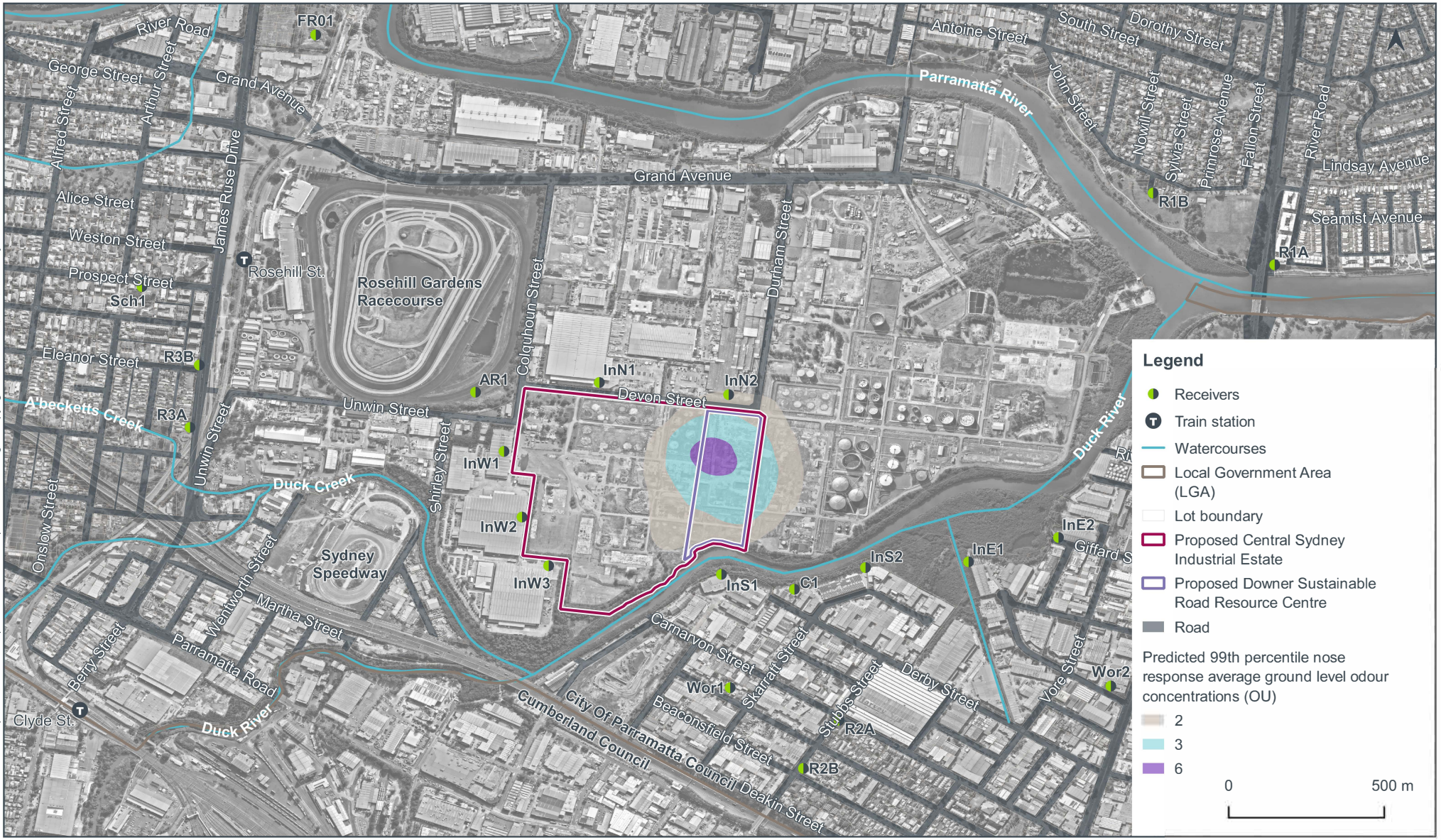
The average windspeed for wind travelling along the axis of the asphalt plant loadout area is calculated from the CALMET modelling data as 2.2m/s and would pass through the space above the truck where the asphalt is loaded along the length of the load alley resulting in a flow rate of 6.2m^3/s (2.8m^2 x 2.2m/s). The bitumen vapour evacuation system achieves a flow of 20,000m^3/hr (5.56m^3/s) and thus it could be expected a level of control of approximately 89% ((5.56m^3/s ÷ 6.2m^3/s) x 100) for this activity.

As a sensitivity analysis TAS applied this level of control to the loading asphalt to the truck activity for the dispersion modelling and revised the odour modelling predictions. As the loading asphalt to the truck activity accounts for approximately 88% of modelled ground level fugitive odour emissions in the AQIA, applying the control associated with the bitumen vapour evacuation system would result in a significant reduction in the ground level fugitive odour emissions and modelled predictions.

Figure 6.18 presents an isopleth diagram showing the 99th percentile nose-response ground level odour concentrations with the application of the bitumen vapour evacuation system. The results indicate levels of 2OU, applicable for urban residential areas, would be achieved at all assessment locations and the 6OU level, applicable for assessment locations within an existing industrial precinct, would be largely constrained to the site.

Figure 6.18
Predicted 99th percentile nose-response average ground level odour concentrations

Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
STATE SIGNIFICANT DEVELOPMENT - RESPONSE TO SUBMISSIONS



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Management and control of fugitive particulate matter emissions

Scenario 2 as presented in the AQIA assesses potential impacts associated with the Road Resource Centre operations and construction earthworks associated with the subdivision and lot preparation. The AQIA predicts exceedances of the annual average PM_{10} and $PM_{2.5}$ impact assessment criteria.

The Road Resource Centre operations account for approximately 33% and 45% of modelled PM10 and PM2.5 emissions for Scenario 2. Based on scaling of the predicted GLCs, the EPA estimates that potential incremental contributions from the Road Resource Centre operations could be approximately:

- **2.1 ug/m^3 of annual average PM_{10}, which is approximately 8% of the impact assessment criteria, which is not considered insignificant;**
- **1.1 ug/m^3 of annual average $PM_{2.5}$, which is approximately 14% of the impact assessment criteria, which is considered significant.**

Of the $PM_{2.5}$ emissions estimated from the Road Resource Centre operations, exhaust emissions account for 52% of total $PM_{2.5}$ emissions. Presumably these are emissions from proposed non-road emissions sources, such as front-end loaders. Exhaust emissions also account for a proportion of PM_{10} emissions (approximately 18%).

Where exceedances of the impact assessment criteria are predicted, the Applicant must demonstrate that all feasible and reasonable mitigation measures have been implemented. The AQIA does not benchmark proposed mitigation measures against best practice.

The EPA considers that there are measures available to minimise emissions from industrial plant. This could include committing to using non-road vehicles that meet the highest available emission performance. Alternatively retrofitting older style fleet with particulate matter filters to achieve an equivalent level of performance could be considered.

The Applicant must benchmark the Proposal against best practice to demonstrate that all feasible and reasonable best practice mitigation measures have been incorporated into the design of the proposal. This should include consideration of:

- **Utilising non-road vehicles that achieve the highest available particulate matter emission performance;**
- **Retrofitting non-road vehicles with particulate matter filters, where new equipment is not feasible to be purchased for the proposal;**
- **Other fugitive emission mitigation measures which could be relevant to the proposed material handling activities, such as complete enclosure.**

The AQIA concludes that "*all the assessed air pollutants generated by the operation of the Project would comply with the relevant assessment criteria at the applicable receptor locations*" and there are no predicted exceedances of the annual average $PM_{2.5}$ and PM_{10} impact assessment criteria at the residential receptor locations.

The predicted incremental contribution from the Sustainable Road Resource Centre operations (Stage 1) is presented in Scenario 1 which includes all activity associated with Stage 1 and there is no need to scale the predicted levels from Scenario 2. The maximum predicted level at the residential receptor locations for Scenario 1 indicate an annual average PM_{10} level of 0.6µg/m^3 which is approximately 2% of the impact assessment criteria and an annual average $PM_{2.5}$ level of 0.3µg/m^3 which is 4% of the impact assessment criteria. The predicted levels indicate Stage 1 does not have significant impact at these locations.

The exhaust emissions from Stage 1 include all diesel plant and equipment operating at the site. This includes both non-road vehicles and road vehicles accessing the site to import and export

materials. It is noted that there is a potential double counting of the $PM_{2.5}$ emissions in the emissions inventory as the emission factors applied for the activities already include a potential contribution from exhaust emissions of the equipment and hence the emissions estimates are conservative.

Based on the proposed activities associated with Stage 1 it is not unexpected that for the $PM_{2.5}$ emissions, a significant portion is comprised of exhaust emissions as the majority of these particles are often only generated through combustion processes. The project would apply operational mitigation measures to minimise the generation of the exhaust emissions including:

- Switching engines of on-site vehicles and plant off when not in use for extended periods of time.
- Having all on-site vehicles and plant fitted with pollution reduction devices where practicable.
- Maintaining and servicing on-site vehicles and plant according to manufactures specifications to ensure optimal performance.

It must also be re-iterated that Stage 1 has been designed with specific thought as to how exhaust emissions can be reduced including:

- The asphalt plant is positioned at the front of the site to minimise the overall travel distance on-site and associated asphalt truck exhaust emissions, as asphalt trucks make up the largest component of the total number of operational heavy vehicle movements to and from the site.
- The modern RAP processing plant will use conveyors to minimise the use of the front-end loader and associated exhaust emissions.
- The RAP processing plant receiving hopper/feeder is positioned at the southern end of the RAP processing shed, immediately adjacent to (as close as possible to) the unprocessed RAP stockpiles, minimising the distance required for the front-end loader to travel when loading unprocessed RAP into the RAP processing plant, reducing exhaust emissions.
- The processed RAP storage bunkers are positioned immediately adjacent to (as close as possible to) the asphalt plants processed RAP cold feeders, minimising the distance required for the front-end loader to travel when loading processed RAP into the asphalt plant, reducing exhaust emissions.
- The Reconomy facility recovered materials storage bunkers/bays are positioned immediately adjacent to (as close as possible to) the Reconomy wash plant, minimising the distance required for the front-end loader to travel when transferring recovered materials (aggregate, sand, organics) from the Reconomy wash plant to the storage bunkers.
- The Reconomy facility recovered materials storage bunkers/bays are positioned as close as possible to the asphalt plants raw material cold feeders, minimising the distance required for the front-end loader to travel when loading recovered Reconomy materials into the asphalt plant, reducing exhaust emissions.
- All virgin aggregates (stone and sand) used in the manufacture of asphalt are tipped into an underground hopper where the materials are transferred to silos (by covered belt feeders) and then transferred to the asphalt plant (by covered belt feeders). At many conventional asphalt plant operations, both of these raw aggregate transfer activities are undertaken by front-end loader, whereas at Stage 1 they will be undertaken by belt feeder, preventing the need for another front-end loader and significantly reducing the amount of exhaust emissions from the site.
- The diesel tank for refuelling trucks and mobile plant is positioned at the front of the site thereby allowing any vehicle entering the site to fill up with fuel without travelling any further than necessary. If the diesel storage tank was positioned at the rear (southern end of the site), asphalt trucks would need to complete a full loop of the entire perimeter of the site to fill up with fuel, before travelling back to the front of the site to load asphalt. By locating the diesel tank at the front of the site the asphalt trucks can fill up with diesel on route to the load alley (also positioned at the front of the site), reducing the heavy vehicle travel distance to a minimum and reducing exhaust emissions.

- The main light vehicle and visitor parking area is at the site entrance, allowing the majority of light vehicle's visiting the site to enter and exit without travelling around the full perimeter of the site, reducing light vehicle travel distance and reducing exhaust emissions.
- As the largest constituents of asphalt are aggregates, sand and bitumen, it makes sense to use recovered aggregates and sand where possible and to co-locate these resource recovery facilities as well as bitumen products manufacturing on the same site as the asphalt plant.
  RAP makes up around 20% of new asphalt and this percentage is likely to increase as road design specifications allows. Therefore, RAP storage and processing facilities should be co-located with or be close to asphalt plants to minimise heavy vehicle traffic on Sydney roads and associated exhaust emissions.
  Co-locating an asphalt plant, bitumen products plant, RAP storage and processing facility and a road sweepings and non-destructive excavations resource recovery plant is an Australia and world first, significantly reducing heavy vehicle exhaust emissions as follows:

  - Reduction of up to 5,400,000 tonne (t) kilometres (km) of RAP transport per annum on Sydney roads - If the RAP processing facility was not co-located on the same site as the asphalt plant and with Downer's lease at 12 Grand Avenue coming to an end, they would only likely be able to secure an appropriate site to lease for RAP storage and processing in another industrial area in the outskirts of western Sydney. This would require 180,000 tpa of processed RAP to be transported approximately 30km from the off-site RAP processing facility, to the new asphalt plant site in Devon Street, Rosehill. Workings: 180,000tpa of RAP x 30 km = 5,400,000 t km.
  - Reduction of up to 18,000,000 t km of virgin aggregates per annum on Sydney and regional roads – With the use of a minimum of 180,000tpa of RAP (comprised predominantly of aggregates) in the manufacture of asphalt, a similar volume of virgin aggregates need to be trucked to the site from current suppliers approximately 100 km from the site (outside the Sydney basin). Workings: 180,000tpa of virgin aggregates x 100 km = 18,000,000 t km.
  - Reduction of up to 900,000 t km of virgin aggregates per annum on Sydney and regional roads – With the use of a minimum of 12,000tpa of reclaimed aggregates recovered by the proposed Reconomy facility (sourced from street sweepings and non-destructive digging in Sydney, within an average haulage distance of 25 km from the new Devon Street site) a similar volume of virgin aggregates doesn't need to be trucked to the site from current suppliers approximately 100km from the site (outside the Sydney basin). Workings: 1,200,000 t km (12,000tpa of virgin aggregates x 100 km) - 300,000tpa (12,000tpa of recovered aggregates in street sweepings/NDD x 25 km) = 900,000 t km.

- Constructing a bitumen emulsion products plant in Sydney will significantly reduce heavy vehicle exhaust emissions by:

  - Reduction of up to 12,750,000 t km of bitumen emulsion that doesn't need to be transported from interstate. Currently Downer transport all their bitumen emulsion required by local clients (predominantly councils) from either Melbourne (~800 km) or Brisbane (~900 km) to Sydney. Workings: 15,000tpa of bitumen emulsion x 850 km (average distance assuming a 50/50 split transported from Melbourne and Brisbane) = 12,750,000 t km.

- Locating Stage 1 in one of the last remaining heavy industrial zoned industrial precincts in central Sydney, close to the markets that the facility services rather than outside or on the outskirts of the Sydney basin, significantly reduces heavy vehicle exhaust emissions by:

  - reducing the haulage distance for heavy vehicles delivering asphalt to construction projects in the central parts of Sydney by as much as 12,500,000 t km. Workings: 500,000tpa x 25 km (extra distance trucks would have to travel if asphalt plant based in outskirts of Sydney) = 12,500,000 t km.

- reducing the haulage distance for street sweeping and non-destructive digging trucks by as much as 1,000,000 t km. Workings: 40,000tpa x 25 km (extra distance trucks would have to travel if Reconomy plant based in outskirts of Sydney) = 1,000,000 t km.
- reducing the haulage distance for RAP trucks by as much as 6,250,000 t km. Workings: 250,000tpa x 25 km (extra distance trucks would have to travel if RAP processing facility based in outskirts of Sydney) = 6,250,000 t km.

It is therefore considered that Stage 1 is setting the benchmark in:

- how to deliver asphalt for the construction of roads in the most overall sustainable way by considering all reasonable and feasible ways to design Stage 1 to minimise exhaust emissions by minimising the number of mobile plant required and minimising the distance that mobile plant, heavy vehicles (trucks) and light vehicles need to travel on-site; and
- how to co-locate resource recovery facilities that recover raw materials used in asphalt production on the same site as the asphalt plant, to minimise the distance heavy vehicles need to travel off-site.

In addition to the design and operational controls to reduce vehicle emissions from the operation, Stage 1 has also adopted design and operational controls to minimise other particulate matter emissions. The following sections describe the main sources of emissions from the various components of Stage 1 and the proposed design and operational controls to minimise particulate matter emissions.

Unprocessed RAP stockpile area

RAP material is old asphalt pavements that have past their useful life cycle and has been extracted from road surfaces either by being milled up, or by being removed as slabs of asphalt by heavy machinery. RAP is then transported to Stage 1 by truck and stockpiled in the unprocessed RAP stockpile area.

RAP is bound material with an average of 4.5% bitumen and 2-3% moisture. RAP particle size distribution tests undertaken by Downer indicate that only a very small component (approx. 4-6%) of RAP is of an approximately 0.5 mm particle size. These particles can still become mobile, however due to their size are not able to be entrained in the atmosphere and they typically fallout soon after lift-off.

The frequency of wind speeds greater than 4 m/s (wind speed at which there is some potential for wind erosion on the stockpiles) at the site is approx. 6% of the time which is not significant.

Also, in the process of stockpiling unprocessed RAP, the smaller particles are likely to travel to the bottom of the stockpile through gaps made by the larger particles and settle on the bottom of the pile. As wind hits the stockpile only the larger particles would be subject to the wind and unlikely to be lifted-off from the surface.

Therefore, wind erosion from the unprocessed RAP stockpiles is not a significant source of dust, providing further justification from an air quality perspective for why these stockpiles don't need to be enclosed/covered.

Regardless, the RAP stockpile area will be fitted with a dust suppression system in the form of water sprinklers that will be permanently fitted to structures surrounding this area. These can be used if there is ever any visible dust in the unprocessed RAP stockpile area. This sprinkler system, combined with the bound material properties and minimal fines fraction of RAP, will minimise the potential for fugitive dust emissions from the unprocessed RAP stockpiles.

Housing the RAP stockpile area within a large industrial warehouse/shed is unreasonable and unfeasible. There would be significant risk of plant and trucks hitting or damaging the warehouse walls or support piers/posts whilst tipping, loading and navigating in an enclosed space, resulting in possible building collapse if damaged. A single span structure would therefore be required

spanning an area of nearly 2 hectares with a significant height of approx. 18-20m. Construction of such a large structure is unviable and unnecessary. The management of RAP stockpiles in a shed due the tipping height of trucks and the reach height of heavy plant and equipment creates significant safety risks.

It must be noted that the site development plan included in the EIS proposed a gravel hard stand base for the RAP stockpile area. The revised site development plan includes a sealed asphaltic concrete surface in the RAP stockpile area and RAP stockpiles will be restricted to the western and eastern sides of the RAP stockpile area reserving a roadway through the middle of the RAP stockpile area for RAP delivery trucks to enter and exist this area. This roadway will be swept regularly along with the rest of the sites internal roadways to keep them free from debris, minimising dust emissions from heavy vehicles travelling on the internal roads and preventing the tracking of material onto local roads.

RAP processing facility

The RAP process facility is located within the confines of an industrial shed 12 m in height, 76 m in length by 30 m wide (Figure 6.19). The southern, western and northern faces are fully clad and enclosed with access for maintenance being through roller doors. The eastern side of the shed is partially open to 7 m above the ground to allow front-end loader access to load unprocessed RAP into the receiving hopper/feeder and to transfer processed RAP from the processed RAP storage bunkers/bays to the adjacent asphalt plant RAP feeders.

This regular access to several finish product bays on a constant basis is required as part of the integrated and sustainable process of operations whilst also managing production to ensure quality and stockpile management.

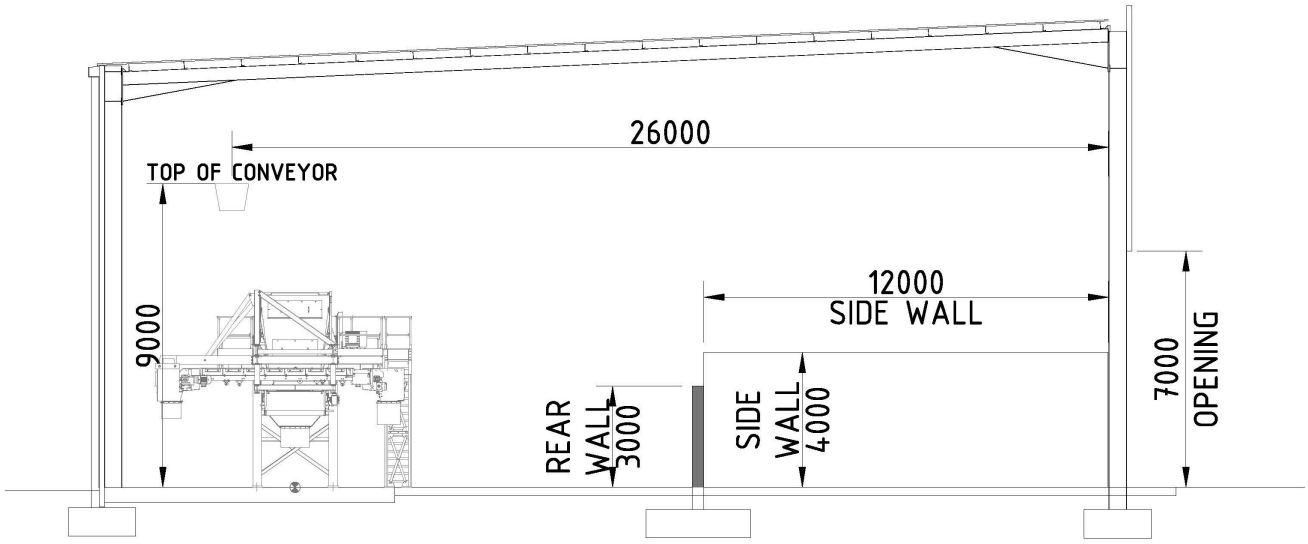


Figure 6.19a: Reclaimed asphalt pavement processing facility cross-section

EQUIPMENT LIST	
ITEM	DESCRIPTION
1	SERIES 46 48" x 70' STATIONARY CONVEYOR
2	5142LP LOW PROFILE SCREEN
3	PIONEER 4250 SINGLE ROTOR HORIZONTAL SHAFT IMPACTOR WITH STATIONARY SUPPORT STRUCTURE
4	SERIES 46 48" x 132' STATIONARY CONVEYOR
5	6203-32LP+5 LOW PROFILE SCREEN WITH STATIONARY SUPPORT STRUCTURE
6	SERIES 43 30" x 160' STATIONARY CONVEYOR
7	SERIES 43 30" x 36' REVERSING STYLE STATIONARY CONVEYOR
8	SERIES 43 30" x 110' STATIONARY CONVEYOR
9	SERIES 11 30" x 70' PORTABLE STACKING CONVEYOR
10	SERIES 43 30" x 28' STATIONARY CONVEYOR
11	SERIES 11 30" X 50' PORTABLE STACKING CONVEYOR
12	SERIES 11 30" x 70' STATIONARY CONVEYOR

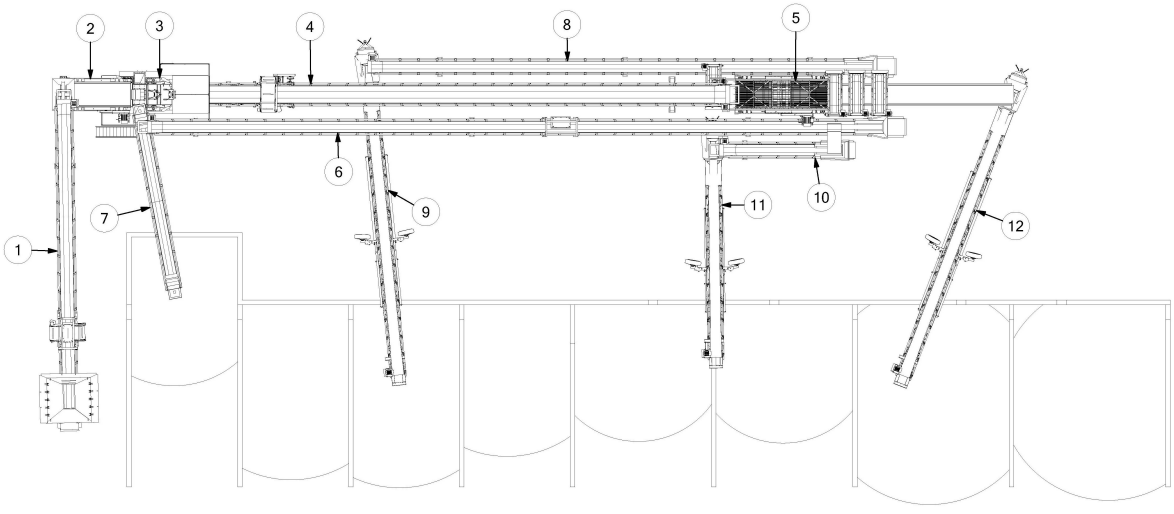


Figure 6.19b: Reclaimed asphalt pavement processing facility plan view

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Furthermore, the granulating and separating/screening process is positioned against the clad western wall of the RAP processing shed, as far (25 m) from the partly open eastern side of the RAP processing shed as possible. The granulating process involves a horizontal impactor, which is a rotating rotor with hard wearing impact blades, fully enclosed inside a housing that contains hard wearing impact curtains. The unprocessed RAP material enters the fully enclosed granulator whereby the rotor impacts the RAP material and throws it forward into the impact curtains, thus separating the bound material.

In this RAP processing technique, the rotor speed is normally run a lot slower than in traditional hard rock quarrying processes. The key intention with RAP processing is to only separate the conglomerates of asphalt, and not to break the original source materials (e.g. hard rock) apart from where they are bound together with bitumen (the binder). If the original source aggregates were to be fractured like in hard rock crushing plants, then virgin faces of aggregate would be exposed, which would not be coated in bitumen, resulting in the overall average bitumen content of RAP being reduced and the benefit of using RAP also being reduced.

Running the rotor at a lower speed and by not fractionating the source aggregates reduces any additional fines and dust being generated. An additional reason for running the horizontal impactor at a slower speed is to reduce heat generation from frictional resistance, as generating too much heat can cause the bitumen within the material to become tacky or sticky causing issues with screening the material and maintenance of the RAP processing plant.

The processed finish RAP product is then transferred to the finished product bunkers along the eastern side of the RAP processing shed by radial transfer conveyors. The concrete bunkers will be approximately 3-4 m in height and 12 m deep allowing sufficient space (depth) for the processed RAP to be fully contained within the perimeter of the shed. The radial transfer conveyors are fully enclosed (as described further below and shown in Figure 6.20). Just prior to release from the transfer conveyor into the finish product bunkers, a spray mist is applied to the newly crushed RAP (as shown in Figure 6.21). This process eliminates any risk of dust/particulate emissions when the RAP drops from the end of the transfer conveyor into the finish product bays and would add moisture to the stockpiled material.

Whilst the processing plant will be contained within the confines of the shed structure, all of the conveyors will also have roll top type belt covers to form two functions:

1. Guarding - preventing persons from becoming entangled in plant and equipment.
2. Dust or particulate mitigation - covers will prevent any cross-wind disturbance that may occur during strong easterly winds that could cause any finer fractions of the processed RAP to become airborne, even though unlikely (see earlier discussion on limited dispersion distance of finest RAP fractions).

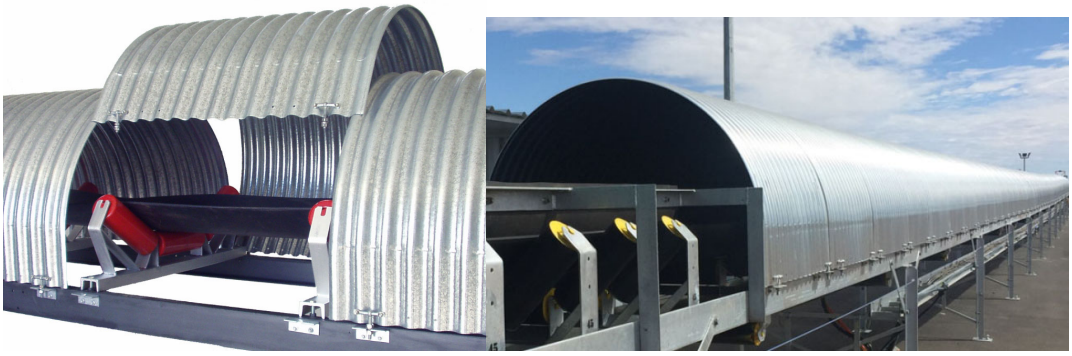


Figure 6.20 Examples of conveyor roll top covers



Figure 6.21 Example of micro sprays at conveyor discharge

The newly processed RAP material (temporarily stored in the concrete product bunkers) is now ready to be loaded by front-end loader into the asphalt plants' RAP cold feeders for incorporation into asphalt production. This RAP material is still bound in bitumen (unlike crushed hard rock quarry materials such as aggregates, manufactured sand or crusher dust), contains a certain percentage of moisture and is unlikely to emit dust.

Asphalt plant

The asphalt plant has a number of inherent design elements (some of which have been mentioned previously) that minimise emissions including:

- A 40 m high dryer stack to disperse air emissions generated from the asphalt mixing and drying. The air emissions are passed through a dust filter prior to discharge in the stack.
- A partially enclosed asphalt loadout area equipped with a bitumen vapour evacuation system to capture any fugitive emissions associated with the loadout process (refer to odour response above for further discussion on the proposed asphalt plant bitumen vapour evacuation system).
- An encapsulated skip for reducing air emissions during mixing prior to the loadout phase.
- All virgin aggregates (stone and sand) used in the manufacture of asphalt are tipped into an underground hopper where the materials are transferred to silos (by covered belt feeders) and then transferred to the asphalt plant (by covered belt feeders). At many conventional asphalt plant operations, aggregates, sand and crusher dust are tipped into open storage bays from where they are loaded by front-end loader and transferred to and tipped into the asphalt plant cold feeders. The activity of tipping aggregates from trucks into open storage bunkers and handling this material with the front-end loader can generate dust, which is eliminated at the Sustainable Road Resource Centre by incorporation of the underground receival hopper, covered conveyor system and storage of all types of aggregates in silos.

Bitumen emulsion plant

The bitumen storage and emulsion plant has a number of inherent design elements (some of which have been mentioned previously) that minimise emissions including:

- Bitumen is stored in individual storage silos and pumped to the asphalt plant in a closed system when required. Feedstock bitumen is supplied to the storage silos from tankers via a suction process with excess air within the storage silos vented from a breather pipe at the top and passed through a carbon filter prior to discharge to air.
- Ingredients for the bitumen emulsion are pumped into sealed emulsion tanks and stored at a lower temperature which minimises air emissions.

The AQIA discusses mitigation and management measures, however limited detail has been provided regarding how these will be implemented. These include:

- **Exposed areas and stockpiles being covered and dampened with water as far as practicable;**
- **Dampen material when excessively dusty during handling; and**
- **A sweeper unit to be regularly deployed to the operational site to sweep/clean internal roads periodically to prevent any tracking of debris.**

The Applicant must provide further detailed information regarding the mitigation measures including the measures listed above. The Applicant must provide detailed information regarding how fugitive particulate emissions will be managed at each of the proposed facilities for the operation of the Road Resource Centre.

The above sections thoroughly describe the specific air quality controls inherent in the design of the proposed Stage 1 and in the concept of co-locating asphalt production with a bitumen emulsion plant as well as resource recovery facilities that recover resources from road waste that are used as raw materials in asphalt production.

Table 6.15 summarises, elaborates on and adds to the other construction and operational management measures that were included in the EIS and AQIA that will be implemented at Stage 1 as well as during the construction of the earthworks and services associated with the rest of the proposed industrial estate.

As noted in the AQIA and EIS, a Construction and Operational Environment Management Plan (CEMP and OEMP) will be developed for the site. The CEMP and OEMP would include a specific chapter which outlines the measures to manage dust emissions at the site and include aspects such as key performance indicators, response mechanisms and complaints management. This would include the following and further specific details on how potential fugitive particulate emissions would be managed at the site beyond those already incorporated into the design and that are inherent in Stage 1.

As part of the measures to manage dust emissions at the site, training would be provided to on-site personnel to identify visible dust generation when handling material during construction and operation. The identification of visible dust will require the application of water to dampen the material or will require activities to be stopped or modified, to prevent or at least minimise visible dust.

Table 6.15 Construction and operational management measures

Source	Management measures
Construction	Weather forecast to be checked prior to undertaking material handling or processing and appropriate management measures implemented prior to adverse weather to minimise dust e.g. dampening exposed surfaces and haul roads, dampening or covering temporary stockpile with high fines fractions. If adverse weather conditions occur during construction, activities are to be assessed and modified as required. Cease activity where reasonable levels of dust cannot be maintained using available means.
	Engines of on-site vehicles and plant to be switched off when not in use.
	Vehicles and plant are to be fitted with pollution reduction devices where practicable.

Source	Management measures
	Vehicles are to be maintained and serviced according to manufacturer's specifications.
	Visual monitoring of activities is to be undertaken to identify dust generation.
	The extent of exposed surfaces and stockpiles is to be kept to a minimum.
	Exposed areas and stockpiles are either to be covered or are to be dampened with water as far as is practicable if dust emissions are visible, or there is potential for dust emissions outside operating hours. Stockpiles of material that are going to remain in place for an extended period of time and have the potential to generate dust are to either be covered or vegetated.
	Dampen material when excessively dusty during handling.
	Reduce drop heights from loading and handling equipment where practical.
	Vehicle traffic is to be restricted to designated routes.
	Co-ordinate the delivery schedule to avoid a queue of incoming or outgoing trucks that will be idling for extended periods of time.
	Speed limits are to be enforced.
	Vehicle loads are to be covered when travelling off-site.
Asphalt plant (operations)	Ensure all emission controls built into the design of the asphalt plant (e.g. the stack exhaust controls and the bitumen vapour evacuation system at the loadout area) are being maintained to operate as per manufacturers specifications.
	Clean up any aggregates that spill onto the road surface at the underground aggregate loading hopper (immediately after the spill) to prevent them being tracked onto the internal and external roads.
RAP stockpile and processing facility (operations)	The unprocessed RAP material must be dampened using the proposed sprinkler system when visible dust is evident from the stockpiles or during handling of the RAP material.
	The unprocessed RAP stockpiles must be restricted to the designated stockpile areas and not be allowed to encroach onto the truck access road through the centre of the stockpile area. This central unprocessed RAP stockpile area access road must be swept on a regular basis to remove spilt RAP material.
	The volume of unprocessed RAP must be regularly monitored and receival of unprocessed RAP stopped, when the stockpile area reaches capacity, to prevent RAP being stockpiled outside the designated stockpile area.
	Maintenance access roller doors on the RAP processing shed must remain closed at all times during RAP processing.
	All dust controls built into the design of the RAP processing facility (e.g. roll top type belt covers on conveyors and spray misters at discharge points of the radial transfer conveyors) must be maintained to operate as per manufacturers specifications.
	The volume of processed RAP in the finished product bunkers must be regularly monitored and processing stopped, when the bunkers reach capacity, to prevent RAP spilling out of the bunkers and RAP processing shed.
Bitumen emulsion plant (operations)	Ensure all emission controls built into the design of the bitumen plant (e.g. the carbon filter on bitumen storage tanks) are being maintained to operate as per manufacturers specifications.
Reconomy facility (operations)	Organic material recovered from road sweepings in the Reconomy plant must be removed from site on a regular basis to reduce level of decomposition and associated odour.
General site (operations)	Weather forecast to be checked daily and appropriate management measures implemented prior to adverse weather to minimise particulate emissions from the site. If adverse weather conditions occur during operations, activities are to be assessed and modified as required. Cease activity where reasonable levels of dust cannot be maintained using available means.
	Engines of on-site vehicles and plant to be switched off when not in use.
	Vehicles and plant are to be fitted with pollution reduction devices where practicable.
	Vehicles are to be maintained and serviced according to manufacturer's specifications.
	Visual monitoring of activities is to be undertaken to identify dust generation.

Source	Management measures
	Maintain an odour complaint logbook and in the event of a complaint conduct an immediate investigation of any odour sources, together with appropriate actions to eliminate any identified excessive odour.
	Reduce drop heights from loading and handling equipment where practical.
	Spills on trafficked areas to be cleaned immediately.
	Driveways and hardstand areas to be swept/cleaned regularly as required. A road sweeper will be regularly deployed to the operational site to sweep/clean internal roads periodically to prevent any tracking of fine debris.
	Co-ordinate the delivery schedule to avoid a queue of incoming or outgoing trucks that will be idling for extended periods of time.
	Speed limits are to be enforced.
	Vehicle loads are to be covered when travelling off-site.

Demonstrating compliance with the Protection of the Environment Operations Clean Air Regulation

The proposed Road Resource Centre operations include a proposed asphalt plant. A point source discharge is proposed for the asphalt production processes. All point sources must comply with the relevant prescribed concentrations contained in the Protection of the Environment Operations Clean Air Regulation (Clean Air Regulation) as a minimum.

As per section 3.5 of the Approved Methods for Modelling and Assessment of Air Pollutants in NSW, emission estimates for proposed projects must be used to demonstrate compliance with the Clean Air Regulation can be achieved.

The AQIA does not estimate pollutant concentration discharges through the proposed point source and does not demonstrate compliance with the Clean Air Regulation.

The AQIA must be revised to demonstrate emissions from the proposed asphalt plant can comply with the Clean Air Regulation.

The point source at the project is associated with the asphalt plant stack exhaust. The in-stack concentrations for the plant were inadvertently not set out in the AQIA.

Table 6.16 presents the applicable standards of concentration for a non-scheduled activity as per the *Protection of the Environment Operations (Clean Air) Regulation 2010* (POEO) alongside the commensurate stack concentration for the stack source associated with the asphalt plant. The comparison shows that the source emissions comply with the applicable concentration standards.

Table 6.16 Comparison of applicable POEO standards of concentration with modelled in-stack concentrations (mg/m³)

Pollutant	Standard of concentration for non-schedule activity – Group C	Asphalt plant stack exhaust
Solid particles	100	7.3

Assessment of impacts at proposed industrial lots

The EPA notes that the AQIA has not considered the proposed lots of the industrial estate as potential sensitive receivers for the operation of the Road Resource Centre. The Applicant must revise the AQIA to assess the potential impacts from the operation of the Road Resource Centre at neighbouring industrial receptors.

As noted in the AQIA, places where people work such as at industrial facilities, would only have healthy adults present who are unlikely to reside for more than 24-hours (based on typical working hours) and would also not be present for an annual period (unlike a residence).

Workplace air quality standards are set at suitable levels to manage the health of adult workers present at industrial facilities and the NSW EPA impact assessment criteria are not applicable.

Nevertheless, the predicted air quality levels associated with the project at the proposed industrial lots can be inferred from the isopleth diagrams for Scenario 1 in the AQIA.

6.8.8 Water

Separation of 'clean', 'dirty' and 'contaminated' water during operation

It is unclear if during operation of the proposed Road Resource Centre, measures will be taken to ensure that clean run-off is diverted around the dirty or contaminated areas of the site. Also, storage areas with the potential to generate pollutants, such as the organic bunkers, are not covered to prevent the generation of contaminated run off.

It appears from the description in the EIS that all water that runs onto the site (except for roof water) will be directed to the GPT and bioretention basin. This includes all clean water and potentially contaminated water from the organic bunkers which have 'stand-alone' stormwater pits. The 'standalone' stormwater pits are not pumped to a different location or treated separately to other run-off.

The Applicant must clearly define the clean, dirty, and contaminated catchments on the site and outline how they will each be treated appropriately. All storage areas with the potential to generate contaminated run-off must be covered.

During construction, a detailed erosion and sediment control plan will be in place completed in accordance with the Landcom Managing Urban Stormwater: Soils and Construction "The Blue Book". Clean and dirty water diversion drains, sediment basins and other suitable erosion control measures are nominated in the submitted report and drawings.

During operations, clean water from upstream catchments will be diverted around the Downer facility via proposed trunk drainage systems. The internal site drainage system comprises a system of bunded areas (separated from the stormwater drainage network), and treatment measures to ensure acceptable water quality discharges from the site.

Refer to sections 2 and 3 and appendices A and C of Appendix C.

Water balance does not include process water use

The water balance presented in the Surface Water Impact Assessment (SWIA) is limited to the harvesting and re-use of stormwater, and the use of water in toilet facilities. The use of water in materials processing such as the RAP facility, asphalt manufacturing, bitumen products and Reconomy facility is not included in the water demand. The discharge of water as a component of trade waste is also not identified.

The Applicant must revise the water balance to include all water end uses during operation of the Road Resource Centre and identify any potential for additional re-use.

Refer to updated water balance assessment in Section 4.3 of Appendix C.

Discharges are not clearly defined

During construction, the EIS advises that clean water will be pumped from a Type D sediment basin to Duck River whereas the SWIA states that most water from this sediment

basin will be used for dust suppression on site. No details are provided about the volume or frequency of discharges from this point and only general information is provided about water quality related to suspended solids concentrations that can be expected from a flocculated Type D sediment.

During operation of the Road Resource Centre, the EIS identifies a discharge point from the bioretention basin to Duck River. No details are provided about the volume, frequency or water quality of discharges from this point.

If controlled discharges are to occur an assessment of the potential impact of proposed treated stormwater discharges on the environmental values of the receiving waterway during construction and operation is required.

The Applicant must demonstrate that all options to avoid or minimise a discharge have been considered and where practical and reasonable, implemented.

If controlled discharges are required, the Applicant must provide a discharge impact assessment. This assessment should include details of the measures that have been considered and those proposed to be implemented to minimise discharges of pollutants.

For each proposed discharge point, this assessment must:

- **Estimate the expected frequency and volume of discharges;**
- **Characterise the expected quality of the treated discharges in terms of the typical and maximum concentrations of all pollutants likely to be present at non-trivial levels (this should be based on a risk assessment of the activities and materials on site and the expected performance of the proposed treatment measures);**
- **Assess the potential impact of the proposed discharge on the environmental values of the receiving waterway consistent with the national Water Quality Guidelines (ANZG, 2018; including comparison of the predicted water quality to the relevant guideline values for slightly to moderately disturbed ecosystems); and**
- **Where relevant, identify appropriate measures to mitigate any identified impacts.**

Consistent with the principles of the NSW Water Quality Objectives, the discharge impact assessment must demonstrate that the Proposal will maintain the environmental values of the receiving waterway where they are currently being achieved or contribute to restoring the environmental values where they are not currently being achieved.

During construction, discharge from the site will be required following flocculation of sediment basins within 5 days of forecast rainfall events, when dust suppression is not required, or when prolonged rainfall events occur that are greater than the storage capacity required by the Blue Book.

Generally the dust suppression requirements would require the majority of storage within sediment basins, when prolonged rainfall does not occur. Discharge rates will ultimately depend on the environmental conditions at the time of construction, however would generally be limited to time around rainfall events. When basins are emptied, the flow rate would be expected to be less than 20 L/s based on typically used pump and hose.

Water quality discharge during construction shall be in accordance with the requirements of the Blue Book as set out in Appendix C of Appendix C.

The quality of discharge from the site is to satisfy the following Water Quality Objectives (WQOs) per Landcom Blue Book requirements:

- Water pH released from a controlled sediment basin outflow shall be within the range 6.5 to 8.5.

- Suspended Solids released from controlled sediment basin outflows will be no greater than 50mg/L, 75 NTU's (Nephelometric Turbidity Units) or other turbidity measurement based on confirmed laboratory correlation. Any correlation should be confirmed through laboratory assessment.
- Oils and Grease – no visible films or odour.
- Litter – no visible litter washed or blown from the site.

The effectiveness of sediment and erosion control measures will be confirmed through ongoing site inspections by the construction contractor. Adjustments as required during the construction period will be made based on confirmed site conditions and effectiveness of the implemented measures.

Refer to Section 6.2.2 for details of the volume and frequency of discharge during operational phase. Refer to Section 2.4 of Appendix C for water quality of discharge during operational phase.

- **Estimate the expected frequency and volume of discharges**
  - Refer to Section 6.2.2.
- **Characterise the expected quality of the treated discharges in terms of the typical and maximum concentrations of all pollutants likely to be present at non-trivial levels (this should be based on a risk assessment of the activities and materials on site and the expected performance of the proposed treatment measures);**
  - Refer to Section 2.4 of Appendix C.
- **Assess the potential impact of the proposed discharge on the environmental values of the receiving waterway consistent with the national Water Quality Guidelines (ANZG, 2018; including comparison of the predicted water quality to the relevant guideline values for slightly to moderately disturbed ecosystems); and**
  - Refer to Section 2.4 of Appendix C. The impact of the proposed discharge on the environmental values of the receiving waterway have been based on the City of Parramatta Development Control Plan (DCP) requirements using MUSIC modelling. This sets out the requirements for removal of suspended solids, gross pollutants, phosphorous and nitrogen. Additional stressors per the Water Quality Guidelines for slightly to moderately disturbed ecosystems such as heavy metals and hydrocarbons cannot be modelled in MUSIC. Refer to Section 2.4.9 and Section 2.4.10 of Appendix C for performance of the proposed water quality treatment measures on the receiving waters.
- **Where relevant, identify appropriate measures to mitigate any identified impacts.**
  - Refer to Section 2.4 of Appendix C. The stormwater design includes appropriate measures to mitigate the risk of identified pollutants impacting on the receiving waters. The measures include sump pits, first flush pits, pit inserts, gross pollutant traps and bio-retention basin. In addition to the above, an automated cut-off valve is also provided prior to discharge of waters from the site.

Recycled water use

The EIS advises that an external recycled water service is available to the site. The EPA does not believe it is appropriate for externally supplied recycled effluent to be utilised at the Road Resource Centre due to the potential for contamination and would be unlikely to permit the use of the service under a licence.

The Aquanet Rosehill Recycled Water Facility is part of a Sydney Water recycled water system. The initial source of the recycled water could be from users such as bathrooms, laundries,

kitchens and businesses. The recycled water however is cleaned, treated and purified to a standard that is suitable and safe for its intended industrial and commercial use.

The EIS notes that Downer is exploring potential opportunities for use of recycled water from this source. At this stage Downer has not identified any suitable uses for this recycled water as process water. Any future uses of this water will be as process water and not for uses such as irrigation of vegetation or dust suppression, where the water has the potential to pollute the stormwater system.

6.8.9 Licensed area

A licence will be required for the operation of facilities proposed for the Road Resource Centre. The Proposal should identify which area(s) of the Road Resource Centre the Applicant proposes to be included within the licensed area.

The Applicant should be aware that the EPA anticipates that the majority of the Road Resource Centre will be required to be included within the licensed area and it is likely that due to licensing requirements, the licensed area may be required to cover the entire area of proposed lot 6.

Downer proposes that the EPL described in Section 6.8.11 applies to the parts of Lot 6 shown on Figure 5.1 which contain the RAP processing and Reconomy components (resource recovery, waste storage and waste processing) and the bitumen products plant (petrochemical production).

Downer proposes that the EPL does not apply to the section of the lot comprising the asphalt plant and areas north of this as:

- Up to 550,000 tpa of material to be handled on the lot will be asphalt and 15,000 tpa bitumen products, which will not be waste described in Schedule 1 of the NSW *Protection of the Environment Operations Act 1997* (POEO Act). It is not practical or necessary to have to weigh every asphalt truck (or trucks delivering raw materials for asphalt production) or trucks associated with the bitumen products plant on entering and exiting the site.
- An EPL will be an encumbrance on the unoccupied area shown in the north of the Lot on Figure 5.1.

6.8.10 Weighbridge

The EPA understands the Proposal involves the installation of three weighbridges at the Road Resource Centre. It is unclear as to why three weighbridges are proposed and what the purpose is for each weighbridge.

The Traffic Impact Assessment prepared by PTC Consultants and dated 17 September 2020 (the Traffic Assessment), states that only the RAP vehicles are required to be weighed. The EIS states that only RAP trucks will require the use of the entry weighbridge and there will be three entry lanes for vehicles at the entrance to the Road Resource Centre from Devon Street so vehicles can bypass the weighbridge.

Under section 88 of the POEO Act, licensed waste facilities are subject to the waste levy and the associated requirements including weighbridge requirements. One of the requirements is for all vehicles, whether they are carrying waste or not, are to be weighed via weighbridge both when they enter and exit the licensed area. As such, the Traffic Assessment and the EIS are incorrect and the location and use of weighbridges, and traffic management and flows will need to be reviewed by the Applicant to ensure compliance with the weighbridge requirements.

As stated above, given licensing requirements for the proposed facilities at the Road Resource Centre, the EPA anticipates that it would be difficult for the licensed area of the Road Resource Centre to be limited to a specific area and may be required to encompass the entire area of proposed lot 6. The EPA recommends that the Applicant consider this when reviewing traffic management and flows, and location and use of weighbridges at the Road Resource Centre.

As shown on Figure 5.1, three weighbridges are proposed on Lot 6.

The weighbridge at the site entrance or the weighbridge to the south of the Reconomy facility, will weigh inbound trucks carrying RAP and material bound for the Reconomy facility. After being weighed, these vehicles will travel south along the one-way road to the east of the lot and offload at either the unprocessed RAP stockpile area or the Reconomy facility.

The empty Reconomy trucks and RAP trucks will then be weighed at the weighbridge to the west of the RAP processing facility. The additional weighbridges at the south of the lot will enable Downer to efficiently direct trucks between weighbridges to prevent internal queueing and delays and minimise unnecessary additional travel distance on site.

This arrangement, in combination with the multiple entry and exit lanes, will ensure all vehicles carrying waste can be weighed whilst allowing other vehicles which do not need to be weighed (eg delivery/asphalt trucks) to enter the site without needing to queue on public roads.

As described in Section 6.8.9, up to 550,000 tpa of material to be handled on the lot will be asphalt (or trucks delivering raw materials for asphalt production) and 15,000 tpa will be bitumen products, which will not be waste described in Schedule 1 of the POEO Act. Downer does not propose to weigh all these materials on entering and exiting the site unless where required for operational purposes, as weighing it will cause significant delays and may result in queueing on public roads.

6.8.11 Scheduled activities

The SEARs required the Applicant to identify and describe details of all scheduled and ancillary activities which will be conducted as part of the Proposal. The Applicant must ensure all scheduled and ancillary activities have been identified and listed within the EIS, with particular regard to the construction and operation of the Road Resource Centre.

Section 5.3.8 of the EIS stated Stage 1 will satisfy clauses 34 and 31A of the NSW *Protection of the Environment Operations Act 1997* (POEO Act) for resource recovery and petroleum products and fuel production, and that an EPL will be sought accordingly.

Downer has further considered the activities proposed on Lot 6 and advises there will not be petroleum products and fuel production at the site. The manufacture of bitumen products, ie an emulsion made from blending imported bitumen with other additives and water, does not meet the definition of petroleum product production.

Downer advises it will be carrying out the following scheduled activities, in addition to resource recovery, at Lot 6 and will apply for an EPL accordingly.

- Clause 8, Schedule 1 – chemical production: the proposed emulsion plant will involve production of petrochemical products, and according to clause 8(2) production of more than 2,000 tonnes per year (tpy) of petrochemicals is a scheduled activity. Downer will produce more than 2,000 tpy of bitumen products.
- Clause 41, Schedule 1 – waste processing (non-thermal treatment): the RAP and Reconomy facilities will have more than 1,000 t of waste on site at any time and will process more than 6,000 tpy of waste. Therefore, the criteria in column 2 of clause 41(4) will be exceeded.

- Clause 42, Schedule 1 – waste storage: the RAP and Reconomy facilities will store more than 1,000 t of waste at any time and receive more than 6,000 tpy of waste from offsite. Therefore, the criteria in clauses 42(3)(c) and (d) will be exceeded.

6.8.12 Owner/occupier

The EPA understands that Viva Energy Pty Limited (Viva) is the current owner of the Premises. However, the EPA understands that Viva is not proposed to be the owner/occupier of proposed lot 6 during construction and operation of the Road Resource Centre which will require a licence.

As advised in the SEARs, the EPA is only able to issue a licence to the lawful occupier. The EPA will require evidence that the occupier is the lawful occupier. At this stage, no evidence has been provided regarding this.

Downer, Viva and VEP have exchanged the contract of sale, however the transfer of Lot 6 (Stage 1) from Viva to Downer will only be completed after approval of this SSD application and completion of the subdivision process. The contract of sale allows for Downer to construct and operate the Sustainable Road Resource Centre on Lot 6 under a licence agreement until the transfer of ownership has been completed. Downer will provide this evidence to the EPA that they are the lawful occupier of Lot 6, prior to the EPA granting a licence.

6.8.13 Wheelwash

As advised within the SEARs, best practice material handling facilities utilise a wheel wash to reduce the risk of contaminants being tracked out onto public roads and into local stormwater drains and networks. The EPA notes the Proposal does not include the installation of a wheelwash for the proposed Road Resource Centre.

The EIS only briefly references the lack of wheelwash and states that a wheelwash is not necessary as on-site roads will be regularly maintained with a road sweeper. No further explanation or justification is provided regarding this and no other measures are proposed.

The EPA does not agree with the assertion that a wheelwash is not necessary and does not believe that a road sweeper will ensure that no sediment, particulates, or waste are tracked onto public roads or into local stormwater drains and networks. Particularly given the number of facilities at the site, the extent of the proposed external activities, and the proposed unsealed area of hardstand at the site.

The justification for the lack of wheelwash is inadequate and the EPA expects the Proposal to be amended to include the installation of a wheelwash or the Applicant must provide sufficient justification for not installing a wheelwash including detailed information as to how other proposed mitigation measures will achieve similar environmental outcomes as the installation of a wheelwash at the site.

As described in Section 6.8.7 and shown in Appendix B2, Lot 6 is now proposed to be fully sealed, which will prevent potential generation of sediments from unsealed areas.

As described in Section 6.8.7, the site development plan included in the EIS proposed a gravel hard stand base for the RAP stockpile area. The revised site development plan includes a sealed asphaltic concrete surface in the RAP stockpile area and RAP stockpiles will be restricted to the western and eastern sides of the RAP stockpile area reserving a roadway through the middle of the RAP stockpile area for RAP delivery trucks to enter and exist this area. This roadway will be swept regularly along with the rest of the sites internal roadways to keep them free from debris,

minimising dust emissions from heavy vehicles travelling on the internal roads and preventing the tracking of material onto local roads.

All other materials to be handled on Lot 6 will be unloaded into bins or bunkers or loaded directly onto vehicles and, therefore, there is no opportunity for this material to contact the ground and generate sediments. The exception will be accidental spills, which will be cleaned up at the time of the spill.

Notwithstanding the above, a street sweeper will be operated on roads and exposed paved areas of Lot 6.

Given the above, Downer does not propose to install a wheelwash as part of Stage 1. However, should Downer observe that sediments are being tracked from Lot 6 onto public roads it will consider installation of a wheelwash on the perimeter road between the RAP facility weighbridge (along the western perimeter road) and site exit.

6.8.14 Excavator

The EIS states that the RAP and Reconomy facilities will share an excavator. This presents a high risk of contamination due to the different waste types handled and processed at each facility. A shared excavator could result in contamination at either of the facilities. The Applicant must have an excavator for separate use at each waste facility or provide detailed information regarding how the shared excavator will be managed to ensure that no contamination occurs.

Section 3.2.6 of the EIS states that an excavator will be shared between the RAP and Reconomy facilities. This was an error and will not occur. The Reconomy facility will have a dedicated excavator and front-end loader, which will not be used at other areas of Lot 6.

The RAP facility will have:

- two front-end loaders, one to load raw RAP into the asphalt plant cold feeders and one to manage stockpiles, load raw RAP into processing plant and load finished RAP into trucks.
- one 30-45 t excavator to manage RAP stockpiles.

None of the RAP facility excavators or front-end loaders will be used by the Reconomy facility.

6.8.15 Dangerous Goods and Chemical Transport, Storage and Handling

The EIS states that refuelling, fuel decanting and vehicle maintenance work will occur in a designated area within the Road Resource Centre. It is unclear if this area is undercover and bunded to minimise the potential for leakage or migration of pollutants. The EPA requires the Applicant to provide further information about this area and whether or not it is undercover or bunded. The EPA expects all fuel areas to be bunded and if this is not proposed the Applicant must detail how potential spills in this area will be managed in order to prevent pollution.

The Applicant should be aware that due to the proposed storage of dangerous goods at the Road Resource Centre, prior to commencement of any operations, the EPA would require a report to be submitted certifying that the final layout and design of the Road Resource Centre as constructed meets the specifications and requirements outlined in:

- **AS 1940 The storage and handling of flammable and combustible liquids; and**
- **AS 3780 The storage and handling of corrosive substances.**

As described earlier, refuelling will only take place at the designated refuelling bay next to the self-bunded diesel tank. The refuelling bay is designed to relevant standards to capture any spills

and capture and treat any rainfall as described in Section 2.2.2 of Appendix C. Any mobile plant maintenance and repairs will be conducted offsite.

6.8.16 Standards for Managing Construction & Demolition Waste

It is a requirement under part 8A of the Protection of the Environment Operations (Waste) Regulation 2014 for waste facilities which receive construction and demolition waste to comply with 'the Standards for managing construction waste in NSW' (the Standards). The Standards were developed and implemented to ensure that waste facilities handling construction waste implement appropriate processes and procedures to minimise the risk of harm to human health and the environment posed by asbestos and other contaminants found in the waste.

The SEARs advised that the EIS should demonstrate how compliance with the Standards will be achieved. The EIS does not demonstrate how operations at the Road Resource Centre will ensure compliance and only states that the Standards are noted and that the Operational Environmental Management Plan will include measures to ensure compliance. This is insufficient and the Applicant must provide detailed information as to how compliance with the Standards will be achieved at the site in order to minimise the risk to human health and the environment including the tip and spread area and inspection checkpoints.

Section 18.3.2 of the EIS states:

> DA-ZH-ST086 Asbestos management and DA-ZH-ST087 Removal and disposal of asbestos will be implemented to minimise the potential for receiving/processing asbestos in RAP, including documentation of compliance records.

Section 18.3.3 of the EIS states:

> The following asbestos procedure is implemented under the Downer recovered aggregate and sand order 2019 and will continue for the project:
>
> As suppliers excavate, supplier personnel are present during the process and can closely monitor and inspect the mud as it is being blasted by high pressure air and water for visible contamination. Visible asbestos containing material (ACM) or hazardous contamination identified, will be disposed at licensed facility and not delivered to Downer.

Downers current Reconomy environmental management plan (can be provided to EPA if required) includes various procedures and controls to prevent asbestos and other contaminated/non-conforming waste from being delivered to their Reconomy facility as well as to identify, quarantine, manage and appropriately dispose contaminated/non-conforming waste if it was received at the facility. The current Reconomy environmental management plan will be amended as required to reflect the proposal and include any additional procedures/controls for dealing with contaminated/non-conforming waste.

The Reconomy environmental management plan also states:

> In the unlikely event trace microscopic fibres enter the facility, the segregation process will capture this in the sludge comprising of the inert soil fines component of the waste material (including silts, clays and asbestos fibres) which will be cleaned from the material and thickened through flocculants and coagulants. Moreover, the resource recovery plant is an entirely wet process, where trace microscopic fibres will be managed and not present a respirable risk.

RAP is sourced from roads and is not likely to be contaminated with contaminated/non-conforming wastes unless the road was constructed of contaminated material, which is unlikely given road products must conform to client technical specifications. Notwithstanding, Downers current RAP work instruction for their existing RAP operations (can be provided to EPA if required) includes various procedures and controls to prevent contaminated/non-conforming waste from being delivered to their RAP facility as well as to identify, quarantine, manage and appropriately dispose of non-conforming waste if it was received at the facility. The current RAP work instruction for Downer's existing RAP operations will be amended as required to reflect the proposal and include any additional procedures/controls for dealing with contaminated/non-conforming waste.

In general, the Sustainable Road Resource Centre will not accept or process any waste and materials that are contaminated/non-conforming. Downer will have strict inspection protocols for all waste received at the site, in particular RAP and all road maintenance wastes received at the Reconomy facility. These will include:

- Verification by the supplier of the waste (if not Downer), that it meets the relevant waste classification;
- Prior to tipping the waste at the site, the load is visually inspected;
- The load is then tipped at the relevant waste receival area and visually inspected again. When the waste is tipped, that load is kept separate from the other already tipped material so that it can be quarantined/reloaded into a truck and taken to an appropriate waste facility if it doesn't meet the required waste classification.

6.8.17 Fire Safety Guideline

Fire and Rescue NSW recently developed the 'Fire safety guideline – Fire safety in waste facilities' (the Fire Safety Guideline), dated 23 October 2019. The Fire Safety Guideline was developed as waste facilities are at greater risk of fire related incidents. Any fire involving a waste facility can cause a significant pollution incident. The Fire Safety Guideline is applicable to any waste facility within NSW involved in the storage, processing or resource recovery of combustible waste material.

The EPA stated in the SEARs that the EIS should demonstrate how the Proposal will ensure compliance with the Fire Safety Guideline. This has not been addressed at all within the EIS and no information has been provided regarding how the construction and operation of the Road Resource Centre will ensure compliance with the Fire Safety Guideline.

The Applicant must establish how the Proposal will meet relevant requirements within the Fire Safety Guideline in order to minimise the risk of fire at the facilities.

Downer notes that the only potentially combustible waste proposed to be stored, processed or recovered at the waste facilities on Lot 6 will be organic waste recovered from the Reconomy facility. This material will be the product of wet process, will not be stored onsite long enough to dry out and therefore will not be a flammable material. Further, less than 50 m^3 will be stored onsite at any one time.

Stage 1 has not been designed in detail yet, however, Downer will continue to consider the Fire Safety Guideline, which will be applied as required.

6.8.18 Western Area Remediation Project (SSD-9302)

The EPA understands that the Premises is located in the western area of the former Shell Clyde's oil refinery. The land occupied by former Shell Clyde's oil refinery is declared as significantly contaminated land under section 11 of the Contaminated Land Management

Act 1997 and is subject to a preliminary investigation order issued by the EPA. Furthermore, the western area of the former Shell Clyde refinery is being remediated under the Western Area Remediation Project (WARP) under SSD-9302 to make it suitable for future industrial/commercial use. Viva was the applicant for SSD-9302 and the EPA understands Viva is the current owner of the Premises.

The EPA notes that consent conditions B7, B8, B9, and B10 of the WARP under SSD-9302 state the following:

B7. Within 12 months of the completion of demobilisation, or as otherwise agreed with the Planning Secretary, the Site Auditor must submit a Site Audit Report and Section A, Site Audit Statement to the EPA, Council and the Planning Secretary. The reports must be prepared in accordance with relevant guidelines produced or approved under the CLM Act and must confirm:

a. **(a) the Remediation works approved under this consent have been completed in accordance with the remediation objectives listed in the Detailed RAP;**
b. **(b) the risks to human health and the environment have been addressed in accordance with the objectives of the Detailed RAP.**

B8. Prior to the finalisation of the Site Audit Statement and Site Audit Report, required by Condition B6, the Applicant must prepare a Long Term Environmental Management Plan (LTEMP) for the development, to the satisfaction of the Site Auditor and the Planning Secretary.

B9: The LTEMP must:

a. **be prepared in consultation with Council and the EPA;**
b. **identify where the LTEMP applies and who is responsible for implementing the LTEMP;**
c. **detail how the LTEMP will be implemented, including corrective actions and reporting requirements;**
d. **recommend any systems/controls to be implemented to minimise the potential for any material harm;**
e. **include a groundwater monitoring program to verify natural attenuation is occurring over time, consistent with the requirements of condition B21;**
f. **include biodiversity management measures for the Green and Golden Bell Frog, consistent with the Revised Plan of Management: Restoration of Green and Golden Bell Frog Habitat, Clyde Terminal, January 2019, or its latest version;**
g. **detail procedures for managing and monitoring any remaining contamination, including triggers that would indicate if further management or remediation is required;**
h. **detail procedures for managing and monitoring any remaining contamination that has potential for off-site migration so that it does not present an unacceptable risk to either the on-site or off-site environment;**
i. **include measures to be implemented if any parts of the remediated area are required to be physically disturbed;**
j. **describe any required planning controls for future development that may interact with any remaining contamination at depth;**
k. **incorporate a programme for ongoing monitoring and review to ensure that the LTEMP remains contemporary with relevant environmental standards;**
l. **include mechanisms to report results to Council and the EPA;**
m. **be written in plain language to be understood by all personnel involved in the maintenance activities on the site.**

B10. Upon completion of the Site Audit Statement and Site Audit Report, the Applicant must:

a. **implement the approved LTEMP;**
b. **provide evidence to the Planning Secretary that the LTEMP is listed on the relevant planning certificate for the land, issued under section 10.7 of the EP&A Act.**

The EPA is aware that Viva is proposing to undertake the remediation works for the WARP in three stages. The EIS states a detailed remedial action plan has been developed for the Stage 1 area of the development, however a detailed remediation scope has not yet been finalised for the Stage 2 area. The detailed remediation scope for Stage 2 will be presented in a subsequent detailed remedial action plan and a proposed scope of remediation is outlined in Table 8.6 of the EIS. The EPA notes that works related to Stage 3 have not been discussed in detail in the EIS. The EIS states the Stage 3 area is excluded from the Proposal.

The Proposal involves the subdivision of the Premises into eight lots to form the Central Sydney Industrial Estate which includes the Road Resource Centre on proposed lot 6. The EPA understands that it is possible, that following the subdivision, different entities will own each parcel of land. The EPA understands that Downer EDI Works Pty Ltd (Downer) intends to purchase lot 6 for the construction and operation of the Road Resource Centre.

The Applicant must clarify who will be responsible for SSD-9302 WARP consent conditions B7, B8, B9, and B10, including the proposed lot 6 which is proposed to be owned by Downer. The Applicant must advise how adherence to conditions B7, B8, B9, and B10 will be managed.

Viva Energy Pty Ltd is remediating the Western Area in a staged approach in accordance with the WARP SSD 9302. Stage 1 of remediation was confirmed between DPIE and Viva Energy on 4th June 2020.

Viva Energy is progressing remediation works on Stage 1 under the guidance of a NSW EPA accredited site auditor. Physical works are underway on Stage 1 and are expected to be fully completed in November 2020 with the NSW EPA accredited site auditor indicating that the site audit statement (with an accompanying LTEMP) will be issued in approximately mid December 2020.

Viva Energy has also been carrying out additional investigations on Stages 2 and 3.

It is therefore intended that Viva Energy will continue to carry out the staged remediation in Stages 1, 2 and 3 and to obtain site audit statements (with LTEMP's as required) in accordance with conditions B7, B8, B9 and B10. Condition B10 would run with the land but for the sake of clarity a condition of approval on the current SSD requiring the owner of land (from time to time) to comply with the terms of any LTEMP could be imposed.

6.8.19 Road Resource Centre Works

As stated above, the EPA understands that Downer intends to purchase lot 6 for the construction and operation of the Road Resource Centre. However, Downer is not the Applicant for the Proposal which incorporates the Road Resource Centre and is not the current owner of the Premises. The EIS proposes works to be conducted for the creation of the Central Sydney Industrial Estate which is inclusive of lot 6. The EIS also outlines works specific to the construction of the Road Resource Centre.

The EPA requires the Applicant to provide information regarding the agreement of the purchase of lot 6 with Downer and when this is proposed to occur.

It is not made clear in the EIS who is going to be responsible for which of the proposed works at lot 6. The EPA requires the Applicant to provide clarity regarding the responsibility for the works at proposed lot 6.

VE Property is the applicant for the State significant development application number SSD-10459. As outlined in the EIS:

- VE Property will be the person carrying out the subdivision and infrastructure works required to create the proposed new Central Sydney Industrial Estate. This includes all works required to provide a site audit statement from a NSW EPA accredited site auditor confirming that proposed Lot 6 is suitable for ongoing commercial/industrial use subject to a condition requiring compliance with an environmental management plan (Lot 6 site audit statement).
- Downer EDI Works Pty Ltd (Downer) will then construct and operate the proposed Sustainable Road Resource Centre including the asphalt plant, the reclaimed asphalt pavement facility, the bitumen products plant and the Reconomy facility.

As the EPA is aware, the site is currently part of the premises subject to environment protection licence 570 which applies to the Clyde Terminal (EPL 570). It is proposed that, once the Lot 6 site audit statement is obtained, a variation will be made to EPL 570 to remove Lot 6 from the premises of EPL 570.

Once this occurs, Downer will then separately apply for a new environment protection licence to authorise all scheduled development works proposed as part of its Sustainable Road Resource Centre.

The matter of legal ownership and occupation is discussed in Section 6.8.12.

6.9 Sydney Metro

6.9.1 Concurrence of Sydney Metro is not required

As this is a SSD development application, the provisions of clause 88 of the *State* Environmental Planning Policy (Infrastructure) 2007 (ISEPP) do not apply.

Section 4.13(2A) of the Environmental Planning and Assessment Act 1979 excludes concurrence or consultation requirements from applying to development applications for SSD, unless an environmental planning instrument requires concurrence or consultation to SSD. As clause 88 of the ISEPP does not require concurrence to be provided in the context of a development application for SSD, concurrence is not required for the DA.

An amendment to the ISEPP relating to the Interim Sydney Metro West Corridor has been the subject of public consultation under the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the consent authority has been notified of the ISEPP amendment.

The Explanation of Intended Effect (see attached) exhibited for public consultation states that the ISEPP would be modified to require Sydney Metro to review development applications in the newly identified corridor to seek their advice on whether an application will have an adverse effect on the viability of the Sydney Metro West project. In particular for works that involve the penetration of ground to a depth of at least 2m below ground level (existing) Sydney Metro will need to consider:

- **the practicability and cost of carrying out rail expansion projects on the land in the future, and**
- **the structural integrity or safety of, or ability to operate, such a project, and**
- **the land acquisition costs and the costs of construction, operation or maintenance of such a project.**

When this State Significant Development was lodged the ISEPP amendment for inclusion of the Interim Sydney Metro West Corridor had been exhibited and notified to the consent authority but not yet gazetted. Accordingly, pursuant to Section 4.15(1)(ii) of the EP&A Act the consent authority is required to consider the Interim Sydney Metro West Corridor in determining a development application. A letter is provided to the consent authority in accordance with this requirement under the EP&A Act.

Noted.

6.9.2 Conditions requested in event of approval of the DA

Sydney Metro has reviewed the DA documents that were available on the NSW Major Projects site on 22 September 2020, including having regard to the matters outlined in the ISEPP.

Based on this review Sydney Metro has the following comments:

Sydney Metro notes that the Downer site has 24/7 operation of parts of the facility. Sydney Metro advises that there is the potential for traffic flow along Unwin Street to Wentworth Street to be interrupted at times during the construction phases of the Sydney Metro - West project works.

Noted.

For future development applications it is requested that the Applicant:

- **Consider the State Environmental Planning Policy (Infrastructure) 2007;**
- **Consider the Sydney Metro Underground Corridor Protection Guidelines (available from www.sydneymetro.info) and**
- **Consultation with Sydney Metro is recommended.**

Noted – further development of the site (after it has been subdivided) will be subject to future development applications.

Sydney Metro is to be given the opportunity to provide No Objection to any proposed penetrative subsurface investigations (including boreholes) in the first or second reserve of the Interim Sydney Metro West Corridor (as per the Sydney Metro Underground Corridor Protection Guidelines).

Understood.

In order to ensure the appropriate management and mitigation of the proposed development's impacts on the Interim Sydney Metro West Corridor, Sydney Metro requests that the following conditions be imposed on the development consent:

All bulk earthworks are to be undertaken in accordance with the details, methodology, advice, undertakings, measures and recommendations detailed in the following documents:

a. **Bulk earthworks plan – Phase 2 – C013919.01-DA32 Issue D prepared by Costin Roe Consulting dated 12 August 2020**
b. **Bulk earthworks sections – C013919.01-DA35 Issue C prepared by Costin Roe Consulting dated 12 August 2020 subject to any amendments to those documents required by Sydney Metro in accordance with this consent.**

The Department of Planning, Industry and Environment is also advised that Sydney Metro's conditions are not to be amended, replaced or superseded without further agreement from Sydney Metro.

Noted, but this condition would need to be updated to reflect the revised site development plans and associated engineering drawings (Appendix B).

6.9.3 Next steps

If, at any point, the DA is amended prior to the consent authority's determination, please ensure that the amended DA and any new or amended supporting documents are provided to Sydney Metro for further assessment. Any amendments to the DA may alter the impacts of the proposed development on the Interim Sydney Metro West Corridor assessed by Sydney Metro, so Sydney Metro may need to vary any requested conditions.

Sydney Metro would be grateful if a copy of the Notice of Determination and any conditions of consent for the DA be forwarded to Sydney Metro should the consent authority determine to grant consent to the DA.

In the event that the proposed development is the subject of a Land and Environment Court appeal, the consent authority is requested to notify Sydney Metro.

Noted.

6.10 Sydney Water

6.10.1 Sydney water servicing

A Section 73 Compliance Certificate under the Sydney Water Act 1994 must be obtained from Sydney Water.

The proponent is advised to make an early application for the certificate, as there may be water and wastewater pipes to be built that can take some time. This can also impact on other services and buildings, driveways or landscape designs.

Applications must be made through an authorised Water Servicing Coordinator. For help either visit www.sydneywater.com.au > Plumbing, building and developing > Developing > Land development or telephone 13 20 92.

Contact has already been made with Sydney Water through the water servicing coordinator. Sydney Water has issued a notice of anticipated requirements for a Section 73 subdivider/developer compliance certificate.

Those notices are being used to develop initial detailed designs for potable water and wastewater.

A condition of approval requiring the issuance of a formal notice of requirements and the need for the issuance of a Section 73 certificate prior to subdivision approval is anticipated.

6.10.2 Building plan approval

The approved plans must be submitted to the Sydney Water Tap in™ online service to determine whether the development will affect any Sydney Water sewer or water main, stormwater drains and/or easement, and if further requirements need to be met.

The Sydney Water Tap in™ online self-service replaces our Quick Check Agents as of 30 November 2015.

The Tap in™ service provides 24/7 access to a range of services, including:

- **building plan approvals**
- **connection and disconnection approvals**

- **diagrams**
- **trade waste approvals**
- **pressure information**
- **water meter installations**
- **pressure boosting and pump approvals**
- **changes to an existing service or asset, e.g. relocating or moving an asset.**

Sydney Water's Tap in™ online service is available at:

https://www.sydneywater.com.au/SW/plumbing-building-developing/building/sydney-water-tapin/index.htm

Noted.

6.10.3 Trade wastewater requirements

If this development is going to generate trade wastewater, the property owner must submit an application requesting permission to discharge trade wastewater to Sydney Water's sewerage system. You must obtain Sydney Water approval for this permit before any business activities can commence. It is illegal to discharge Trade Wastewater into the Sydney Water sewerage system without permission.

The permit application should be emailed to Sydney Water's Business Customer Services at businesscustomers@sydneywater.com.au

A Boundary Trap is required for all developments that discharge trade wastewater where arrestors and special units are installed for trade wastewater pre-treatment.

If the property development is for Industrial operations, the wastewater may discharge into a sewerage area that is subject to wastewater reuse. Find out from Business Customer Services if this is applicable to your development.

Downer commits to applying for a trade waste agreement prior to operating the Reconomy facility.

6.10.4 Backflow prevention requirements

Backflow is when there is unintentional flow of water in the wrong direction from a potentially polluted source into the drinking water supply.

All properties connected to Sydney Water's supply must install a testable Backflow Prevention Containment Device appropriate to the property's hazard rating. Property with a high or medium hazard rating must have the backflow prevention containment device tested annually. Properties identified as having a low hazard rating must install a non-testable device, as a minimum.

Separate hydrant and sprinkler fire services on non-residential properties, require the installation of a testable double check detector assembly. The device is to be located at the boundary of the property.

Before you install a backflow prevention device:

1. **Get your hydraulic consultant or plumber to check the available water pressure versus the property's required pressure and flow requirements.**
2. **Conduct a site assessment to confirm the hazard rating of the property and its services. Contact PIAS at NSW Fair Trading on 1300 889 099.**

For installation you will need to engage a licensed plumber with backflow accreditation who can be found on the Sydney Water website

http://www.sydneywater.com.au/Plumbing/BackflowPrevention/

This is a standard requirement and backflow devices will be included as required by Sydney Water.

6.10.5 Water efficiency recommendations

Water is our most precious resource and every customer can play a role in its conservation. By working together with Sydney Water, business customers are able to reduce their water consumption. This will help your business save money, improve productivity and protect the environment.

Some water efficiency measures that can be easily implemented in your business are:

- **Install water efficiency fixtures to help increase your water efficiency, refer to WELS (Water Efficiency Labelling and Standards (WELS) Scheme, http://www.waterrating.gov.au/**
- **Consider installing rainwater tanks to capture rainwater runoff, and reusing it, where cost effective. Refer to http://www.sydneywater.com.au/Water4Life/InYourBusiness/RWTCalculator.cfm**
- **Install water-monitoring devices on your meter to identify water usage patterns and leaks.**
- **Develop a water efficiency plan for your business.**

It is cheaper to install water efficiency appliances while you are developing than retrofitting them later.

Downer has committed to the installation of rainwater tanks that will store up to 100 kl at any one time. Downer will explore other water efficiency measures during further detailed design and operation and will implement them where reasonable and feasible. As discussed previously, Downer will consider the use of recycled industrial water from the Aquanet industrial water pipeline situated along Devon Street for future use as process water in the Reconomy facility.

6.10.6 Contingency plan recommendations

Under Sydney Water's customer contract Sydney Water aims to provide Business Customers with a continuous supply of clean water at a minimum pressure of 15meters head at the main tap. This is equivalent to 146.8kpa or 21.29psi to meet reasonable business usage needs.

Sometimes Sydney Water may need to interrupt, postpone or limit the supply of water services to your property for maintenance or other reasons. These interruptions can be planned or unplanned.

Water supply is critical to some businesses and Sydney Water will treat vulnerable customers, such as hospitals, as a high priority.

Have you thought about a contingency plan for your business? Your Business Customer Representative will help you to develop a plan that is tailored to your business and minimises productivity losses in the event of a water service disruption.

For further information please visit the Sydney Water website at:

http://www.sydneywater.com.au/OurSystemsandOperations/TradeWaste/ or contact Business Customer Services on 1300 985 227 or businesscustomers@sydneywater.com.au.

Noted.

6.11 NSW Fire and Rescue

FRNSW have reviewed the documentation provided and submit the following general comments and recommendations for consideration:

It is recommended that advice and considerations contained within FRNSW's Fire Safety Guideline – *Emergency Vehicle Access* be addressed. This is required such that FRNSW are able to safely access all parts of the site where an incident may occur.

Lot 6 gradients are generally 3% or flatter and meet NSW Fire Safety Guidelines – Emergency Access requirements. Circulation routes are available around the facility as shown on Figure 5.1.

VEP and Downer commit to addressing FRNSW's *Fire Safety Guideline – Emergency Vehicle Access* during detailed design of internal roads, vehicle access and parking.

It is recommended that provisions be made for the containment of contaminated fire water run-off based on the worst credible fire scenario for the site. Any system(s) provided is to be automatic in nature and should not rely upon on-site staff or emergency services personnel to access or activate provided systems or valves in the event of fire.

Containment of fire water has been considered with the provision of an automatic stormwater shut-off valve. Refer drawing Co13919.01-DA41 (Appendix B3) which shows the proposed location of the valve. The valve would be actioned by an automatic fire trip and electrical actuator. The valve would close within one minute of the fire alarm, and prior to any fire-water reaching the isolation point.

It is recommended that if the development proposes to incorporate a fire engineered solution (FES), whether a building design having a performance solution in accordance with the *National Construction Code* (*NCC*) or other infrastructure where building codes are not applicable, FRNSW should be engaged in the fire engineering brief (FEB) consultation process at the preliminary design phase, post approval of the development application. FRNSW also recommend that clauses E1.10 and E2.3 be addressed where a FES is required.

There are no fire engineered solutions proposed for this development. All aspects where applicable (i.e. habitable buildings) are proposed to comply with the relevant BCA deemed to satisfy provisions.

It is recommended that an emergency plan be developed for the facility in accordance with *AS 3745–2010 Planning for emergencies in facilities.* An external consultant should be engaged to provide specialist advice and services in relation fire safety planning and developing an emergency plan.

Downer commits to preparing an emergency plan in accordance with *AS 3745–2010 Planning for emergencies in facilities*, which will be appended to and submitted to DPIE with the operational environmental management plan.

It is recommended that an emergency services information package (ESIP) be developed for the site and access to this document be provided to emergency service organisations. https://www.fire.nsw.gov.au/gallery/files/pdf/guidelines/guidelines_ESIP_and_TFP.pdf

Downer commits to preparing an emergency services information package, which will be appended to the operational environmental management plan and made available to emergency services as they enter Lot 6.

6.12 Transport for New South Wales (TfNSW)

6.12.1 Parramatta light rail (PLR)

It is noted that an assessment of cumulative impacts with the PLR, in particular the Stabling and Maintenance Facility at 6 Grand Avenue, Rosehill is not included in the development application. It is requested that the applicant:

- **Undertakes an assessment of cumulative traffic impacts, flooding and construction/operational noise and vibration impacts as part of the Response to Submissions;**
- **Ensures that operational noise as a result of the subject development does not result in PLR operational criteria being exceeded; and**

Flooding

Cumulative impact assessment in floodplain management was introduced because it was assumed that each development would provide some small incremental increase in flood level (which generally could not be accurately defined), and over time the cumulative impact of all these small increases would combine to produce a large cumulative impact. However, this reasoning has much less validity today, as councils generally require nil (taken as < 10 mm) impact in the 1% AEP event, and the modelling today can determine the hydraulic effects with a high degree of certainty. Thus, in theory there should be nil cumulative impact in the 1% AEP.

For the development under consideration there is nil (taken as < 10 mm) increase in the 0.2% AEP event for mainstream flooding and nil in any event for overland flooding. If all other developments produce similar increases, there will only be a cumulative increase in events greater than the mainstream 0.2% AEP event.

It is likely that there will be a cumulative impact in events greater than the 0.2% AEP, as houses and other buildings will be constructed on land above the 1% AEP, thus constricting flow paths and reducing temporary floodplain storage. However, to model this we would require details of the extent of likely future changes to the entire Parramatta River and Duck River catchments. This can only be provided by planning authorities and councils.

Noise

Traffic noise levels are not increasing because of the project, hence there would be no residual increase in offsite traffic noise contributions. MAC note that noise related project emissions are <35 dB $LA_{eq(15min)}$ at 6 Grand Avenue Rosehill, NSW. Hence cumulative impacts to residential receivers further to the north and west would be around 10 dB lower than ambient levels in these areas and hence would not result in additional cumulative noise impacts.

Traffic

The proposed development is considered outside of the PLR catchment area. Furthermore, the development won't generate any additional traffic.

Includes PLR for any consultation with Sydney Water regarding the proposed wastewater and potable water mains on Colquhoun Street.

Noted.

6.12.2 Construction pedestrian and traffic management

Several construction projects, including the PLR project, are likely to occur at the same time as this development. The cumulative increase in construction vehicle movements

from these projects could have the potential to impact on vehicle traffic within the precinct, as well as the safety of pedestrians and cyclists particularly during commuter peak periods. It is advised that:

- **The Construction Pedestrian and Traffic Management Plan should also include traffic impact assessment of inbound and outbound vehicles on surrounding road network as well as internal road network. Further breakdown of trips per truck type during construction activities would also be provided as requested in the SEARs; and**
- **There will be intermittent, short and long term road closures, as well as material changes to road network operations during the construction and operation phases of the PLR.**

Recommendation

It is requested that the applicant be conditioned to prepare a Construction Pedestrian and Traffic Management Plan (CPTMP) in consultation with the TfNSW, prior to the issue of any Construction Certificate or any preparatory, demolition or excavation works, whichever is the earlier.

Downer will prepare a CPTMP as part of their CEMP.

6.12.3 Heavy vehicle movements during operation

It is not clear from the development application that the PBS2B type vehicles would access the proposed site (Lot 6).

Recommendation

As the subject site could be accessed via 25-26m B-Double road network, it is envisaged that the PBS2B type vehicles would be used for the site operation. Therefore, the site internal road network as well as the new external road should be constructed to support PBS2B vehicles to take advantage of more productive vehicles in the future.

The traffic consultant PTC confirms internal Lot 6 roads and truck-accessible areas as well as the proposed public access road in the centre of the industrial estate are designed to accommodate 26m B Double type vehicles.

6.12.4 Clarification and additional information

The Traffic Impact Assessment (TIA) prepared to support the development application includes the following:

- **Table 15 of the TIA shows unequal number of employees arriving and departing;**
- **Table 16 of the TIA includes some recovered material that are not useable at the site such as organic materials, however it does not account for recovered metal that would also generate some outgoing trips; and**
- **Section 3.3.7 of the TIA states that 25 truck parking bays will be provided on site, however based on Section 10.2, a total of 18 truck parking bays will be provided. This discrepancy needs to be clarified. It is not clear from the TIA that adequate parking/queuing area is available for trucks within the site.**

Recommendation

It is requested that the applicant clarifies and / or provides additional information as part of the Response to Submissions.

For Table 15, the arrival and departure numbers of employees were checked and there was an error in the departure showing only 43 rather than 48. The error was located for the 17:00 departures and has been corrected. This change has not affected the traffic assessment.

For Table 16, recovered metals were originally included in the heavy vehicle traffic movements. However, it was erroneously left out of Table 16. Recovered metal has now been included in Table 16 and details of how the heavy vehicle movements were calculated for Reconomy has also been included in section 8.3.2.

Section 3.3.7 – Corrected number of truck parking bays noted (18).

Adequate parking/queueing area for trucks now addressed in Section 10.2 of the TIA.

Refer to Attachment 2 of Appendix H for revised TIA text.

6.12.5 Suggested conditions of consent

Construction Pedestrian and Traffic Management

Prior to the issue of any construction certificate or any preparatory, demolition or excavation works, whichever is the earlier, the applicant shall:

- **Prepare a final Construction Pedestrian and Traffic Management Plan (CPTMP) for the Central Sydney Industrial Estate and Downer Sustainable Road Products Complex (Stage 1) in consultation with the Sydney Coordination Office within TfNSW. The CPTMP needs to specify matters including, but not limited to, the following:**
  - **A description of the development;**
  - **Location of any proposed work zone(s);**
  - **Haulage routes;**
  - **Proposed construction hours;**
  - **Predicted number of construction vehicle movements, detail of vehicle types and demonstrate that proposed construction vehicle movements can work within the context of road changes in the surrounding area, noting that construction vehicle movements are to be minimised during peak periods;**
  - **Construction vehicle access arrangements;**
  - **Construction program and construction methodology, including any construction staging;**
  - **Measures to minimise construction worker vehicle movements within the precinct;**
  - **Consultation strategy for liaison with surrounding stakeholders, including other developments under construction and Parramatta Light Rail Builder;**
  - **Identify any potential impacts to general traffic, cyclists, pedestrians, bus services and any light rail within the vicinity of the site from construction vehicles during the construction of the proposed works. Proposed mitigation measures should be clearly identified and included in the CPTMP; and**
  - **Identify the cumulative construction activities of the development and other projects within or around the development site, including the Parramatta Light Rail Project, Sydney Metro West Project and private development. Proposed measures to minimise the cumulative impacts on the surrounding road network should be clearly identified and included in the CPTMP.**
- **Submit a copy of the final plan to TfNSW for endorsement via development.sco@transport.nsw.gov.au; and**
- **Provide the builder's direct contact number to small businesses adjoining or impacted by the construction work and TfNSW via development.sco@transport.nsw.gov.au to resolve issues relating to traffic, public transport, freight, servicing and pedestrian**

access during construction in real time. The applicant is responsible for ensuring the builder's direct contact number is current during any stage of construction.

Downer commits to preparing a construction pedestrian and traffic management plan as required above, which will be appended to the construction environment management plan and submitted to TfNSW and DPIE for review.

6.13 Heritage NSW

The proposed SSD is within an area assessed as part of a remediation project in 2019. The EIS for that project identified the Western Area to be of State heritage significance. The significance assessment is not included in the supporting documentation; however, it is noted that the area is not listed on the SHR or Parramatta Local Environmental Plan (LEP) 2011.

There is little to no potential for archaeological relics as stated in the EIS for the proposed SSD. No further archaeological assessment is required.

If DPIE approves the proposal an Unexpected Finds condition could be imposed, reminding the proponent that S146 of the NSW Heritage Act, 1977, requires that if 'relics' are found that the Heritage Council of NSW must be notified.

These comments are noted.

6.14 Endeavour Energy

6.14.1 Potential impacts on local Endeavour Energy assets

Endeavour Energy has noted that whilst the EIS addresses the electricity infrastructure required to facilitate the proposed development, some of the other issues raised (in their SEARs) are addressed in general terms only. Endeavour Energy's primary concern is the potential impact of the proposed development on Endeavour Energy's nearby Rosehill Zone Substation and Camellia Transmission Substation which do not appear to be specifically mentioned/addressed in the EIS. In this regard Endeavour Energy has noted the following in the EIS:

17 HAZARDOUS AND OFFENSIVE DEVELOPMENT

17.3 Potential impacts

17.3.3 Impact to surrounding infrastructure

There is an electrical easement along the eastern boundary of the site. The electrical infrastructure is underground and will therefore not be impacted by potential hazards associated with operation of the project.

There are some aboveground electrical infrastructure and equipment such as substations along Devon Street on the northern boundary of the site, however the PHA has examined the potential for off-site hazards and concluded the project would not result in damaging effects off-site.

No other significant infrastructure was identified in proximity to the project.

17.3.4 Surrounding land uses

No hazards associated with the project were identified in the PHA with the potential to result in significant off-site safety impacts on surrounding land uses. It is considered that the likelihood of any off-site safety impacts on people or property is minimal.

Off [sic] the three foregoing issues that potentially impact Endeavour Energy's nearby Rosehill Zone Substation and Camellia Transmission Substation, the potential change in flood affectation is of particular concern. Appendix G 'Flood Impact Assessment Report' the figures indicate there will be changes in the various flooding scenarios that will impact the as shown by the following example where an up to 50 mm increase in flood levels is indicated [Figure 6.22**]. In this regard Endeavour Energy believes that the proposed development of the site should not have any impact/increase in flood affectation of the surrounding area and appropriate measures should be incorporated on site to ensure this is achieved.**

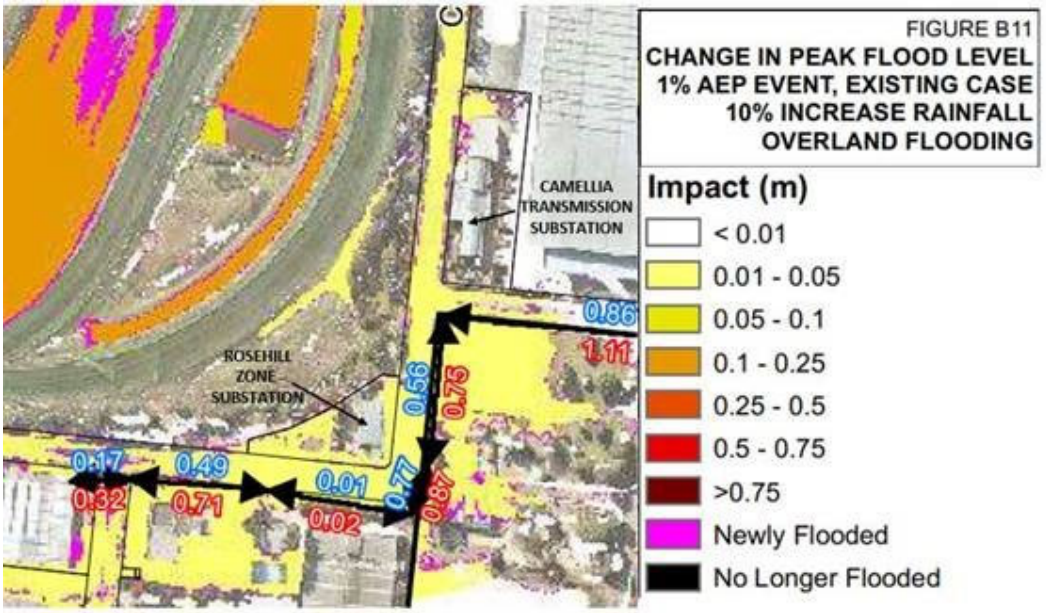


Figure 6.22 Figure from EIS Appendix G

Figure B11 in Appendix B of Appendix G of the EIS represents the impact of an assumed 10% anthropomorphic climate change increase in existing (ARR&R1987) rainfall intensity. Figure B12 and B13 (also from Appendix B of Appendix G of the EIS) represents the impact of a respective 20% and 30% increase to the existing rainfall intensity. These increases in rainfall intensity and resulting flood levels are not due to the proposed development and obviously cannot be mitigated by any form of mitigation works on the development site.

Figures B14 to Figure B17 in Appendix B of Appendix G of the EIS indicate that the proposed works on the site will reduce flood levels on Unwin and Colquhoun Streets for the 1% AEP to PMF overland flow events, thus benefitting those flood affected external land users.

As previously advised, Endeavour Energy is aware that electricity infrastructure is not defined/regarded as sensitive land use in the traditional sense. Nonetheless the impacts of hazardous and offensive development, air quality and flooding may all significantly affect electricity infrastructure and place supply at risk - particularly for such significant substation assets any such potential impacts should be mitigated so as not to increase the risk above the existing conditions.

Flooding

See above.

Air quality

The Endeavour Energy assets are located on the corner of Unwin Street and Colquhoun Street and the corner of Devon Street and Colquhoun Street. Whilst the locations were not specifically assessed in the AQIA, the potential for any air quality impacts at these locations can be inferred using the nearest discrete receptors located at InN1, InW1 and AR1 (located near the corner of Unwin Street and Colquhoun Street on the Rosehill Racecourse). The location of these discrete receptors is shown in Figure 2-1 of the AQIA. TAS note that these discrete receptors represent locations closer to the project than the Endeavour Energy assets and the predicted air quality levels are likely to be conservative.

The predicted air quality results for InN1, InW1 and AR1 indicate compliance with the NSW EPA impact assessment criteria for the assessed pollutants and a similar level would be achieved at the Endeavour Energy asset locations. The NSW EPA impact assessment criteria are designed to protect the health of sensitive individuals who are most susceptible to harm and also to prevent nuisance deposition of dust on surfaces. Thus, on the basis of the modelling predictions there would be no expected air quality impacts associated with the project at these locations and hence does not indicate any risk above the existing conditions.

Hazardous and offensive development

The PHA (Appendix I of EIS) concluded:

- Offsite effects due to loss of containment of Dangerous Goods including Class 8 corrosives, Class 3 flammables and bitumen are extremely unlikely as dedicated, fully contained storage and handling areas compliant with the relevant standards (AS 1940 *The storage and handling of flammable and combustible liquids* and AS 3780 *The storage and handling of corrosive substances*) are provided in the design.
- These areas are also well separated from the site boundary exceeding the separation distances required under AS 3780 and AS1940. It is therefore very unlikely that an accident event involving hazardous materials would have any effects that could extend off site.

Therefore, the proposed development of Lot 6 is unlikely to have any impacts on Endeavour Energy's nearby Rosehill Zone Substation and Camellia Transmission Substation.

6.14.2 Network Capacity / Connection

Endeavour Energy has noted the following in the EIS:

Electricity

Electricity infrastructure is available to all proposed lots and approvals for electricity extensions will be granted by Endeavour Energy. The site is in a good location for electrical supply given its proximity to Camellia Zone and Rosehill Zone substations. This reflects the supply requirements of the previous site use and there is ample capacity in the substations for the new lots.

Endeavour Energy has made an offer of supply (Appendix B of Appendix F), which confirms there is an existing high voltage (HV) line near the site on Devon Street from Rosehill Zone Substation.

HV reticulation can be supplied to all proposed lots. An accredited service provider level 3 will be engaged to investigate and to propose a method of supply for the site following lodgement of the development application.

There are Ausgrid underground protection and control cables in the site (generally running along the boundary of proposed Lot 6). These cables are along the eastern boundary of Lot 6 and will be retained in the proposed easement along the eastern Lot 6 boundary described in Section 3.2.1. The easement will comprise native grasses and pebbles as described in Section 3.1.5, which can be easily removed if the cables need to be accessed.

Up to three electrical substations will service Stage 1 and will be built in the north-west of Lot 6, east of the driveway entry lanes (Figure 3.6).

An electrical substation to suit the initial streetlight power for the subdivision, will be built on Lot 4.

Accordingly, the applicant should continue to work through the customer connection process with Endeavour Energy's Network Connections Branch who are responsible for managing the conditions of supply with the proponent and their Accredited Service Provider (ASP). Endeavour Energy's Network Connections Branch can be contacted on business days via Head Office enquiries on telephone: 133 718 or (02) 9853 6666 from 9am - 4:30pm.

The customer connection process is being completed and as an end result, the development will adhere to all of Endeavour Energy's requirements handed down by Endeavour Energy's Network Connections Branch.

In regard to the padmount substations required to facilitate the proposed development, Endeavour Energy's general requirements is for a padmount substation to be located at ground level with direct access from a public road. As shown in the following Figure A4.3 'Padmount easements and clearances', from Endeavour Energy's Mains Design Instruction MDI 0044 'Easements and Property Tenure Rights', padmount substations require:

- **Easement with a minimum size of 2.75 x 5.5 metres (single transformer)**
- **Restriction for fire rating which usually extends 3 metres horizontally from the base of the substation footing and 6 metres vertically from the same point.**
- **Restriction for swimming pools which extends 5 metres from the easement (which is usually not required for industrial development).**

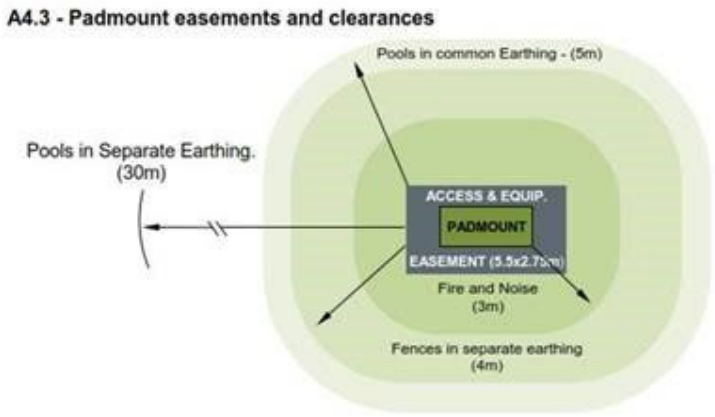


Figure 6.23 Padmount easements and clearances

All required pad mount sub stations will be delivered with the necessary easements per requirements (Figure 6.23).

6.14.3 Flooding and Drainage

The electricity network required to service an area/development must be fit for purpose and meet the technical specifications, design, construction and commissioning standards based on Endeavour Energy's risk assessment associated with the implementation and use of the network connection/infrastructure for a flood prone site. Risk control has focused typically on avoiding the threat, but where this is not possible, reducing the negative effect or probability of flood damage to assets by implementing good design and maintenance practices.

Padmount substation cubicles are weatherproof not flood proof and the cable pits whilst designed to be self draining should not be subject to excessive ingress of water. Section 7 'Substation and switching stations' of Endeavour Energy's Mains Construction Instruction MCI 0006 'Underground distribution construction standards manual' provides the following details of the requirements for flooding and drainage in new padmount substation locations [Figure 6.24**].**

7.1.6 Flooding and drainage

Substations are to be located such that the risk of flooding or stormwater damage is minimal.

As a minimum the level at the top of the transformer footing, HV and LV switchgear, shall not be lower than the 1:100 year flood level.

All drains within the substation site area or in the vicinity shall be properly maintained to avoid the possibility of water damage to Endeavour Energy's equipment.

In areas where, as determined by the Network Substation Manager, there is a high water table or a heightened risk of flooding, indoor substations will not be permitted.

All materials used in the construction below the substation (ground level) shall be capable of withstanding prolonged immersion in water without swelling or deterioration.



Figure 51 - Example substation raised above 1:100 flood level

Figure 6.24 Example substation raised above 1:100 flood level

The above flood and drainage issues will be addressed by JDG Electrical in their detailed design of the electrical network for the project. The customer connection process is currently being completed and the development will adhere to all of Endeavour Energy's requirements including those associated with flooding and drainage, handed down by Endeavour Energy's Network Connections Branch.

6.15 Ausgrid

With refence to SEARS section 10 - Infrastructure requirements:

> **an assessment of the impacts of the development on existing utility infrastructure and service provider assets surrounding the site, and a description of how any potential impacts would be avoided and minimised.**

The developer should prepare an infrastructure plan detailing information on the existing capacity and any augmentation and easement requirements of the development for the provision of utilities including staging of infrastructure.

Ausgrid has transmission cables buried adjacent to the site along Devon St. Suitable precautions should be adopted by the development regarding the construction and ongoing operation of the facility in the vicinity of these cables.

Ausgrid recommends the proponent obtain the plans through DBYD and refer to Ausgrid Network Standard NS156 regarding working near these cables.

Ausgrid advised on 8 October, 2020 that the pilot cable along the eastern boundary of the site can be decommissioned.



CHAPTER 7

PROJECT EVALUATION AND CONCLUSION

7 PROJECT EVALUATION AND CONCLUSION

Downer owns and operates an asphalt plant, Reconomy facility, offices and workshop at 1A Unwin Street, Rosehill. Downer also operates a RAP recycling facility on land it leases at part of 12 Grand Avenue, Rosehill.

In late 2019, the Sydney Metro West project informed Downer that the Rosehill site was required for the Clyde stabling and maintenance facility and would be compulsorily acquired. As such, Downer investigated alternative sites for the relocation of the Rosehill and Camellia operations.

In the time since the investigation, Downer has agreed with VEP to acquire a parcel of land in its proposed subdivision of the Western Area of Shell's former Clyde Oil Refinery.

The relocation of Downer's operations to the site will form Stage 1 of the Estate. Accordingly, the SSD application will seek approval for all subdivision works to create the Estate, with the Downer facility on the eastern edge of the site on a Stage 1 area of 6.998 ha. VEP is the proponent for the development, with Downer's operations to form Stage 1 of the Estate.

Therefore, VEP is applying to gain SSD approval for:

- subdivision and infrastructure works to create a new 35 hectare (ha) Central Sydney Industrial Estate (the Estate) on the site of the former Shell Clyde Refinery; and
- development and operation of Downer's Sustainable Road Resource Centre as Stage 1 of the Estate (Stage 1).

The Western Area was historically part of the Clyde refinery/terminal and is the site of this application. However, this area is no longer required for the Clyde Terminal following completion of the Conversion Project. The tanks, structures, pipework and associated infrastructure have been removed and residual contamination in the area is being remediated.

Downer's Rosehill and Camellia operations service Central Sydney and surrounds and it is important that these operations remain in the general vicinity. These operations require a heavy industrial land zoning to operate. As the only heavy industrial land in the vicinity is the Rosehill/Camellia industrial precinct, Downer needed to find a site in this precinct to relocate its local operations.

The impact assessments determined the project is unlikely to have significant residual impacts, that is, it is unlikely to exceed government standards and criteria. An exception is air quality, where cumulative particulate criteria will be exceeded at some industrial receivers and a commercial receiver. The industrial receivers are subject to workplace air quality standards and the approved methods criteria are not applicable. The exceedance at the commercial receiver is minor and people would not be in this receiver for long term periods. The 24-hour average concentrations at the commercial premises will be below the short-term criteria.

On balance, given the need for the project, lack of alternatives, suitability of the site, consistency with plans and policies, minor environmental impacts and economic benefit of the project, it is clear the project is in the public interest and its approval is likely to benefit the state of NSW.

Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
State Significant Development Application

RESPONSE TO SUBMISSIONS

Prepared for VE Property Pty Ltd and Downer EDI Works Pty Ltd | November 2020



APPENDICES



CHAPTER 8

REFERENCES

8 REFERENCES

ERM (2020) *Clyde Western Area Remediation Project: Stage 1 – Detailed Remediation Action Plan*. Prepared for Viva Energy Australia Pty Ltd.

NSW Department of Planning, Infrastructure and Environment (2017) *Draft Environmental Impact Assessment Guidance Series: Responding to Submissions.* NSW Government.



APPENDIX A

SUBMISSIONS MATRIX

Stakeholder		**Government agency**	DPIE	PCC	DPI - Fisheries	Heritage NSW	TfNSW	EPA	**Public organisation**	Ausgrid	Sydney Water	Endeavour Energy	Fire & Rescue	Sydney Metro West	**Total**	Agency	Public
Stakeholder type			Agency	Agency	Agency	Agency	Agency	Agency		Organisation	Organisation	Organisation	Organisation	Organisation			
View			Comments	Object	Comments	Comments	Comments	Comments		Comments	Comments	Comments	Comments	Comments			
Form/ letter			Letter	Letter	Letter	Letter	Letter	Letter		Email	Email	Email	Email	Letter			
Water	Any dround/surface water take must be licenced		1													1	0
	Determine the appropriate licensing requirement if Reconomy pond intercepts water table during construction		1													1	0
	Predict volume of groundwater take if Reconomy pond intercepts water table during construction		1													1	0
	Use of external recycled water supply							1								1	0
	Demonstrate avoidance/ minimisarion of discharges							1								1	0
	Assess impacts of discharges of treated water on receiving waters during construction and operation							1								1	0
	Revise water balance to include all water end uses for Stage 1							1								1	0
	Define clean, dirty and contaminated catchments onsite							1								1	0
	Flooding		1													1	0
	Stormwater outlets		1													1	0
	Mangroves		1													1	0
	Rainwater harvesting		1													1	0
	Content of flood evacuation plan		1													1	0
	Climate change impacts on freeboard		1													1	0
	Transition between constructed/natural drainage			1												1	0
	1% AEP/PMF flood impacts			1												1	0
	Further consideration 0.2% AEP			1												1	0
	Overland flowpaths - roads and swales			1												1	0
	Overall WSUD concept			1												1	0
	Climate change impacts on flooding			1												1	0
	Prepare flood and water management strategy			1												1	0
	Prepare evacuation and flood emergency response plan			1												1	0
	ESCP success criteria				1											1	0
	Drainage outlet specifications/flow rates				1											1	0
	Move outlets to areas of lower ecological value				1											1	0
	Water demand										1					0	0
	Application for s73 certificate										1					0	0
	Submission of approved plans										1					0	0
	Trade wastewater application										1					0	0
	Requirement for boundary trap										1					0	0
	Requirement for backflow containment device										1					0	0

	Requirement for double check detector assembly										1						0	0
	Requirement for pressure check and site assessment										1						0	0
	Recommended water efficiency measures										1						0	0
	Cumulative flood assessment						1										1	0
	Water supply interruption contingency										1						0	0
Biodiversity	Biodiversity development assessment report		1	1													2	0
	Riparian corridor		1	1													2	0
	Directional lighting			1													1	0
	Riparian species diversity/density			1	1												2	0
	Swale species diversity			1													1	0
	Remnant site trees			1													1	0
	Engagement of arborist			1													1	0
	Extent of marine vegetation disturbance				1												1	0
	Riparian weed management				1												1	0
	VMP audit suitably qualified person				1												1	0
	Road through riparian zone				1												1	0
	Retaining wall adjacent to riparian zone				1												1	0
	D emonstrate 10% landscaped area			1													1	0
Traffic/pedestrains	Local road network		1														1	0
	Pedestrian/bike paths - riparian zone			1													1	0
	Riparian public access easement			1													1	0
	Pedestrian/bike paths - new road			1													1	0
	Connections to Duck/Parramatta rivers, Camellia Town Centre			1													1	0
	Cumulative traffic assessment						1										1	0
	Assess impacts of inbound and outbound traffic						1										1	0
	Road closures associated with PLR						1										1	0
	Prepare construction pedestrian and traffic management plan						1										1	0
	Support of PBS2B type vehicles						1										1	0
	Traffic and pedestrian conditions of consent						1										1	0
	Clarify amount of truck bays						1										1	0
	Account for outgoing recovered metal						1										1	0
	Clarify employee arrival/departure times						1										1	0
	New road width			1													1	0
	Agreement re right of way for future Carnarvon Rd link			1													1	0
	Stage 1 driveway width			1													1	0
	Impacts to project traffic from construction of Sydney Metro													1			0	1
Noise	The NIA has not considered potentially annoying characteristics of noise							1									1	0
	NIA must outline whether the stated noise attenuation levels are achievable and the notional design parameters needed to achieve them							1									1	0
	Assessment needs to fully outline the noise modelling approach used and justify its accuracy							1									1	0
	Assessment must be amended to consider the occurrence of temperature inversion conditions							1									1	0
	assessment must be amended to consider the							1									1	0
	EPA advises that it would not support the application of the industrial interface provisions							1									1	0
	Section 2.4.2 contains a typographical error							1									1	0
	Assessment must be amended to consider the adjusted PANL applicable in this situation							1									1	0
	Ensure that adopted background noise data are reviewed and a statement provided that the data conforms to the requirements of the NPfI							1									1	0
	Outline the nature and extent of out of standard hours construction and the justification for it in accordance with the ICNG							1									1	0
	Proposed construction hours							1									1	0
	Cumulative noise/vibration assessment						1										1	0
	Impacts on PLR criteria						1										1	0
ual	Building heights			1													1	0

Mat	Visu	Degree of impact			1													1	0
	Air quality	Ambient air quality		1														1	0
		Best practice management of air toxics							1									1	0
		Demonstrate compliance with odour criteria							1									1	0
		Demonstrate application of all feasible and resonable mitigation measures for $PM_{2.5/10}$							1									1	0
		Consider measures for reducing non-road vehicle emissions							1									1	0
		Commercial receiver		1														1	0
		Mitigation meausures		1														1	0
		Benchark proposal against best practice emissions management							1									1	0
		Demonstrate compliance with Clean Air Regulation							1									1	0
		Assess lots adjacent to Lot 6 as receivers							1									1	0
		Industrial receivers		1														1	0
		Unpaved roads		1														1	0
		Unsealed hardstand							1									1	0
	Revision of site plan								1									1	0
	Provide DA to Sydney Metro/inform Sydney Metro if there is an LEC appeal														1			0	1
	Amended DA/new douments to be provided to Sydney Metro														1			0	1
	Conditions relating to bulk earthworks														1			0	1
	Input on proposed penetrative subsurface investigations in Interim Sydney Metro West Corridor														1			0	1
	Inclusions and consultation for future development applications														1			0	1
	Clarify responsible party for implementation of WARP conditions							1										1	0
	Concurrence of Sydney Metro not required														1			0	1
	Site remediation		1															1	0
	Lot sizes		1															1	0
	Developer contributions			1														1	0
	Proposed uses of lots other than Lot 6										1							0	1
	Underground cables									1								0	1
	Use of shared excavator							1										1	0
	Requirement for wheelwash							1										1	0
	Provide evidence of lawful owner of Lot 6							1										1	0
	List all activities scheduled under PEO Act							1										1	0
	Project staging										1							0	1
	Requirement for weighbridge							1										1	0
	EPL licensed area							1										1	0
	Draft Camellia masterplan			1														1	0
	Environmental management	Enclosure of facilities and materials							1									1	0
		WARP long term environmental management plan							1									1	0
		A cid suphate soils		1														1	0
		Continuous improvement of environmental performance							1									1	0
		Stage 1 operation EPL							1									1	0
		Stage 1 construction EPL							1									1	0
		Asbestos		1														1	0
		Reconomy material recovery rate		1														1	0
	Hazards	Kerosene blending																0	0
		Demonstrate compliance with fire safety guideline							1									1	0
		Separation of dangerous goods		1														1	0
		Bunding of vehicle refuelling and maintenance area							1									1	0
		Material safety data sahhets		1														1	0
		Preparation of emergency services information package													1			0	1
		Preparation of emergency plan													1			0	1

Ha	Fire engineering brief consultation												1			0	1
	Containment of contaminated fire water												1			0	1
	High pressure pipeline		1													1	0
	Application of Fire Safety Guideline												1			0	1
	Preliminary hazard assessment												1			0	1
	Compliance with Australian standards		1													1	0
Heritage	Significance of Parramatta Archaeological Management Unit 2966					1										1	0
	Heritage listings					1										1	0
	Requirements for unexpected finds protocol					1										1	0
	Potential for relics					1										1	0
Waste	Sources							1								1	0
	Physical/chemical characteristics							1								1	0
	Types of polution potentially generated by storage/use & management measures							1								1	0
	Changes in waste characteristics between catchments							1								1	0
	Waste classifications							1								1	0
	Liquid waste							1								1	0
	Standards for managing C&D waste							1								1	0
	Quantities							1								1	0
	Storage quantities							1								1	0
	Throughput quantities							1								1	0
	Processing procedures							1								1	0
	Record keeping and weighing							1								1	0
	Material fates							1								1	0
	Fates of materials not suitable for reuse							1								1	0
	Applications for resource recovery orders							1								1	0
	Materials to be produced under resource recovery order							1								1	0
	Management of non-conformaing waste							1								1	0
	Recovered organics							1								1	0
	Glass not permitted to be received at Reconomy (Unwin St)							1								1	0
	Reuse of plastic and oil							1								1	0
Asphalt	Asphalt release agent							1								1	0
	Bitumen emulsion tanks							1								1	0



APPENDIX B

REVISED DRAWINGS



APPENDIX B1

SUBDIVISION STAGING PLANS

STAGE 1A

M.G.A

GRAND PARADE

238.42

101
DP 1168951

465.765

101
DP 809340

2
DP 224288

458.43

1 DP 383675

1 DP 1190873

642.985

DURHAM STREET

COLQUHOUN STREET

DEVON STREET

632.925

21.455

120.76

152.4

60.96

(A)

259.08

(B)

(C)

171.59

130.09

T21.08

(H)

(J)

(K)

(M)

21
60.04ha
BY DED'N

20
35.068ha
(INCLUDING RIPARIAN SETBACK)

429.82

2
DP 864567

RIPARIAN SETBACK IS 40m BOUNDARY

MEAN HIGH WATER

RIVER

DUCK

NOTES:
1. ALL DIMENSIONS SHOWN HEREON ARE APPROXIMATE AND SUBJECT TO FINAL SURVEY
2. NO CADASTRAL SURVEY HAS BEEN UNDERTAKEN

(A) EASEMENT TO DRAIN WATER 10.2 & 13.4 WIDE (AC 424785)
(B) EASEMENT 6.095 WIDE (B309159) – SYDNEY WATER PIPELINE
(C) EASEMENT TO DRAIN WATER 13.4 WIDE (AC424784)
(H) PIPELINE EASEMENT (V540637 & V540638)
(J) PIPELINE EASEMENT (V22813)
(K) PIPELINE EASEMENT WHOLE OF LOT (R297864)
(M) EASEMENT FOR PEDESTRIAN ACCESS 40 WIDE & VARIABLE WIDTH

30 0 60 150 330m

SCALE 1:3000

CLIENT

VE PROPERTY PTY LTD

PROJECT

PLAN OF PROPOSED SUBDIVISION OF LOT 100 IN DP 1168951 STAGE 1A

NOTES

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5	GKO	11/11/2020	AMEND RIPARIAN SETBACK
4A	GKO	13/10/2020	SY074707.000.11.4 VER A
4	GKO	06/08/2020	APPROX AUSGRID LINE ADDED
3	GKO	23/07/2020	EASEMENTS ADDED
2	GKO	16/07/2020	LOT 6 DIMENSION AND AREA AMENDED
1	GKO	22/06/2020	INITIAL ISSUE

SYM	CODE	DESCRIPTION
	BIN	BIN
	BM	BENCH MARK
	BO	BOLLARD
	DJM	DRAINAGE MANHOLE
	EFP	ELEC FUSE BOX
	ELP	ELEC GARDEN LIGHT
	EL	ELEC GREEN PILLAR
	LP	ELEC LIGHT POLE
	EP	ELECT SINGLE PIT
	SPL	ELEC STAY POLE
	PP	ELEC POWER POLE
	ELP	ELEC POLE/LIGHT
	TRANS	ELE POLE/TRANSFORM
	FD	FUEL DIP
	GM	GAS MAIN
	GMR	GAS METER
	GAS	GAS VALVE
	AG	GATE
	GUL	GULLY PIT
	HYD	HYDRANT
	BOR	BOREHOLE

SYM	CODE	DESCRIPTION
	OFM	OPTICAL FIBRE MARKER
	OFP	OPTICAL FIBRE PIT
	TM	PALM TREE
	SE	SEAT
	TS	SHRUB
	TCA	TELSTRA PIT
	SLH	SEWER LAMP HOLE
	SMH	SEWER MANHOLE
	SVP	SEWER VENT PIPE
	SI	SIGN
	BUS	BUS STOP SIGN
	T	TREE
	SGL	TRAFFIC LIGHT
	SCL	TRAFFIC CONTROLLER
	SJX	TRAFFIC JUNCTION BOX
	US	UNKNOWN SERVICE
	WAV	WATER AIR VALVE
	WMR	WATER METER
	WEP	WATER PUMP
	WSV	WATER STOP VALVE
	WTP	WATER TAP

Symbols shown are indicative only. The symbol size and orientation does not necessarily represent the real size or orientation of the feature.

DRAINAGE PIPE U/G
DRAIN
ELECT. CABLE A/G
ELEC. CABLE U/G
GAS PIPE
FENCE LINE
SEWERAGE PIPE
TELSTRA CABLE
WATER PIPE

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w www.landpartners.com.au

ISO 9001:2008
FS 535063

HEIGHT DATUM: AHD	LOCAL AUTHORITY: CITY OF PARRAMATTA
HEIGHT ORIGIN: N/A	SCALE: 1:3000(A1)
MERIDIAN: 56	CONTOUR INTERVAL: N/A
CO-ORD SYSTEM: MGA	SURVEYOR: N/A — DATE OF SURVEY: -
CCAD FILE: 74707 ver 9 final subdivision	DRAWN: SF/CLP — DATE: 11/11/2020
AUTOCAD FILE: SY074707.000.11A.5	CHECKED: GKO — DATE: 11/11/2020
ARCHIVE FILE: SY074707.000.11.4_A	APPROVED: GKO — DATE: 11/11/2020
PLAN NUMBER: SY074707.000.11A.5	SHEET 1 OF 1

PD:GKO

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STAGE 1B

M.G.A

GRAND PARADE

238.42

101
DP 1168951

465.765

101
DP 809340

2
DP 224288

458.43

1 DP 383675

1 DP 1190873

642.985

DURHAM STREET

COLQUHOUN STREET

DEVON STREET

493.715

139.21

21.455

120.76

152.4

60.96

259.08

T21.08

171.59

130.09

511.03

429.82

(A) (B) (C) (G) (H) (J) (K) (L) (M)

6
6.998ha
(INCLUDING RIPARIAN SETBACK)

5
28.07ha
(INCLUDING RIPARIAN SETBACK)

21
60.04ha
BY DED'N

2
DP 864567

RIPARIAN SETBACK IS 40m BOUNDARY

MEAN HIGH WATER

RIVER

DUCK

NOTES:
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(C) EASEMENT TO DRAIN WATER 13.4 WIDE (AC424784)
(G) PROPOSED EASEMENT FOR SERVICES 5 WIDE
(H) PIPELINE EASEMENT (V540637 & V540638)
(J) PIPELINE EASEMENT (V22813)
(K) PIPELINE EASEMENT WHOLE OF LOT (R297864)
(L) EASEMENT FOR OVERLAND FLOW 5 WIDE
(M) EASEMENT FOR PEDESTRIAN ACCESS 40 WIDE & VARIABLE WIDTH

30 0 60 150 330m

SCALE 1:3000

CLIENT

VE PROPERTY PTY LTD

PROJECT

PLAN OF PROPOSED SUBDIVISION OF LOT 100 IN DP 1168951 STAGE 1B

NOTES

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6	GKO	11/11/2020	AMEND RIPARIAN SETBACK
5B	GKO	02/11/2020	LANDSCAPE SETBACK REMOVED
4B	GKO	13/10/2020	SY074707.11.4 VER B
4	GKO	06/08/2020	APPROX AUSGRID LINE ADDED
3	GKO	23/07/2020	EASEMENTS ADDED
2	GKO	16/07/2020	LOT 6 DIMENSION AND AREA AMENDED
1	GKO	22/06/2020	INITIAL ISSUE

SYM	CODE	DESCRIPTION
	BIN	BIN
	BM	BENCH MARK
	BO	BOLLARD
	DJM	DRAINAGE MANHOLE
	EFP	ELEC FUSE BOX
	ELP	ELEC GARDEN LIGHT
	EL	ELEC GREEN PILLAR
	LP	ELEC LIGHT POLE
	EP	ELECT SINGLE PIT
	SPL	ELEC STAY POLE
	PP	ELEC POWER POLE
	ELP	ELEC POLE/LIGHT
	TRANS	ELE POLE/TRANSFORM
	FD	FUEL DIP
	GM	GAS MAIN
	GMR	GAS METER
	GAS	GAS VALVE
	AG	GATE
	GUL	GULLY PIT
	HYD	HYDRANT
	BOR	BOREHOLE

SYM	CODE	DESCRIPTION
	OFM	OPTICAL FIBRE MARKER
	OFP	OPTICAL FIBRE PIT
	TM	PALM TREE
	SE	SEAT
	TS	SHRUB
	TCA	TELSTRA PIT
	SLH	SEWER LAMP HOLE
	SMH	SEWER MANHOLE
	SVP	SEWER VENT PIPE
	SI	SIGN
	BUS	BUS STOP SIGN
	T	TREE
	SGL	TRAFFIC LIGHT
	SCL	TRAFFIC CONTROLLER
	SJX	TRAFFIC JUNCTION BOX
	US	UNKNOWN SERVICE
	WAV	WATER AIR VALVE
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ISO 9001:2008 FS 535063

HEIGHT DATUM: AHD	LOCAL AUTHORITY: CITY OF PARRAMATTA
HEIGHT ORIGIN: N/A	SCALE: 1:3000(A1)
MERIDIAN: 56	CONTOUR INTERVAL: N/A
CO-ORD SYSTEM: MGA	SURVEYOR: N/A — DATE OF SURVEY: -
CCAD FILE: 74707 ver 9 final subdivision	DRAWN: SF/CLP — DATE: 11/11/2020
AUTOCAD FILE: SY074707.000.11B.6	CHECKED: GKO — DATE: 11/11/2020
ARCHIVE FILE: SY074707.000.11.5B	APPROVED: GKO — DATE: 11/11/2020
PLAN NUMBER: SY074707.000.11B.6	SHEET 1 OF 1

PD:GKO

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M.G.A

STAGE 2

DEVON STREET

COLQUHOUN STREET

UNWIN STREET

51
8060m²

52
8060m²

54
1.067ha

55
1.067ha

56
2.133ha

53
2.755ha

80.005 | 80 (G) | 78.12 | 72.24 (G) | 8.485 | 8.485 (G) | 150.36 | (G)

100.76 | 100.8 | 100.83 | 136.67 | 130.73 | 130.65 | (B) | 130.65

80.005 | 79.86 | 78.12 | 78.24 | 156.07

20 | 172.39 | (B) | 136.57 | (L)

152.4 | (B)

159.84 | 98.88

374.38

6
STAGE 1
SUBDIVISION

21

RESIDUE LOT
57
19.44ha

2
DP 864567

(A) 259.08

(A) 121.08

(C) 156.59

130.085

(M) WATER

HIGH

MEAN

IS

BOUNDARY

(M)

40m

RIPARIAN

SETBACK

RIVER

DUCK

CARNARVAN STREET

NOTES:
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(G) PROPOSED EASEMENT FOR SERVICES 5 WIDE
(L) EASEMENT FOR OVERLAND FLOW 5 WIDE
(M) EASEMENT FOR PEDESTRIAN ACCESS 40 WIDE & VARIABLE WIDTH

20 0 40 100 140m

SCALE 1:1500

CLIENT

VE PROPERTY
PTY LTD

PROJECT

PLAN OF
PROPOSED SUBDIVISION
OF
LOT 5 OF STAGE 1 OF
SUBDIVISON OF
LOT 100 IN DP1168951
STAGE 2

NOTES

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7	GKO	11/11/2020	AMEND RIPARIAN SETBACK
6	GKO	02/11/2020	LANDSCAPE SETBACK REMOVED
5	GKO	19/10/2020	LOT BOUNDARIES AMENDED
4	GKO	19/08/2020	SMALL LOT 3 REMOVED
3	GKO	24/07/2020	EASEMENTS DETAIL ADDED
2	GKO	17/07/2020	EASEMENT AMENDED
1	GKO	22/06/2020	INITIAL ISSUE

SYM	CODE	DESCRIPTION
	BIN	BIN
	BM	BENCH MARK
	BO	BOLLARD
	DJM	DRAINAGE MANHOLE
	EFP	ELEC FUSE BOX
	ELP	ELEC GARDEN LIGHT
	EL	ELEC GREEN PILLAR
	LP	ELEC LIGHT POLE
	EP	ELECT SINGLE PIT
	SPL	ELEC STAY POLE
	PP	ELEC POWER POLE
	ELP	ELEC POLE/LIGHT
	TRANS	ELE POLE/TRANSFORM
	FD	FUEL DIP
	GM	GAS MAIN
	GMR	GAS METER
	GAS	GAS VALVE
	AG	GATE
	GUL	GULLY PIT
	HYD	HYDRANT
	BOR	BOREHOLE

SYM	CODE	DESCRIPTION
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	OFP	OPTICAL FIBRE PIT
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	TS	SHRUB
	TCA	TELSTRA PIT
	SLH	SEWER LAMP HOLE
	SMH	SEWER MANHOLE
	SVP	SEWER VENT PIPE
	SI	SIGN
	BUS	BUS STOP SIGN
	T	TREE
	SGL	TRAFFIC LIGHT
	SCL	TRAFFIC CONTROLLER
	SJX	TRAFFIC JUNCTION BOX
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ISO 9001:2008
FS 535063

HEIGHT DATUM: AHD	LOCAL AUTHORITY: CITY OF PARRAMATTA
HEIGHT ORIGIN: N/A	SCALE: 1:1500 (A1)
MERIDIAN: 56	CONTOUR INTERVAL: N/A
CO-ORD SYSTEM: MGA	SURVEYOR: N/A — DATE OF SURVEY: -
CCAD FILE: 74707 ver 9 final subdivision	DRAWN: SF/CLP — DATE: 2/11/2020
AUTOCAD FILE: SY074707.000.12.7	CHECKED: GKO — DATE: 2/11/2020
ARCHIVE FILE: SY074707.000.12.6	APPROVED: GKO — DATE: 2/11/2020
PLAN NUMBER: SY074707.000.12.7	SHEET 1 OF 1

PD GKO

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M.G.A

STAGE 3

DEVON STREET

COLQUHOUN STREET

UNWIN STREET

51

52

54

55

STAGE 2

53

59
2.135ha

60
3.318ha

63
3.633ha

64
2.35ha

56
SUBDIVISION

58
2.125ha

61
1.553ha

62
3.097ha

6
STAGE 1
SUBDIVISION

7

21 WIDE ROAD

PROPOSED

(G) (B) (L) (M) (H) (C) (A)

156.36 136.57 255.23 130 129.08 121.08 17.1 67 74.61 40m 88.14 21 178.69 208.52 155.61 155.79 156.07 136.65 136.72 100 137.66 130.085 139.49

RIPARIAN SETBACK

MEAN HIGH WATER

RIVER

BOUNDARY IS

DUCK

CARNARVAN STREET

2
DP 864567

NOTES:
1. ALL DIMENSIONS SHOWN HEREON ARE APPROXIMATE AND SUBJECT TO FINAL SURVEY
2. NO CADASTRAL SURVEY HAS BEEN UNDERTAKEN

(A) EASEMENT TO DRAIN WATER 10.2 & 13.4 WIDE (AC 424785)
(B) EASEMENT 6.095 WIDE (B309159) – SYDNEY WATER PIPELINE
(C) EASEMENT TO DRAIN WATER 13.4 WIDE (AC424784)
(G) PROPOSED EASEMENT FOR SERVICES 5 WIDE
(H) RIGHT OF ACCESS 21 WIDE AND VARIABLE WIDTH
(L) EASEMENT FOR OVERLAND FLOW 5 WIDE
(M) EASEMENT FOR PEDESTRIAN ACCESS 40 WIDE & VARIABLE WIDTH

20 0 40 100 140m

SCALE 1:1500

CLIENT

VE PROPERTY
PTY LTD

PROJECT

PLAN OF PROPOSED SUBDIVISION OF LOT 57 OF STAGE 2 OF SUBDIVISON OF LOT 100 IN DP1168951 STAGE 3

NOTES

The title boundaries shown hereon were not marked at the time of survey and have been determined by plan dimensions only and not by field survey.

Services shown hereon have been located where possible by field survey, If not able to be so located, services have been plotted from the records of relevant authorities where available and have been noted accordingly on the plan. Where such records do not exist or are inadequate a notation has been made hereon.

Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

8	GKO	23/11/2020	LOT 61 & 62 AMENDED
7	GKO	11/11/2020	AMEND RIPARIAN SETBACK & (H)
6	GKO	02/11/2020	LANDSCAPE SETBACK REMOVED
5	GKO	29/10/2020	PLAN AMENDED
4	GKO	20/10/2020	LOT BOUNDARIES AMENDED
3	GKO	24/07/2020	EASEMENTS DETAIL ADDED
2	GKO	17/07/2020	EASEMENT AMENDED
1	GKO	22/06/2020	INITIAL ISSUE

SYM	CODE	DESCRIPTION
	BIN	BIN
	BM	BENCH MARK
	BO	BOLLARD
	DJM	DRAINAGE MANHOLE
	EFP	ELEC FUSE BOX
	ELP	ELEC GARDEN LIGHT
	EL	ELEC GREEN PILLAR
	LP	ELEC LIGHT POLE
	EP	ELECT SINGLE PIT
	SPL	ELEC STAY POLE
	PP	ELEC POWER POLE
	ELP	ELEC POLE/LIGHT
	TRANS	ELE POLE/TRANSFORM
	FD	FUEL DIP
	GM	GAS MAIN
	GMR	GAS METER
	GAS	GAS VALVE
	AG	GATE
	GUL	GULLY PIT
	HYD	HYDRANT
	BOR	BOREHOLE

SYM	CODE	DESCRIPTION
	OFM	OPTICAL FIBRE MARKER
	OFP	OPTICAL FIBRE PIT
	TM	PALM TREE
	SE	SEAT
	TS	SHRUB
	TCA	TELSTRA PIT
	SLH	SEWER LAMP HOLE
	SMH	SEWER MANHOLE
	SVP	SEWER VENT PIPE
	SI	SIGN
	BUS	BUS STOP SIGN
	T	TREE
	SGL	TRAFFIC LIGHT
	SCL	TRAFFIC CONTROLLER
	SJX	TRAFFIC JUNCTION BOX
	US	UNKNOWN SERVICE
	WAV	WATER AIR VALVE
	WMR	WATER METER
	WEP	WATER PUMP
	WSV	WATER STOP VALVE
	WTP	WATER TAP

Symbols shown are indicative only. The symbol size and orientation does not necessarily represent the real size or orientation of the feature.

DRAINAGE PIPE U/G — SW
DRAIN — D
ELECT. CABLE A/G — E
ELEC. CABLE U/G — E
GAS PIPE — GAS
FENCE LINE
SEWERAGE PIPE — S
TELSTRA CABLE — T
WATER PIPE — W

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ISO 9001:2008
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HEIGHT DATUM: AHD	LOCAL AUTHORITY: CITY OF PARRAMATTA
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MERIDIAN: 56	CONTOUR INTERVAL: N/A
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CCAD FILE: 74707 ver 9 final subdivision	DRAWN: SF/CLP — DATE: 23/11/2020
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ARCHIVE FILE: SY074707.000.13.6	APPROVED: GKO — DATE: 23/11/2020

PLAN NUMBER: SY074707.000.13.8 — SHEET 1 OF 1

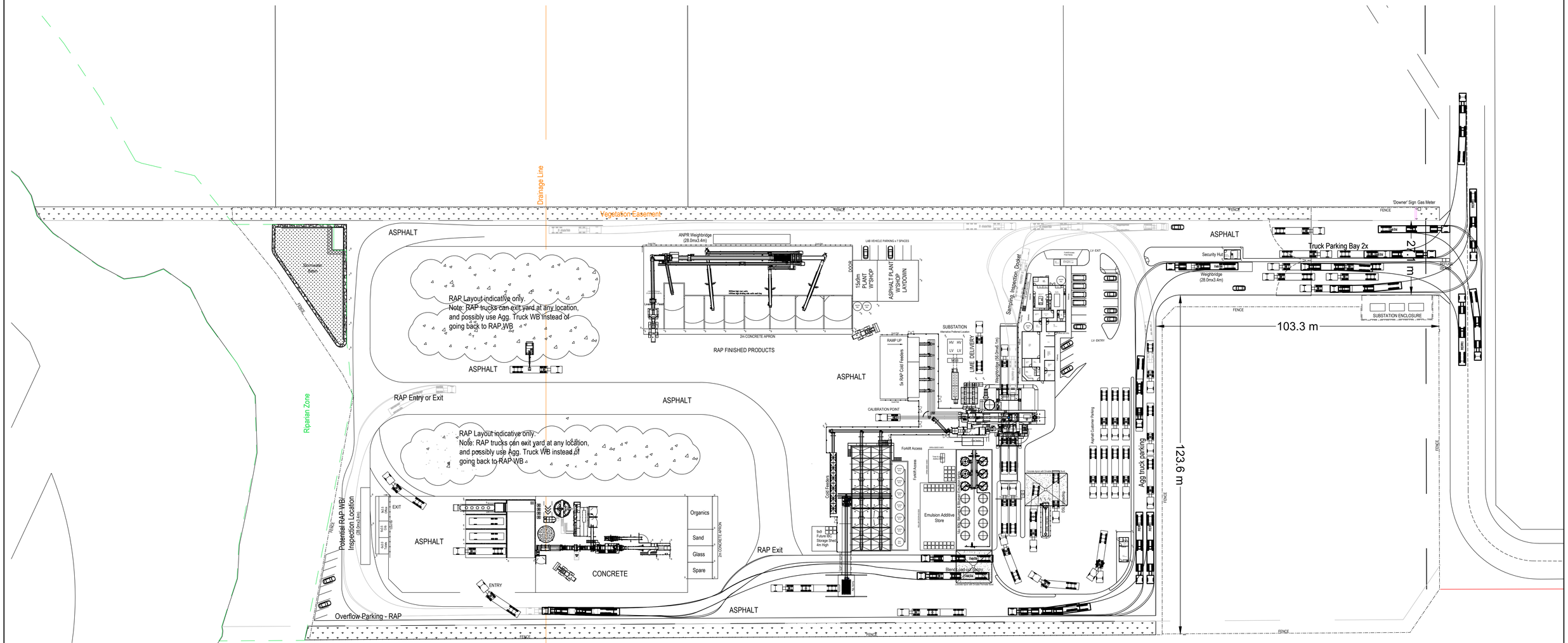
PD GKO

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APPENDIX B2

STAGE 1 CONCEPT PLAN



PROPOSED SITE LAYOUT
SCALE 1:500

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR APPROVAL

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	28.10.20	F
ISSUED FOR INFORMATION - FENCING ADDED	08.10.20	E
ISSUED FOR INFORMATION	01.10.20	D
ISSUED FOR INFORMATION	04.09.20	C
ISSUED FOR INFORMATION	21.08.20	B
ISSUED FOR INFORMATION	11.08.20	A

AMENDMENTS	DATE	ISSUE
ISSUED FOR APPROVAL	20.11.20	K
ISSUED FOR APPROVAL	13.11.20 (2)	J
ISSUED FOR APPROVAL	13.11.20	I
ISSUED FOR APPROVAL	12.11.20	H
ISSUED FOR TENDER	30.10.20	G

AMENDMENTS	DATE	ISSUE

CLIENT
DOWNER GROUP
TRINITI BUSINESS CAMPUS, 39 DELHI ROAD
NORTH RYDE NSW 2113
PH: (02) 9468 9700

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE
9 DEVON STREET, CLYDE NSW

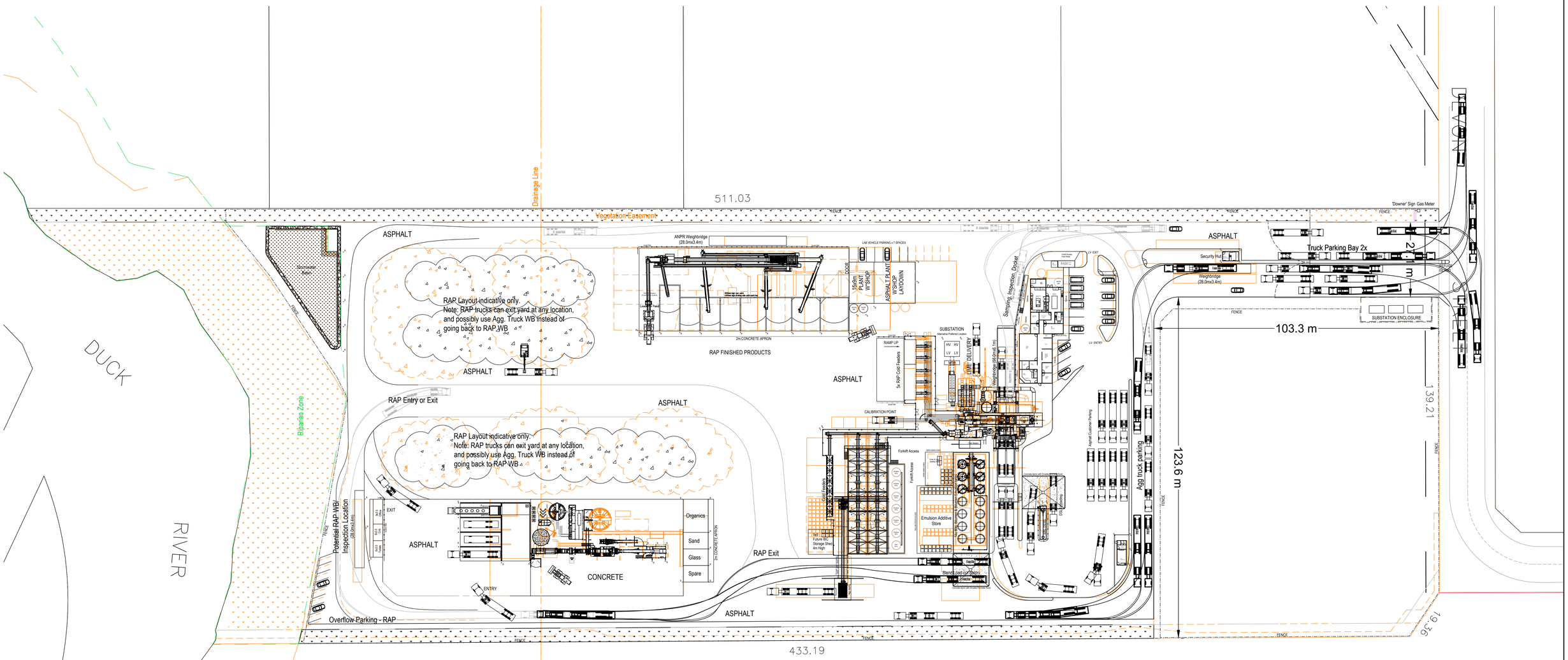
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF
XC	HU	AUG		A0	AS SHOWN	C013919.02-AR100

Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 448
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3721
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PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
PROPOSED SITE LAYOUT

DRAWING No. C013919.02-AR100 ISSUE K



PROPOSED SITE LAYOUT (WITH RTS CHANGES)
SCALE 1:500

LEGEND:

- DENOTES PROPOSED SITE LAYOUT REVISED FOR RTS
- DENOTES SITE LAYOUT PREVIOUSLY SUBMITTED

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR APPROVAL

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	20.11.20	A

CLIENT
DOWNER GROUP
TRINITI BUSINESS CAMPUS, 39 DELHI ROAD
NORTH RYDE NSW 2113
PH: (02) 9468 9700

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE
9 DEVON STREET, CLYDE NSW

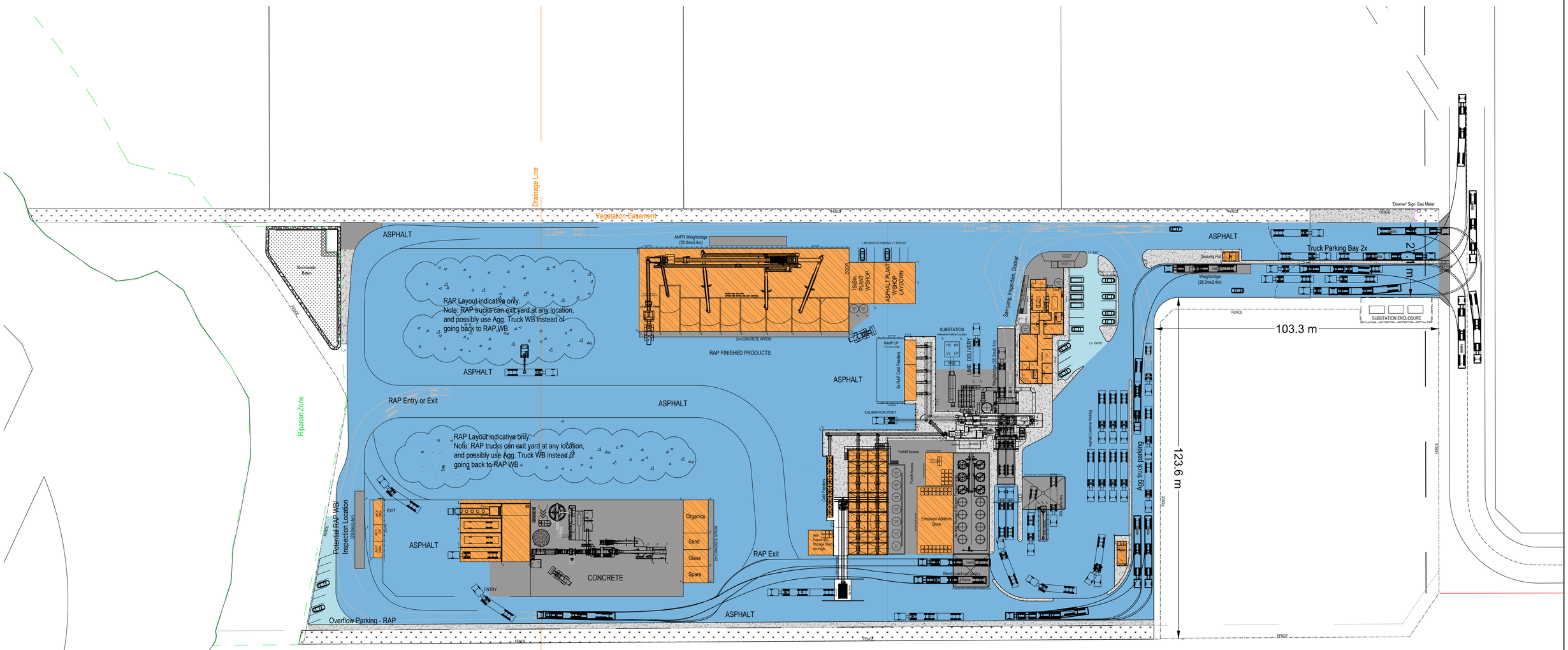
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	HU	AUG		A0	AS SHOWN	C013919.02-AR101

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DRAWING TITLE
PROPOSED SITE LAYOUT (WITH RTS CHANGES)

DRAWING No. C013919.02-AR101 ISSUE A



PROPOSED PAVEMENT LAYOUT
SCALE 1:500

LEGEND:

- HEAVY DUTY ASPHALT PAVEMENT
- LIGHT DUTY ASPHALT PAVEMENT
- ROOFED AREAS
- HEAVY DUTY CONCRETE PAVEMENT
- LIGHT DUTY CONCRETE PAVEMENT

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR APPROVAL

AMENDMENTS	DATE	ISSUE
ISSUED FOR APPROVAL	25.11.20	A

CLIENT: DOWNER GROUP
TRINITI BUSINESS CAMPUS, 39 DELHI ROAD
NORTH RYDE NSW 2113
PH: (02) 9468 9700

PROJECT: SUSTAINABLE ROAD RESOURCE CENTRE
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	HU	AUG		A0	AS SHOWN	C013919.02-AR200

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DRAWING TITLE: PROPOSED PAVEMENT LAYOUT
DRAWING No: C013919.02-AR200
ISSUE: A



APPENDIX B3

CIVILS AND STORMWATER

PROPOSED CENTRAL SYDNEY INDUSTRIAL ESTATE INCORPORATING NEW DOWNER SUSTAINABLE ROAD RESOURCE CENTRE.

9 DEVON STREET, CLYDE NSW 2142
PART LOT 100 DP1168951
CIVIL PACKAGE - SSD 10459

DRAWING LIST:

DRAWING NO.	DRAWING TITLE
C013919.01-DA10	DRAWING LIST & GENERAL NOTES
C013919.01-DA15	SERVICES ARRANGEMENT PLAN
C013919.01-DA21	EROSION AND SEDIMENT CONTROL PLAN- PHASE 1
C013919.01-DA22	EROSION AND SEDIMENT CONTROL PLAN- PHASE 2
C013919.01-DA23	EROSION AND SEDIMENT CONTROL PLAN- FINAL STAGE
C013919.01-DA25	EROSION AND SEDIMENT CONTROL DETAILS
C013919.01-DA31	BULK EARTHWORKS PLAN - PHASE 1
C013919.00-DA32	BULK EARTHWORKS PLAN - PHASE 2
C013919.00-DA35	BULK EARTHWORKS SECTIONS
C013919.00-DA41	STORMWATER DRAINAGE PLAN - PHASE 1
C013919.00-DA42	STORMWATER DRAINAGE PLAN - PHASE 2
C013919.00-DA45	STORMWATER DRAINAGE DETAILS - SHEET 1
C013919.00-DA46	STORMWATER DRAINAGE DETAILS - SHEET 2
C013919.00-DA51	FINISHED LEVELS PLAN - PHASE 1
C013919.00-DA60	PROPOSED PUBLIC ACCESS ROAD & TYPICAL SECTION



LOCALITY PLAN
NOT TO SCALE

ELECTRONIC INFORMATION NOTES:

1. THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
2. THE CONTRACTOR'S DIRECT AMENDMENT OR MANIPULATION OF THE DATA OR INFORMATION THAT MIGHT BE CONTAINED WITHIN AN ENGINEER-SUPPLIED DIGITAL TERRAIN MODEL AND ITS SUBSEQUENT USE TO UNDERTAKE THE WORKS WILL BE SOLELY AT THE DISCRETION OF AND THE RISK OF THE CONTRACTOR.
3. THE CONTRACTOR IS REQUIRED TO HIGHLIGHT ANY DISCREPANCIES BETWEEN THE DIGITAL TERRAIN MODEL AND INFORMATION PROVIDED IN THE CONTRACT AND/OR DRAWINGS AND IS REQUIRED TO SEEK CLARIFICATION FROM THE SUPERINTENDENT.
4. THE ENGINEER WILL NOT BE LIABLE OR RESPONSIBLE FOR THE POSSIBLE ON-GOING NEED TO UPDATE THE DIGITAL TERRAIN MODEL, SHOULD THERE BE ANY AMENDMENTS OR CHANGES TO THE DRAWINGS OR CONTRACT INITIATED BY THE CONTRACTOR.

GENERAL NOTES:

G1 THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ANY DISCREPANCY SHALL BE REFERRED TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

G2 ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE RELEVANT AND CURRENT STANDARDS AUSTRALIA CODES AND WITH THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITIES EXCEPT WHERE VARIED BY THE PROJECT SPECIFICATION.

G3 ALL DIMENSIONS SHOWN SHALL BE VERIFIED BY THE BUILDER ON SITE. ENGINEER'S DRAWINGS SHALL NOT BE SCALED FOR DIMENSIONS. ENGINEER'S DRAWINGS ISSUED IN ANY ELECTRONIC FORMAT MUST NOT BE USED FOR DIMENSIONAL SETOUT. REFER TO THE ARCHITECT'S DRAWINGS FOR ALL DIMENSIONAL SETOUT INFORMATION.

G4 DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE BUILDER TO KEEP THE WORKS AND EXCAVATIONS STABLE AT ALL TIMES.

G5 UNLESS NOTED OTHERWISE ALL LEVELS ARE IN METRES AND ALL DIMENSIONS ARE IN MILLIMETRES.

G6 ALL WORKS SHALL BE UNDERTAKEN IN ACCORDANCE WITH ACCEPTABLE SAFETY STANDARDS & APPROPRIATE SAFETY SIGNS SHALL BE INSTALLED AT ALL TIMES DURING THE PROGRESS OF THE JOB.

G7 ALL SERVICES ARE BASED ON 'DIAL BEFORE YOU DIG' INFORMATION. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL SERVICES ARE IDENTIFIED PRIOR TO THE COMMENCEMENT OF ANY WORKS.

SITE PREPARATION NOTES:

1. ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED BY THE GEOTECHNICAL REPORT.
2. EXISTING LEVELS ARE BASED ON INFORMATION PROVIDED BY LANDPARTNERS TITLED AS0205 Clyde_BE__200620 TIN DATED 08/07/20.
3. STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED.
4. COMPLETE CUT TO FILL EARTHWORKS TO ACHIEVE THE REQUIRED LEVELS AS INDICATED ON THE DRAWINGS WITHIN A TOLERANCE OF +0mm/-10mm THROUGH BUILDING PADS/PAVEMENTS AND +0mm/-20mm ELSEWHERE.
5. PREPARE STEEP BATTERS TO RECEIVE FILL BY CONSTRUCTING BENCHING TO FACILITATE FILL PLACEMENT AND COMPACTION.
6. AREAS TO RECEIVE FILL (THAT ARE NOT ON BENCHED BATTERS) AND AREAS IN CUT SHALL BE PROOF ROLLED TO IDENTIFY ANY SOFT HEAVING MATERIAL. SOFT MATERIAL SHALL BE BOXED OUT AND REMOVED PRIOR TO FILL PLACEMENT. PROOF ROLLING TO BE INSPECTED BY A GEOTECHNICAL ENGINEER OR THE EARTHWORKS DESIGNER.
7. SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
8. IMPORTED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HILF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HILF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
9. ALL ENGINEERED FILL PARTICLES SHALL BE ABLE TO BE INCORPORATED WITHIN A SINGLE LAYER. FURTHER, LESS THAN 30% OF PARTICLES SHALL BE RETAINED ON THE 37.5 MM SIEVE. ENGINEERED FILL SHALL BE ABLE TO BE TESTED IN ACCORDANCE WITH THE STANDARD COMPACTION METHOD (AS1289.5.4.1) OR HILF TEST METHOD (AS1289.5.7.1). THESE METHODS REQUIRE LESS THAN 20% RETAINED ON THE 37.5 MM SIEVE. WHERE BETWEEN 20% AND 30% OF PARTICLES ARE RETAINED ON THE 37.5 MM SIEVE THE ABOVE TEST METHODS SHALL STILL BE ADOPTED AND TEST REPORTS ANNOTATED APPROPRIATELY. THESE REQUIREMENTS SHOULD BE MET BY THE MATERIAL AFTER PLACEMENT AND COMPACTION
10. ALL THE EARTHWORKS UNDERTAKEN AND THE SUBGRADE CONDITION IN THE CUT AREAS (IN THE STATED PERIOD) ARE DOCUMENTED IN THE REPORTS AND HAVE BEEN UNDERTAKEN IN ACCORDANCE WITH THE SPECIFICATION.
11. PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
12. EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
13. MATCH EXISTING LEVELS AT BATTER INTERFACE.
14. CONTRACTOR TO MATCH EXISTING LEVELS AT THE INTERFACE OF EARTHWORKS AND EXISTING SURFACE AT BATTER LOCATIONS OR WHERE NO RETAINING WALLS ARE PRESENT. ANY DISCREPANCY BETWEEN DESIGN AND EXISTING LEVELS TO BE REFERRED TO THE ENGINEER FOR DIRECTION OR ADJUSTMENTS TO DESIGN LEVELS.
15. DURING EARTHWORKS THE CONTRACTOR IS TO ENSURE ALL AREAS ARE FREE DRAINING & WILL NOT RETAIN WATER DURING RAINFALL. PROVIDE TEMPORARY MEASURES AS REQUIRED TO ENSURE FREE FLOWING RUNOFF THROUGH MANAGED DRAINAGE PATHS, DIVERSION DRAINS OR OTHER SUITABLE DISPOSAL METHOD AS AGREED DURING THE WORKS. REFER ANY CONCERNS TO THE ENGINEER. REFER TO EROSION AND SEDIMENT CONTROL DRAWINGS AND NOTES.

STORMWATER DRAINAGE NOTES:

1. ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3:2003 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
2. THE MINOR (PIPED) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 20 YEAR ARI STORM EVENT AND THE MAJOR (OVERLAND) SYSTEM HAS BEEN DESIGNED FOR THE 1 IN 100 YEAR ARI STORM EVENT.
3. ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS C013730.00-C51 TO C53.
4. PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
5. EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
6. ALL STORMWATER PIPES Ø375 OR GREATER SHALL BE CLASS 2 (WITH HS2 SUPPORT) REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
7. ALL PIPES UP TO AND INCLUDING Ø300 TO BE uPVC GRADE SN8 UNO.
8. PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
9. ALL CONCRETE PITS GREATER THAN 1000mm DEEP SHALL BE REINFORCED USING N12-200 EACH WAY CENTERED IN WALL AND BASE. LAP MINIMUM 300mm WHERE REQUIRED. ALL CONCRETE FOR PITS SHALL BE F'c 25 MPA. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
10. IN ADDITION TO ITEM 6 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
11. PIPES SHALL BE LAID AS PER PIPE LAYING DETAILS. PARTICULAR CARE SHALL BE TAKEN TO ENSURE THAT THE PIPE IS FULLY AND EVENLY SUPPORTED. RAM AND PACK FILLING AROUND AND UNDER BACK OF PIPES AND PIPE FAUCETS, WITH NARROW EDGED RAMMERS OR OTHER SUITABLE TAMPING DETAILS.
12. CONCRETE PIPES UNDER, OR WITHIN THE ZONE OF INFLUENCE OF PAVED AREAS SHALL BE LAID USING HS2 TYPE SUPPORT, AS A MINIMUM, IN ACCORDANCE WITH AS 3725. AGGREGATE BACKFILL SHALL NOT BE USED FOR PIPE BEDDING AND OR HAUNCH/SIDE SUPPORT.
13. WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Ø100 uPVC TO EACH SIDE OF PIPE.
14. ALL SUBSOIL DRAINAGE LINES SHALL BE Ø100 SLOTTED uPVC WITH APPROVED FILTER WRAP LAID IN 300mm WIDE GRANULAR FILTER UNLESS NOTED OTHERWISE. LAY SUBSOIL LINES TO MATCH FALLS OF LAND AND/OR 1 IN 200 MINIMUM. PROVIDE CAPPED CLEANING EYE (RODDING POINT) AT UPSTREAM END OF LINE AND AT 30m MAX. CTS. PROVIDE SUBSOIL LINES TO ALL PAVEMENT/ LANDSCAPED INTERFACES, TO REAR OF RETAINING WALLS (AS NOMINATED BY STRUCTURAL ENGINEER) AND AS SHOWN ON PLAN.
15. ALL PIPE GRADES 1 IN 200 MINIMUM UNO.
16. PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
17. MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
18. PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY', THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' U.N.O.
19. PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
20. DOWN PIPES (DP) TO BE AS PER HYDRAULIC ENGINEERS DETAILS WITH CONNECTOR TO MATCH DP SIZE U.N.O. ON PLAN. PROVIDE CLEANING EYE AT GROUND LEVEL.
21. PIPE LENGTHS NOMINATED ON PLAN OR LONGSECTIONS ARE MEASURED FROM CENTER OF PITS TO THE NEAREST 0.5m AND DO NOT REPRESENT ACTUAL LENGTH. THE CONTRACTOR IS TO ALLOW FOR THIS.

EROSION CONTROL NOTES :

ALL CONTROL WORK INCLUDING DIVERSION BANKS AND CATCH DRAINS, V-DRAINS AND SILT FENCES SHALL BE COMPLETED DIRECTLY FOLLOWING THE COMPLETION OF THE EARTHWORKS.

1. SILT FENCES AND SILT FENCE RETURNS SHALL BE ERECTED CONVEX TO THE CONTOUR TO POND WATER.
2. HAY BALE BARRIERS AND GEOFABRIC FENCES ARE TO BE CONSTRUCTED TO TOE OF BATTER, PRIOR TO COMMENCEMENT OF EARTHWORKS, IMMEDIATELY AFTER CLEARING OF VEGETATION AND BEFORE REMOVAL OF TOP SOIL.
3. ALL TEMPORARY EARTH BERMS, DIVERSION AND SILT DAM EMBANKMENTS ARE TO BE MACHINE COMPACTED, SEEDED AND MULCHED FOR TEMPORARY VEGETATION COVER AS SOON AS THEY HAVE BEEN FORMED.
4. CLEAR WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO THE DRAINAGE SYSTEM.
5. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND PROVIDING ON GOING ADJUSTMENT TO EROSION CONTROL MEASURES AS REQUIRED DURING CONSTRUCTION.
6. ALL SEDIMENT TRAPPING STRUCTURES AND DEVICES ARE TO BE INSPECTED AFTER STORMS FOR STRUCTURAL DAMAGE OR CLOGGING, TRAPPED MATERIAL IS TO BE REMOVED TO A SAFE, APPROVED LOCATION.
7. ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE MAINTAINED UNTIL THE END OF THE DEFECTS LIABILITY PERIOD.
8. ALL EARTHWORKS AREAS SHALL BE ROLLED ON A REGULAR BASIS TO SEAL THE EARTHWORKS.
9. ALL FILL AREAS ARE TO BE LEFT WITH A BUND AT THE TOP OF THE SLOPE AT THE END OF EACH DAYS EARTHWORKS. THE HEIGHT OF THE BUND SHALL BE A MINIMUM OF 200MM.
10. ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
11. AFTER REVEGETATION OF THE SITE IS COMPLETE AND THE SITE IS STABLE IN THE OPINION OF A SUITABLY QUALIFIED PERSON ALL TEMPORARY WORK SUCH AS SILT FENCE, DIVERSION DRAINS ETC SHALL BE REMOVED.
12. ALL TOPSOIL STOCKPILES ARE TO BE SUITABLY COVERED TO THE SATISFACTION OF THE SITE MANAGER TO PREVENT WIND AND WATER EROSION.
13. ANY AREA THAT IS NOT APPROVED BY THE CONTRACT ADMINISTRATOR FOR CLEARING OR DISTURBANCE BY THE CONTRACTOR'S ACTIVITIES SHALL BE CLEARLY MARKED AND SIGN POSTED, FENCED OFF OR OTHERWISE APPROPRIATELY PROTECTED AGAINST ANY SUCH DISTURBANCE.
14. ALL STOCKPILE SITES SHALL BE SITUATED IN AREAS APPROVED FOR SUCH USE BY THE SITE MANAGER. A 6m BUFFER ZONE SHALL EXIST BETWEEN STOCKPILE SITES AND ANY STREAM OR FLOW PATH. ALL STOCKPILES SHALL BE ADEQUATELY PROTECTED FROM EROSION AND CONTAMINATION OF THE SURROUNDING AREA BY USE OF THE MEASURES APPROVED IN THE EROSION AND SEDIMENTATION CONTROL PLAN.
15. ACCESS AND EXIT AREAS SHALL INCLUDE SHAKE-DOWN OR OTHER METHODS APPROVED BY THE SITE MANAGER FOR THE REMOVAL OF SOIL MATERIALS FORM MOTOR VEHICLES.
16. THE CONTRACTOR IS TO ENSURE RUNOFF FROM ALL AREAS WHERE THE NATURAL SURFACE IS DISTURBED BY CONSTRUCTION, INCLUDING ACCESS ROADS, DEPOT AND STOCKPILE SITES, SHALL BE FREE OF POLLUTANTS BEFORE IT IS EITHER DISPERSED TO STABLE AREAS OR DIRECTED TO NATURAL WATERCOURSES.
17. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN SLOPES, CROWNS AND DRAINS ON ALL EXCAVATIONS AND EMBANKMENTS TO ENSURE SATISFACTORY DRAINAGE AT ALL TIMES WATER SHALL NOT BE ALLOWED TO POND ON THE WORKS UNLESS SUCH PONDING IS PART OF AN APPROVED ESCP / SWMP.

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.08.20	C
REVISED AS CLOUDED	21.07.20	B
ISSUED FOR INFORMATION	08.07.20	A

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	HU	MAY 20		A0	AS SHOWN	C013919.01-DA10

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Tel: (02) 9251-7699 Fax: (02) 9241-3721
email: mail@costinroe.com.au

FOR INFORMATION

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
DRAWING LIST & GENERAL NOTES

DRAWING NO. C013919.01-DA10

ISSUE C

DEVON STREET

COLQUHOUN STREET

UNWIN STREET

UPSTREAM FLOWS TO DISCHARGE TO RELOCATED STORMWATER DRAINAGE INFRASTRUCTURE

UPSTREAM FLOWS TO DISCHARGE TO RELOCATED STORMWATER DRAINAGE INFRASTRUCTURE

EASEMENT FOR SYDNEY WATER LINE 6.09M WIDE (B)

EASEMENT FOR SYDNEY WATER LINE 6.09M WIDE (B)

DRAINAGE EASEMENT

DRAINAGE EASEMENT

DRAINAGE EASEMENT

IL 3.05m

EXISTING PIPES TO BE REMOVED. SIZE TBC

PIPE SIZE TO MATCH EXISTING PIPE BEING REMOVED. SIZE TBC ON SITE

EXISTING HEADWALL TO BE REMOVED

IL 2.67m

IL 2.65m

IL 2.45m

CONSTRUCT NEW HEADWALL TO DISCHARGE TO EXISTING SWALE AT APPROX IL 2.40

10.2m WIDE EASEMENT

13.4m WIDE EASEMENT

13.4m WIDE EASEMENT

LIMIT OF WORKS FOR PHASE 2 OF THE DEVELOPMENT

SITE DISCHARGE POINT 1
DISCHARGE INTO DUCK RIVER AT APPROX IL 1.00m & FINAL POSITION TBC ON SITE.
PROVIDE 'NATURAL' ENERGY DISSIPATOR OUTLET.
REFER DA46.

APPROXIMATE 40m RIPARIAN SETBACK (USING ARTARMON CREEK)

APPROXIMATE EXTENT OF TREE LINE

DUCK RIVER

REFER DRAWING DA41 FOR DETAILS.

STAGE 2

SUBDIVISION

DEVELOPMENT AREA

PROPOSED ROAD

51 52 54 55 56 58 59 60 61 62 63 64

2.135ha 3.318ha 1.553ha 3.097ha 3.633ha 2.35ha

2 DP 864567

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LANDPARTNERS TITLED AS0205 Clyde_BE_200620 TIN DATED 08/07/20.

- SINGLE GRATED GULLY PIT (SGGP)
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- EXISTING DRAINAGE LINE TO BE REMOVED
- SUPER LOT BOUNDARY
- EXISTING ELECTRICAL LINNE
- EXISTING WATER LINE
- EXISTING SEWER LINE
- SEWER RISING MAIN
- 105kPa GAS MAIN
- Q100 FLOOD EXTENT
- APPROXIMATE EXTENT OF TREE LINE
- RIPARIAN SETBACK

SERVICES ARRANGEMENT PLAN
SCALE 1:1000

10m 0 10 20 30 40 50 60 70 80 90 100m
SCALE 1:1000 AT A0 SHEET SIZE

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
REVISED PER CLIENT COMMENTS	19.11.20	F
REVISED PER NEW SITE PLAN	18.11.20	E
ISSUED FOR INFORMATION	14.08.20	D
ISSUED FOR INFORMATION	12.08.20	C
REVISED AS CLOUDED	21.07.20	B
ISSUED FOR INFORMATION	08.07.20	A

AMENDMENTS	DATE	ISSUE
REVISED PER NEW SITE PLAN	30.11.20	H
REVISED PER CLIENT COMMENTS	20.11.20	G

AMENDMENTS	DATE	ISSUE

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF
XC	HU	MAY 20		A0	AS SHOWN	C013919.01- DA15

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PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
SERVICES ARRANGEMENT PLAN

DRAWING No. C013919.01- DA15

ISSUE H

DEVON STREET

DEVON STREET

COLQUHOUN STREET

UNWIN STREET

1
DA25

STABILISED CONSTRUCTION ENTRY.
REFER TO DETAIL ON DA25

CLEAN WATER FROM
UPSTREAM CATCHMENT

PROVIDE DIVERSION DRAIN
TO SEDIMENT BASIN

PROVIDE TEMPORARY BUND
BETWEEN DIRTY WATER AND
CLEAN WATER DIVERSION DRAIN.
TYPICAL

LIMIT OF WORKS FOR
PHASE 1 OF THE
DEVELOPMENT

PROVIDE DIVERSION DRAIN
TO SEDIMENT BASIN

PROVIDE SILT FENCE

PROVIDE SILT FENCE

REFER DRAWING DA22 FOR
EROSION AND SEDIMENT
CONTROL PLAN - PHASE 2.

PROVIDE DIVERSION DRAIN
TO SEDIMENT BASIN

SEDIMENT BASIN (PHASE 1):

CATCHMENT AREA	= 6.4 1ha
REQUIRED BASIN VOLUME	= 2037m³
BASE DIMENSIONS (L X W)	= 18m x 56m
TOP DIMENSIONS (L X W)	= 27m x 65m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 2100m³

PROVIDE SILT FENCE

EMERGENCY OVERFLOW WEIR
LENGTH = 5.0m.
DETAILS ON DA25

CLEAN WATER
DISCHARGE TO DUCK
RIVER VIA PUMPED
SYSTEM

APPROXIMATE 40m RIPARIAN SETBACK

APPROXIMATE EXTENT OF TREELINE

DUCK RIVER

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C013919.01-DA25.
SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER-THE BLUE BOOK'.
CAPACITY BASED UPON 5 DAY RAINFALL DEPTH AT 85th PERCENTILE INTENSITY (33.1mm).

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSED AND DEWATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

NOTES:
1. ASSUME TYPE D SOIL (CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)

LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS. TYPICAL (N.S.O.P.)

- SILT FENCE ONLY
- SITE BOUNDARY
- DIVERSION DRAIN
- CLEAN WATER DIVERSION DRAIN
- OVERLAND FLOW DIRECTION
- APPROXIMATE EXTENT OF TREE LINE
- RIPARIAN SETBACK

EROSION & SEDIMENT CONTROL NOTE:

REFER TO DA10 FOR EROSION & SEDIMENT CONTROL NOTES

EROSION & SEDIMENT CONTROL PLAN - PHASE 1

SCALE 1:1000

FOR INFORMATION

10m 0 10 20 30 40 50 60 70 80 90 100m
SCALE 1:1000 AT A0 SHEET SIZE

AMENDMENTS	DATE	ISSUE
REVISED PER NEW SITE PLAN	30.11.20	F
REVISED PER CLIENT COMMENTS	20.11.20	E
REVISED PER NEW SITE PLAN	18.11.20	D
ISSUED FOR INFORMATION	12.08.20	C
REVISED AS CLOUDED	21.07.20	B
ISSUED FOR INFORMATION	03.07.20	A

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD
RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	HU	MAY 20		A0	AS SHOWN	C013919.01- DA21

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Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
EROSION & SEDIMENT CONTROL
PLAN - PHASE 1

DRAWING No C013919.01- DA21

ISSUE F

STABILISED CONSTRUCTION ENTRY (ALTERNATE). REFER TO DETAIL ON DA25

PROVIDE SILT FENCE

STABILISED CONSTRUCTION ENTRY. REFER TO DETAIL ON DA25

CLEAN WATER FROM UPSTREAM CATCHMENT

PROVIDE DIVERSION DRAIN TO SEDIMENT BASIN

PROVIDE TEMPORARY BUND BETWEEN DIRTY WATER AND CLEAN WATER DIVERSION DRAIN. TYPICAL

PROVIDE SILT FENCE

PROVIDE CLEAN WATER DIVERSION DRAIN

KEEP EXISTING HEADWALL AND CLEAN WATER DRAIN TO DISCHARGE INTO EXISTING SWALE

PROVIDE SILT FENCE

PROVIDE DIVERSION DRAIN TO SEDIMENT BASIN

EXISTING GRASSED SWALE REMAINS IN PLACE.

EASEMENT FOR SYDNEY WATER LINE 6.09M WIDE (B3091959)

PROVIDE DIVERSION DRAIN TO SEDIMENT BASIN

PROVIDE DIVERSION DRAIN TO SEDIMENT BASIN

PROVIDE SILT FENCE

PROVIDE DIVERSION DRAIN TO SEDIMENT BASIN

PROVIDE DIVERSION DRAIN TO SEDIMENT BASIN

PROVIDE EARTH BUND TO DIVERT DIRTY WATER TO SEDIMENT BASIN AND TO SEPARATE PHASE 1 & 2 OF THE DEVELOPMENT.

REFER DRAWING DA21 FOR EROSION AND SEDIMENT CONTROL PLAN - PHASE 1.

LIMIT OF WORKS FOR PHASE 2 OF THE DEVELOPMENT

SEDIMENT BASIN (PHASE 2):

CATCHMENT AREA	= 25.3ha
REQUIRED BASIN VOLUME	= 8039m³
BASE DIMENSIONS (L X W)	= 120m x 40m
TOP DIMENSIONS (L X W)	= 129m x 49m
MAX SIDE SLOPE	= 1V:3H
DEPTH	= 1.5m
PROVIDED BASIN VOLUME	= 8315m³

PROVIDE SILT FENCE

APPROXIMATE 40m RIPARIAN SETBACK (USING AVERAGING RULE)

APPROXIMATE EXTENT OF TREE LINE

CLEAN WATER DISCHARGE TO DUCK RIVER VIA PUMPED SYSTEM

LIMIT OF WORKS FOR PHASE 2 OF THE DEVELOPMENT

NO LAND DISTURBED. EXISTING GRASS AND PAVEMENT TO REMAIN IN PLACE TO MINIMISE SEDIMENT RUNOFF.

EXISTING GRASSED SWALE REMAINS IN PLACE.

DUCK RIVER

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C013919.01-DA25.
SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER-THE BLUE BOOK'. CAPACITY BASED UPON 5 DAY RAINFALL DEPTH AT 85th PERCENTILE INTENSITY (33.1mm).

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

EACH BASIN IS TO HAVE A MARKER PLACED AS PER THE DETAIL TO INDICATE WHEN SEDIMENT IS TO BE REMOVED. REMOVED SEDIMENT IS TO BE CLASSED AND DEWATERED PRIOR TO REMOVAL FROM SITE.

ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

NOTES:
1. ASSUME TYPE D SOIL (CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)

LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS. TYPICAL (N.S.O.P.)

- SILT FENCE ONLY
- SITE BOUNDARY
- DIVERSION DRAIN
- CLEAN WATER DIVERSION DRAIN
- OVERLAND FLOW DIRECTION
- APPROXIMATE EXTENT OF TREE LINE
- RIPARIAN SETBACK

EROSION & SEDIMENT CONTROL NOTE:

REFER TO DA10 FOR EROSION & SEDIMENT CONTROL NOTES

EROSION & SEDIMENT CONTROL PLAN - PHASE 2

SCALE 1:1000

FOR INFORMATION

10m 0 10 20 30 40 50 60 70 80 90 100m

SCALE 1:1000 AT A0 SHEET SIZE

AMENDMENTS	DATE	ISSUE
REVISED PER NEW SITE PLAN	30.11.20	F
REVISED PER CLIENT COMMENTS	20.11.20	E
REVISED PER NEW SITE PLAN	18.11.20	D
ISSUED FOR INFORMATION	12.08.20	C
REVISED AS CLOUDED	21.07.20	B
ISSUED FOR INFORMATION	08.07.20	A

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	HU	MAY 20		A0	AS SHOWN	C013919.01- DA22

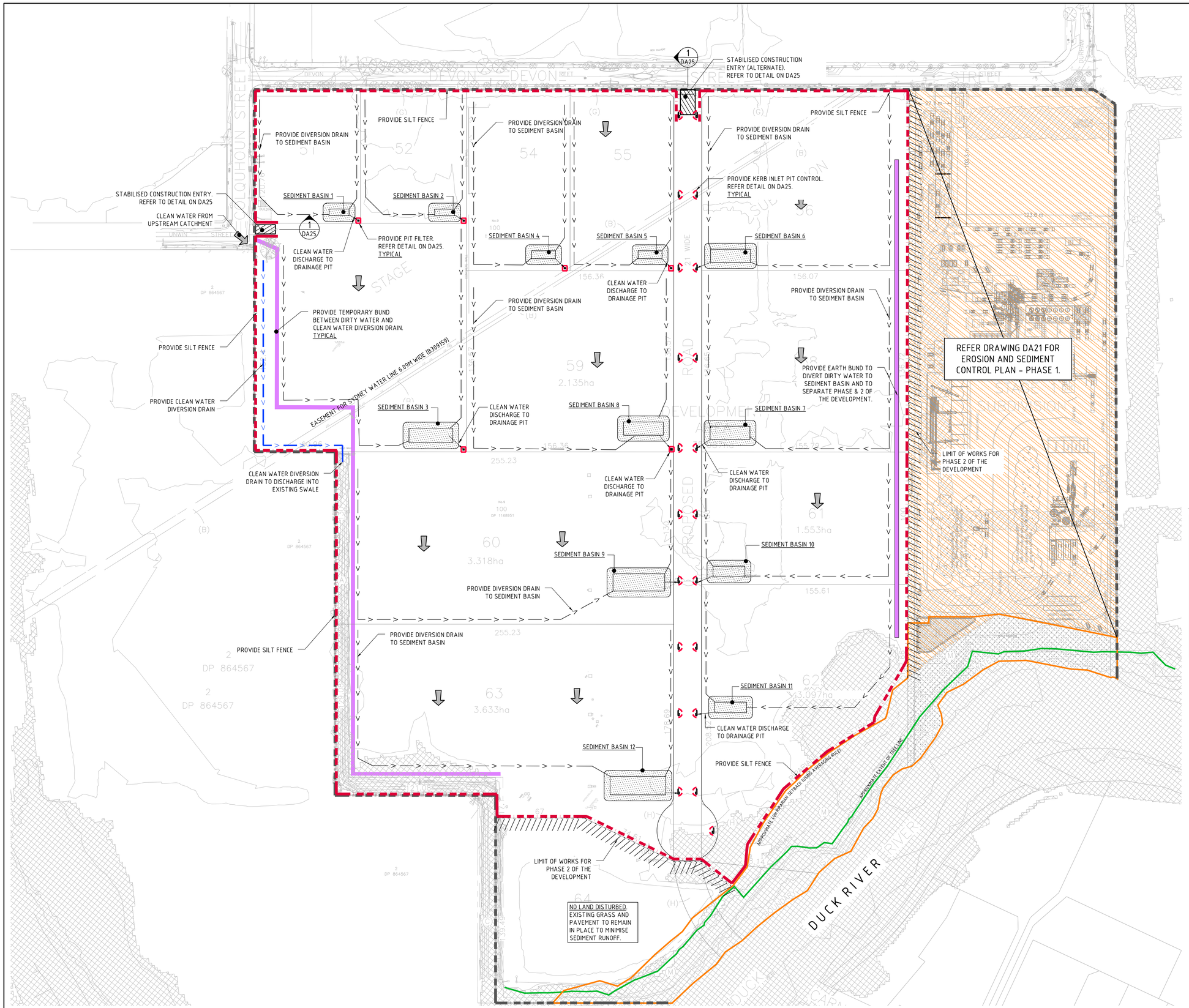
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DRAWING TITLE
EROSION & SEDIMENT CONTROL PLAN - PHASE 2

DRAWING No. C013919.01- DA22 ISSUE F



SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C013919.01-DA25.
SEDIMENTATION BASIN SIZING BASED ON RECOMMENDATIONS OF 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER-THE BLUE BOOK'. CAPACITY BASED UPON 5 DAY RAINFALL DEPTH AT 85th PERCENTILE INTENSITY (33.1mm).

SEDIMENTATION BASINS TO COLLECT RUN-OFF IN EXTREME RAINFALL EVENTS. COLLECTED RUN-OFF TO BE ASSESSED BY A QUALIFIED LABORATORY FOR DOUSING RATES OF ALUM OR GYPSUM TO ENSURE COAGULATION OF SEDIMENTS PRIOR TO WATER BEING DISCHARGED TO COUNCIL STORMWATER SYSTEM.

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ALLOWANCE TO BE MADE DURING BENCHING OF SITE TO ENSURE RUN-OFF IS DIRECTED TO SEDIMENTATION BASINS.

NOTES:
1. ASSUME TYPE D SOIL (CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)

LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS. TYPICAL (N.S.O.P.)

- SILT FENCE ONLY
- SITE BOUNDARY
- DIVERSION DRAIN
- CLEAN WATER DIVERSION DRAIN
- OVERLAND FLOW DIRECTION
- APPROXIMATE EXTENT OF TREE LINE
- RIPARIAN SETBACK

EROSION & SEDIMENT CONTROL NOTE:

REFER TO DA10 FOR EROSION & SEDIMENT CONTROL NOTES

SEDIMENT BASIN SCHEDULE

BASIN No.	CATCHMENT AREA (Ha.)	REQUIRED BASIN VOLUME	BASE DIMENSIONS (LxW)	TOP DIMENSIONS (LxW)	MAX SLIDE SLOPE	DEPTH	PROVIDED BASIN VOLUME
SEDIMENT BASIN 1	0.77	$244m^3$	15mX5m	24mX14m	1V:3H	1.5m	$285m^3$
SEDIMENT BASIN 2	0.77	$244m^3$	15mX5m	24mX14m	1V:3H	1.5m	$285m^3$
SEDIMENT BASIN 3	2.76	$876m^3$	33mX11m	42mX20m	1V:3H	1.5m	$878m^3$
SEDIMENT BASIN 4	1.03	$327m^3$	18mX6m	27mX15m	1V:3H	1.5m	$361m^3$
SEDIMENT BASIN 5	1.03	$327m^3$	18mX6m	27mX15m	1V:3H	1.5m	$361m^3$
SEDIMENT BASIN 6	2.06	$654m^3$	30mX10m	39mX19m	1V:3H	1.5m	$756m^3$
SEDIMENT BASIN 7	2.13	$675m^3$	30mX10m	39mX19m	1V:3H	1.5m	$756m^3$
SEDIMENT BASIN 8	2.14	$678m^3$	30mX10m	39mX19m	1V:3H	1.5m	$756m^3$
SEDIMENT BASIN 9	3.32	$1054m^3$	39mX13m	48mX22m	1V:3H	1.5m	$1147m^3$
SEDIMENT BASIN 10	1.55	$493m^3$	24mX8m	33mX17m	1V:3H	1.5m	$541m^3$
SEDIMENT BASIN 11	1.50	$477m^3$	24mX8m	33mX17m	1V:3H	1.5m	$541m^3$
SEDIMENT BASIN 12	3.63	$1154m^3$	42mX14m	51mX23m	1V:3H	1.5m	$1296m^3$

EROSION & SEDIMENT CONTROL PLAN - FINAL STAGE
SCALE 1:1000

FOR INFORMATION

10m 0 10 20 30 40 50 60 70 80 90 100m
SCALE 1:1000 AT A0 SHEET SIZE

AMENDMENTS	DATE	ISSUE
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ISSUED FOR INFORMATION	08.07.20	A

ARCHITECT

CLIENT

PROJECT: SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

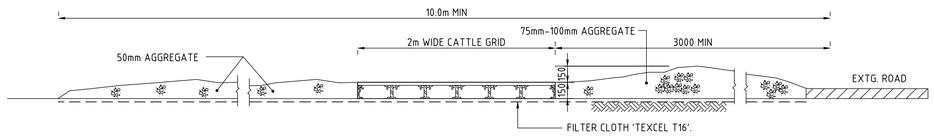
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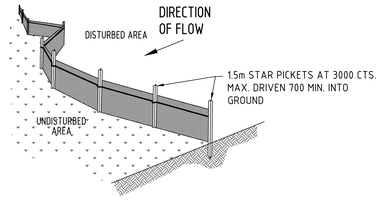
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DRAWING TITLE: EROSION & SEDIMENT CONTROL PLAN - FINAL STAGE

DRAWING No: C013919.01-DA23 ISSUE: F



SECTION 1:20 (1 / DA25) : STABILISED CONSTRUCTION ENTRANCE 'TRUCK SHAKER'

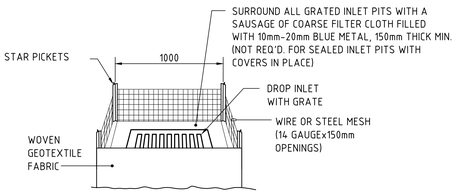


TYPICAL SILT FENCE DETAIL

N.T.S.

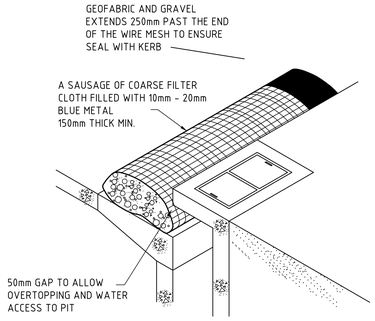
PROVIDE 1m RETURNS AT 30m INTERVALS.

TYPICAL



GRATED INLET PIT FILTER DETAIL

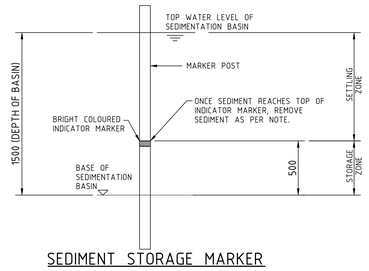
N.T.S



KERB INLET PIT CONTROL

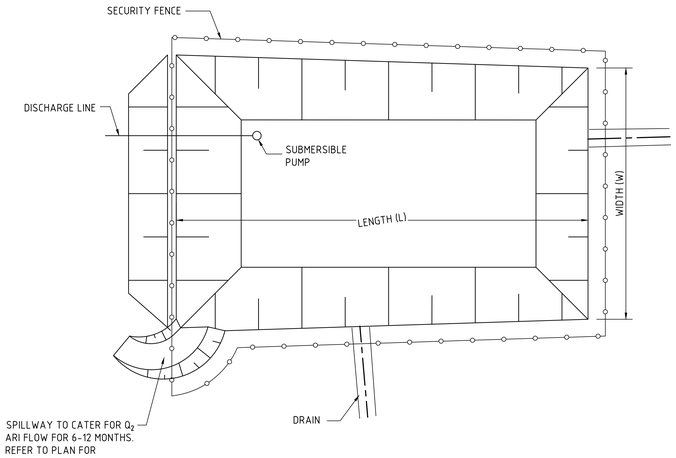
N.T.S

NOTE:- ADOPT ABOVE DETAILS AROUND ALL PITS WITHIN AREA ENCOMPASSED BY SILT FENCE & TO PITS ON THE ROAD ADJACENT TO SITE BOUNDARY.



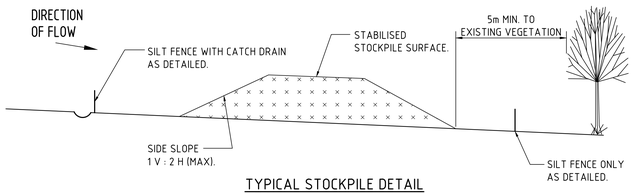
SEDIMENT STORAGE MARKER

SCALE 1:20



TYPICAL SEDIMENT CONTROL POND PLAN

SCALE 1:250

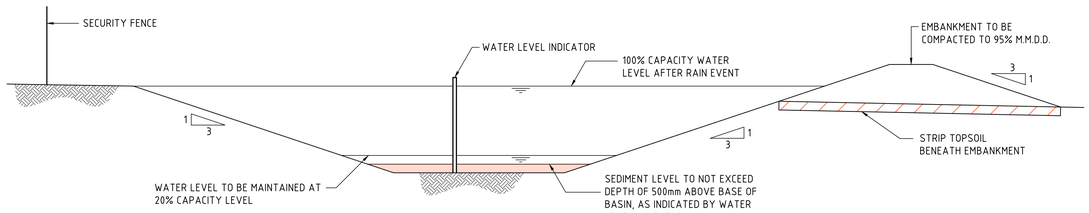


TYPICAL STOCKPILE DETAIL

N.T.S.

STOCKPILE NOTES

1. PLACE ALL STOCKPILES IN LOCATIONS MORE THAN 5m FROM EXISTING VEGETATION, ROADS & HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT ELONGATED MOUNDS. SIDE SLOPE TO BE 1 V: 2 H MAX.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE STOCKPILES ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE USING WOOD CHIP MULCH - 16 TONNE/Ha.
5. CONSTRUCT SILT FENCE WITH CATCH DRAIN ON UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES & SILT FENCE ONLY 1 TO 2m DOWNSLOPE AS SHOWN.



TYPICAL SEDIMENT CONTROL BASIN SECTION

SCALE 1:50

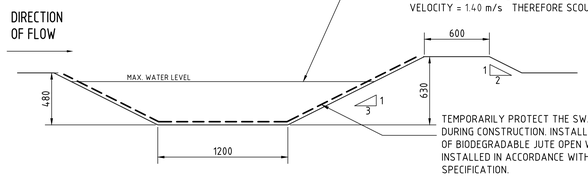
DIVERSION CHANNEL CAPACITY

Q5 = 1370 l/s (A=9.3Ha MAX.)

MANNINGS n=0.02, MIN. SLOPE = 0.5%

CHANNEL CAPACITY (d=400mm) = 1370 l/s + 20% FREEBOARD

VELOCITY = 1.40 m/s THEREFORE SCOUR PROTECTION REQ'D.



DIVERSION DRAIN SECTION

SCALE 1:20

500mm 0 1 2 3 4 5m

SCALE 1:50 AT A0 SHEET SIZE

2m 0 5 10 15 20 25m

SCALE 1:250 AT A0 SHEET SIZE

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A0 SHEET SIZE

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.08.20	B
ISSUED FOR INFORMATION	08.07.20	A

ARCHITECT

CLIENT

PROJECT: SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	HU	MAY 20		A0	AS SHOWN	C013919.01-DA25

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DRAWING TITLE: EROSION AND SEDIMENT CONTROL DETAILS

DRAWING No: C013919.01- DA25 ISSUE: B

DEVON STREET

COLQUHOUN STREET

UNWIN STREET

PROPOSED PAD
FFL 4.50
BEL 4.20

PROPOSED PAD
FFL 3.80
BEL 3.50

PROPOSED SWALE AND WALL ALONG EASTERN BOUNDARY. REFER TO DA35 FOR DETAILS.

LIMIT OF WORKS FOR PHASE 1 OF THE DEVELOPMENT

REFER DRAWING DA32 FOR BULK EARTHWORKS PLAN - PHASE 2.

LOCALLY FILL THROUGH 1%AEP FLOOD EXTENT AND PROVIDE FLOOD COMPENSATION IN PHASE 2 AS NOTED ON DRAWING DA32.

APPROXIMATE 50m RIPARIAN SETBACK (USING AFARMING REEL)

APPROXIMATE EXTENT OF TREE LINE

HATCHED AREA DENOTES APPROXIMATE EXTENT OF PRE-DEVELOPMENT FLOOD EXTENT FOR 1% AEP.

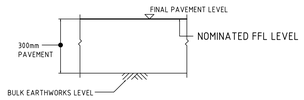
DUCK RIVER

CARNARVAN

LEGEND

LEVELS DATUM IS AHD.

- 4.50 - DESIGN CONTOUR (MAJOR 0.5m)
- 4.60 - DESIGN CONTOUR (MINOR 0.1m)
- 4.00 - EXISTING CONTOUR (0.25m INTERVALS)
- APPROXIMATE EXTENT OF TREE LINE
- RIPARIAN SETBACK



PAVEMENT DETAIL (LOT 6)
N.T.S.

PRELIMINARY BULK EARTHWORKS VOLUMES

PHASE 1 - DOWNER PAD (LOT 6) BULK EARTHWORKS VOLUME

CUT	= -	17,800 m³
FILL	= +	17,800 m³
BALANCE	=	NIL

IMPORT ALLOWANCE = + 10,000 m³ (MAX.)
(FOR SITE PRESENTATION & GENERAL FILLING OF REMEDIATED WORKS)

NO ALLOWANCE HAS BEEN MADE FOR DELETERIOUS MATERIAL, UNCONTROLLED FILL MATERIAL TO BE REWORKED, EROSION AND SEDIMENT CONTROL, BULKING OR COMPACTION OF FILLED SOILS OR TOPSOIL BLENDING.

NOTE:
FILLING LEVELS ARE APPROXIMATE ONLY.
LEVELS ARE BASED ON AN ANTICIPATED MASTERPLAN LAYOUT TO SUIT GENERAL INDUSTRIAL DEVELOPMENTS.
CHANGES MAY BE REQUIRED TO SUIT FUTURE DESIGN OF THE ESTATE AND FUTURE WAREHOUSE FACILITY ARRANGEMENT.

LEVELS NOTE:

LEVELS TO BE ±200mm FROM THOSE SHOWN.
FINAL LEVELS SUBJECT TO MINOR VARIATIONS TO SUIT DETAILED DESIGN.

FILL DEPTH RANGE

No.	FROM DEPTH	TO DEPTH	COLOUR
1	-3.100m	-2.500m	
2	-2.500m	-2.000m	
3	-2.000m	-1.500m	
4	-1.500m	-1.000m	
5	-1.000m	-0.500m	
6	-0.500m	0.000m	
7	0.000m	0.100m	
8	0.100m	0.300m	
9	0.300m	0.500m	
10	0.500m	1.000m	
11	1.000m	1.500m	
12	1.500m	2.000m	
13	2.000m	2.500m	
14	2.500m	3.000m	
15	3.000m	3.500m	

BULK EARTHWORKS PLAN - PHASE 1
SCALE 1:1000

10m 0 10 20 30 40 50 60 70 80 90 100m
SCALE 1:1000 AT A0 SHEET SIZE

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
REVISED PER CLIENT COMMENTS	20.11.20	F
REVISED PER NEW SITE PLAN	19.11.20	E
ISSUED FOR INFORMATION	12.08.20	D
REVISED AS CLOUDED	10.08.20	C
REVISED AS CLOUDED	21.07.20	B
ISSUED FOR INFORMATION	08.07.20	A

AMENDMENTS	DATE	ISSUE
REVISED PER NEW SITE PLAN	30.11.20	G

AMENDMENTS	DATE	ISSUE

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	HU	MAY 20		A0	AS SHOWN	C013919.01- DA31

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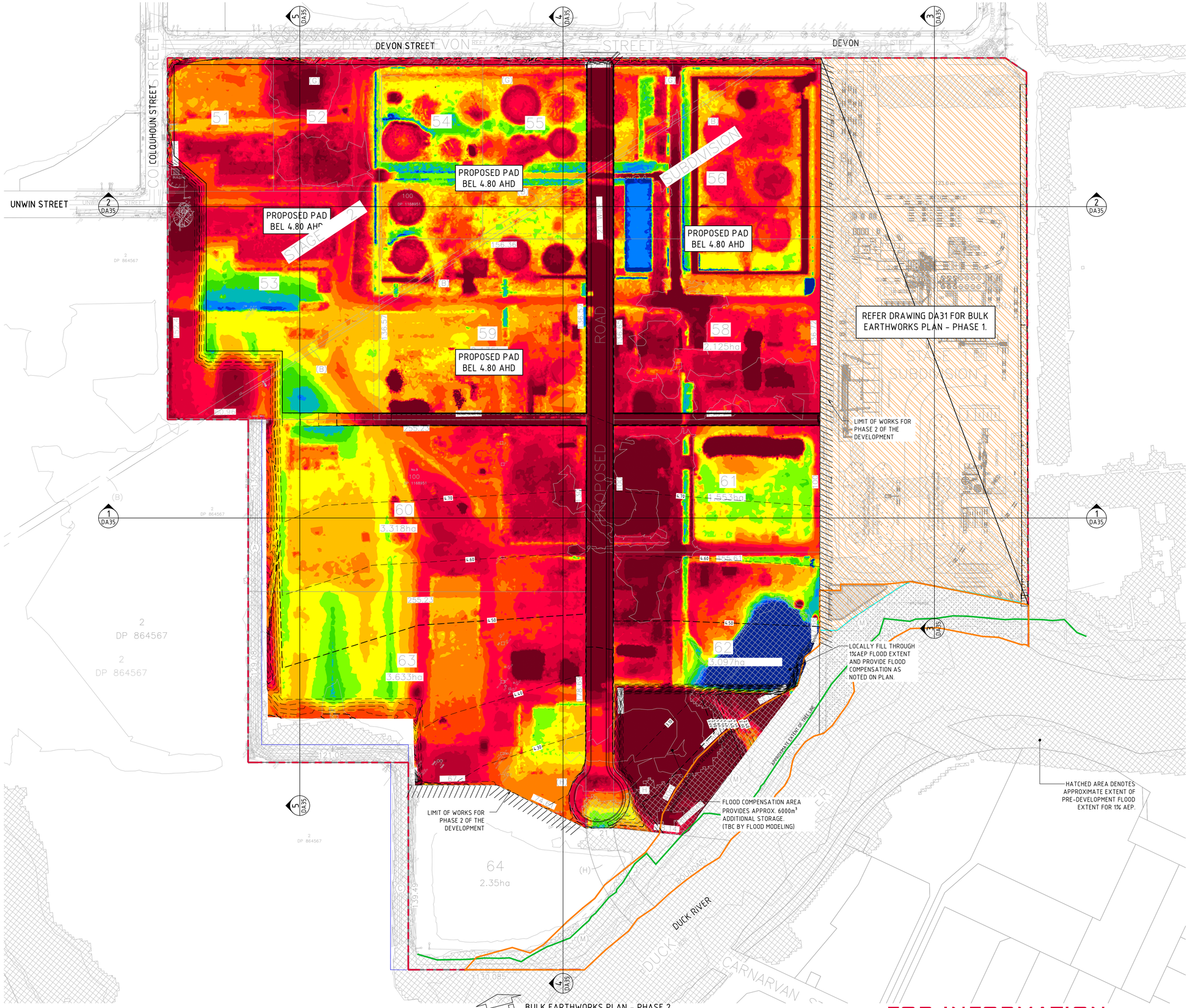
Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
BULK EARTHWORKS PLAN - PHASE 1

DRAWING No. C013919.01- DA31

ISSUE G

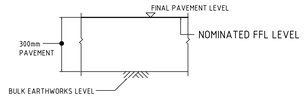


BULK EARTHWORKS PLAN - PHASE 2
SCALE 1:1000

LEGEND

LEVELS DATUM IS AHD.

- 4.50 – DESIGN CONTOUR (MAJOR 0.5m)
- 4.60 – DESIGN CONTOUR (MINOR 0.1m)
- 4.00 – EXISTING CONTOUR (0.25m INTERVALS)
- APPROXIMATE EXTENT OF TREE LINE
- RIPARIAN SETBACK



PAVEMENT DETAIL (LOT 6)
N.T.S.

PRELIMINARY BULK EARTHWORKS VOLUMES

PHASE 2 - LOT 1-7 BULK EARTHWORKS VOLUME

CUT	= -	33,000 m³
FILL	= +	33,000 m³
BALANCE	=	NIL
IMPORT ALLOWANCE (FOR SITE PRESENTATION & GENERAL FILLING OF REMEDIATED WORKS)	= +	20,000 m³ (MAX.)

EARTHWORKS VOLUME MAY CHANGE DEPENDING ON QUALITY OF SOURCE MATERIAL. NO ALLOWANCE HAS BEEN MADE FOR DELETERIOUS MATERIAL, UNCONTROLLED FILL MATERIAL TO BE REWORKED, EROSION AND SEDIMENT CONTROL, BULKING OR COMPACTION OF FILLED SOILS OR TOPSOIL BLENDING. ALLOW FOR CIRCA +20,000 m³ IMPORT FOR PAD.

NOTE:
FILLING LEVELS ARE APPROXIMATE ONLY.
LEVELS ARE BASED ON AN ANTICIPATED MASTERPLAN LAYOUT TO SUIT GENERAL INDUSTRIAL DEVELOPMENTS.
CHANGES MAY BE REQUIRED TO SUIT FUTURE DESIGN OF THE ESTATE AND FUTURE WAREHOUSE FACILITY ARRANGEMENT.

LEVELS NOTE:

LEVELS TO BE ±200mm FROM THOSE SHOWN.
FINAL LEVELS SUBJECT TO MINOR VARIATIONS TO SUIT DETAILED DESIGN.

FILL DEPTH RANGE

No.	FROM DEPTH	TO DEPTH	COLOUR
1	-2.000m	-0.500m	
2	-0.500m	-0.400m	
3	-0.400m	-0.300m	
4	-0.300m	-0.200m	
5	-0.200m	-0.100m	
6	-0.100m	0.000m	
7	0.000m	0.100m	
8	0.100m	0.200m	
9	0.200m	0.300m	
10	0.300m	0.400m	
11	0.400m	0.500m	
12	0.500m	0.600m	
13	0.600m	0.700m	
14	0.700m	0.800m	
15	0.800m	3.000m	

10m 0 10 20 30 40 50 60 70 80 90 100m
SCALE 1:1000 AT A0 SHEET SIZE

FOR INFORMATION

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ISSUED FOR INFORMATION	08.07.20	A
REVISED PER NEW SITE PLAN	30.11.20	G

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

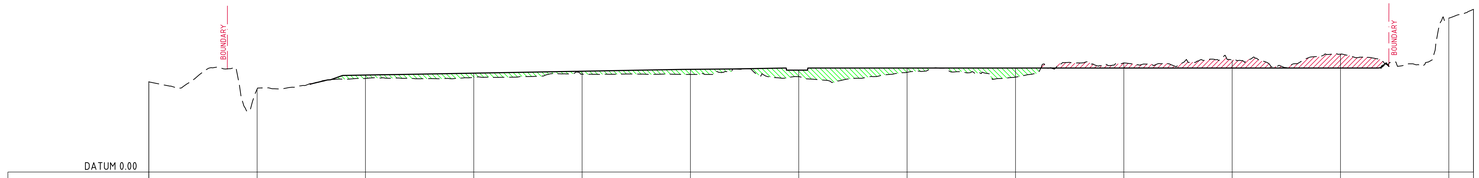
DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	HU	MAY 20		A0	AS SHOWN	C013919.01-DA32

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DRAWING TITLE
BULK EARTHWORKS PLAN - PHASE 2

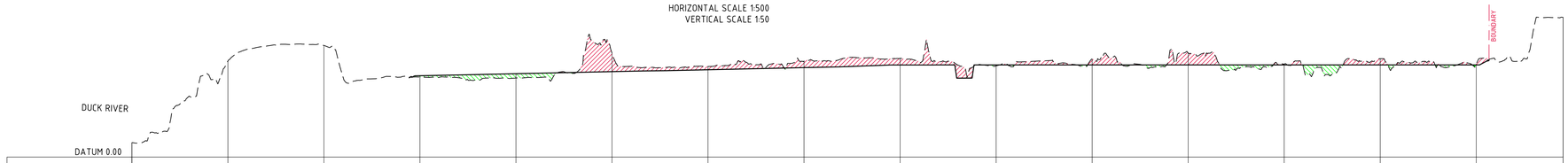
DRAWING No C013919.01-DA32 ISSUE G



DATUM 0.00

CHAINAGE	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000	550.000	600.000	611.390
EXISTING SURFACE LEVEL	4.17	3.826	4.321	4.366	4.513	4.503	4.400	4.598	4.379	5.037	5.053	5.442	7.104	7.51
BULK EARTHWORKS LEVEL			4.477	4.583	4.654	4.739	4.704	4.800	4.800	4.800	4.800	4.800		
CUT/FILL DEPTH			0.156	0.197	0.141	0.236	0.304	0.202	0.421	−0.237	−0.353	−0.642		

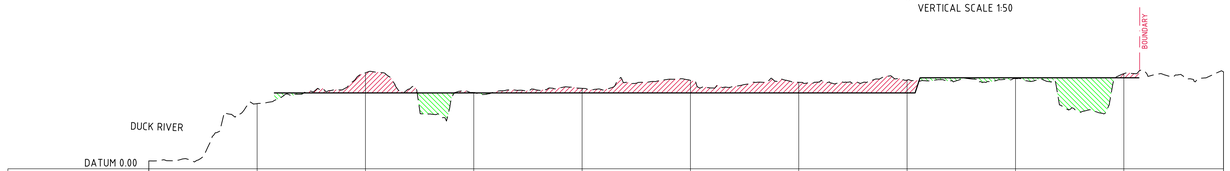
SECTION 5
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:50



DATUM 0.00

CHAINAGE	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000	550.000	600.000	650.000	700.000	745.908
EXISTING SURFACE LEVEL	0.74	5.003	5.817	4.866	4.116	5.409	4.179	4.994	5.140	4.745	4.800	5.429	4.854	4.800	4.844	7.28
BULK EARTHWORKS LEVEL				4.237	4.341	4.451	4.548	4.659	4.796	4.800	4.800	4.800	4.800	4.800	4.800	
CUT/FILL DEPTH				0.071	0.225	−0.958	−0.171	−0.336	−0.344	0.055	−0.326	−0.629	−0.054	−0.326	−0.044	

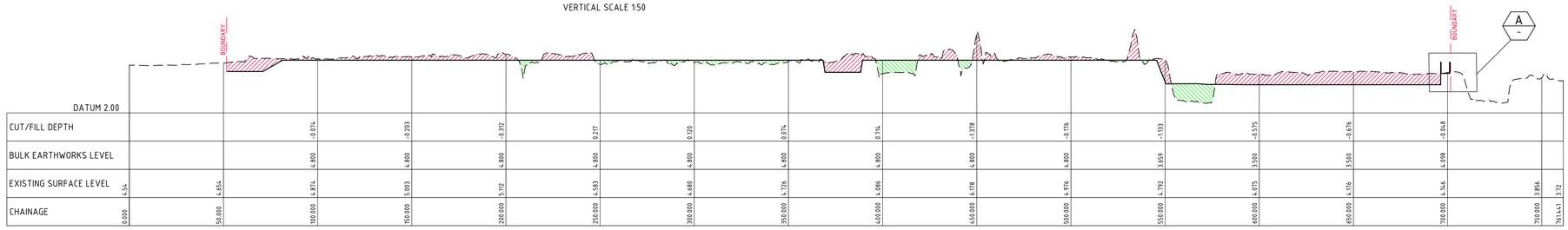
SECTION 4
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:50



DATUM 0.00

CHAINAGE	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	496.049
EXISTING SURFACE LEVEL	0.36	3.007	4.429	3.520	3.711	4.079	3.991	4.092	4.168	4.388	4.47
BULK EARTHWORKS LEVEL			3.500	3.500	3.500	3.500	3.500	3.500	4.200	4.200	
CUT/FILL DEPTH			−0.929	−0.020	−0.211	−0.579	−0.491	−0.592	0.032	−0.188	

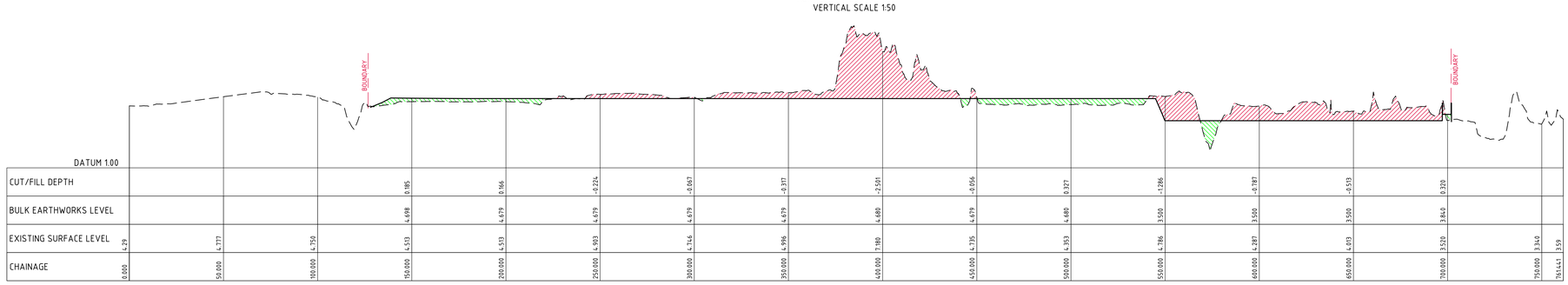
SECTION 3
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:50



DATUM 2.00

CHAINAGE	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000	550.000	600.000	650.000	700.000	750.000	761.441
EXISTING SURFACE LEVEL	4.54	4.654	4.674	5.603	5.112	4.583	4.680	4.726	4.686	6.178	4.976	4.792	4.075	4.716	4.146	3.856	3.72
BULK EARTHWORKS LEVEL			4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	4.800	3.650	3.500	3.500	4.098		
CUT/FILL DEPTH			−0.074	−0.203	−0.312	0.217	0.120	0.074	0.114	−1.378	−0.176	−1.133	−0.575	−0.676	−0.048		

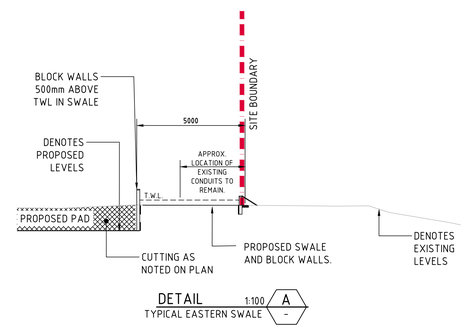
SECTION 2
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:50



DATUM 1.00

CHAINAGE	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000	550.000	600.000	650.000	700.000	750.000	761.441
EXISTING SURFACE LEVEL	4.29	4.777	4.750	4.513	4.513	4.903	4.746	4.996	7.180	4.735	4.553	4.386	4.287	4.693	3.520	3.240	3.59
BULK EARTHWORKS LEVEL				4.698	4.679	4.679	4.679	4.679	4.680	4.679	4.680	3.500	3.500	3.500	3.840		
CUT/FILL DEPTH				0.185	0.166	−0.224	−0.067	−0.317	−2.501	−0.056	0.127	−1.286	−0.787	−0.513	0.320		

SECTION 1
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:50



DETAIL 1:100 A
TYPICAL EASTERN SWALE

1m 0 1 2 3 4 5 6 7 8 9 10m
SCALE 1:100 AT A0 SHEET SIZE

10m 0 10 20 30 40 50 60 70 80 90 100m
SCALE 1:1000 AT A0 SHEET SIZE

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.08.20	C
REVISED FOR NEW SURVEY LEVELS	21.07.20	B
ISSUED FOR INFORMATION	08.07.20	A

AMENDMENTS DATE ISSUE | AMENDMENTS DATE ISSUE | AMENDMENTS DATE ISSUE

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD. REF.
XC	HU	MAY 20		A0	AS SHOWN	C013919.01-DA35

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DRAWING TITLE
BULK EARTHWORKS SECTIONS

DRAWING No. C013919.01-DA35 ISSUE C

REFER DRAWING DA42 FOR STORMWATER DRAINAGE PLAN - PHASE 2.

BIO-RETENTION BASIN
FILTER MEDIA AREA = 600 m²
BASIN FSL = 2.00m AHD
FILTER MEDIA = 0.5m DEEP
EXTENDED DETENTION DEPTH = 0.3m DEEP
SURFACE AREA NOMINATED FOR BIO-RETENTION FILTRATION EXCLUSIVE OF SCOUR PROTECTION, INLET STRUCTURE, & OUTLET STRUCTURE.

PROVIDE SEDIMENT FOREBAY & SCOUR PROTECTION AT OUTLET TO BASIN

GPT UNIT
ROCLA CDS1518 OR APPROVED EQUIVALENT

EXISTING OPEN CHANNEL SHOWN HATCHED

LIMIT OF WORKS FOR PHASE 1 OF THE DEVELOPMENT

PROVIDE CUT OFF VALVE TO FURTHEST DOWNSTREAM PIT PRIOR TO DISCHARGE FROM SITE. FULLY AUTOMATIC FOR FIRE FIGHTING EMERGENCIES. MANUAL OVERRIDE FOR SHUTTING DOWN DURING SPILLAGE.

SITE DISCHARGE POINT 1
DISCHARGE INTO DUCK RIVER AT APPROX IL 1.00m & FINAL POSITION TBC ON SITE. PROVIDE 'NATURAL' ENERGY DISSIPATOR OUTLET. REFER DA46.

Q100 FLOOD LEVEL = RL 3.76m AHD. (APPROX.)

PROPOSED RETAINING WALL (BOULDER WALL H=1.0m)

BASIN FSL 2.00

TOP OF BASIN RL 3.80

2-DA45

PIT A19 PIT A18 PIT A17 PIT A16 PIT A15 PIT A14 PIT A13 PIT A12 PIT A7 PIT A6 PIT A6-1 PIT A5 PIT A4 PIT A3 PIT A2 PIT A1 PIT A1-1 PIT A8 PIT A9 PIT A10 PIT A11

PIT B9 PIT B8 PIT B7 PIT B6 PIT B5 PIT B4 PIT B3 PIT B2 PIT B1

PIT C8 PIT C7 PIT C6 PIT C5 PIT C4 PIT C3 PIT C2 PIT C2-1 PIT C1

Vegetation Easement

ASPHALT

RAP Layout indicative only. Note: RAP trucks can exit yard at any location, and possibly use Agg. Truck WB instead of going back to RAP WB

RAP Entry or Exist

RAP Exit

RAP FINISHED PRODUCTS

EXISTING 600Ø PIPE

REFER STRUCTURAL DRAWINGS FOR INTERFACE OF RECONOMY SLAB AND EXISTING PIPE.

PROPOSED RAINWATER TANKS

PROPOSED RAINWATER TANKS

ASPHALT PLANT WSHOP LAYDOWN

PLANT WSHOP

SUBSTATION

SUBSTATION ENCLOSURE

Truck Parking Bay 2x

Agg truck parking

PROVIDE 3.0m BREAK IN THE KERB FOR OVERLAND FLOW. NOMINAL.

PROVIDE 3.0m BREAK IN THE KERB FOR OVERLAND FLOW. NOMINAL.

PROPOSED FRONT BLOCK CONNECTION.

27.1 m

103.3 m

123.6 m

DEVON STREET

Riparian Zone

APPROXIMATE 40m RIPARIAN SETBACK (USING AVERAGING RULE)

APPROXIMATE EXTENT OF TREE LINE

Potential HHD Inspection Location

Overflow Park

SITE BOUNDARY

5.0m WIDE OVERLAND FLOW CHANNEL FOR UPSTREAM CATCHMENT

EXISTING HEADWALLS

SITE DISCHARGE POINT
DISCHARGE INTO DUCK RIVER. FINAL POSITION TBC ON SITE. PROVIDE 'NATURAL' ENERGY DISSIPATOR OUTLET.

PUMP OUT PIT
CONNECT TO NEAREST STORMWATER PIT

UNDERGROUND RWS PIPES TO BE INSTALLED & CAPPED FOR FUTURE DP CONNECTION TO EMULSION/IBC ROOFS.

PIT SCHEDULE - NETWORK A

PIT No.	GRATE RL	TYPE	LID SIZE	COMMENT
PIT A01	3.80	SGGP	900X900	
PIT A02	3.80	SGGP	900X900	
PIT A02-1	3.70	SGGP	900X900	
PIT A03	3.93	SGGP	900X900	
PIT A04	3.93	SGGP	900X900	
PIT A5	3.80	SGGP	900X900	
PIT A6	3.82	SGGP	900X900	
PIT A6-1	3.90	SGGP	900X900	
PIT A7	3.80	SGGP	900X900	
PIT A8	3.80	SGGP	900X900	
PIT A9	3.80	SGGP	900X900	
PIT A10	3.80	SGGP	900X900	
PIT A11	3.80	SGGP	900X900	
PIT A12	3.75	SGGP	900X900	
PIT A13	3.80	SGGP	900X900	
PIT A14	3.80	SGGP	900X900	
PIT A15	3.70	SGGP	900X900	◯ WITH PIT INSERT
PIT A16	3.70	SGGP	900X900	
PIT A17	3.70	SGGP	900X900	◯ WITH PIT INSERT
PIT A18	3.75	SGGP	900X900	
PIT A19	3.80	SGGP	900X900	

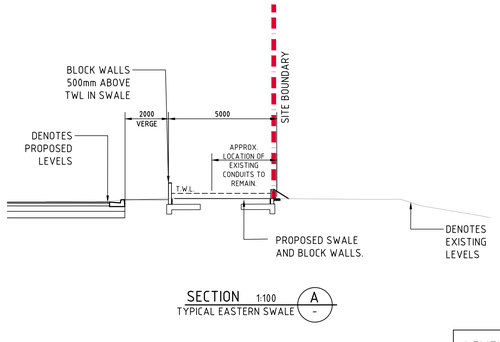
PIT SCHEDULE - NETWORK B

PIT No.	GRATE RL	TYPE	LID SIZE	COMMENT
PIT B01	4.00	SGGP	900X900	
PIT B02	4.10	SGGP	900X900	
PIT B03	4.10	SGGP	900X900	
PIT B04	3.80	SGGP	900X900	
PIT B05	3.70	SGGP	900X900	◯ WITH PIT INSERT
PIT B06	3.70	SGGP	900X900	◯ WITH PIT INSERT
PIT B07	3.70	SGGP	900X900	◯ WITH PIT INSERT
PIT B08	3.70	SGGP	900X900	◯ WITH PIT INSERT
PIT B09	3.70	SGGP	900X900	◯ WITH PIT INSERT

PIT SCHEDULE - NETWORK C

PIT No.	GRATE RL	TYPE	LID SIZE	COMMENT
PIT C01	3.90	SGGP	900X900	
PIT C02	3.90	SGGP	900X900	
PIT C02-1	3.90	SGGP	900X900	
PIT C03	4.10	SGGP	900X900	
PIT C04	4.10	SGGP	900X900	
PIT C5	3.90	SGGP	900X900	
PIT C6	3.90	SGGP	900X900	
PIT C7	3.80	SGGP	900X900	
PIT C8	3.80	SGGP	900X900	

CONCEPT STORMWATER DRAINAGE PLAN - PHASE 1
SCALE 1:500



SECTION 1:100 — A
TYPICAL EASTERN SWALE

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LANDPARTNERS TITLED AS0205 Clyde_BE_200620 TIN DATED 08/07/20.

- SGGP - SINGLE GRATED GULLY PIT (SGGP)
- SGGP - SGGP WITH PIT INSERT OR SILT MESH
- GD - GD, GRATED DRAIN (300W x 225D UNO)
- DP - ROOFWATER DOWNPIPE (INDICATIVE)
- RWP - ROOFWATER LINE
- DISH DRAIN - DISH DRAIN
- SWP - PROPOSED DRAINAGE LINE
- SWP - EXISTING DRAINAGE LINE
- SWP - EXISTING DRAINAGE LINE TO BE REMOVED
- SUPER LOT BOUNDARY
- Q100 FLOOD EXTENT
- APPROXIMATE EXTENT OF TREE LINE
- RIPARIAN SETBACK

LEVELS NOTE:

LEVELS TO BE ±500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO MINOR VARIATIONS TO SUIT DETAILED DESIGN.

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SHEET SIZE

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
REVISED PER CLIENT COMMENTS	20.11.20	F
REVISED PER CLIENT COMMENTS	19.11.20	E
REVISED PER NEW SITE PLAN	18.11.20	D
ISSUED FOR INFORMATION	12.08.20	C
REVISED AS CLOUDED	20.07.20	B
ISSUED FOR INFORMATION	08.07.20	A

AMENDMENTS	DATE	ISSUE
REVISED PER NEW SITE PLAN	30.11.20	G

AMENDMENTS	DATE	ISSUE

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	HU	MAY 20		A0	AS SHOWN	C013919.01- DA41

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PRECISION | COMMUNICATION | ACCOUNTABILITY

DRAWING TITLE
CONCEPT STORMWATER DRAINAGE PLAN - PHASE 1

DRAWING No C013919.01- DA41 ISSUE G

DEVON STREET

COLQUHOUN STREET

UNWIN STREET

PROPOSED PAD RL 4.80

PROPOSED PAD RL 4.80

PROPOSED PAD RL 4.80

PROPOSED PAD RL 4.80

PROPOSED PAD RL 4.80

PROPOSED PAD RL 4.80

PROPOSED PAD RL 4.80

PROPOSED PAD RL 4.55 TO RL 4.80

PROPOSED PAD RL 4.60 TO RL 4.80

PROPOSED PAD RL 4.40 TO RL 4.60

PROPOSED PAD RL 4.15 to RL 4.60

EASEMENT FOR SYDNEY WATER LINE 6.09M WIDE (B3105159)

DRAINAGE EASEMENT

10.2m WIDE EASEMENT

13.4m WIDE EASEMENT

13.4m WIDE EASEMENT

UPSTREAM FLOWS TO DISCHARGE TO RELOCATED STORMWATER DRAINAGE INFRASTRUCTURE

EXISTING PIPES TO BE REMOVED. SIZE TBC

PIPE SIZE TO MATCH EXISTING PIPE BEING REMOVED. SIZE TBC ON SITE

EXISTING HEADWALL TO BE REMOVED

CONSTRUCT NEW HEADWALL TO DISCHARGE TO EXISTING SWALE AT APPROX IL 2.40

LIMIT OF WORKS FOR PHASE 2 OF THE DEVELOPMENT

REFER DRAWING DA41 FOR STORMWATER DRAINAGE PLAN - PHASE 1.

APPROXIMATE 40m RIPARIAN SETBACK (USING ARTARMON CREEK)

APPROXIMATE EXTENT OF TREE LINE

PIT A1 IL 3.05m

PIT A2 IL 2.67m

PIT A3 IL 2.65m

IL 2.45m

PIT B1 PIT B2 PIT B3 PIT B4 PIT B5 PIT B6

PIT R1-A PIT R1 PIT R2-A PIT R2 PIT R3-A PIT R3 PIT R4-A PIT R4 PIT R5-A PIT R5 PIT R6-A PIT R6 PIT R7-A PIT R7 PIT R8-A PIT R8 PIT R9-A PIT R9 PIT R10-A PIT R10 PIT R11

SITE DISCHARGE POINT 1
DISCHARGE INTO DUCK RIVER AT APPROX IL 1.00m & FINAL POSITION TBC ON SITE.
PROVIDE 'NATURAL' ENERGY DISSIPATOR OUTLET.
REFER DA46.

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LANDPARTNERS TITLED AS0205 Clyde_BE_200620 TIN DATED 08/07/20.

- SINGLE GRATED GULLY PIT (SGGP)
- PROPOSED DRAINAGE LINE
- EXISTING DRAINAGE LINE
- EXISTING DRAINAGE LINE TO BE REMOVED
- SUPER LOT BOUNDARY
- Q100 FLOOD EXTENT
- APPROXIMATE EXTENT OF TREE LINE
- RIPARIAN SETBACK

PIT SCHEDULE

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
PIT A1	4.60	S.G.G.P	1200x1200	
PIT A2	4.50	S.G.G.P	1200x1200	
PIT A3	4.15	S.G.G.P	1200x1200	
PIT B1	4.80	S.G.G.P	1200x1200	
PIT B2	4.80	S.G.G.P	1200x1200	
PIT B3	4.80	S.G.G.P	1200x1200	
PIT B4	4.80	S.G.G.P	1200x1200	
PIT B5	4.80	S.G.G.P	1200x1200	
PIT B6	4.80	S.G.G.P	1500x1500	
PIT R1	4.19	K.I.P	900x900	
PIT R1-A	4.19	K.I.P	900x900	
PIT R2	4.17	K.I.P	900x900	
PIT R2-A	4.17	K.I.P	900x900	
PIT R3	4.15	K.I.P	1500x1500	
PIT R3-A	4.15	K.I.P	1200x1200	
PIT R4	4.13	K.I.P	1500x1500	
PIT R4-A	4.13	K.I.P	900x900	
PIT R5	4.10	K.I.P	3000x1500	
PIT R5-A	4.10	K.I.P	1500x900	
PIT R6	4.07	K.I.P	3000x900	
PIT R6-A	4.07	K.I.P	900x900	
PIT R7	4.05	K.I.P	3600x1500	
PIT R7-A	4.05	K.I.P	1500x900	
PIT R8	4.03	K.I.P	3600x1200	
PIT R8-A	4.03	K.I.P	900x900	
PIT R9	4.00	K.I.P	3600x1500	
PIT R9-A	4.00	K.I.P	900x900	
PIT R10	3.96	K.I.P	3600x1500	
PIT R10-A	3.96	K.I.P	1500x900	
PIT R11	3.92	K.I.P	3600x1500	

STORMWATER DRAINAGE NOTES:

REFER TO DA10 FOR STORMWATER NOTES.

CONCEPT STORMWATER DRAINAGE PLAN - PHASE 2
SCALE 1:1000

10m 0 10 20 30 40 50 60 70 80 90 100m
SCALE 1:1000 AT A0 SHEET SIZE

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
REVISED PER CLIENT COMMENTS	19.11.20	F
REVISED PER NEW SITE PLAN	18.11.20	E
ISSUED FOR INFORMATION	14.08.20	D
ISSUED FOR INFORMATION	12.08.20	C
REVISED AS CLOUDED	21.07.20	B
ISSUED FOR INFORMATION	08.07.20	A

AMENDMENTS	DATE	ISSUE
REVISED PER NEW SITE PLAN	30.11.20	H
REVISED PER CLIENT COMMENTS	20.11.20	G

AMENDMENTS	DATE	ISSUE

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF
XC	HU	MAY 20		A0	AS SHOWN	C013919.01-DA42

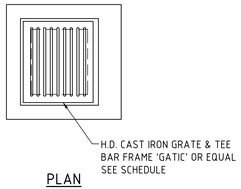
Costin Roe Consulting Pty Ltd.
Consulting Engineers
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-3721
email: mail@costinroe.com.au

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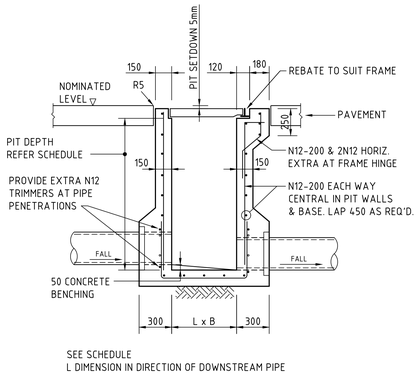
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DRAWING TITLE
CONCEPT STORMWATER DRAINAGE PLAN - PHASE 2

DRAWING No. C013919.01-DA42 ISSUE H



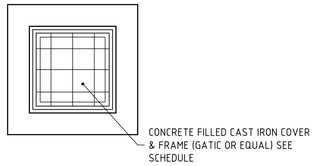
PLAN
SCALE 1:20



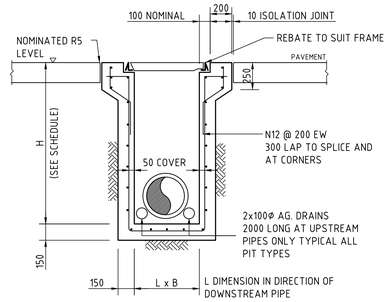
SEE SCHEDULE
L DIMENSION IN DIRECTION OF DOWNSTREAM PIPE

SECTION
SCALE 1:20

SINGLE GRATED GULLY PIT - SGGP

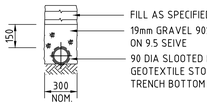


PLAN
1:20

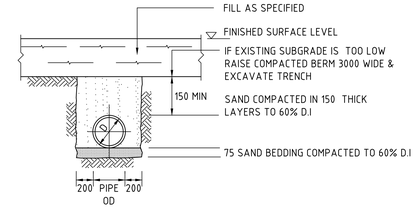


SECTION
SCALE 1:20

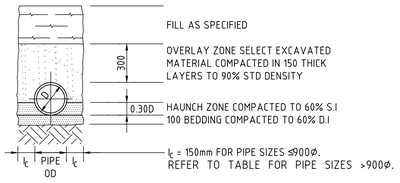
SEALED JUNCTION PIT - SJP



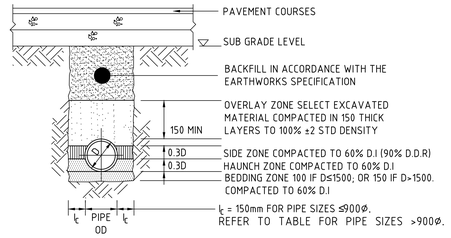
SUPPORT TO AG. DRAIN



SUPPORT TO uPVC PIPES



TYPE H1 SUPPORT TO CONCRETE PIPES AT LANDSCAPED AREAS



TYPE HS2 SUPPORT TO CONCRETE PIPES UNDER PAVEMENT

D≤ 1350, MAX FILL = 4.0m
D> 1350, MAX FILL = 3.0m

BEDDING & HAUNCH MATERIAL GRADING	
SIEVE SIZE	WEIGHT PASSING(%)
19	100
2.36	100 TO 50
0.60	90 TO 20
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

SIDE ZONE MATERIAL GRADING	
SIEVE SIZE	WEIGHT PASSING(%)
75	100
9.5	100 TO 50
2.36	100 TO 30
0.60	50 TO 15
0.075	25 TO 0

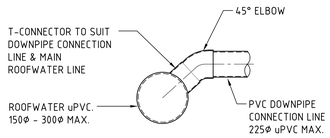
SELECT FILL MATERIAL IN ACCORDANCE WITH TABLE 1 AS 3725

SIDE ZONE WIDTH	
PIPE SIZE	t_t (mm)
≤900Φ	150
1050Φ	175
1200Φ	200
1350Φ	225
1500Φ	250
1650Φ	275
1800Φ	300

REFER TO ENGINEER FOR TRENCH WIDTHS FOR PIPE SIZES GREATER THAN 1800Φ

PIPE LAYING DETAILS

SCALE 1:20

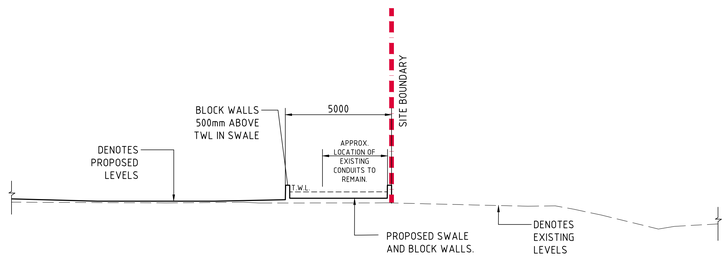


DOWN PIPE CONNECTION TO uPVC PIPE

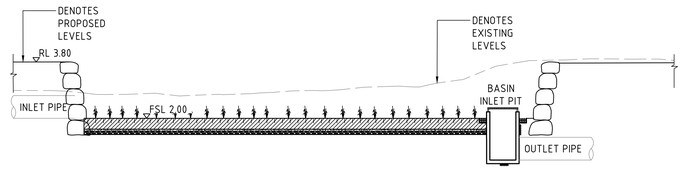
1. PROPRIETARY T-PIECE CONNECTORS SHALL BE USED TO WHERE DIRECT CONNECTIONS ARE REQUIRED TO uPVC PIPES .
2. ALL JOINTS TO BE SEALED WITH SOLVENT WELDED JOINTS.
3. THE PVC PIPE SHALL NOT PROTUDE BEYOND THE INNER SURFACE OF THE STORMWATER PIPE.

DOWNPIPE CONNECTION DETAILS

SCALE 1:20



SECTION 1:100 1 DA41
TYPICAL EASTERN SWALE



SECTION 1:100 2 DA41
BIO-RETENTION BASIN

200mm 0 500 1000 1500 2000mm
SCALE 1:20 AT A0 SHEET SIZE

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
ISSUED FOR INFORMATION	12.08.20	B
ISSUED FOR INFORMATION	21.07.20	A

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF
XC	HU	MAY 20		A0	AS SHOWN	C013919.01-DA45

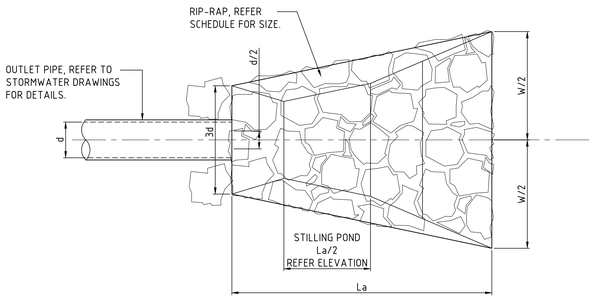
Costin Roe Consulting Pty Ltd.
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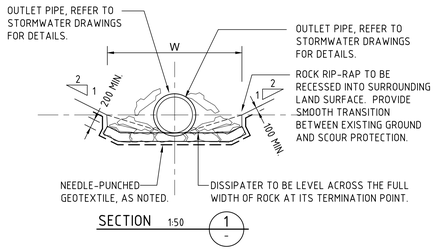
PRECISION | COMMUNICATION | ACCOUNTABILITY

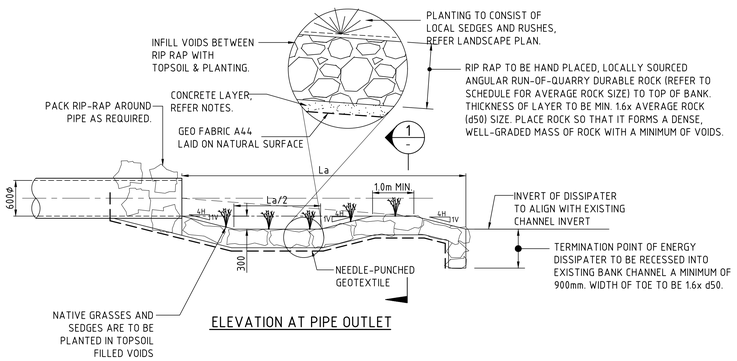
DRAWING TITLE
CONCEPT STORMWATER DRAINAGE DETAILS - SHEET 1

DRAWING No. C013919.01-DA45 ISSUE B



PLAN VIEW AT PIPE OUTLET





ELEVATION AT PIPE OUTLET

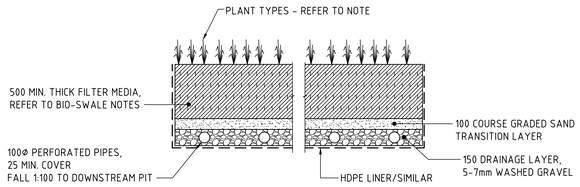
DISSIPATER NOTES:

1. ALIGN STRUCTURE EVENLY WITH BANK.
2. LOCATE STRUCTURE AT INVERT LEVEL OF STREAM AND POINT IN A DOWNSTREAM DIRECTION.
3. PIPE TO REST ON, AND BE PACKED IN, BY RIP-RAP (SIZE AS NOTED).
4. DISCHARGE INTO STREAM WHERE BEDROCK IS PRESENT, OTHERWISE SCOUR PROTECT AS REQUIRED.
5. SCOUR PROTECT THE OPPOSITE BANK AS REQUIRED. SCOUR PROTECTION TO BE PROVIDED WHERE OPPOSITE BANK IS WITHIN 12-14 TIMES THE PIPE DIAMETER.
6. RIP-RAP TO CONSIST OF ANGULAR RUN-OF-QUARRY ROCK (d50= 150mm MINIMUM) AS NOTED IN THE SCHEDULE. RIP-RAP TO BE MINIMUM THICKNESS OF RIP-RAP LAYER TO BE 1.6x AVERAGE ROCK SIZE (d50).
7. RIP-RAP IS TO BE PLACED OVER A 200mm LAYER OF MASS CONCRETE OVER NEEDLE-PUNCHED GEOFAB A44.
8. PLACE ROCK SO THAT IT FORMS A DENSE, WELL-GRADED MASS OF ROCK WITH A MINIMUM OF VOIDS. THE FINISHED RIP-RAP SURFACE SHOULD BE FREE OF POCKETS OF SMALL ROCK OR CLUSTERS OF LARGE ROCKS.
9. GAPS IN RIP-RAP TO BE HAND PACKED WITH TOPSOIL & PLANTED WITH NATIVE SEDGES & RUSHES TO PROVIDE. THE INTENT IS FOR THERE TO BE NO VOIDS BETWEEN RIP-RAP BOULDERS.
10. ENSURE THE FINISHED ROCK SURFACE BLENDS WITH THE SURROUNDING GROUND LEVELS. NO OVERFALL OR PROTRUSION OF ROCK SHOULD BE APPARENT.
11. ENSURE THAT STORMWATER FROM SURROUNDING GROUND IS FREE TO ENTER THE STRUCTURE WITHOUT CAUSING UNDESIRABLE PONDING OR SCOUR.

OUTLET	PIPE Φ	La	W	d_{50}	Q_1		Q_{20}	
					FLOW	VELOCITY	FLOW	VELOCITY
OUTLET 1 (DOWNER)	1050Φ	10m	12m	0.8m	0.86m^3/s	0.30m/s	1.90m^3/s	0.50m/s
OUTLET 2 (ESTATE)	2x1350Φ	15m	20m	1.0m	2.73m^3/s	0.40m/s	6.18m^3/s	0.60m/s

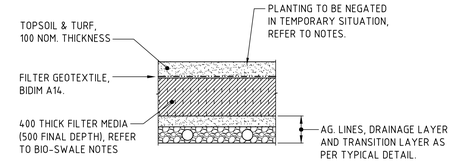
OUTLET STRUCTURES

SCALE 1:50



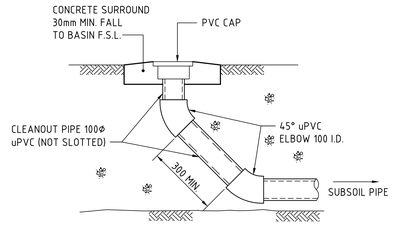
TYPICAL BIO-RETENTION DETAIL

SCALE 1:20



TEMPORARY BIO-RETENTION PROTECTION DETAIL

SCALE 1:20
TEMPORARY CONSTRUCTION REQUIREMENT DETAIL - REFER TO NOTES FOR IMPLEMENTATION PERIODS.



BIORETENTION CLEANOUT EYE ELEVATION

SCALE 1:20
DENOTED C.E. ON PLAN

BIO-RETENTION NOTES :

FILTER MEDIA TO BE LOAMY SAND WITH A PERMEABILITY NOT LESS THAN 200mm/hr. FILTER MEDIA TO BE FREE OF RUBBISH, DELETERIOUS MATERIAL, TOXICANTS, DECLARED PLANTS AND LOCAL WEEDS, AND IS TO NOT BE HYDROPHOBIC.

FILTER MEDIA TO HAVE THE FOLLOWING COMPOSITION RANGE:

CLAY & SILT (<0.05mm)	<3%
VERY FINE SAND (0.05-0.15mm)	5-30%
FINE SAND (0.15-0.25mm)	10-30%
MEDIUM TO COARSE SAND (0.25-1.00mm)	40-60%
COARSE SAND (1.0-2.0mm)	7-10%
FINE GRAVEL (2.0-3.4mm)	<3%

FILTER MEDIA THAT DOES NOT MEET THE FOLLOWING CRITERIA SHALL BE REJECTED:

a. ORGANIC MATTER CONTENT TO BE IDEALLY WITHIN 1% TO 3% (W/W) AND TO BE NO GREATER THAN 5%(W/W).
b. PH TO BE BETWEEN 5.5 AND 7.5
c. PHOSPHOROUS CONTENT TO BE NO GREATER THAN 35mg/kg

FILTER MEDIA TO BE ASSESSED BY QUALIFIED HORTICULTURALIST TO ENSURE CAPABILITY OF SUPPORTING PLANT LIFE.

DRAINAGE LAYER TO BE CLEAN GRAVEL 5-7mm.

PLANTS TO BE IN ACCORDANCE WITH PARRAMATTA CITY COUNCIL.

PROVIDE 100mm TOPSOIL AND TEMPORARY EROSION PROTECTION (JUTEMASTER OR EQUIV) TO SWALE BATTER SLOPES AND ADJACENT LANDSCAPED AREAS. NOTE THAT NO TOPSOIL IS TO BE PLACED OVER FILTRATION MEDIA. PROVIDE SILT FENCE TO TOP OF BANK UNTIL SUCH TIME AS THIS STABILISING AND VEGETATION HAS BEEN COMPLETED.

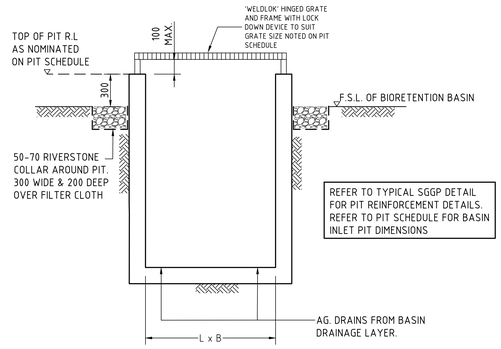
BIO-RETENTION TO BE PARTIALLY INSTALLED, FOLLOWING COMPLETION OF THE ROAD, WITH THE TOP 75-100mm OF FILTER MEDIA REPLACED WITH A FINE TO COARSE SAND UNDERLAIN WITH A GEOTEXTILE LAYER (REFER TO DETAIL). FOLLOWING COMPLETION OF THE UPSTREAM DEVELOPMENT AND SITE STABILISATION, THE SAND IS TO BE REMOVED, REPLACED WITH FILTER MATERIAL AND PLANTED OUT. REFER TO TEMPORARY BIO-BASIN DETAIL

PRIOR TO PLANTING, THE TOP 100mm OF THE BIORETENTION FILTER MEDIA IS TO BE AMELIORATED WITH APPROPRIATE ORGANIC MATTER, FERTILISER AND TRACE ELEMENTS TO AID PLANT ESTABLISHMENT AS PER THE TABLE BELOW:

TABLE: RECIPE FOR AMELIORATING TOP 100mm OF BIORETENTION FILTER MEDIA

CONSTITUENT	QUANTITY (kg/m2 OF FILTER AREA)
GRANULATED POULTRY MANURE FINES	50
SUPERPHOSPHATE	2
MAGNESIUM SULPHATE	3
POTASSIUM SULPHATE	2
TRACE ELEMENT MIX	1
FERTILISER NPK (16.4.14)	4
LIME	20

BIO-RETENTION BASIN DETAILS



SECTION

SCALE 1:20

BASIN INLET PIT - BIP

SCALE 1:20 AT A0 SHEET SIZE

200mm 0 500 1000 1500 2000mm

SCALE 1:20 AT A0 SHEET SIZE

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
REVISED AS CLOUDED	18.11.20	C
ISSUED FOR INFORMATION	12.08.20	B
ISSUED FOR INFORMATION	21.07.20	A

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD. REF.
XC	HU	MAY 20		A0	AS SHOWN	C013919.01-DA46

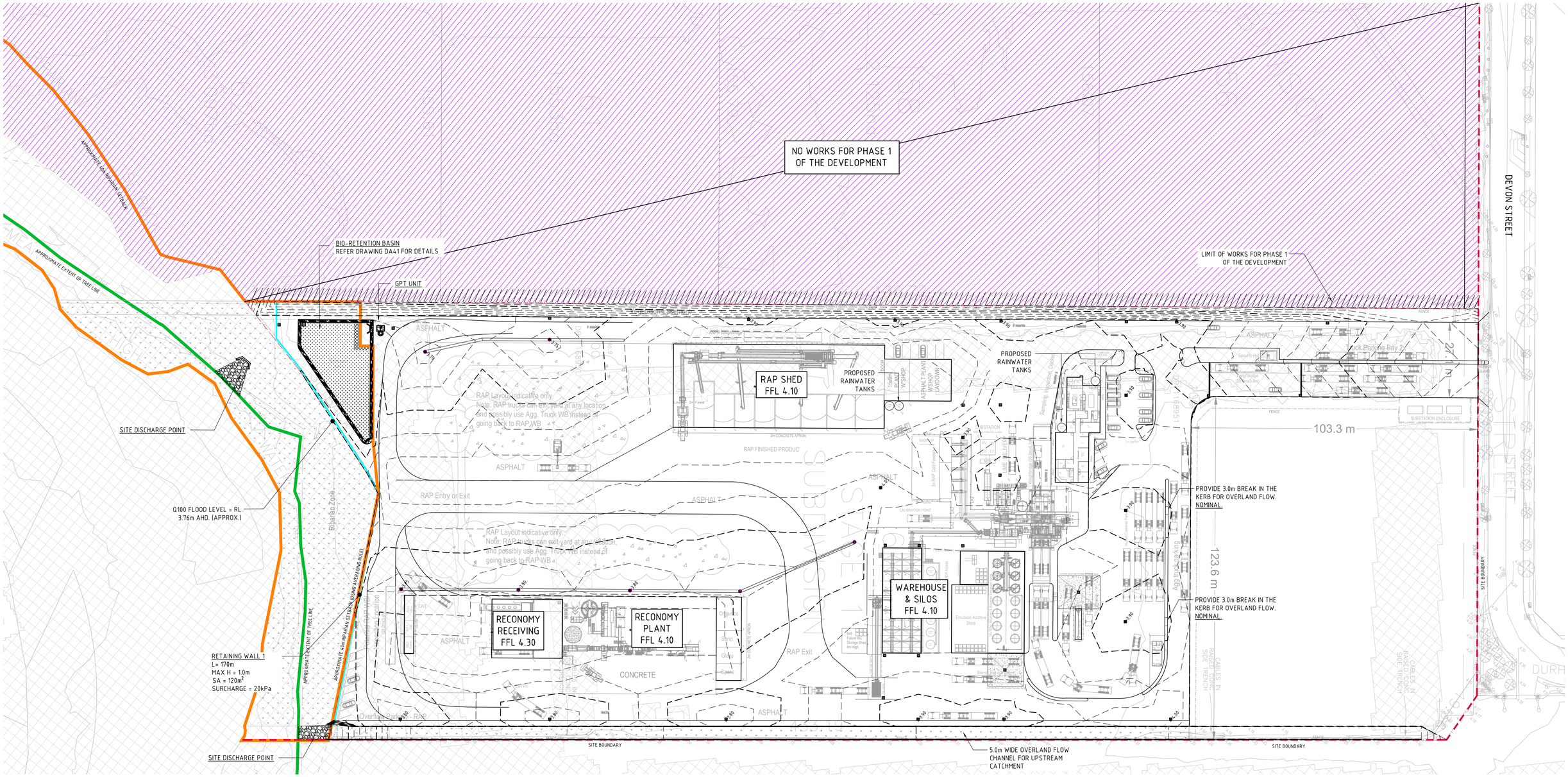
Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 988 446
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
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DRAWING TITLE
CONCEPT STORMWATER DRAINAGE DETAILS - SHEET 2

DRAWING No. C013919.01-DA46 ISSUE C



CONCEPT FINISHED LEVELS PLAN - PHASE 1
SCALE 1:500

LEGEND:

LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON SURVEY INFORMATION PROVIDED BY LANDPARTNERS TITLED AS0205 Clyde_BE_200620 TIN DATED 08/07/20.

- 4.00 - DESIGN CONTOUR (MAJOR 0.5m)
- 3.90 - DESIGN CONTOUR (MINOR 0.1m)
- 4.05 - EXISTING CONTOUR (0.25m INTERVALS)
- SINGLE GRATED GULLY PIT (SGGP)
- Q100 FLOOD EXTENT
- APPROXIMATE EXTENT OF TREE LINE
- RIPARIAN SETBACK

5m 0 10 20 30 40 50m
SCALE 1:1000 AT A0 SHEET SIZE

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
REVISED PER NEW SITE PLAN	30.11.20	E
REVISED PER NEW SITE PLAN	20.11.20	D
ISSUED FOR INFORMATION	12.08.20	C
REVISED AS CLOUDED	21.07.20	B
ISSUED FOR INFORMATION	08.07.20	A

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD REF:
XC	HU	MAY 20		A0	AS SHOWN	C013919.01- DA51

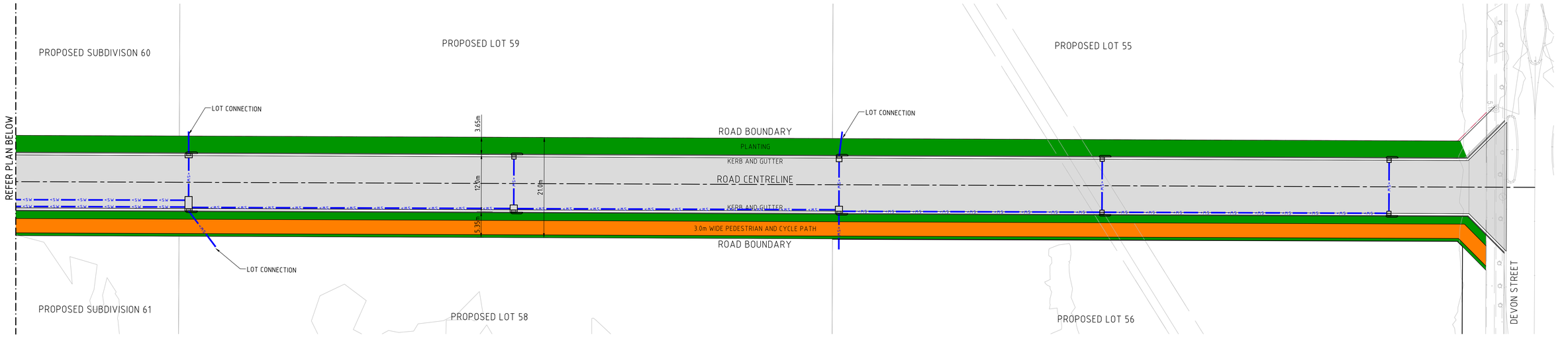
Costin Roe Consulting Pty Ltd.
Consulting Engineers ACN 003 696 448
Level 1, 8 Windmill Street
Walsh Bay, Sydney NSW 2000
Tel: (02) 9251-7699 Fax: (02) 9241-5731
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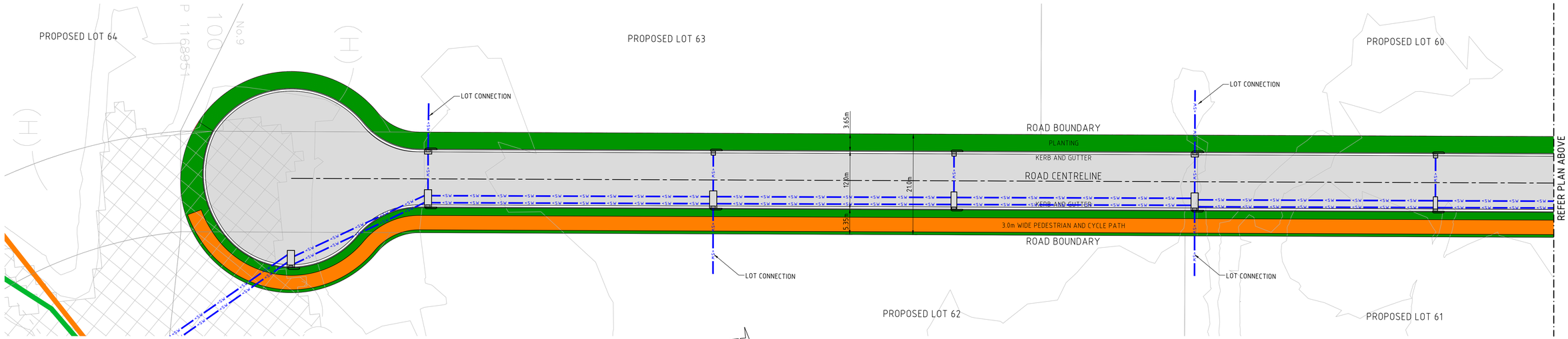
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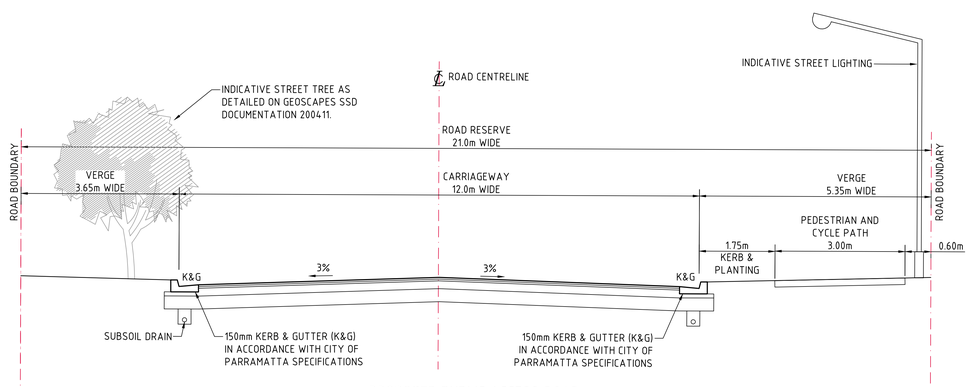
DRAWING TITLE:
CONCEPT FINISHED LEVELS PLAN - PHASE 1

DRAWING No: C013919.01- DA51 ISSUE: E





PROPOSED ACCESS ROAD
SCALE 1:300



PROPOSED PUBLIC ACCESS ROAD
TYPICAL CROSS SECTION
SCALE 1:50

500mm 0 1 2 3 4 5m
SCALE 1:50 AT A0 SHEET SIZE

3m 0 5 10 15 20 25 30m
SCALE 1:300 AT A0 SHEET SIZE

FOR INFORMATION

AMENDMENTS	DATE	ISSUE
REVISED PER NEW SITE PLAN	30.11.20	F
REVISED PER CLIENT COMMENTS	19.11.20	E
ISSUED FOR INFORMATION	18.11.20	D
ISSUED FOR INFORMATION	12.08.20	C
REVISED AS CLOUDED	21.07.20	B
ISSUED FOR INFORMATION	08.07.20	A

ARCHITECT

CLIENT

PROJECT
SUSTAINABLE ROAD RESOURCE CENTRE (PHASE 1)
9 DEVON STREET, CLYDE NSW

DESIGNED	DRAWN	DATE	CHECKED	SIZE	SCALE	CAD. REF.
XC	HU	MAY 20		A0	AS SHOWN	C013919.01- DA60

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DRAWING TITLE
PROPOSED PUBLIC ACCESS ROAD AND TYPICAL SECTION

DRAWING No. C013919.01- DA60 ISSUE F



APPENDIX B4

LANDSCAPE DRAWINGS

GEOSCAPES
LANDSCAPE ARCHITECTS

CENTRAL SYDNEY INDUSTRIAL ESTATE - SSD

9 DEVON STREET, ROSEHILL, NSW 2142

LANDSCAPE DESIGN REPORT

Report Ref: **200411_SSD_RPT_LAN_LDR01**

Prepared for:

VE PROPERTY

Prepared By:

Ben Gluszkowski
Director
Registered Landscape Architect #5868

GEOSCAPES
Suite 215/284 Victoria Avenue
Chatswood, NSW 2067

Geoscapes Pty Ltd
ABN 84 620 205 781
ACN 620 205 781

Document Status

Issue	Issue	Signature	Date
A	FOR SSD SUBMISSION	BG	25.06.20
B	FOR SSD SUBMISSION	BG	17.07.20
C	FOR SSD SUBMISSION	BG	24.07.20
D	FOR SSD SUBMISSION	BG	14.08.20
E	FOR SSD SUBMISSION	BG	17.08.20
F	FOR SSD SUBMISSION	BG	21.08.20
G	FOR SSD SUBMISSION	BG	08.09.20
H	FOR SSD SUBMISSION	BG	11.09.20
I	FOR SSD SUBMISSION	BG	11.11.20
J	FOR SSD SUBMISSION	BG	26.11.20

1.0 - The Project

This Landscape Design Report (LDR) relates to a proposed Industrial Estate located at 9 Devon Street, Rosehill, NSW. The proposal comprises of a staged eight lot subdivision, estate landscaping and riparian corridor works. The submission also incorporates Downer Sustainable Road Resource Centre (Stage 1). The Stage 1 works include the asphalt plant, reconomy facility, workshop, silos, main office, car parking, storage hardstand, road access and associated earthworks and landscaping.

The development is located on the site of the former Shell Clyde refinery and has an area of approximately 35 hectares. It is within the City of Parramatta Council Local Government Area and is zoned in Parramatta LEP as IN3 Heavy Industrial. Of the 35 hectares approximately 2.08 hectares is a riparian corridor in the form of a 40m offset from Duck River using an averaging method. Approximately 7 hectares is defined for the Stage 1 Lot 6 Downer Sustainable Road Resource Centre. Streetscape works are also proposed for an access road reserve. The estate is bound by Devon Street to the north, the Clyde Refinery to the east, Duck River to the south and existing industrial development to the west.

Duck River is zoned W1 Natural Waterways under the Parramatta Local Environmental Plan 2011 (LEP). The principal objective of W1 is to protect the ecological and scenic values of natural waterways, and development is highly restricted to achieve this objective. All existing vegetation is to be retained and no development is proposed in this zone.

Along the existing shoreline, Mangrove Forests species and Swamp Oak Floodplain Forest are present. The swamp oak forest is an endangered ecological community (EEC).

Retained existing shoreline vegetation, proposed riparian planting and a 5m landscape buffer to Devon and Colquhoun Streets, will help to screen or filter potential visual impacts generated by the development and integrate the site into the surrounding landscape character.

This design report has been prepared as part of an SSD submission to the Department of Planning, Industry and Environment and is to be read alongside Geoscapes landscape design drawings SSD-00 to SSD-17. This report, the landscape design drawings and the vegetation management plan (AECOM) addresses the following requirement from the Minister's SEARs:

11. Visual Impact

- *detailed plans showing suitable landscaping which incorporates endemic species.*



2.0 - Overall Design Approach

2.1 Landscaping Areas

Total available landscape area for the industrial estate is approximately 31,373m2 with a proportion of this being existing vegetation to be retained.

Within Stage 1 (Lot 6) the total landscape area is 9,268m2, this represents 13.3% of the total site area of Lot 6 (69,846m2). Of the 9,268m2, approximately 2182m2 is existing vegetation to be retained and the remaining 7086m2 is proposed as new planting along the site's southern riparian zone, eastern and western boundaries, and lab/office parking areas. This also includes the future northern 5m setback, the details of which are subject to a future approval. The design also proposes to retain existing street trees along Devon Street and new tree planting along the access road.

Following earthworks approximately 15.96 hectares of land is proposed to be hydroseeded or sprayed with a tackifier for soil stabilisation. Post construction an additional area of 1.2 hectares in the northern part of Lot 6 will be treated with gravel or hydroseed. This land is subject to a future approval.

2.2 Landscape Design Objectives

Landscaping aims to achieve the following outcomes:

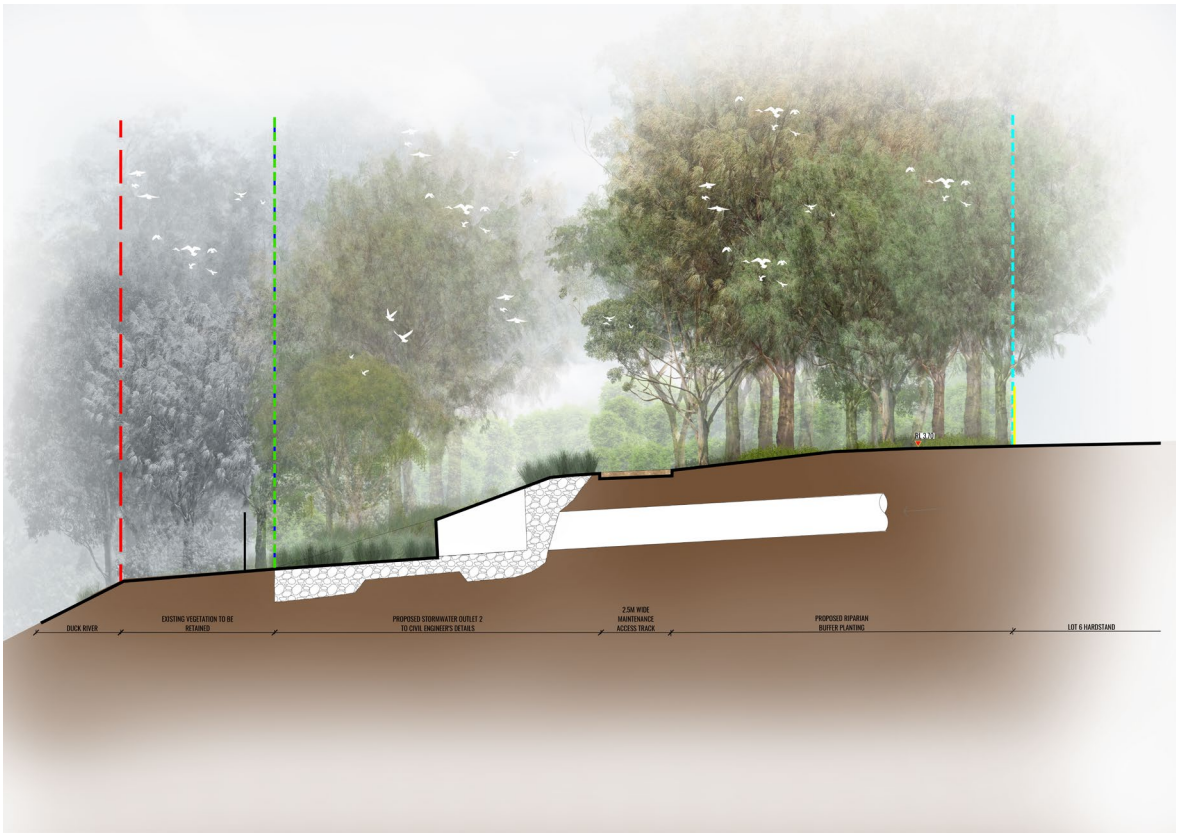
- Strengthen local character with the use of endemic and native species. These are to be selected predominantly from the Paramatta City Council species lists and from the Vegetation Management Plan (VMP) prepared by AECOM.
- Preserve and retain street trees along Devon Street wherever possible and strengthen visual character of the estate through the use of street trees along the new access road.
- Maintain a 5m landscape setback along Devon Street and Colquhoun Street. Planting design within this setback is subject to a future approval.
- Create a visual buffer along the western boundary of the Lot 6 Downer site, with a dense mix of native evergreen tree and shrub planting.
- Manage stormwater by planting the swale along Lot 6's eastern boundary, the bioretention basin and the stormwater outlet rip-raps with suitable native grass species.
- Hydroseed or tackifier use in disturbed areas for erosion and sediment control immediately after subdivision earthworks.
- Protect and enhance the existing ecological character by revegetating areas identified within the riparian management zone. Tree canopy cover to constitute a minimum 60% of the revegetation area and include species that have been listed in the VMP.



3.0 – Landscape Design Proposals

3.1 Riparian Corridor/Buffer Zone - South

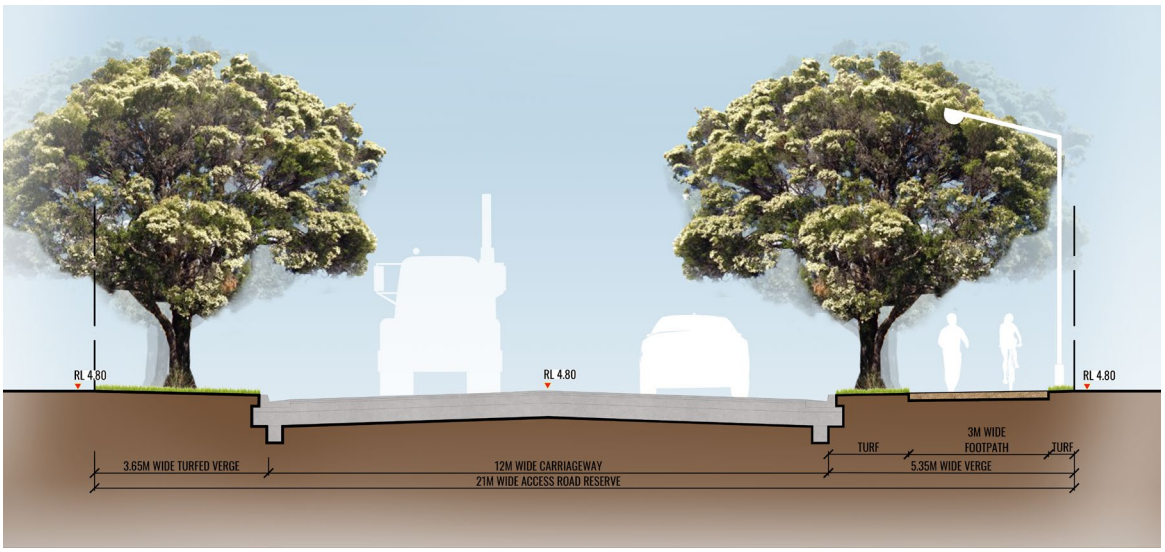
A 40m wide riparian corridor (using averaging methodology) on the northern side of Duck River is proposed. This riparian corridor is fully structured with trees, shrubs, grasses and groundcovers. The riparian buffer will consist of approximately a mix of 505 large canopy and sub-canopy species which have been selected from the Swamp Oak Floodplain Forest Endangered Ecological Community (EEC). The tree canopy cover constitutes about 60% of the revegetation area and a 2.5m wide decomposed gravel track has been proposed within this zone for maintenance access. The stormwater outlet's rip-rap is planted intermittently with native grasses.



TYPICAL SECTION THROUGH RIPARIAN CORRIDOR

3.2 Streetscape works for Access Road Reserve

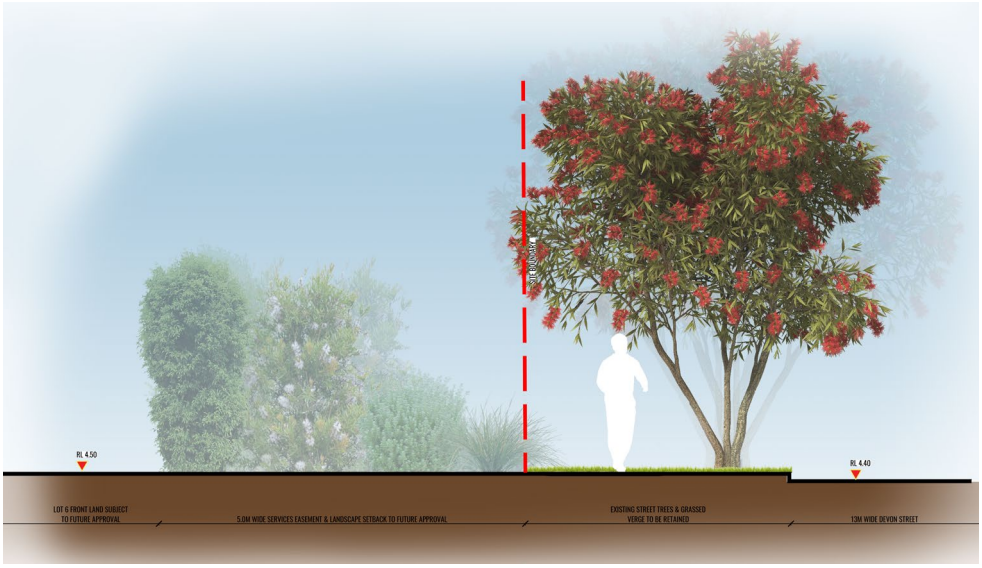
A 21m wide access road reserve is proposed for the estate. It comprises of a 12m wide carriageway for vehicles and provides access to future lots and to a future bridge connect over Duck River. The proposed turfed verge on the western side contains *Melaleuca linariifolia* (Snow-in-Summer) as street trees spaced every 8m along the road. The eastern turfed verge comprises *Melaleuca linariifolia* (Snow-in-Summer) as street trees spaced every 8m along the road and a 3m wide pedestrian and cycle path.



TYPICAL STREETSCAPE SECTION

3.3 Stage 1 Lot 6 Downer Site - North

Entry to the proposed Stage 1 Lot 6 Downer Sustainable Road Resource Centre is situated to the north of the site along Devon Street. The existing line of mature trees and turfed verge along the street are proposed to be retained wherever possible and only to be removed at vehicular entry points. A 5m landscape setback is to be maintained within the proposed easement for services for all lots along Devon Street and Colquhoun Street. This will provide visual screening along the street frontage. All planting within this setback is subject to future approval.



TYPICAL SECTION THROUGH NORTHERN 5M LANDSCAPE SETBACK

3.4 Stage 1 Lot 6 Downer Site – West

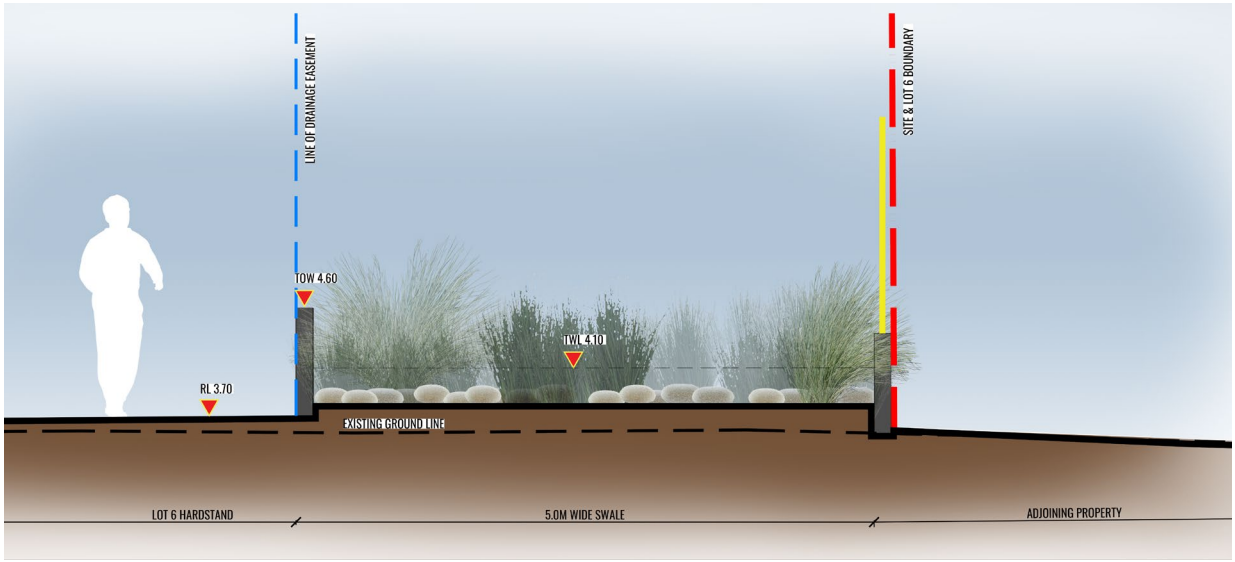
A 5m wide landscape buffer is proposed to the western boundary of Lot 6. This is intended to provide dense screening to the adjoining lots 4 and 5. It comprises of structured native evergreen trees, shrubs, grasses and groundcovers that require low maintenance and will be planted on a slope of 1 in 4. Proposed species have been selected predominantly from the Paramatta City Council's plant list and those suggested in the VMP.



SECTION THROUGH EASTERN 5M LANDSCAPE BUFFER

3.5 Stage 1 - Lot 6 Downer Site - East

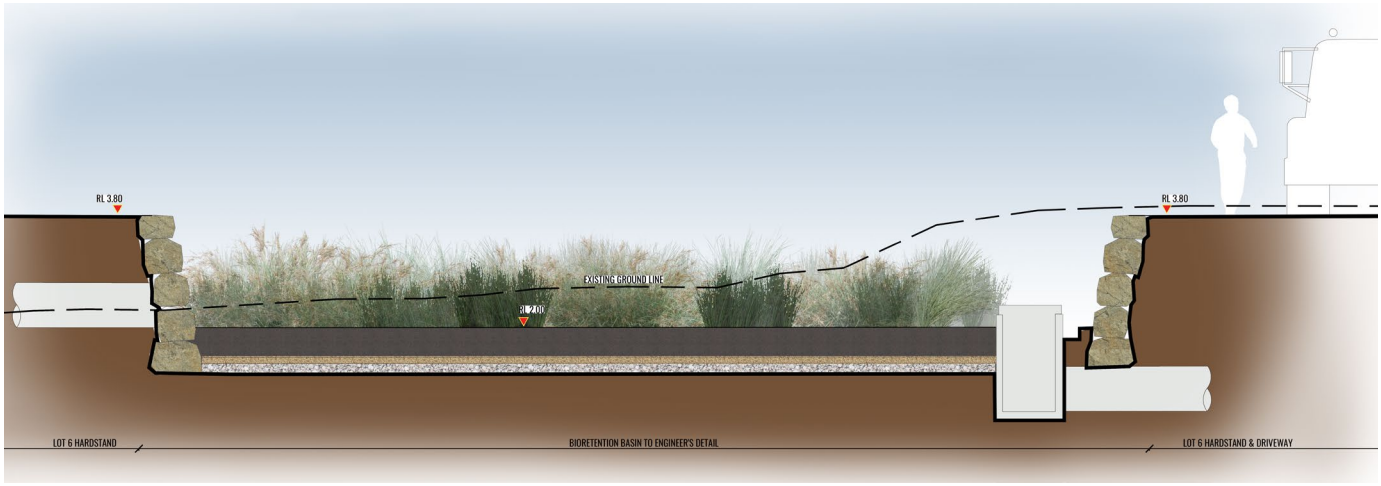
The swale proposed along the drainage easement on the site's eastern boundary will be a mix of low maintenance native grasses planted at a density of 3/m2 and 30-40mm Nepean river pebbles for unobstructed flows. It continues south into the riparian buffer zone.



SECTION THROUGH SWALE ON EASTERN BOUNDARY

3.6 Stage 1 - Lot 6 Downer Site Bio-retention Basin

The bioretention basin located in the south west corner of the Lot 6 Downer site has a total area of 592 m2. It is planted with a mix of Swamp Oak Floodplain Forest native grasses at a density of 5/m2 to assist with stormwater filtration processes.



SECTION THROUGH BIORETENTION BASIN

4.0 – Planting Species and Schedules

Endemic plant species found within the Swamp Oak Floodplain Forest EEC have been selected for the riparian corridor in accordance with the VMP and recommendations from AECOM.

Riparian Corridor Planting - Swamp Oak Floodplain Forest								
CODE	BOTANICAL NAME	COMMON NAME	MATURE HEIGHT	MATURE WIDTH	POT SIZE	NATIVE	PLANTING DENSITY	QTY*
Trees Canopy Species 1 per 300m2								
ALP EXC	*Alphitonia excelsa*	Red Ash	20m	15m	Forestry Tube	✓	AS SHOWN	11
CAS GLA	*Casuarina glauca*	Swamp Oak	20m	15m	Forestry Tube	✓	AS SHOWN	15
GLO FER	*Glochidion ferdinandi*	Cheese Tree	15m	8m	Forestry Tube	✓	AS SHOWN	16
MEL STY	*Melaleuca styphelioides*	Prickly-leaved Tea Tree	10m	8m	Forestry Tube	✓	AS SHOWN	11
MEL QUI	*Melaleuca quinquenervia*	Forest Red Gum	20m	6m	Forestry Tube	✓	AS SHOWN	19
Small Trees / Shrubs 1 per 50m2								
ACM smi	*Acmena smithii*	Lilly Pilly	3-5m	2m	Tube	✓	AS SHOWN	182
CUP ANA	*Cupaniopsis anacardioides*	Tuckeroo	6m	3m	Tube	✓	AS SHOWN	19
CAL SAL	*Callistemon salignus*	Sweet Willow Bottlebrush	8m	5m	Tube	✓	AS SHOWN	15
MEL alt	*Melaleuca alternifolia*	Narrow-leaved Paperbark	7m	3m	Tube	✓	AS SHOWN	95
MEL ERI	*Melaleuca ericifolia*	Swamp Paperbark	9-15m	3m	Tube	✓	AS SHOWN	34
MYO acu	*Myoporum acuminatum*	Waterbush	10m	3m	Tube	✓	AS SHOWN	88
Grasses and Groundcovers 1 per 2.5m² in fully structured vegetation only								
BLE ind	*Blechnum indicum*	Swamp Water-fern	1m	NIL	Forestry Tube	✓	AS SHOWN	467
CAR app	*Carex appressa*	Tall Sedge	1m	1m	Forestry Tube	✓	AS SHOWN	467
DIA cae	*Dianella caerulea*	Blue Flax Lily	0.8m	1.5m	Forestry Tube	✓	AS SHOWN	513
JUN usi	*Juncus usitatus*	Common Rush	1.2m	0.5m	Forestry Tube	✓	AS SHOWN	467
ISO inu	*Isolepis inundata*	Swamp Club-sedge	0.5m	0.5m	Forestry Tube	✓	AS SHOWN	467
LOM lon	*Lomandra longifolia*	Spiny-headed Mat-Rush	0.8m	0.8m	Forestry Tube	✓	AS SHOWN	513
VIO ban	*Viola banksii*	A Violet	0.40m	NIL	Forestry Tube	✓	AS SHOWN	513
Vines 1 per 25m² in fully structured vegetation only								
PAR str	*Parsonsia straminea*	Common Silkpod	0.1m	NIL	Tube	✓	AS SPECIFIED	114
STE dis	*Stephania japonica var. discolor*	Snake Vine	na	NIL	Tube	✓	AS SPECIFIED	113
FLA ind	*Flagellaria indica*	Whip Vine	15m	NIL	Tube	✓	AS SPECIFIED	113
Bioretention Basin planting								
BAU jun	*Baumea juncea*	Bare Twig Rush	1m	1m	Tubestock	✓	5/m2	370
CAR app	*Carex appressa*	Tall Sedge	1m	1m	Tubestock	✓	5/m2	370
DIA cae	*Dianella caerulea*	Blue Flax Lily	0.8m	1.5m	Tubestock	✓	5/m2	370
GAH cla	*Gahnia clarkei*	Saw Sedge	1.5m	1.5m	Tubestock	✓	5/m2	370
IMP inu	*Imperata cylindrica var. major*	Blady Grass	1.2m	0.3m	Tubestock	✓	5/m2	370
ISO inu	*Isolepis inundata*	Swamp Club-sedge	0.5m	0.5m	Tubestock	✓	5/m2	370
JUN usi	*Juncus usitatus*	Common Rush	1.2m	0.5m	Tubestock	✓	5/m2	370
LOM lon	*Lomandra longifolia*	Spiny-headed Mat-Rush	0.8m	0.8m	Tubestock	✓	5/m2	370
Stormwater Outlet Rip-rap Planting								
BAU jun	*Baumea juncea*	Bare Twig Rush	1m	1m	Tubestock	✓	3/m2	39
CAR app	*Carex appressa*	Tall Sedge	1m	1m	Tubestock	✓	3/m2	39
DIA cae	*Dianella caerulea*	Blue Flax Lily	0.8m	1.5m	Tubestock	✓	3/m2	39
GAH cla	*Gahnia clarkei*	Saw Sedge	1.5m	1.5m	Tubestock	✓	3/m2	39
IMP inu	*Imperata cylindrica var. major*	Blady Grass	1.2m	0.3m	Tubestock	✓	3/m2	39
ISO inu	*Isolepis inundata*	Swamp Club-sedge	0.5m	0.5m	Tubestock	✓	3/m2	39
JUN usi	*Juncus usitatus*	Common Rush	1.2m	0.5m	Tubestock	✓	3/m2	39
LOM lon	*Lomandra longifolia*	Spiny-headed Mat-Rush	0.8m	0.8m	Tubestock	✓	3/m2	39
Swale planting								
BAU jun	*Baumea juncea*	Bare Twig Rush	1m	1m	Tubestock	✓	3/m2	17
CAR app	*Carex appressa*	Tall Sedge	1m	1m	Tubestock	✓	3/m2	17
DIA cae	*Dianella caerulea*	Blue Flax Lily	0.8m	1.5m	Tubestock	✓	3/m2	17
GAH cla	*Gahnia clarkei*	Saw Sedge	1.5m	1.5m	Tubestock	✓	3/m2	17
IMP inu	*Imperata cylindrica var. major*	Blady Grass	1.2m	0.3m	Tubestock	✓	3/m2	17
ISO inu	*Isolepis inundata*	Swamp Club-sedge	0.5m	0.5m	Tubestock	✓	3/m2	17
JUN usi	*Juncus usitatus*	Common Rush	1.2m	0.5m	Tubestock	✓	3/m2	17
LOM lon	*Lomandra longifolia*	Spiny-headed Mat-Rush	0.8m	0.8m	Tubestock	✓	3/m2	17
*Final plant number to be calculated at CC stage								



Stage 1 Lot 6 Downer Site Planting								
CODE	BOTANICAL NAME	COMMON NAME	MATURE HEIGHT	MATURE WIDTH	POT SIZE	NATIVE	PLANTING DENSITY	QTY*
Trees								
CAL SAL	*Callistemon salignus*	Sweet Willow Bottlebrush	8m	5m	100LT	✓	AS SHOWN	9
ELA RET	*Elaeocarpus reticulatus*	Blueberry Ash	9m	4m	75LT	✓	AS SHOWN	21
EUC TER	*Eucalyptus tereticornis*	Forest Red Gum	20-30m	5m	75LT	✓	AS SHOWN	6
GLO FER	*Glochidion ferdinandi*	Cheese Tree	15m	8m	100LT	✓	AS SHOWN	9
WAT FLO	*Waterhousea floribunda*	Weeping Lilly Pilly	8m	5m	75LT	✓	AS SHOWN	11
Shrubs & Hedge planting								
ACM smi	*Acmena smithii*	Lilly Pilly	3m**	1m	200mm	✓	750mm Ctrs	491
BUR spi	*Bursaria spinosa*	Sweet Bursaria	1.5-4m	1.5-3m	200mm	✓	AS SHOWN	39
COR alb	*Correa alba*	White Correa	1.5m	1.5m	200mm	✓	AS SHOWN	50
COR gla	*Correa glabra 'Ivory Lantern'*	Rock Correa	1.6m	0.6m	200mm	✓	AS SHOWN	45
COR ref	*Correa reflexa*	Native Fuchsia	0.5-1.2m	0.5m	200mm	✓	AS SHOWN	41
CAL rev	*Callistemon citrinus 'Reeve's Pink'*	Reeve's Pink Bottlebrush	3m	2m	200mm	✓	AS SHOWN	137
CAL whi	*Callistemon citrinus 'White Anzac'*	Bottlebrush	0.5-1.5m	2m	200mm	✓	AS SHOWN	128
CRI ped	*Crinum pedunculatum*	Swamp Lily	1.5-3m	1-3m	200mm	✓	AS SHOWN	10
DOR exc	*Doryanthes excelsa*	Gymea Lily	2-3m	2-3m	200mm	✓	AS SHOWN	4
Grasses and Groundcovers								
DIA bre	*Dianella caerulea 'Breeze'®*	Blue Flax Lily	0.8m	0.8m	Tubestock	✓	5/m2	745
DIA lil	*Dianella caerulea 'Little Jess'™*	Blue Flax Lily	0.4m	0.4m	Tubestock	✓	5/m2	700
LOM tan	*Lomandra longifolia 'Tanika'®*	Spiny-headed Mat-Rush	0.8m	0.6m	Tubestock	✓	5/m2	714
LOM kat	*Lomandra longifolia 'Katrinus Deluxe'*	Spiny-headed Mat-Rush	0.8m	0.8m	Tubestock	✓	5/m2	804
VIO ban	*Viola banksii*	Native Violet	0.4m	NIL	140mm	✓	3/m2	893
Swale planting								
BAU jun	*Baumea juncea*	Bare Twig Rush	1m	1m	Tubestock	✓	3/m2	647
CAR app	*Carex appressa*	Tall Sedge	1m	1m	Tubestock	✓	3/m2	647
DIA cae	*Dianella caerulea*	Blue Flax Lily	0.8m	1.5m	Tubestock	✓	3/m2	647
GAH cla	*Gahnia clarkei*	Saw Sedge	1.5m	1.5m	Tubestock	✓	3/m2	647
IMP inu	*Imperata cylindrica var. major*	Blady Grass	1.2m	0.3m	Tubestock	✓	3/m2	647
ISO inu	*Isolepis inundata*	Swamp Club-sedge	0.5m	0.5m	Tubestock	✓	3/m2	647
JUN usi	*Juncus usitatus*	Common Rush	1.2m	0.5m	Tubestock	✓	3/m2	647
LOM lon	*Lomandra longifolia*	Spiny-headed Mat-Rush	0.8m	0.8m	Tubestock	✓	3/m2	647
*Final plant number to be calculated at CC stage								
**To be trimmed to specified height								

Proposed Access Road Street tree planting								
CODE	BOTANICAL NAME	COMMON NAME	MATURE HEIGHT	MATURE WIDTH	POT SIZE	NATIVE	PLANTING DENSITY	QTY*
Trees								
MEL LIN	*Melaleuca linariifolia*	Snow in Summer	10m	4m	75LT	✓	AS SHOWN	71

5.0 – Conclusion

The proposed landscape design aims to introduce new endemic and native planting to the development site that will be cohesive with the natural character found in the surrounding riparian ecology of Duck River. Following maturity, planting will also help to blend the development into the surrounding context by filtering and softening views of the built forms.



Existing street trees are retained where possible and new street trees have been proposed along the access road to strengthen the estate's visual character. An additional landscape setback is provided for all lots that face Devon Street and Colquhoun Street. The planting to this setback is subject to future approval.

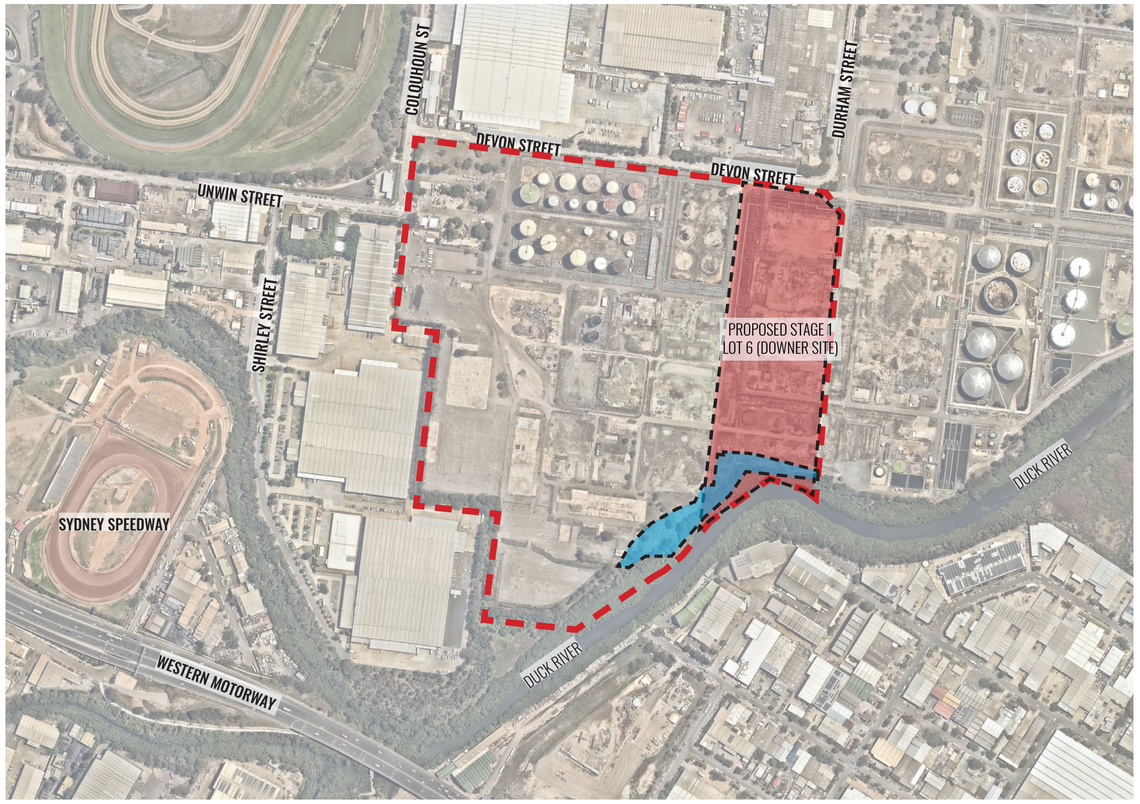
Existing vegetation along Duck River is to be retained and protected. Riparian planting proposed in the revegetation area complies with all requirements detailed in the VMP. Structured planting proposed in landscape buffer zones will be effective in helping to screen boundaries between lots.

The proposed swale, bioretention basin and stormwater outlets are planted with a mix of native grasses that will allow unobstructed flows and aid with the filtration of stormwater. All new planting proposed is either endemic, or native low water use and this approach will be adopted across the entire site.



SSD - CENTRAL SYDNEY INDUSTRIAL ESTATE - 9 DEVON STREET, ROSEHILL, NSW 2142

Landscape Documentation for State Significant Development Application



SUBDIVISION BOUNDARY

EXTENT OF RIPARIAN WORKS

EXTENT OF STAGE 1 (LOT 6) WORKS

IMAGE TAKEN FROM NEARMAP 2020

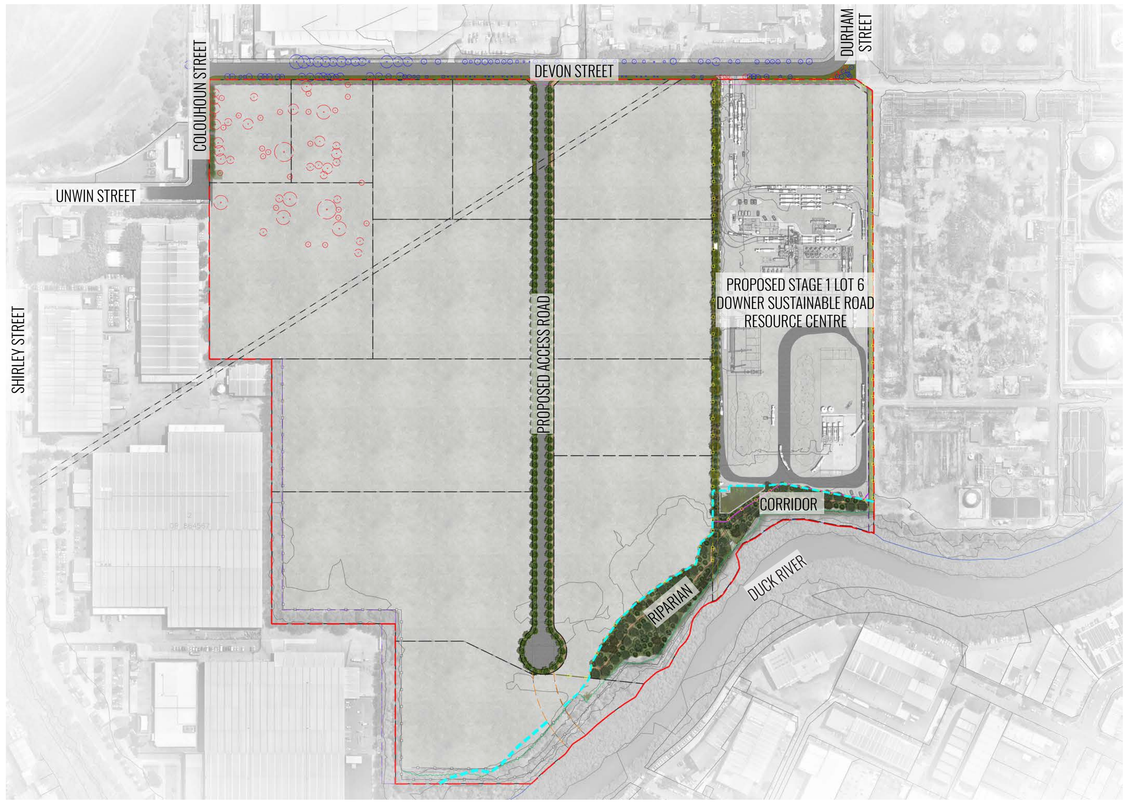


KEY PLAN - SHEET LAYOUTS

SCALE 1:6000

Drawing Register

Dwg No.	Drawing Name
SSD-00	Cover Sheet
SSD-01	Overall Master Plan
SSD-02	Temporary Erosion Control Plan
SSD-03	Streetscape Plan - Devon Street
SSD-04	Streetscape Plan - Proposed Access Road
SSD-05	Riparian Corridor Detail Plan - 1
SSD-06	Riparian Corridor Detail Plan - 2
SSD-07	Riparian Corridor Detail Plan - 3
SSD-08	Riparian Corridor Section A-A
SSD-09	Riparian Corridor Section B-B
SSD-10	Stage 1 Lot 6 (Downer) Detail Plan - 1
SSD-11	Stage 1 Lot 6 (Downer) Detail Plan - 2
SSD-12	Stage 1 Lot 6 (Downer) Detail Plan - 3
SSD-13	Stage 1 Lot 6 (Downer) Detail Plan - 4
SSD-14	Stage 1 Lot 6 (Downer) Section CC
SSD-15	Stage 1 Lot 6 (Downer) Section DD & EE
SSD-16	Specifications & Typical Details
SSD-17	Plant Schedules & Imagery



SITE PLAN

SCALE 1:3000

Drawing Title:

Cover Sheet

DWG No: **SSD-00**

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Project Manager:
Element Environment Pty. Ltd.

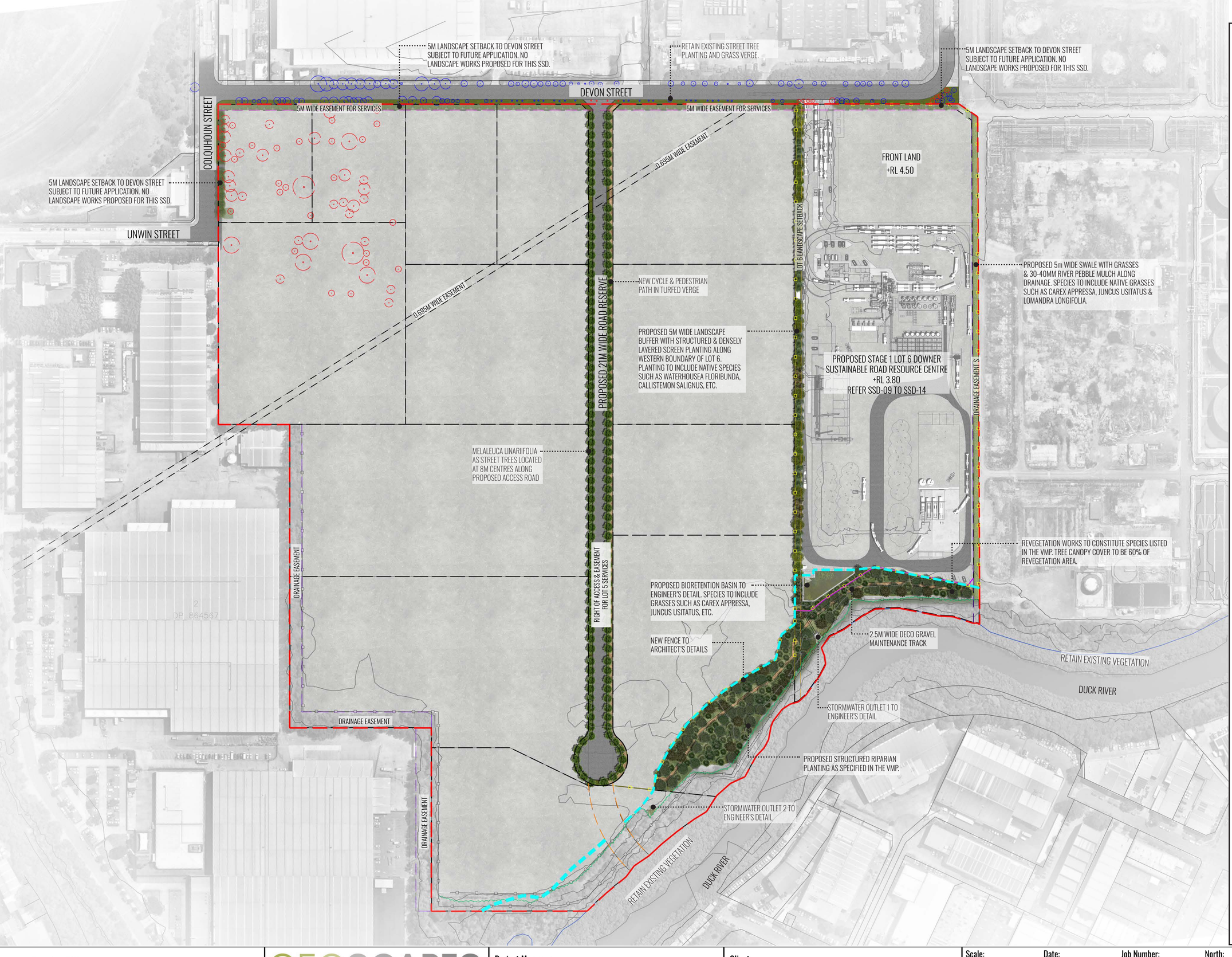
Client:
VE PROPERTY
LEVEL 16, 720 BOURKE STREET
DOCKLANDS VIC 3008
PH: (03) 8823 444

Scale:	Date:	Job Number:	North:
As shown @ A1	26.11.2020	200411	

Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

FOR SSD APPLICATION

Revision	Date	Description	Drawn	Checked
H	09.09.20	UPDATED FOR SSD	SB	BG
I	11.09.20	UPDATED FOR SSD	SB	BG
J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG



LEGEND

- SITE BOUNDARY
- LOT BOUNDARIES
- EASEMENT TO DRAIN WATER. REFER TO SURVEY DRAWINGS.
- EASEMENT 6.095M WIDE FOR SYDNEY WATER. REFER TO SURVEY DRAWINGS.
- RIGHT OF ACCESS & EASEMENT FOR LOT 5 SERVICES. REFER TO SURVEY DRAWINGS.
- 5M WIDE EASEMENT FOR SERVICES. REFER TO SURVEY DRAWINGS.
- 5M WIDE LANDSCAPE SETBACK. REFER TO LOT 6 DETAIL PLANS SSD-09 TO SSD-12.
- EXISTING VEGETATION TO BE RETAINED.
- EXISTING VEGETATION TO BE REMOVED.
- PROPOSED TREES.
- PROPOSED MASS HEDGE PLANTING & SHRUBS.
- PROPOSED GROUNDCOVERS
- PROPOSED SWALE. REFER TO ENGINEER'S DRAWINGS.
- 40M AVERAGE RIPARIAN CORRIDOR. REFER TO VMP FOR DETAILS.
- MEAN HIGH WATER LEVEL OF DUCK RIVER. REFER TO CIVIL DRAWINGS.
- APPROXIMATE EXTENT OF EXISTING TREE CANOPY TO BE RETAINED
- NEW FENCE TO ARCHITECT'S DETAIL. REFER SSD-03 TO SSD-14 FOR DETAILS.
- EXISTING FENCE REFER TO CIVIL ENGINEER'S DRAWINGS
- PROPOSED SITE CONTOURS TO ENGINEERS DETAILS
- DECO GRAVEL MAINTENANCE TRACK. REFER TO SSD-05 & SSD-06.
- HARDSTAND
- FOOTPATH & TURFED VERGE
- ROAD
- RETAINING WALL TO ENGINEER'S DETAIL. REFER TO CIVIL DRAWINGS.

Drawing Title:

Overall Master Plan

DWG No: **SSD-01**

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Project Manager:
Element Environment Pty. Ltd.

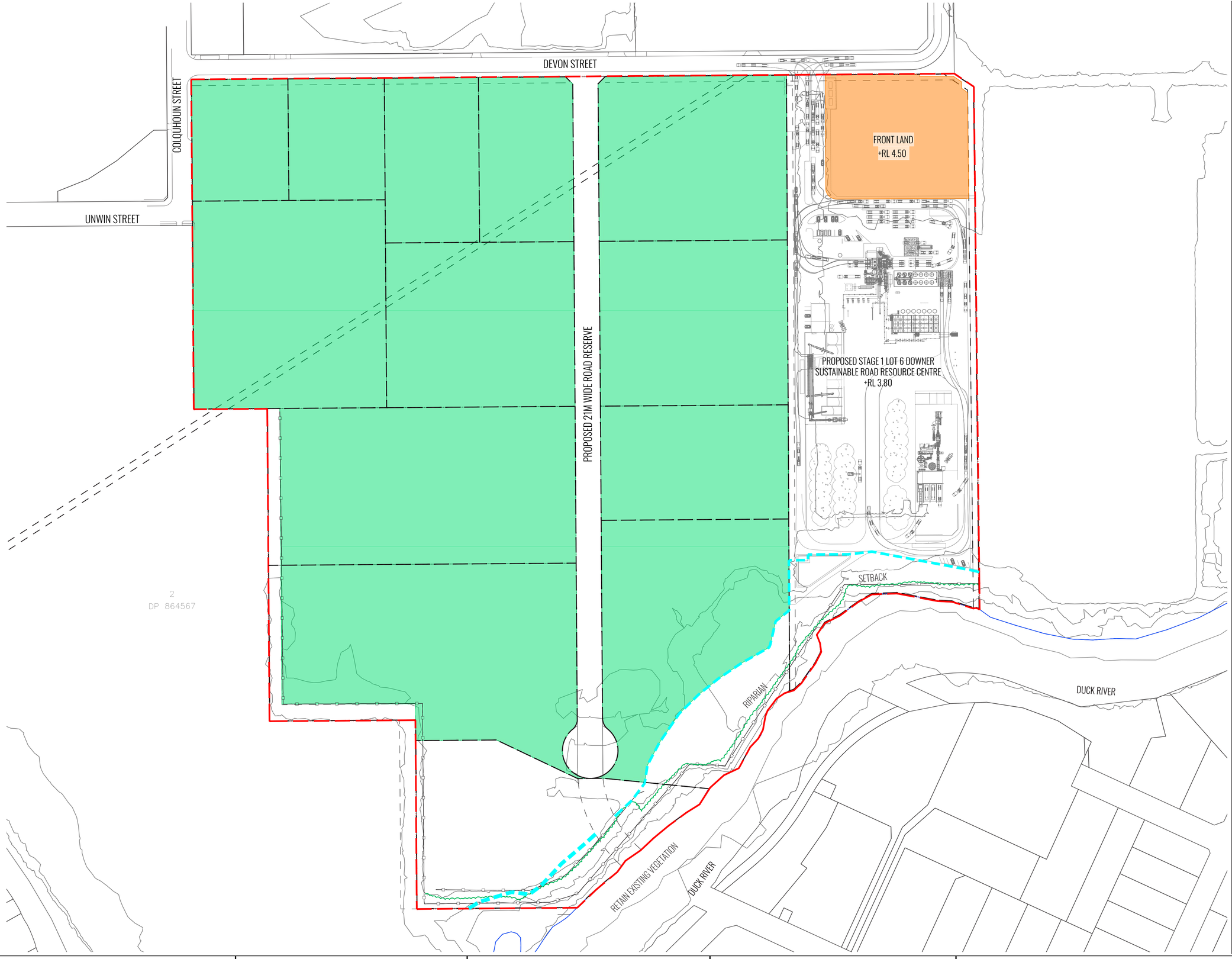
Client:
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LEVEL 16, 720 BOURKE STREET
DOCKLANDS VIC 3008
PH: (03) 8823 444

Scale:	Date:	Job Number:	North:
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Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

FOR SSD APPLICATION

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J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG



LEGEND

- SITE BOUNDARY
- LOT BOUNDARY
- AREAS TO BE HYDROSEEDED OR SUBJECTED TO TACKIFIER FOR SOIL STABILISATION (23.25 ha). REFER TO CIVIL DRAWINGS.
- CONSTRUCTION STAGING AREA (1.2 ha). POST CONSTRUCTION TREATED WITH GRAVEL OR HYDROSEED FOR SHORT TERM PARKING AS REQUIRED. FUTURE USE SUBJECT TO FUTURE DA.
- APPROXIMATE EXTENT OF EXISTING TREE CANOPY TO BE RETAINED
- 40M AVERAGE RIPARIAN CORRIDOR EXTENT. REFER TO VMP FOR DETAILS.
- MEAN HIGH WATER LEVEL OF DUCK RIVER. REFER TO CIVIL DRAWINGS.
- EXISTING FENCE REFER TO CIVIL ENG'S DRAWINGS
- 4.60 PROPOSED SITE CONTOURS. REFER TO CIVIL ENGINEER'S DRAWINGS.

Drawing Title:

Temporary Erosion Control Plan

DWG No: **SSD-02**

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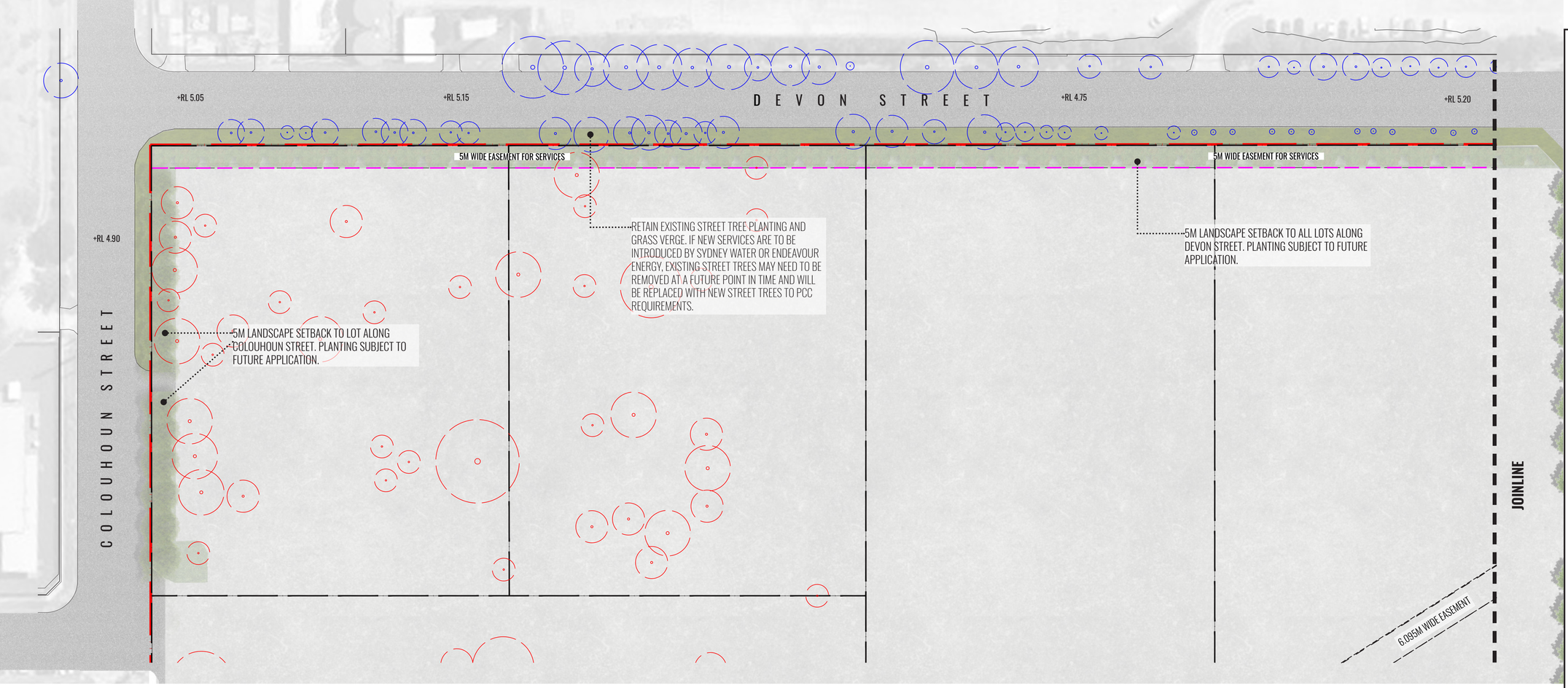
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DOCKLANDS VIC 3008
PH: (03) 8823 444

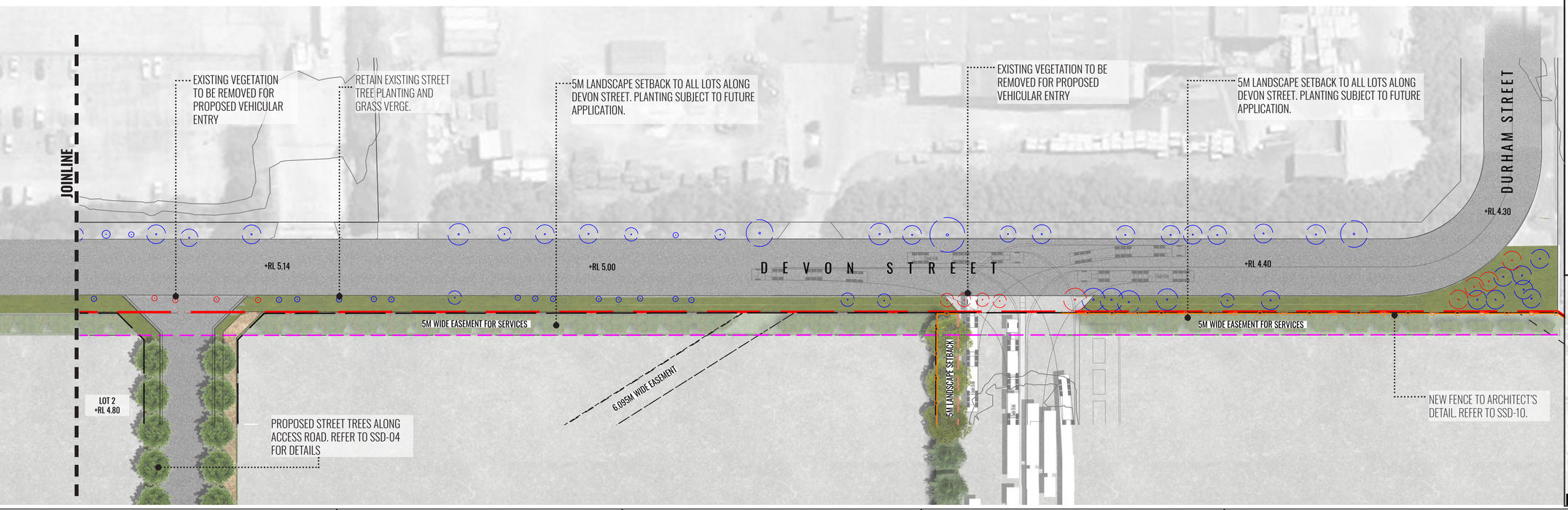
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Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

Revision — **FOR SSD APPLICATION**

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I	11.09.20	UPDATED FOR SSD	SB	BG
J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG





LEGEND

- SITE BOUNDARY
- LOT BOUNDARY
- EXISTING VEGETATION TO BE RETAINED.
- EXISTING VEGETATION TO BE REMOVED.
- NEW 2.1M HIGH SECURITY FENCE TO ARCHITECT'S DETAIL. REFER TO SSD-09 TO SSD-12.
- EXISTING TURFED VERGE TO BE RETAINED
- EASEMENT 6.095M WIDE FOR SYDNEY WATER. REFER TO SURVEY DRAWINGS.
- 5M WIDE EASEMENT FOR SERVICES. REFER TO SURVEY DRAWINGS.
- 5M WIDE LANDSCAPE SETBACK. REFER TO DETAIL PLANS SSD-09 TP SSD-12.



Drawing Title:

Streetscape Plan - Devon Street

DWG No: **SSD-03**

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Project Manager:
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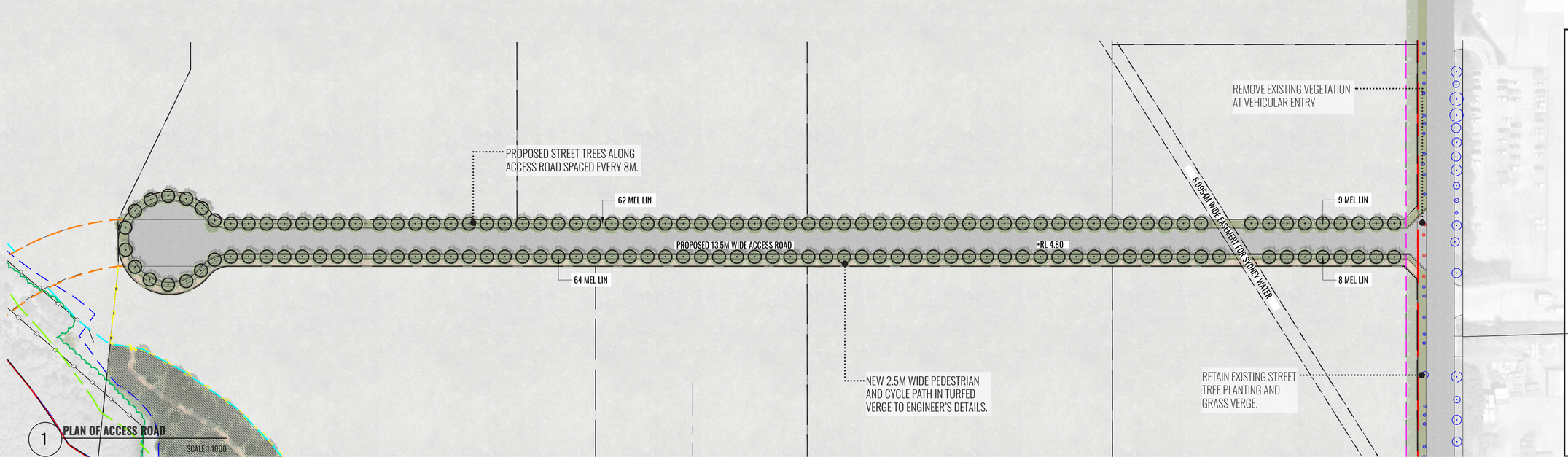
Client:
VE PROPERTY
LEVEL 16, 720 BOURKE STREET
DOCKLANDS VIC 3008
PH: (03) 8823 444

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Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

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K	26.11.20	UPDATED FOR RTS	PT	BG

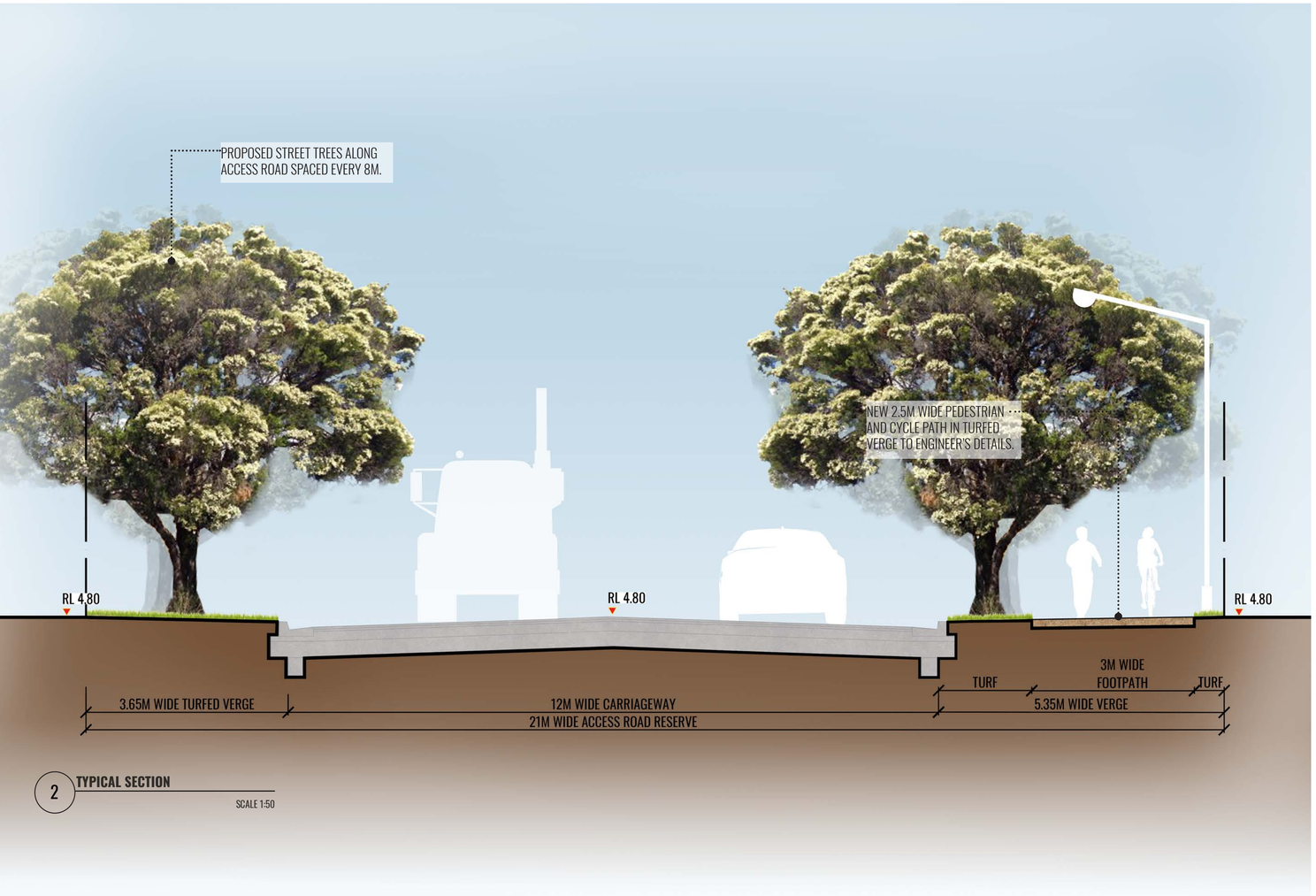


1 **PLAN OF ACCESS ROAD**

SCALE 1:1000

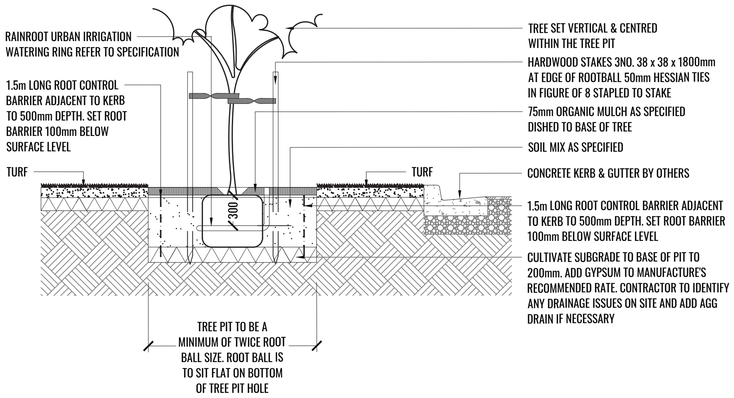
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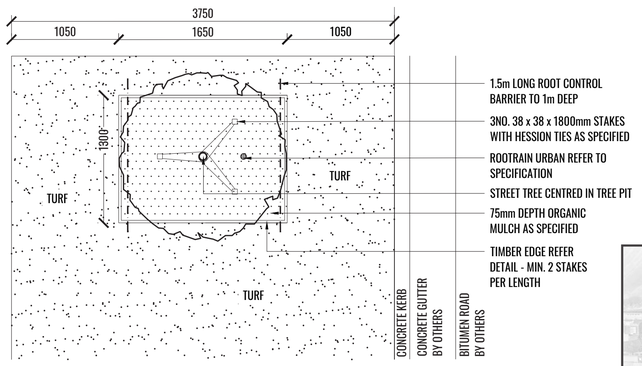
- SITE BOUNDARY
- LOT BOUNDARIES
- EXISTING VEGETATION TO BE RETAINED.
- EXISTING VEGETATION TO BE REMOVED.
- PROPOSED STREET TREES AT 8M CENTRES ALONG ACCESS ROAD.
- NEW 3M WIDE FOOTPATH & CYCLE PATH IN TURFED VERGE. REFER TO DETAILS.
- PROPOSED 12M WIDE ACCESS ROAD
- EASEMENT 6.095M WIDE FOR SYDNEY WATER. REFER TO SURVEY DRAWINGS.
- RIGHT OF ACCESS & EASEMENT FOR LOT 5 SERVICES. REFER TO SURVEY DRAWINGS.
- 5M WIDE EASEMENT FOR SERVICES. REFER TO SURVEY DRAWINGS.
- SW PITS TO ENGINEER'S DETAILS



2 **TYPICAL SECTION**

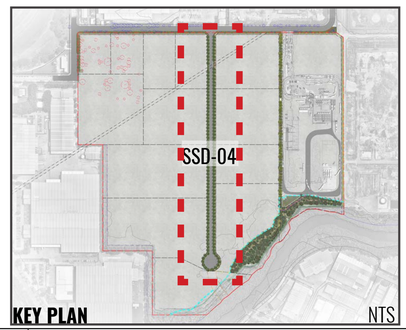
SCALE 1:50





3 **TYPICAL STREET TREE PLANTING DETAIL**

SCALE 1:30



Drawing Title:

Streetscape Plan - Proposed Access Road

DWG No: **SSD-04**

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Client:
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DOCKLANDS VIC 3008
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Scale: As shown @ A1

Date: 26.11.2020

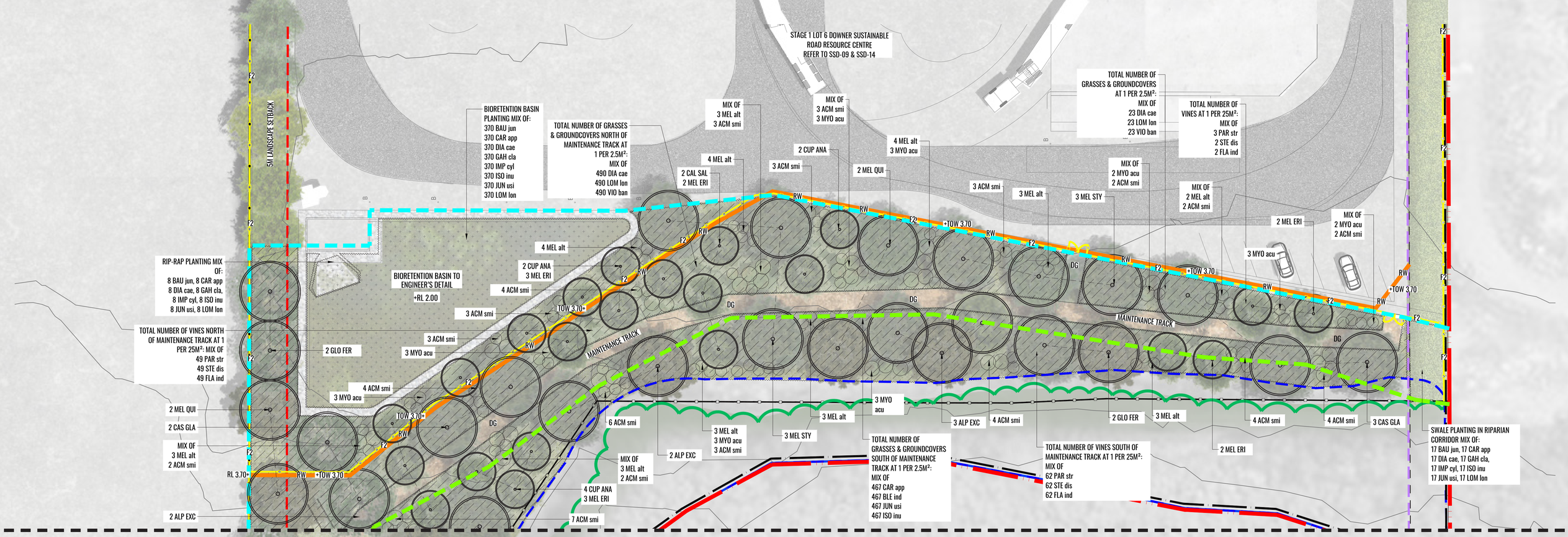
Job Number: 200411

North:

Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

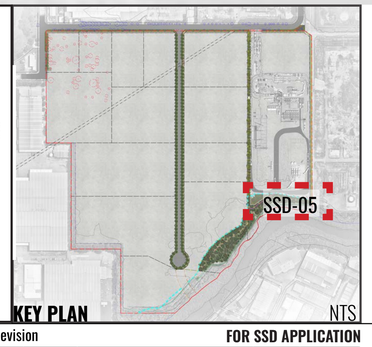
FOR SSD APPLICATION

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I	11.09.20	UPDATED FOR SSD	SB	BG
J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG



LEGEND

- SITE BOUNDARY
- MEAN HIGH WATER LEVEL OF DUCK RIVER. REFER TO CIVIL DRAWINGS.
- LOT BOUNDARIES
- F2 NEW 1.8M HIGH BLACK MESH FENCE & MAINTENANCE ACCESS GATE TO SUIT DOWNER SITE FENCE. REFER SSD 08-SSD 12.
- EASEMENT TO DRAIN WATER. REFER TO SURVEY DRAWINGS.
- EXISTING FENCE REFER TO CIVIL ENG'S DRAWINGS
- STOMRWATER OUTLET WITH RIP-RAP PLANTING. REFER TO CIVIL ENGINEER'S DETAILS.
- 5M WIDE LANDSCAPE SETBACK.
- PROPOSED TREES.
- RW RETAINING WALL TO ENGINEER'S DETAIL. REFER TO CIVIL DRAWINGS.
- 20M RIPARIAN LINE
- PROPOSED SHRUBS. REFER TO PLANTING SCHEDULE.
- 40M AVERAGE RIPARIAN CORRIDOR EXTENT. REFER TO VMP FOR DETAILS.
- AREA FOR PROPOSED GROUNDCOVERS & VINES.
- EXTENT OF REVEGETATION AREA AS SPECIFIED IN THE VMP.
- DG 2.5M WIDE DECO GRAVEL MAINTENANCE TRACK
- EXTENT OF WEED MANAGEMENT AREA AS SPECIFIED IN THE VMP.
- PROPOSED SITE CONTOURS. REFER TO ENGINEERS DETAILS
- APPROXIMATE EXTENT OF EXISTING TREE CANOPY TO BE RETAINED
- STRUCTURED RIPARIAN BUFFER PLANTING INCLUDING GROUNDCOVERS & VINES PLANTED THROUGHOUT.



KEY PLAN NTS

Drawing Title:

Riparian Corridor Detail Plan - 1

DWG No: **SSD-05**

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Scale:	Date:	Job Number:	North:
1:250 @ A1 1:500 @ A3	26.11.2020	200411	

Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

Revision — **FOR SSD APPLICATION**

Rev	Date	Description	Drawn	Checked
H	09.09.20	UPDATED FOR SSD	SB	BG
I	11.09.20	UPDATED FOR SSD	SB	BG
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K	26.11.20	UPDATED FOR RTS	PT	BG

REFER TO SSD-05

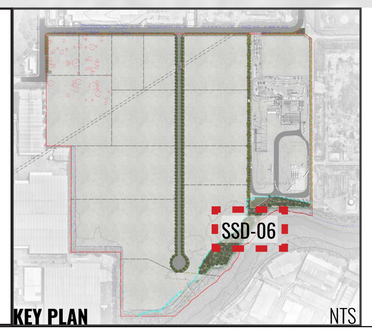
1 GLO FER
5 ACM smi
3 MEL alt
1 MEL ERI
3 ACM smi
2 CAS GLA
2 ALP EXC
MIX OF
5 ACM smi
4 MEL alt
4 CAL SAL
5 ACM smi
FOR TOTAL NUMBER OF GRASSES & GROUNDCOVERS NORTH OF MAINTENANCE TRACK AT 1 PER 2.5M² & VINES AT 1 PER 25M² REFER TO SSD-05
MIX OF
2 ACM smi
1 MYO acu
MIX OF
3 MEL alt
3 ACM smi
3 MYO acu
2 CAS GLA
5 MEL ERI
MIX OF
5 ACM smi
3 MYO acu
MIX OF
3 ACM smi
2 MYO acu
3 MYO acu
2 GLO FER
IX OF
EL alt
M smi
F2
DG
MAINTENANCE TRACK
MAINTENANCE TRACK
DG
DG
2 MEL QUI
5 ACM smi
RIP-RAP PLANTING MIX OF:
15 BAU jun, 15 CAR app
15 DIA cae, 15 GAH cla,
15 IMP cyl, 15 ISO inu
15 JUN usi, 15 LOM lon
MIX OF
3 MYO acu
3 ACM smi
FOR TOTAL NUMBER OF GRASSES & GROUNDCOVERS SOUTH OF MAINTENANCE TRACK AT 1 PER 2.5M² & VINES AT 1 PER 25M² REFER TO SSD-05
MIX OF
3 ACM smi
3 MYO acu
3 MEL alt
2 ACM smi
4 ACM smi
3 ACM smi
2 CUP ANA
3 MYO acu
3 GLO FER
3 MEL alt
MIX OF
3 ACM smi
3 MYO acu
3 MEL alt
2 ALP EXC
4 CAL SAL
MIX OF
4 ACM smi
3 MYO acu
3 CUP ANA
3 MEL alt
3 ACM smi
5 MEL QUI
3 CAS GLA
DUCK RIVER

REFER TO SSD-07

LEGEND

- SITE BOUNDARY
- MEAN HIGH WATER LEVEL OF DUCK RIVER. REFER TO CIVIL DRAWINGS.
- LOT BOUNDARIES
- F2 NEW 1.8M HIGH BLACK MESH FENCE & MAINTENANCE ACCESS GATE TO SUIT DOWNER SITE FENCE. REFER SSD 08-SSD 12.
- EASEMENT TO DRAIN WATER. REFER TO SURVEY DRAWINGS.
- EXISTING FENCE REFER TO CIVIL ENG'S DRAWINGS
- STOMRWATER OUTLET WITH RIP-RAP PLANTING. REFER TO CIVIL ENGINEER'S DETAILS.
- 5M WIDE LANDSCAPE SETBACK.
- PROPOSED TREES.
- RW RETAINING WALL TO ENGINEER'S DETAIL. REFER TO CIVIL DRAWINGS.
- 20M RIPARIAN LINE
- PROPOSED SHRUBS. REFER TO PLANTING SCHEDULE.
- 40M AVERAGE RIPARIAN CORRIDOR EXTENT. REFER TO VMP FOR DETAILS.
- AREA FOR PROPOSED GROUNDCOVERS & VINES.
- EXTENT OF REVEGETATION AREA AS SPECIFIED IN THE VMP.
- DG 2.5M WIDE DECO GRAVEL MAINTENANCE TRACK
- EXTENT OF WEED MANAGEMENT AREA AS SPECIFIED IN THE VMP.
- PROPOSED SITE CONTOURS. REFER TO ENGINEERS DETAILS
- APPROXIMATE EXTENT OF EXISTING TREE CANOPY TO BE RETAINED
- STRUCTURED RIPARIAN BUFFER PLANTING INCLUDING GROUNDCOVERS & VINES PLANTED THROUGHOUT.

KEY PLAN NTS



Drawing Title:
Riparian Corridor Detail Plan - 2
DWG No: **SSD-06**

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Project Manager:
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DOCKLANDS VIC 3008
PH: (03) 8823 444

Scale: 1:250 @ A1, 1:500 @ A3
Date: 26.11.2020
Job Number: 200411
North:
Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

FOR SSD APPLICATION

Revision	Date	Description	Drawn	Checked
H	09.09.20	UPDATED FOR SSD	SB	BG
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J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG

REFER TO SSD-05

MIX OF
3 ACM smi
3 MYO acu

1 CUP ANA

5 MEL QUI

F2

3 CAL SAL

MIX OF
3 ACM smi
2 MEL alt

3 CAS GLA

MIX OF
5 MEL alt
4 ACM smi

MIX OF
5 ACM smi
5 MYO acu

FOR TOTAL NUMBER OF GRASSES & GROUNDCOVERS NORTH OF MAINTENANCE TRACK AT 1 PER 2.5M² & VINES AT 1 PER 25M² REFER TO SSD-05

1 MEL ERI

2 CUP ANA

3 GLO FER

MIX OF
3 MEL alt
2 MYO
acu

4 MEL ERI

3 MEL STY

3 MYO acu

MIX OF
3 ACM smi
2 MEL alt

DG

MAINTENANCE TRACK

MIX OF
5 ACM smi
4 MEL alt

MIX OF
3 ACM smi
3 MEL alt
3 MYO acu

1 GLO FER

4 MYO acu

MIX OF
3 MEL alt
3 MYO acu

MIX OF
4 MYO acu
6 ACM smi

4 MEL ERI

3 ACM smi

4 MEL alt

3 MYO acu

MIX OF
3 ACM smi
2 MEL alt

FOR TOTAL NUMBER OF GRASSES & GROUNDCOVERS SOUTH OF MAINTENANCE TRACK AT 1 PER 2.5M² & VINES AT 1 PER 25M² REFER TO SSD-05

DUCK RIVER

MIX OF
3 MEL alt
4 ACM smi

2 CAL SAL
2 CUP ANA

2 MEL STY
2 GLO FER

4 MEL ERI

3 MEL QUI

MIX OF
3 ACM smi
3 MYO acu

MIX OF
5 ACM smi
4 MEL alt
2 MYO acu

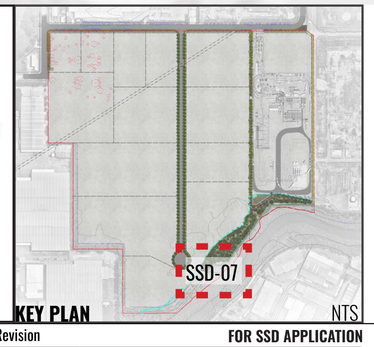
4 ACM smi

3 MEL ERI

RIP-RAP PLANTING MIX OF:
16 BAU jun, 16 CAR app
16 DIA cae, 16 GAH cla,
16 IMP cyl, 16 ISO inu
16 JUN usi, 16 LOM lon

LEGEND

- SITE BOUNDARY
- MEAN HIGH WATER LEVEL OF DUCK RIVER. REFER TO CIVIL DRAWINGS.
- LOT BOUNDARIES
- F2 NEW 1.8M HIGH BLACK MESH FENCE & MAINTENANCE ACCESS GATE TO SUIT DOWNER SITE FENCE. REFER SSD 08-SSD 12.
- EASEMENT TO DRAIN WATER. REFER TO SURVEY DRAWINGS.
- EXISTING FENCE REFER TO CIVIL ENG'S DRAWINGS
- STOMRWATER OUTLET WITH RIP-RAP PLANTING. REFER TO CIVIL ENGINEER'S DETAILS.
- 5M WIDE LANDSCAPE SETBACK.
- PROPOSED TREES.
- RW RETAINING WALL TO ENGINEER'S DETAIL. REFER TO CIVIL DRAWINGS.
- 20M RIPARIAN LINE
- PROPOSED SHRUBS. REFER TO PLANTING SCHEDULE.
- 40M AVERAGE RIPARIAN CORRIDOR EXTENT. REFER TO VMP FOR DETAILS.
- AREA FOR PROPOSED GROUNDCOVERS & VINES.
- EXTENT OF REVEGETATION AREA AS SPECIFIED IN THE VMP.
- DG 2.5M WIDE DECO GRAVEL MAINTENANCE TRACK
- EXTENT OF WEED MANAGEMENT AREA AS SPECIFIED IN THE VMP.
- 0.50 PROPOSED SITE CONTOURS. REFER TO ENGINEERS DETAILS
- APPROXIMATE EXTENT OF EXISTING TREE CANOPY TO BE RETAINED
- STRUCTURED RIPARIAN BUFFER PLANTING INCLUDING GROUNDCOVERS & VINES PLANTED THROUGHOUT.



KEY PLAN NTS

Drawing Title:

Riparian Corridor Detail Plan - 3

DWG No: **SSD-07**

GEOSCAPES LANDSCAPE ARCHITECTS
Suite 215, 284 Victoria Ave, Chatswood NSW 2067 Ph. (02) 9411 1485
www.geoscapes.com.au
ABN 84 620 205 781 ACN 620 205 781

Project Manager:
Element Environment Pty. Ltd.

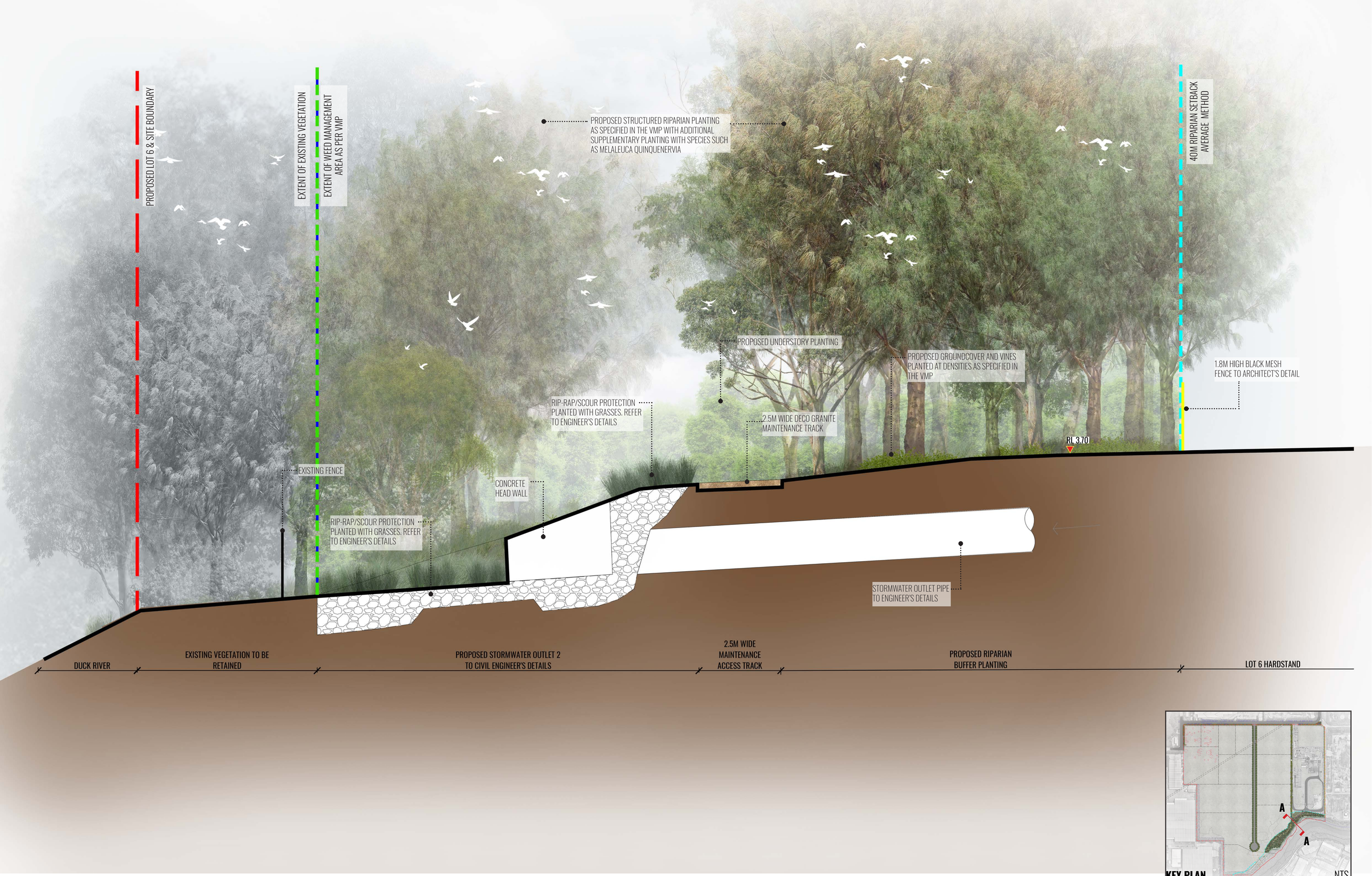
Client:
VE PROPERTY
LEVEL 16, 720 BOURKE STREET
DOCKLANDS VIC 3008
PH: (03) 8823 444

Scale:	Date:	Job Number:	North:
1:250 @ A1 1:500 @ A3	26.11.2020	200411	

Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

Revision — **FOR SSD APPLICATION**

Rev	Date	Description	Drawn	Checked
H	09.09.20	UPDATED FOR SSD	SB	BG
I	11.09.20	UPDATED FOR SSD	SB	BG
J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG



KEY PLAN NTS

Drawing Title:

Riparian Corridor Section A-A

DWG No: **SSD-08**

GEOSCAPES
LANDSCAPE ARCHITECTS
Suite 215, 284 Victoria Ave, Chatswood NSW 2067 Ph. (02) 9411 1485
www.geoscapes.com.au
ABN 84 620 205 781 ACN 620 205 781

Project Manager:
Element Environment Pty. Ltd.

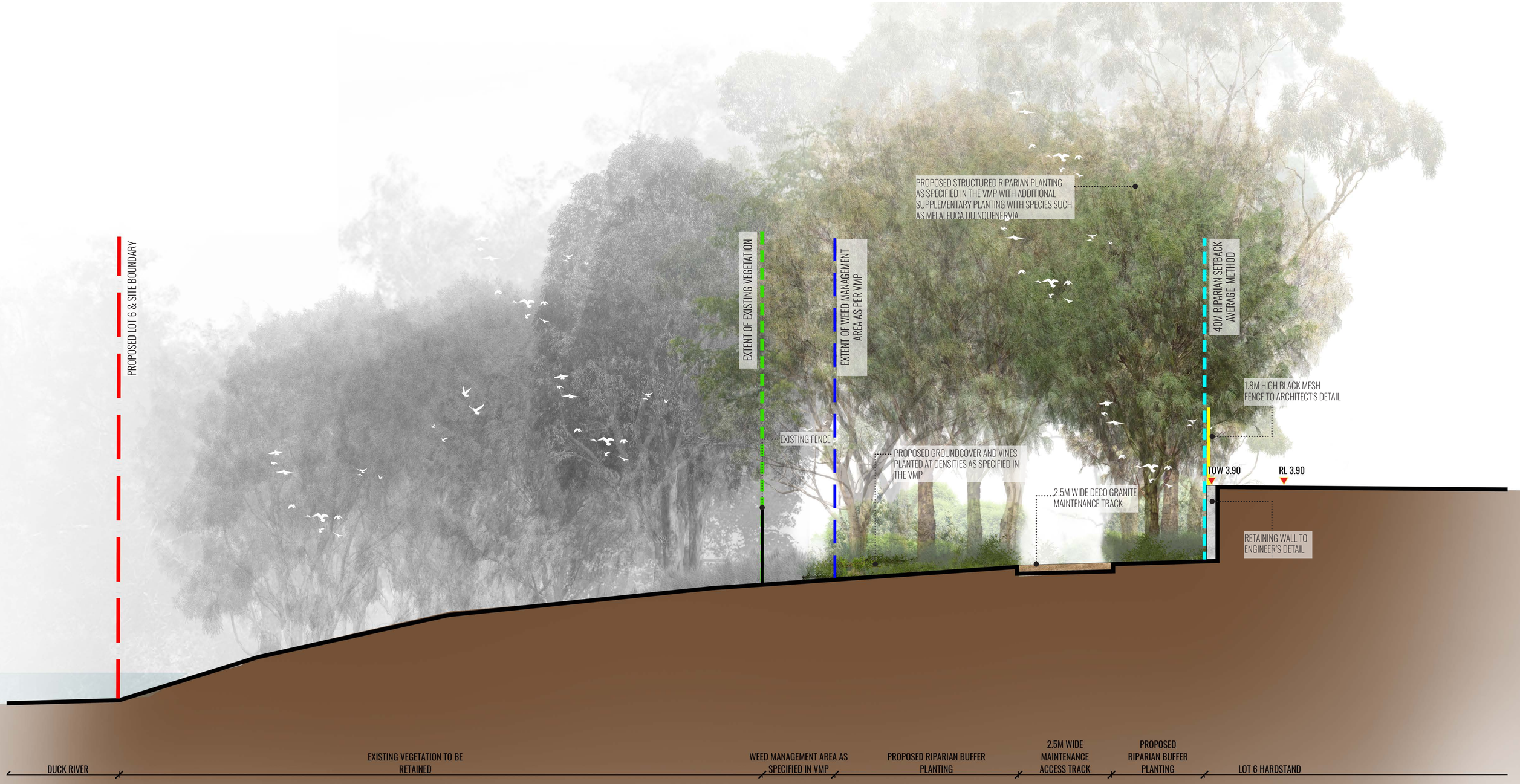
Client:
VE PROPERTY
LEVEL 16, 720 BOURKE STREET
DOCKLANDS VIC 3008
PH: (03) 8823 444

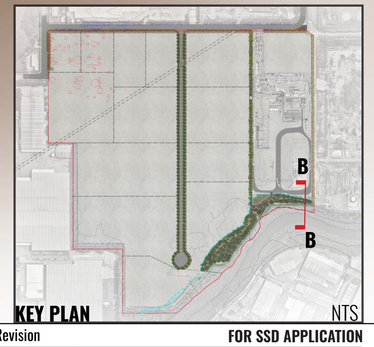
Scale: 1:50 @ A1, 1:100 @ A3
Date: 26.11.2020
Job Number: 200411
North:

Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

Revision — **FOR SSD APPLICATION**

Rev	Date	Description	Drawn	Checked
H	09.09.20	UPDATED FOR SSD	SB	BG
I	11.09.20	UPDATED FOR SSD	SB	BG
J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG





KEY PLAN NTS

Drawing Title:

Riparian Corridor Section B-B

DWG No: **SSD-09**

GEOSCAPES
LANDSCAPE ARCHITECTS
Suite 215, 284 Victoria Ave, Chatswood NSW 2067 Ph. (02) 9411 1485
www.geoscapes.com.au
ABN 84 620 205 781 ACN 620 205 781

Project Manager:
Element Environment Pty. Ltd.

Client:
VE PROPERTY
LEVEL 16, 720 BOURKE STREET
DOCKLANDS VIC 3008
PH: (03) 8823 444

Scale:	Date:	Job Number:	North:
1:50 @ A1 1:100 @ A3	26.11.2020	200411	

Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

FOR SSD APPLICATION

Revision	Date	Description	Drawn	Checked
H	09.09.20	UPDATED FOR SSD	SB	BG
I	11.09.20	UPDATED FOR SSD	SB	BG
J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG

DEVON STREET STREETSCAPE PLANS
REFER TO SSD-03

5M LANDSCAPE SETBACK
SUBJECT TO SEAPARATE APPLICATION

5M LANDSCAPE SETBACK
SUBJECT TO SEAPARATE APPLICATION

Downer Sign Gas Water

80 LOM kat
VEHICULAR ENTRY
+RL 4.55
2 GLO FER
4 CRI ped
6 COR alb
30 VIO ban
'DOWNER' SIGN
LINE OF 5M LANDSCAPE SETBACK.
REFER TO ARCHITECT'S DRAWINGS
3 CAL whi
2 CAL rev
30 VIO ban
4 COR gla
15 ACM smi
3 DOR exc
85 DIA bre
1 DOR exc
55 DIA lil
3 BUR spi
1 GLO FER
5 CAL whi
3 COR alb
3 ELA RET
55 LOM tan
5 CAL rev
55 LOM kat
3 COR gla
5 CAL whi
3 COR ref
55 DIA bre
3 BUR spi
1 EUC TER
55 DIA lil
5 CAL rev
55 LOM tan
3 COR alb
3 WAT FLO
5 CAL whi
3 COR gla
55 LOM kat
LINE OF 5M LANDSCAPE SETBACK.
REFER TO ARCHITECT'S DRAWINGS
5 CAL rev
3 COR ref
55 DIA bre
5 CAL whi
3 BUR spi
55 DIA lil
1 GLO FER
6 CRI ped
833 VIO ban
4 COR alb
55 LOM tan
3 ELA RET
5 CAL rev
3 COR gla
476 ACM smi
55 LOM kat
5 CAL whi
3 COR ref
55 DIA bre
5 CAL rev

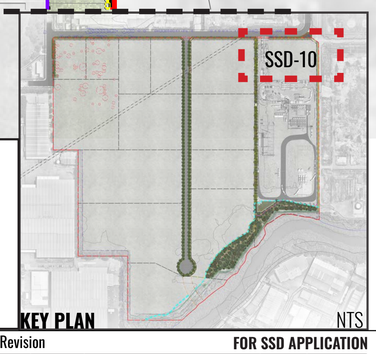
WAITING BAYS &
SECURITY HUT

FRONT LAND
+RL 4.50

LINE OF DRAINAGE EASEMENT. REFER
TO SURVEY DRAWINGS

SWALE PLANTING
MIX OF:
647 BAU jun
647 CAR app
647 DIA cae
647 GAH cla
647 IMP cyl
647 ISO inu
647 JUN usi
647 LOM lon

REFER TO SSD-11



KEY PLAN NTS

LEGEND

- SITE BOUNDARY
- LOT BOUNDARY
- EXISTING STREET TREES TO BE RETAINED.
- EXISTING STREET TREES TO BE REMOVED.
- PROPOSED TREES.
- PROPOSED MASS HEDGE PLANTING & SHRUBS.
- PROPOSED GROUNDCOVERS
- PROPOSED SWALE. REFER TO ENGINEER'S DRAWINGS.
- BIORETENTION BASIN PLANTING. REFER TO ENGINEER'S DRAWINGS.
- HARDSTAND TO ARCHITECT'S DETAIL
- RIPARIAN BUFFER PLANTING. REFER SSD-04 TO SSD-07.
- 40M AVERAGE RIPARIAN CORRIDOR EXTENT. REFER TO VMP FOR DETAILS.
- NEW FOOTPATH TO EXISTING TURFED VERGE
- NEW 2.1M HIGH SECURITY FENCE TO ARCHITECT'S DETAIL.
- NEW 1.8M HIGH BLACK MESH FENCE TO ARCHITECT'S DETAIL.
- 5M WIDE LANDSCAPE SETBACK.
- EASEMENT TO DRAIN WATER. REFER TO SURVEY DRAWINGS.
- EASEMENT FOR SERVICES. REFER TO SURVEY DRAWINGS.
- PROPOSED SITE CONTOURS. REFER TO ENGINEERS DETAILS
- RETAINING WALL TO ENGINEER'S DETAIL. REFER TO CIVIL DRAWINGS.
- +TOW 3.80 PROPOSED TOP OF WALL LEVELS.
- +RL 3.80 PROPOSED LEVELS.
- STOMRWATER OUTLET WITH RIP-RAP PLANTING. REFER TO CIVIL ENGINEER'S DETAILS.

Drawing Title:

Stage 1 Lot 6 (Downer) Detail Plan - 1

DWG No: **SSD-10**

GEOSCAPES
LANDSCAPE ARCHITECTS
Suite 215, 284 Victoria Ave, Chatswood NSW 2067 Ph. (02) 9411 1485
www.geoscapes.com.au
ABN 84 620 205 781 ACN 620 205 781

Project Manager:
Element Environment Pty. Ltd.

Client:
VE PROPERTY
LEVEL 16, 720 BOURKE STREET
DOCKLANDS VIC 3008
PH: (03) 8823 444

Scale: 1:250 @ A1, 1:500 @ A3
Date: 26.11.2020
Job Number: 200411
North:

Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

Revision — FOR SSD APPLICATION

Rev	Date	Description	Drawn	Checked
H	09.09.20	UPDATED FOR SSD	SB	BG
I	11.09.20	UPDATED FOR SSD	SB	BG
J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG

REFER TO SSD-10

3 BUR spi
5 CAL whi
1 GLO FER
55 DIA lil
LINE OF 5M LANDSCAPE SETBACK. REFER TO ARCHITECT'S DRAWINGS
55 LOM tan
3 CAL SAL
3 COR alb
5 CAL rev
3 COR gla
55 LOM kat
5 CAL whi
3 COR ref
55 DIA bre
5 CAL rev
55 DIA lil
3 BUR spi
1 GLO FER
5 CAL whi
3 COR alb
55 LOM tan
3 ELA RET
5 CAL rev
3 COR gla
55 LOM kat
5 CAL whi
5 COR ref
60 DIA lil
REFER TO SSD-10 FOR DETAILS OF GROUNDCOVER SPECIES & NUMBERS
ELECTRICAL SUBSTATION
+RL 3.75
4 COR alb
60 DIA lil
3 WAT FLO
5 CAL rev
3 COR gla
55 LOM kat
REFER TO SSD-10 FOR DETAILS OF HEDGING SPECIES & NUMBERS
5 CAL whi
3 COR ref
55 DIA bre
+RL 3.90
5 CAL rev
55 DIA lil
3 BUR spi
1 GLO FER
5 CAL whi
3 COR alb
55 LOM tan
3 ELA RET
5 CAL rev
3 COR gla
55 LOM kat
5 CAL whi
+RL 3.80
3 COR ref
55 DIA bre
5 CAL rev
3 BUR spi
55 DIA lil
LINE OF 5M LANDSCAPE SETBACK. REFER TO ARCHITECT'S DRAWINGS
ASPHALT LAB & PLANT WORKSHOP
DOOR
WATER TANK
WATER TANK
LV-ENTRY
LV-EXIT
+RL 3.80
+RL 3.80
+RL 3.70
+RL 3.70
ASPHALT CUSTOMER PARKING
TOILET & DRIVER'S LOUNGE
RL 3.70+
F2
F2
F2
F2
F2
LAB & LAB STORE
+RL 4.30
CONTROL & PRODUCTION OFFICE
+RL 4.30
WATER TANK
HV LV
LV HV
MSB
+RL 4.05
XV - Articulated Vehicle
XV - Articulated Vehicle
XV - Articulated Vehicle
+RL 3.70
LIME DELIVERY
COLD FEEDERS
+RL 4.00
DSL UNLOADING
BITUMEN UNLOADING
TRUCK SPRAY GANTRY
RL 3.95+
REFER TO SSD-07 FOR PLANTING MIX & TOTAL PLANT NUMBERS FOR SWALE.
LINE OF DRAINAGE EASEMENT. REFER TO SURVEY DRAWINGS
RL 3.70+
FORKLIFT ZONE
PMB ADDITIVE STORE & WAREHOUSE
+RL 4.10
IBC/BULK-BAG FREIGHT UNLOADING
FORKLIFT ACCESS
ROLLER DOOR ACCESS
+RL 3.95
VERTICAL SILOS
+RL 4.10
RL 3.70+
Culvert Over Conveyor
Ag. Lapping

REFER TO SSD-12

LEGEND

- SITE BOUNDARY
- LOT BOUNDARY
- EXISTING STREET TREES TO BE RETAINED.
- EXISTING STREET TREES TO BE REMOVED.
- PROPOSED TREES.
- PROPOSED MASS HEDGE PLANTING & SHRUBS.
- PROPOSED GROUNDCOVERS
- PROPOSED SWALE. REFER TO ENGINEER'S DRAWINGS.
- BIORETENTION BASIN PLANTING. REFER TO ENGINEER'S DRAWINGS.
- HARDSTAND TO ARCHITECT'S DETAIL
- RIPARIAN BUFFER PLANTING. REFER SSD-04 TO SSD-07.
- 40M AVERAGE RIPARIAN CORRIDOR EXTENT. REFER TO VMP FOR DETAILS.
- NEW FOOTPATH TO EXISTING TURFED VERGE
- NEW 2.1M HIGH SECURITY FENCE TO ARCHITECT'S DETAIL.
- NEW 1.8M HIGH BLACK MESH FENCE TO ARCHITECT'S DETAIL.
- 5M WIDE LANDSCAPE SETBACK.
- EASEMENT TO DRAIN WATER. REFER TO SURVEY DRAWINGS.
- EASEMENT FOR SERVICES. REFER TO SURVEY DRAWINGS.
- PROPOSED SITE CONTOURS. REFER TO ENGINEERS DETAILS
- RETAINING WALL TO ENGINEER'S DETAIL. REFER TO CIVIL DRAWINGS.
- +TOW 3.80 PROPOSED TOP OF WALL LEVELS.
- +RL 3.80 PROPOSED LEVELS.
- STOMRWATER OUTLET WITH RIP-RAP PLANTING. REFER TO CIVIL ENGINEER'S DETAILS.

SSD-11

KEY PLAN NTS

Drawing Title:
Stage 1 Lot 6 (Downer) Detail Plan - 2
DWG No: **SSD-11**

GEOSCAPES LANDSCAPE ARCHITECTS
Suite 215, 284 Victoria Ave, Chatswood NSW 2067 Ph. (02) 9411 1485
www.geoscapes.com.au
ABN 84 620 205 781 ACN 620 205 781

Project Manager:
Element Environment Pty. Ltd.

Client:
VE PROPERTY
LEVEL 16, 720 BOURKE STREET
DOCKLANDS VIC 3008
PH: (03) 8823 444

Scale: 1:250 @ A1, 1:500 @ A3
Date: 26.11.2020
Job Number: 200411
North:
Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

FOR SSD APPLICATION

Revision	Date	Description	Drawn	Checked
H	09.09.20	UPDATED FOR SSD	SB	BG
I	11.09.20	UPDATED FOR SSD	SB	BG
J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG

REFER TO SSD-11

3 COR alb
5 CAL rev
3 COR gla
5 CAL whi
3 COR ref
5 CAL rev
3 BUR spi
5 CAL whi
3 COR alb
5 CAL rev
3 COR gla
5 CAL whi
3 COR ref
5 CAL rev
3 BUR spi
5 CAL whi
3 COR alb
5 CAL rev
3 COR gla
5 CAL whi
3 COR ref
5 CAL rev
3 BUR spi

3 CAL SAL
55 LOM kat
55 DIA bre
55 DIA lil
1 GLO FER
55 LOM tan
3 ELA RET
55 LOM kat
55 DIA bre
55 DIA lil
1 EUC TER
55 LOM tan
3 WAT FLO
55 LOM kat
55 DIA bre
1 GLO FER
55 DIA lil
55 LOM tan
3 ELA RET
55 LOM kat
55 DIA bre
55 DIA lil
1 EUC TER

REFER TO SSD-10 FOR DETAILS OF GROUNDCOVER SPECIES & NUMBERS
REFER TO SSD-10 FOR DETAILS OF HEDGING SPECIES & NUMBERS
REFER TO SSD-10 FOR DETAILS OF GROUNDCOVER SPECIES & NUMBERS
REFER TO SSD-10 FOR DETAILS OF HEDGING SPECIES & NUMBERS

LINE OF 5M LANDSCAPE SETBACK. REFER TO ARCHITECT'S DRAWINGS
LINE OF 5M LANDSCAPE SETBACK. REFER TO ARCHITECT'S DRAWINGS

+RL 3.90
+RL 3.80
+RL 3.90
+RL 3.70

F2

RAP FINISHED PRODUCTS
+RL 4.00

LOADING BAY (FOR 19.0M B.A.V.)

Kitchen Waste

+RL 3.70
+RL 4.00
+RL 3.80
+RL 4.00
+RL 3.70

SPARE
GLASS
SAND
ORGANICS

RL 3.70+

LINE OF DRAINAGE EASEMENT. REFER TO SURVEY DRAWINGS

REFER TO SSD-07 FOR PLANTING MIX & TOTAL PLANT NUMBERS FOR SWALE.

+RL 4.00
INDICATIVE RAP LAYOUT
+RL 3.95
+RL 3.70

RECONOMY PLANT
+RL 4.10

RL 3.70+

REFER TO SSD-13

LEGEND

- SITE BOUNDARY
- LOT BOUNDARY
- EXISTING STREET TREES TO BE RETAINED.
- EXISTING STREET TREES TO BE REMOVED.
- PROPOSED TREES.
- PROPOSED MASS HEDGE PLANTING & SHRUBS.
- PROPOSED GROUNDCOVERS
- PROPOSED SWALE. REFER TO ENGINEER'S DRAWINGS.
- BIORETENTION BASIN PLANTING. REFER TO ENGINEER'S DRAWINGS.
- HARDSTAND TO ARCHITECT'S DETAIL
- RIPARIAN BUFFER PLANTING. REFER SSD-04 TO SSD-07.
- 40M AVERAGE RIPARIAN CORRIDOR EXTENT. REFER TO VMP FOR DETAILS.
- NEW FOOTPATH TO EXISTING TURFED VERGE
- NEW 2.1M HIGH SECURITY FENCE TO ARCHITECT'S DETAIL.
- NEW 1.8M HIGH BLACK MESH FENCE TO ARCHITECT'S DETAIL.
- 5M WIDE LANDSCAPE SETBACK.
- EASEMENT TO DRAIN WATER. REFER TO SURVEY DRAWINGS.
- EASEMENT FOR SERVICES. REFER TO SURVEY DRAWINGS.
- PROPOSED SITE CONTOURS. REFER TO ENGINEERS DETAILS
- RETAINING WALL TO ENGINEER'S DETAIL. REFER TO CIVIL DRAWINGS.
- +TOW 3.80 PROPOSED TOP OF WALL LEVELS.
- +RL 3.80 PROPOSED LEVELS.
- STORMWATER OUTLET WITH RIP-RAP PLANTING. REFER TO CIVIL ENGINEER'S DETAILS.

SSD-12

KEY PLAN NTS

Drawing Title:
Stage 1 Lot 6 (Downer) Detail Plan - 3
DWG No: **SSD-12**

GEOSCAPES LANDSCAPE ARCHITECTS
Suite 215, 284 Victoria Ave, Chatswood NSW 2067 Ph. (02) 9411 1485
www.geoscapes.com.au
ABN 84 620 205 781 ACN 620 205 781

Project Manager: Element Environment Pty. Ltd.

Client: VE PROPERTY
LEVEL 16, 720 BOURKE STREET
DOCKLANDS VIC 3008
PH: (03) 8823 444

Scale: 1:250 @ A1, 1:500 @ A3
Date: 26.11.2020
Job Number: 200411
North:
Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

FOR SSD APPLICATION

Revision	Date	Description	Drawn	Checked
H	09.09.20	UPDATED FOR SSD	SB	BG
I	11.09.20	UPDATED FOR SSD	SB	BG
J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG

REFER TO SSD-12

5 CAL whi
3 COR alb
55 LOM tan
3 CAL SAL
5 CAL rev
3 COR gla
55 LOM kat
REFER TO SSD-10 FOR DETAILS OF HEDGING SPECIES & NUMBERS
5 CAL whi
3 COR ref
55 DIA bre
5 CAL rev
LINE OF 5M LANDSCAPE SETBACK. REFER TO ARCHITECT'S DRAWINGS
3 BUR spi
+RL 3.80
1 GLO FER
55 DIA lil
5 CAL whi
55 LOM tan
3 COR alb
3 ELA RET
5 CAL rev
REFER TO SSD-10 FOR DETAILS OF GROUNDCOVER SPECIES & NUMBERS
3 COR gla
55 LOM kat
5 CAL whi
3 COR ref
55 DIA bre
5 CAL rev
55 DIA lil
3 BUR spi
1 EUC TER
+RL 3.70
5 CAL whi
55 LOM tan
3 COR alb
2 WAT FLO
5 CAL rev
3 COR gla
35 LOM kat

INDICATIVE RAP LAYOUT
+RL 3.95

RAP ENTRY/EXIT

RECONOMY RECEIVING
+RL 4.30

+RL 4.00

REFER TO SSD-07 FOR PLANTING MIX & TOTAL PLANT NUMBERS FOR SWALE.

+RL 4.30

LINE OF DRAINAGE EASEMENT. REFER TO SURVEY DRAWINGS

+RL 3.70

+RL 3.70

BIORETENTION BASIN TO ENGINEER'S DETAIL
+RL 2.00

RIPARIAN ZONE
REFER TO SSD-04 TO SSD-05

TOW 3.70+
RW
F2
RL 3.70+
+TOW 3.70

LEGEND

- SITE BOUNDARY
- LOT BOUNDARY
- HARDSTAND TO ARCHITECT'S DETAIL
- RIPARIAN BUFFER PLANTING. REFER SSD-04 TO SSD-07.
- PROPOSED SITE CONTOURS. REFER TO ENGINEERS DETAILS
- RETAINING WALL TO ENGINEER'S DETAIL. REFER TO CIVIL DRAWINGS.
- EXISTING STREET TREES TO BE RETAINED.
- 40M AVERAGE RIPARIAN CORRIDOR EXTENT. REFER TO VMP FOR DETAILS.
- +TOW 3.80 PROPOSED TOP OF WALL LEVELS.
- EXISTING STREET TREES TO BE REMOVED.
- NEW FOOTPATH TO EXISTING TURFED VERGE
- +RL 3.80 PROPOSED LEVELS.
- PROPOSED TREES.
- F1 NEW 2.1M HIGH SECURITY FENCE TO ARCHITECT'S DETAIL.
- STOMRWATER OUTLET WITH RIP-RAP PLANTING. REFER TO CIVIL ENGINEER'S DETAILS.
- PROPOSED MASS HEDGE PLANTING & SHRUBS.
- F2 NEW 1.8M HIGH BLACK MESH FENCE TO ARCHITECT'S DETAIL.
- PROPOSED GROUNDCOVERS
- 5M WIDE LANDSCAPE SETBACK.
- PROPOSED SWALE. REFER TO ENGINEER'S DRAWINGS.
- EASEMENT TO DRAIN WATER. REFER TO SURVEY DRAWINGS.
- BIORETENTION BASIN PLANTING. REFER TO ENGINEER'S DRAWINGS.
- EASEMENT FOR SERVICES. REFER TO SURVEY DRAWINGS.

KEY PLAN NTS
SSD-13

Drawing Title:
Stage 1 Lot 6 (Downer) Detail Plan - 4
DWG No: **SSD-13**

GEOSCAPES LANDSCAPE ARCHITECTS
Suite 215, 284 Victoria Ave, Chatswood NSW 2067 Ph. (02) 9411 1485
www.geoscapes.com.au
ABN 84 620 205 781 ACN 620 205 781

Project Manager:
Element Environment Pty. Ltd.

Client:
VE PROPERTY
LEVEL 16, 720 BOURKE STREET
DOCKLANDS VIC 3008
PH: (03) 8823 444

Scale: 1:250 @ A1, 1:500 @ A3
Date: 26.11.2020
Job Number: 200411
North:

Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

Revision FOR SSD APPLICATION

Rev	Date	Description	Drawn	Checked
H	09.09.20	UPDATED FOR SSD	SB	BG
I	11.09.20	UPDATED FOR SSD	SB	BG
J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG



KEY PLAN NTS

Drawing Title:

Stage 1 Lot 6 (Downer) Section CC

DWG No: **SSD-14**

GEOSCAPES
LANDSCAPE ARCHITECTS
Suite 215, 284 Victoria Ave, Chatswood NSW 2067 Ph. (02) 9411 1485
www.geoscapes.com.au
ABN 84 620 205 781 ACN 620 205 781

Project Manager:

Element Environment Pty. Ltd.

Client:

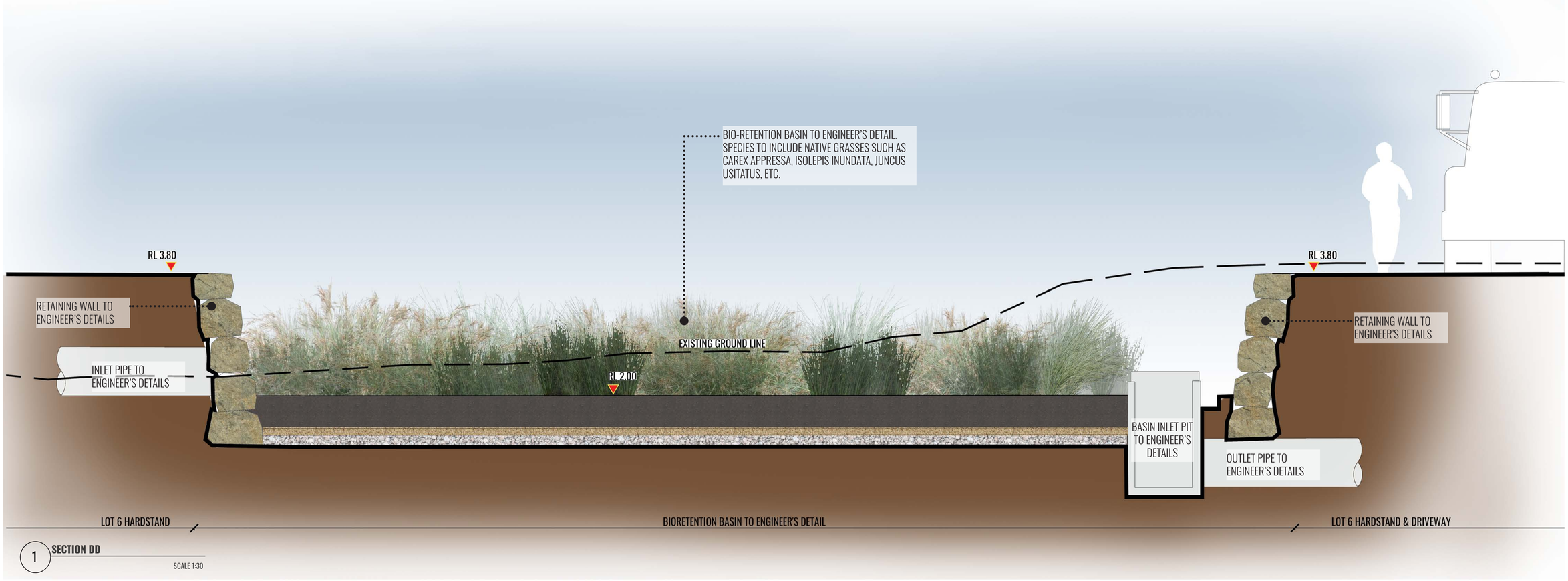
VE PROPERTY
LEVEL 16, 720 BOURKE STREET
DOCKLANDS VIC 3008
PH: (03) 8823 444

Scale:	Date:	Job Number:	North:
1:20 @ A1 1:40 @ A3	26.11.2020	200411	

Project: SSD - Central Syney Industrial Estate
9 Devon Street, Rosehill, NSW 2142

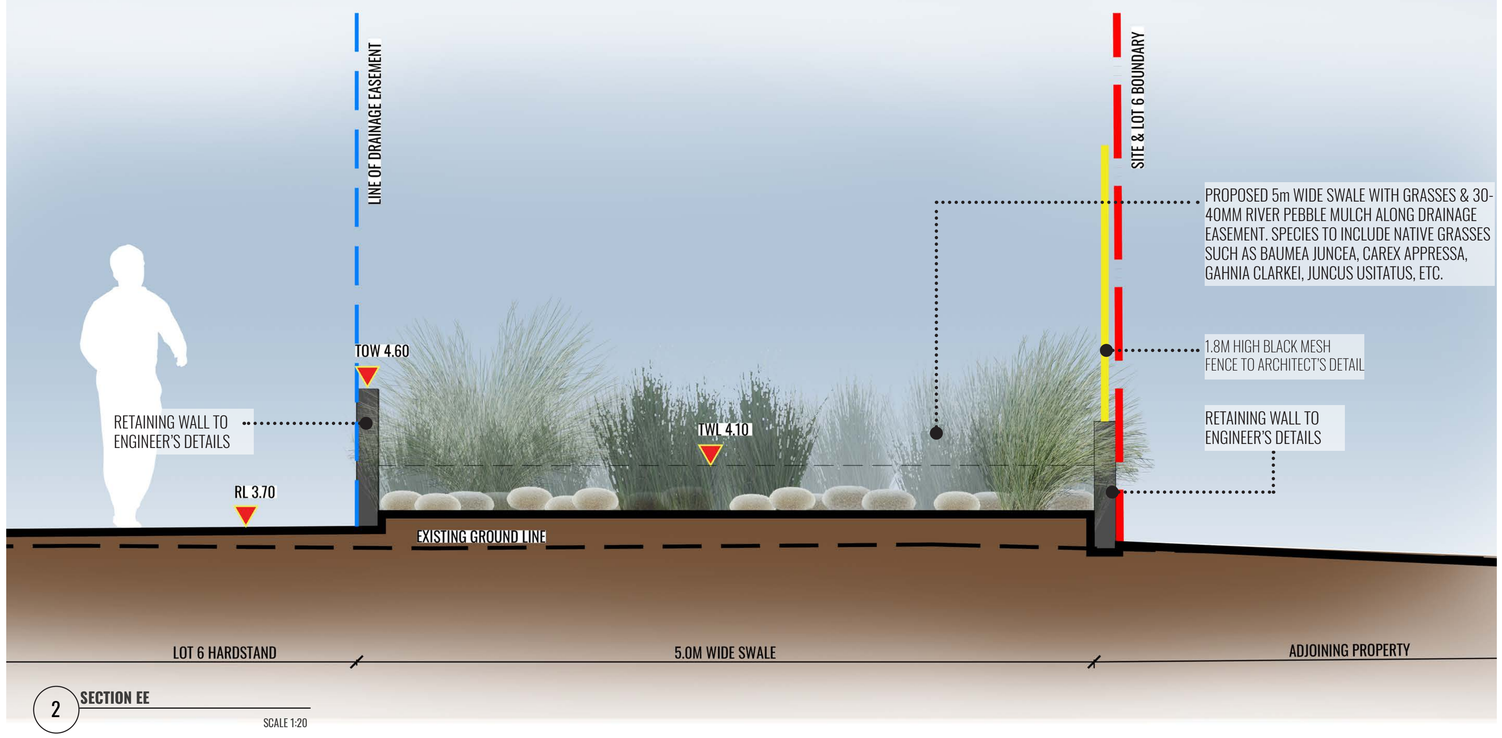
Revision — **FOR SSD APPLICATION**

Rev	Date	Description	Drawn	Checked
H	09.09.20	UPDATED FOR SSD	SB	BG
I	11.09.20	UPDATED FOR SSD	SB	BG
J	11.11.20	UPDATED FOR RTS	PT	BG
K	26.11.20	UPDATED FOR RTS	PT	BG



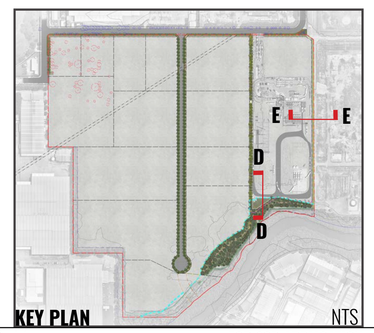
1 **SECTION DD**

SCALE 1:30



2 **SECTION EE**

SCALE 1:20



KEY PLAN NTS

Drawing Title:

Stage 1 Lot 6 (Downer) Sections DD & EE

DWG No: **SSD-15**

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ABN 84 620 205 781 ACN 620 205 781

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OUTLINE SPECIFICATION AND MAINTENANCE PLAN

SPECIFICATIONS

Soils
Contractor to assess and test existing site soils for potential deficiencies. Any new topsoil required for re-vegetation works should ideally consist of 50% existing site topsoil and 50% new topsoil equal or equivalent to 'Native Low 'P' Mix' as supplied by Australian Native Landscapes. Soil to conform to AS4419 and specifications as listed in Landscape Soils Handbook (Simon Leake & Elke Haege 2017). Refer to typical planting detail.

Mulch
75mm of Forest Fines Organic Mulch. Mulching and conditioners to be in accordance with AS4454.

Plant Stock
All grown or purchased plant stock must conform to all the conditions and requirements given in NATSPEC Guide: Specifying Trees. Forestry protective tubes to be used on all tree planting.

MAINTENANCE

All maintenance practices for the Riparian Management Zone must follow those specified within the VMP prepared by AECOM Australia Pty Ltd.

Monitoring, maintenance and review processes must be carried out for a **minimum period of 24 months** by a qualified Bush Regeneration Consultant. As per the VMP there are two specific tasks to be undertaken, these are weed management and regenerative planting within the Riparian Management Zone. Both of these are separated into tasks during and following construction. This includes ongoing maintenance for the duration of development works. A qualified bush regeneration consultant must be engaged to inspect and manage the Riparian Management Zone. This will ensure that any maintenance works within the Riparian Management Zone are guided by the principles as outlined in the VMP and according to best practice Bush Regeneration techniques.

Outline Summary of Maintenance Tasks (Note: Refer to VMP for detailed maintenance tasks)

Sediment and Erosion Control
Inspection during the construction period to ensure effectiveness.
Frequency During Construction: Daily

Rubbish Removal
Rubbish removal must be undertaken on a regular basis to ensure the site remains in tidy condition and rubbish does not enter the waterway.
Frequency During Construction: Weekly
Frequency During Operation: Monthly for 2 years

Weed Eradication and Management
Treatment of weeds should, as a first priority, be undertaken with best practice bush regeneration techniques aimed at minimal use of herbicides, encouragement of natural regrowth, the use of non-invasive grass species and the prevention of weed seed or spread. Always use mechanical/physical removal over the use of herbicide where possible.
Frequency During Construction: Weekly
Frequency During Operation : Annually for 2 years

Tree Replacement and Growth
Tree replacement strategies undertaken as per Bush Regeneration consultant's recommendations. Undertake monitoring of condition of Riparian Management Zone and undertake weeding and replanting if required. To ensure the standard of 90% survival rate, revegetated areas would undergo regular maintenance of watering, weeding, replacement of dead or dying plants and adjustment of tree protection fencing where necessary.
Frequency During Construction: Ongoing
Frequency During Operation: Annually for 2 years

Pruning, Trimming, Stakes and Ties
Remove deadwood, remove suckering roots from rootball, check ties. Improve plant shape and promote new growth. Adjust ties and stakes as necessary. Stakes can be removed once plants are self-supporting.
Frequency During Construction: Ongoing
Frequency During Operation: Annually for 2 years

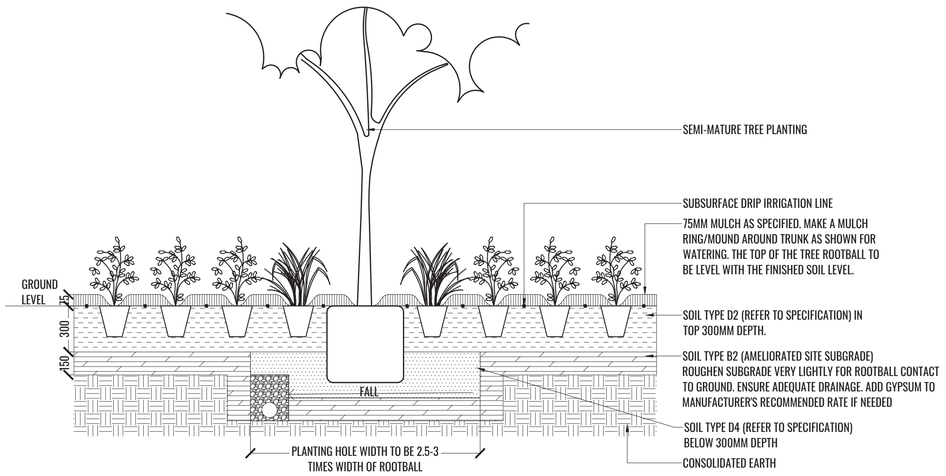
Pests and Disease Control
Inspection of the riparian management zone to investigate the presence of pests, diseases and feral animals.
Frequency During Construction: Monthly or after major storm events.
Frequency During Operation : Monthly for 2 years

Mulching
If mulch layer gets thin during establishment period, top up mulch.
Frequency During Construction: Ongoing
Frequency During Operation: Annually for 2 years

Watering
A temporary irrigation system or regular hand watering should be undertaken. Water as necessary every day especially during periods of hot weather. Best practice watering is early morning or late afternoon to reduce evaporation. **Frequency During Construction: 2 week interval watering should be maintained until planting is fully established.**

TYPICAL LANDSCAPE DETAILS

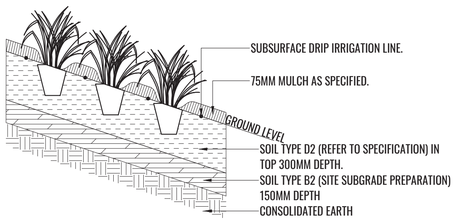
TREE/SHRUB SIZE AND QUALITY TO BE TO NATSPEC STANDARD. SPECIES IS TO BE AS PER PLAN AND PLANT SCHEDULE. ENSURE ONLY HEALTHY AND VIGOROUS, DISEASE FREE, WELL MAINTAINED PLANTS ARE USED.
TAKE CARE TO ENSURE FOLIAGE, BRANCHES, TRUNKS AND ROOT CROWNS ARE NOT DAMAGED BEFORE, DURING AND AFTER PLANTING.
ENSURE OPTIMUM MAINTENANCE AND ESTABLISHMENT OF TREES/SHRUBS OCCURS AS SOON AS THEY ARE AT SITE



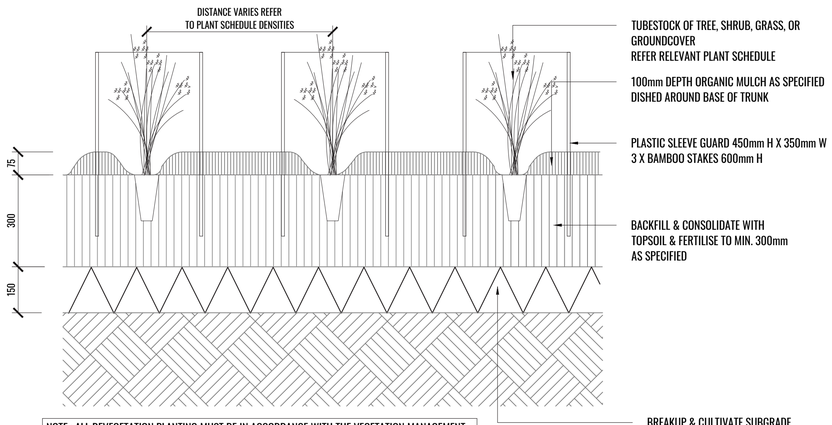
THOROUGHLY SOAK THE ROOTBALL OF TREE WITH FRESH WATER BEFORE TAKING OFF POT OR BAG. WHEN PLANTING HOLE IS COMPLETE USE A SHARP SPADE TO SHAVE OFF 20-50MM OF THE SIDES AND BASE OF ROOTBALL (TO ROOD PRUNE IT) BEFORE CAREFULLY PLACING INTO PLANTING HOLE. IF NORTH IS MARKED ON THE TREE, ENSURE ORIENTATION IS CORRECT WITH NORTH MARKING TO THE NORTH.
- REMOVE ANY STAKES, TIES AND LABELS. WATER ROOTBALL THOROUGHLY.
- TOP OF ROOTBALL TO FINISH FLUSH WITH TOP OF SOIL

1 **MASS PLANTING TYPICAL DETAIL**
TYPICAL SECTION — SCALE 1:20

NATSPEC QUALITY PLANTS TO BE INSTALLED. FOR PLANT SPECIES, QUANTITIES AND SIZE, REFER TO LANDSCAPE PLAN AND PLANTING SCHEDULE



2 **TYPICAL TUBESTOCK PLANTING ON 1 IN 4 SLOPE OR FLATTER DETAIL**
TYPICAL SECTION — SCALE 1:20



NOTE : ALL REVEGETATION PLANTING MUST BE IN ACCORDANCE WITH THE VEGETATION MANAGEMENT SPECIFICATIONS AS PREPARED BY
REFER TO DOCUMENT REF :

3 **TYPICAL TUBESTOCK REVEGETATION PLANTING DETAIL**
TYPICAL SECTION — SCALE 1:10

Drawing Title:
Specifications & Typical Details
DWG No: **SSD-16**

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PLANTING SCHEDULE

Riparian Corridor Planting - Swamp Oak Floodplain Forest								
CODE	BOTANICAL NAME	COMMON NAME	MATURE HEIGHT	MATURE WIDTH	POT SIZE	NATIVE	PLANTING DENSITY	QTY*
Trees Canopy Species 1 per 300m2								
ALP EXC	*Alphitonia excelsa*	Red Ash	20m	15m	Forestry Tube	✓	AS SHOWN	11
CAS GLA	*Casuarina glauca*	Swamp Oak	20m	15m	Forestry Tube	✓	AS SHOWN	15
GLO FER	*Glochidion ferdinandi*	Cheese Tree	15m	8m	Forestry Tube	✓	AS SHOWN	16
MEL STY	*Melaleuca styphelioides*	Prickly-leaved Tea Tree	10m	8m	Forestry Tube	✓	AS SHOWN	11
MEL QUI	*Melaleuca quinquenervia*	Forest Red Gum	20m	6m	Forestry Tube	✓	AS SHOWN	19
Small Trees / Shrubs 1 per 50m2								
ACM smi	*Acmena smithii*	Lilly Pilly	3-5m	2m	Tube	✓	AS SHOWN	182
CUP ANA	*Cupaniopsis anacardioides*	Tuckeroo	6m	3m	Tube	✓	AS SHOWN	19
CAL SAL	*Callistemon salignus*	Sweet Willow Bottlebrush	8m	5m	Tube	✓	AS SHOWN	15
MEL alt	*Melaleuca alternifolia*	Narrow-leaved Paperbark	7m	3m	Tube	✓	AS SHOWN	95
MEL ERI	*Melaleuca ericifolia*	Swamp Paperbark	9-15m	3m	Tube	✓	AS SHOWN	34
MYO acu	*Myoporum acuminatum*	Waterbush	10m	3m	Tube	✓	AS SHOWN	88
Grasses and Groundcovers 1 per 2.5m² in fully structured vegetation only								
BLE ind	*Blechnum indicum*	Swamp Water-fern	1m	NIL	Forestry Tube	✓	AS SHOWN	467
CAR app	*Carex appressa*	Tall Sedge	1m	1m	Forestry Tube	✓	AS SHOWN	467
DIA cae	*Dianella caerulea*	Blue Flax Lily	0.8m	1.5m	Forestry Tube	✓	AS SHOWN	513
JUN usi	*Juncus usitatus*	Common Rush	1.2m	0.5m	Forestry Tube	✓	AS SHOWN	467
ISO inu	*Isolepis inundata*	Swamp Club-sedge	0.5m	0.5m	Forestry Tube	✓	AS SHOWN	467
LOM lon	*Lomandra longifolia*	Spiny-headed Mat-Rush	0.8m	0.8m	Forestry Tube	✓	AS SHOWN	513
VIO ban	*Viola banksii*	A Violet	0.40m	NIL	Forestry Tube	✓	AS SHOWN	513
Vines 1 per 25m² in fully structured vegetation only								
PAR str	*Parsonsia straminea*	Common Silkpod	0.1m	NIL	Tube	✓	AS SPECIFIED	114
STE dis	*Stephania japonica var. discolor*	Snake Vine	na	NIL	Tube	✓	AS SPECIFIED	113
FLA ind	*Flagellaria indica*	Whip Vine	15m	NIL	Tube	✓	AS SPECIFIED	113
Bioretention Basin planting								
BAU jun	*Baumea juncea*	Bare Twig Rush	1m	1m	Tubestock	✓	5/m2	370
CAR app	*Carex appressa*	Tall Sedge	1m	1m	Tubestock	✓	5/m2	370
DIA cae	*Dianella caerulea*	Blue Flax Lily	0.8m	1.5m	Tubestock	✓	5/m2	370
GAH cla	*Gahnia clarkei*	Saw Sedge	1.5m	1.5m	Tubestock	✓	5/m2	370
IMP inu	*Imperata cylindrica var. major*	Blady Grass	1.2m	0.3m	Tubestock	✓	5/m2	370
ISO inu	*Isolepis inundata*	Swamp Club-sedge	0.5m	0.5m	Tubestock	✓	5/m2	370
JUN usi	*Juncus usitatus*	Common Rush	1.2m	0.5m	Tubestock	✓	5/m2	370
LOM lon	*Lomandra longifolia*	Spiny-headed Mat-Rush	0.8m	0.8m	Tubestock	✓	5/m2	370
Stormwater Outlet Rip-rap Planting								
BAU jun	*Baumea juncea*	Bare Twig Rush	1m	1m	Tubestock	✓	3/m2	39
CAR app	*Carex appressa*	Tall Sedge	1m	1m	Tubestock	✓	3/m2	39
DIA cae	*Dianella caerulea*	Blue Flax Lily	0.8m	1.5m	Tubestock	✓	3/m2	39
GAH cla	*Gahnia clarkei*	Saw Sedge	1.5m	1.5m	Tubestock	✓	3/m2	39
IMP inu	*Imperata cylindrica var. major*	Blady Grass	1.2m	0.3m	Tubestock	✓	3/m2	39
ISO inu	*Isolepis inundata*	Swamp Club-sedge	0.5m	0.5m	Tubestock	✓	3/m2	39
JUN usi	*Juncus usitatus*	Common Rush	1.2m	0.5m	Tubestock	✓	3/m2	39
LOM lon	*Lomandra longifolia*	Spiny-headed Mat-Rush	0.8m	0.8m	Tubestock	✓	3/m2	39
Swale planting								
BAU jun	*Baumea juncea*	Bare Twig Rush	1m	1m	Tubestock	✓	3/m2	17
CAR app	*Carex appressa*	Tall Sedge	1m	1m	Tubestock	✓	3/m2	17
DIA cae	*Dianella caerulea*	Blue Flax Lily	0.8m	1.5m	Tubestock	✓	3/m2	17
GAH cla	*Gahnia clarkei*	Saw Sedge	1.5m	1.5m	Tubestock	✓	3/m2	17
IMP inu	*Imperata cylindrica var. major*	Blady Grass	1.2m	0.3m	Tubestock	✓	3/m2	17
ISO inu	*Isolepis inundata*	Swamp Club-sedge	0.5m	0.5m	Tubestock	✓	3/m2	17
JUN usi	*Juncus usitatus*	Common Rush	1.2m	0.5m	Tubestock	✓	3/m2	17
LOM lon	*Lomandra longifolia*	Spiny-headed Mat-Rush	0.8m	0.8m	Tubestock	✓	3/m2	17
*Final plant number to be calculated at CC stage								

Stage 1 Lot 6 Downer Site Planting								
CODE	BOTANICAL NAME	COMMON NAME	MATURE HEIGHT	MATURE WIDTH	POT SIZE	NATIVE	PLANTING DENSITY	QTY*
Trees								
CAL SAL	*Callistemon salignus*	Sweet Willow Bottlebrush	8m	5m	100LT	✓	AS SHOWN	9
ELA RET	*Elaeocarpus reticulatus*	Blueberry Ash	9m	4m	75LT	✓	AS SHOWN	21
EUC TER	*Eucalyptus tereticornis*	Forest Red Gum	20-30m	5m	75LT	✓	AS SHOWN	6
GLO FER	*Glochidion ferdinandi*	Cheese Tree	15m	8m	100LT	✓	AS SHOWN	9
WAT FLO	*Waterhousea floribunda*	Weeping Lilly Pilly	8m	5m	75LT	✓	AS SHOWN	11
Shrubs & Hedge planting								
ACM smi	*Acmena smithii*	Lilly Pilly	3m**	1m	200mm	✓	750mm Ctrs	491
BUR spi	*Bursaria spinosa*	Sweet Bursaria	1.5-4m	1.5-3m	200mm	✓	AS SHOWN	39
COR alb	*Correa alba*	White Correa	1.5m	1.5m	200mm	✓	AS SHOWN	50
COR gla	*Correa glabra 'Ivory Lantern'*	Rock Correa	1.6m	0.6m	200mm	✓	AS SHOWN	45
COR ref	*Correa reflexa*	Native Fuchsia	0.5-1.2m	0.5m	200mm	✓	AS SHOWN	41
CAL rev	*Callistemon citrinus 'Reeve's Pink'*	Reeve's Pink Bottlebrush	3m	2m	200mm	✓	AS SHOWN	137
CAL whi	*Callistemon citrinus 'White Anzac'*	Bottlebrush	0.5-1.5m	2m	200mm	✓	AS SHOWN	128
CRI ped	*Crinum pedunculatum*	Swamp Lily	1.5-3m	1-3m	200mm	✓	AS SHOWN	10
DOR exc	*Doryanthes excelsa*	Gymea Lily	2-3m	2-3m	200mm	✓	AS SHOWN	4
Grasses and Groundcovers								
DIA bre	*Dianella caerulea 'Breeze'®*	Blue Flax Lily	0.8m	0.8m	Tubestock	✓	5/m2	745
DIA lil	*Dianella caerulea 'Little Jess'™*	Blue Flax Lily	0.4m	0.4m	Tubestock	✓	5/m2	700
LOM tan	*Lomandra longifolia 'Tanika'®*	Spiny-headed Mat-Rush	0.8m	0.6m	Tubestock	✓	5/m2	714
LOM kat	*Lomandra longifolia 'Katrinus Deluxe'*	Spiny-headed Mat-Rush	0.8m	0.8m	Tubestock	✓	5/m2	804
VIO ban	*Viola banksii*	Native Violet	0.4m	NIL	140mm	✓	3/m2	893
Swale planting								
BAU jun	*Baumea juncea*	Bare Twig Rush	1m	1m	Tubestock	✓	3/m2	647
CAR app	*Carex appressa*	Tall Sedge	1m	1m	Tubestock	✓	3/m2	647
DIA cae	*Dianella caerulea*	Blue Flax Lily	0.8m	1.5m	Tubestock	✓	3/m2	647
GAH cla	*Gahnia clarkei*	Saw Sedge	1.5m	1.5m	Tubestock	✓	3/m2	647
IMP inu	*Imperata cylindrica var. major*	Blady Grass	1.2m	0.3m	Tubestock	✓	3/m2	647
ISO inu	*Isolepis inundata*	Swamp Club-sedge	0.5m	0.5m	Tubestock	✓	3/m2	647
JUN usi	*Juncus usitatus*	Common Rush	1.2m	0.5m	Tubestock	✓	3/m2	647
LOM lon	*Lomandra longifolia*	Spiny-headed Mat-Rush	0.8m	0.8m	Tubestock	✓	3/m2	647
*Final plant number to be calculated at CC stage								
**To be trimmed to specified height								

Proposed Access Road Street tree planting								
CODE	BOTANICAL NAME	COMMON NAME	MATURE HEIGHT	MATURE WIDTH	POT SIZE	NATIVE	PLANTING DENSITY	QTY*
Trees								
MEL LIN	*Melaleuca linariifolia*	Snow in Summer	10m	4m	75LT	✓	AS SHOWN	144

PLANT IMAGES


Alphitonia excelsa


Casuarina glauca


Melaleuca quinquenervia


Callistemon salignus


Waterhousea floribunda


Acmena smithii


Carex appressa


Lomandra longifolia


Dianella caerulea


Crinum pedunculatum


Viola banksii


Myoporum acuminatum

Drawing Title:

Planting Schedules & Imagery

DWG No: **SSD-17**

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APPENDIX B5

SECTION 88B INSTRUMENT

INSTRUMENT SETTING OUT TERMS OF EASEMENTS OR PROFITS À PRENDRE INTENDED TO BE CREATED OR RELEASED AND OF RESTRICTIONS ON THE USE OF LAND OR POSITIVE COVENANTS INTENDED TO BE CREATED PURSUANT TO SECTION 88B CONVEYANCING ACT 1919.

Plan: Plan of Subdivision of Lot 100 in DP1168951 covered by Subdivision Certificate No. …….. Dated ……..

Full name and address of the owner of the land: Viva Energy Australia Pty Ltd
ABN: 46 004 610 459
Level 16, 720 Bourke Street
Docklands Vic 3008

Part 1 (Creation)

Number of item shown in the intention panel on the plan	Identity of easement, profit à prendre, restriction or positive covenant to be created and referred to in the plan	Burdened lot(s) or parcels:	Benefited lot(s), road(s), bodies or Prescribed Authorities
1.	Easement for Pedestrian Access 40 wide and variable width (M)	20	Parramatta City Council

Part 1(b) (Release)

Number of item shown in the intention panel on the plan to be released	Identity of easement, profit à prendre, restriction or positive covenant to be released and referred to in the plan	Burdened lot(s) or parcels:	Benefited lot(s), road(s), bodies or Prescribed Authorities
1.	Easement for pipeline 3.05 metre(s) wide and variable width shown in DP219337 and created by J486578	1/233132	Part of prior Lot 100 in DP1168951, now being Lot 20
2.	Easement for pipeline affecting the whole of the land and created by R297864	Part of prior Lot 100 in DP1168951, now being Lot 20	Viva Energy Aviation Pty Ltd
3.	Easement for pipeline created by DP747776	Part of prior Lot 100 in DP1168951, now being Lot 20	Viva Energy Refining Pty Ltd
4.	Easement for drainage of effluent 1 metre wide created by DP1037474	100/1079715	Part of prior Lot 100 in DP1168951, now being Lot 20

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Part 2 (Terms)

1. Interpretation

In this instrument:

(a) a reference to a party to this instrument or any other document or agreement includes the party's successors, permitted substitutes and permitted assigns;

(b) a reference to legislation or to a provision of legislation (including subordinate legislation) is to that legislation as amended, re-enacted or replaced, and includes any subordinate legislation issued under it; and

(c) headings are for convenience only and do not affect interpretation.

2. Counterparts and electronic signatures

2.1. Counterparts

(a) This instrument may be executed in any number of counterparts, each of which is an original. All of the counterparts together constitute the one document, as if the signatures on the counterparts were on a single copy of this instrument. A counterpart may be physically signed in hard copy, or other electronic form, or by any combination of these.

(b) Without limiting this clause or how a party may execute this instrument:

(i) a party may sign a counterpart by executing a signature page and electronically transmitting the executed counterpart of this instrument in its entirety (that is, not just the signature page) to each other party or their authorised representative. Each other party will be taken to have received that signed counterpart from the signing party at the time they would be taken to have received it if it were a notice given under this instrument; and

(ii) signatures on behalf of one party that are on different counterparts will be taken to be, and have the same effect as, signatures on the same counterpart and on a single copy of this instrument.

2.2. Electronic signatures

The parties acknowledge and agree that:

(a) this instrument, including any counterpart, may be electronically signed, including by using software or a platform for the electronic execution of documents;

(b) any electronic signatures of or on behalf of the parties in this instrument are intended to authenticate this instrument and to have the same legal force and effect as if they were handwritten signatures on this instrument;

(c) without limiting the ways in which this instrument may be validly executed by a party, this instrument or any counterpart may be signed electronically by a party which is a corporation under section 127(1) of the Corporations Act 2001 (Cth) and if any such party does so:

(i) each other party may make and rely on the assumptions set out in section 129(5) of the Corporations Act 2001 (Cth);

(ii) a reference to "a document" and "the document" in sections 127(1) and 129(5) includes a reference to the electronic data file containing this instrument in electronic form; and

(iii) a reference to "signed" or "signs" in sections 127(1) and 129(5) includes a signature in electronic form.

(d) where this instrument is signed electronically, a hard copy print out of the electronic form of the fully signed instrument is an original copy of this instrument.

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2.3. Electronic signatures warranty

Where this instrument or any counterpart is signed electronically by or on behalf of a party:

(a) that party represents and warrants that it or anyone signing on its behalf has:

(i) been duly authorised to enter into and execute this instrument and to create obligations that are valid and binding obligations on the party; and

(ii) affixed their own electronic signature; and

(b) no person may challenge the validity of this instrument by virtue only of the fact that it has been electronically signed by or on behalf of that party, and each party is estopped from asserting otherwise..

Terms of easement, restriction, or positive covenant numbered 1 in the plan:

1. Definitions

For the purposes of this easement, the following words are defined as follows:

"**Associates**" means authorised officers, employees, consultants, contractors, advisers and agents;

"**Authorised User**" means a member of the public;

"**Bicycle**" means a vehicle with two or more wheels that is built to be propelled by human power through a belt, chain or gears (whether or not it has an auxiliary motor). For the purposes of this easement, 'bike' and 'bicycle' mean the same thing;

"**Claim**" means any claim, action, proceeding, demand, liability, loss, damage, expense or cost (including legal costs on a full indemnity basis);

"**Drainage Infrastructure**" means any drainage infrastructure and water wells located on the Easement Site;

"**Easement**" means this easement;

"**Easement Site**" means the site of the Easement identified in the Plan;

"**Instrument**" means this section 88B instrument;

"**Lot Burdened**" means the whole or any part of a lot having the burden of this Easement;

"**Pathway**" means a 2.5 metre wide pathway;

"**Plan**" means the plan to which this Instrument relates;

"**Prescribed Authority**" means City of Parramatta Council; and

"**Proprietor of the Lot Burdened**" means every person (including a corporation) who is at any time entitled to an estate or interest in the Lot Burdened, including without limitation any freehold or leasehold estate or interest in possession in the Lot Burdened and each part of the Lot Burdened.

2. Grant

(a) Subject to the terms of this Easement, the Proprietor of the Lot Burdened grants the Prescribed Authority an easement for public access variable width within the Easement Site.

(b) Subject to clause 2(c):

(i) the Prescribed Authority and its Authorised Users may pass and repass over the Pathway as follows:

1. on foot;

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2. with wheelchairs or other disabled access aid; and
3. on Bicycles, skateboards, scooters, rollerblades or similar items;

without vehicles,

(ii) the Prescribed Authority may construct the Pathway within the Easement Site and must maintain the Pathway. The Prescribed Authority or its Associates may do anything reasonably necessary for the purpose of constructing or maintaining the Pathway including:

(A) entering, passing and re-passing the Lot Burdened within the Easement Site;

(B) taking anything to or from the Easement Site, including materials for the construction or maintenance of the Pathway; and

(C) carrying out the work within the Easement Site to construct, maintain, or repair the Pathway.

(c) The Prescribed Authority must comply with the following in exercising its rights under this Easement:

(i) the Prescribed Authority must:

(A) not construct the Pathway over any Drainage Infrastructure located on the Easement Site;

(B) provide the Proprietor of the Lot Burdened with 5 business days' notice prior to commencing the construction of the Pathway;

(C) ensure all work is done properly and in a workmanlike manner;

(D) cause as little inconvenience as is practicable to the Proprietor of the Lot Burdened;

(E) cause as little damage as is practicable to the Lot Burdened and any improvement on it including the Drainage Infrastructure;

(F) restore the Lot Burdened and any improvement as nearly as is practicable to its former condition;

(G) make good the Lot Burdened to the condition that it was in prior to the construction of the Pathway in the event that the Prescribed Authority no longer requires the Pathway within the Easement Site; and

(H) make good any collateral damage;

(ii) the Pathway must be designed and constructed at the cost of the Prescribed Authority;

(iii) any defects must be rectified by the Prescribed Authority in the 3 months following completion of the construction of the Pathway, at the cost of the Prescribed Authority; and

(iv) the Prescribed Authority will be responsible for the cost of the ongoing repair and maintenance of the Pathway (together with appropriate insurances) following completion of the construction of the Pathway and the rectification of any defects.

3. Indemnity

The Prescribed Authority indemnifies and must keep indemnified the Proprietor of the Lot Burdened and its Associates against all Claims that may be brought against Proprietor of the Lot Burdened or its Associates or which Proprietor of the Lot Burdened or its Associates, may pay, sustain or incur as a direct or indirect result of any one or more of the following:

(a) any breach or non-performance of this instrument by the Prescribed Authority; or

(b) any wrongful, wilful or negligent act or omission of Prescribed Authority or any of its Associates.

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Plan: Plan of Subdivision of Lot 100 in DP1168951 covered by Subdivision Certificate No. ……. Dated ……..

Execution clauses

Viva Energy Australia Pty Ltd

Executed by Viva Energy Australia Pty Ltd
ACN: 004 610 459
pursuant to Sec 127 of the Corporations Act, 2001

_____	_____
Director	Director/Secretary
_____	_____
Print Name	Print Name

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Plan: Plan of Subdivision of Lot 100 in DP1168951 covered by Subdivision Certificate No. ……. Dated ……..

Parramatta City Council

I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Signature of witness:

Name of witness:

Address of witness:

Certified correct for the purposes of the Real Property Act 1900 by the delegate / authorised officer named below who signed this instrument pursuant to the authority specified.

Signature of delegate / authorised officer:

Delegate / authorised officer's name:

Signing on behalf of: **PARRAMATTA CITY COUNCIL**

Authority of officer: Pursuant to s.377 Local Government Act 1993 / s.378 Local Government Act 1993

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Plan: Plan of Subdivision of Lot 100 in DP1168951 covered by Subdivision Certificate No. ……. Dated ……..

Viva Energy Aviation Pty Ltd

Executed by Viva Energy Aviation Pty Ltd
ACN: 167 761 453
pursuant to Sec 127 of the Corporations Act, 2001

_____	_____
Director	Director/Secretary
_____	_____
Print Name	Print Name

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Plan: Plan of Subdivision of Lot 100 in DP1168951 covered by Subdivision Certificate No. ……. Dated ……..

Viva Energy Refining Pty Ltd

Executed by Viva Energy Refining Pty Ltd
ACN: 004 303 842
pursuant to Sec 127 of the Corporations Act, 2001

_____	_____
Director	Director/Secretary
_____	_____
Print Name	Print Name

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INSTRUMENT SETTING OUT TERMS OF EASEMENTS OR PROFITS À PRENDRE INTENDED TO BE CREATED OR RELEASED AND OF RESTRICTIONS ON THE USE OF LAND OR POSITIVE COVENANTS INTENDED TO BE CREATED PURSUANT TO SECTION 88B CONVEYANCING ACT 1919.

Plan: Plan of Subdivision of Lot 100 in DP1168951 covered by Subdivision Certificate No. ……. Dated …….

Full name and address of the owner of the land: VE Property Pty Ltd
ACN: 623 469 625
Level 16, 720 Bourke Street
Docklands Vic 3008

Part 1 (Creation)

Number of item shown in the intention panel on the plan	Identity of easement, profit à prendre, restriction or positive covenant to be created and referred to in the plan	Burdened lot(s) or parcels:	Benefited lot(s), road(s), bodies or Prescribed Authorities
1.	Restriction on Use of Land	6	21
2.	Easement for Services 5 wide (G)	5 and 6	Sydney Water Endeavour Energy Network Asset Partnership
3.	Easement for overland flow 5 wide (L)	6	Parramatta City Council

Part 1(b) (Release)

Number of item shown in the intention panel on the plan to be released	Identity of easement, profit à prendre, restriction or positive covenant to be released and referred to in the plan	Burdened lot(s) or parcels:	Benefited lot(s), road(s), bodies or Prescribed Authorities
1.	Easement to drain water 13.4 wide created by AC424784	2/864567	Part of prior Lot 100 in DP1168951, now being Lots 6 and 21
2.	Easement to drain water 10.2 metres wide and 13.4 metres wide created by AC424785	Part of prior Lot 100 in DP1168951, now being Lot 6 and 21	2/864567

Part 2 (Terms)

1. Interpretation

In this instrument:

(a) a reference to a party to this instrument or any other document or agreement includes the party's successors, permitted substitutes and permitted assigns;

(b) a reference to a reference to any act, regulation, rule, guidelines or similar instrument includes any consolidations, amendments or re-enactments of it, any new statute, regulation, rule or guidelines or similar instrument which replaces it upon its repeal; and

(c) headings are for convenience only and do not affect interpretation.

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2. Counterparts and electronic signatures

2.1. Counterparts

(a) This instrument may be executed in any number of counterparts, each of which is an original. All of the counterparts together constitute the one document, as if the signatures on the counterparts were on a single copy of this instrument. A counterpart may be physically signed in hard copy, or other electronic form, or by any combination of these.

(b) Without limiting this clause or how a party may execute this instrument:

(i) a party may sign a counterpart by executing a signature page and electronically transmitting the executed counterpart of this instrument in its entirety (that is, not just the signature page) to each other party or their authorised representative. Each other party will be taken to have received that signed counterpart from the signing party at the time they would be taken to have received it if it were a notice given under this instrument; and

(ii) signatures on behalf of one party that are on different counterparts will be taken to be, and have the same effect as, signatures on the same counterpart and on a single copy of this instrument.

2.2. Electronic signatures

The parties acknowledge and agree that:

(a) this instrument, including any counterpart, may be electronically signed, including by using software or a platform for the electronic execution of documents;

(b) any electronic signatures of or on behalf of the parties in this instrument are intended to authenticate this instrument and to have the same legal force and effect as if they were handwritten signatures on this instrument;

(c) without limiting the ways in which this instrument may be validly executed by a party, this instrument or any counterpart may be signed electronically by a party which is a corporation under section 127(1) of the Corporations Act 2001 (Cth) and if any such party does so:

(i) each other party may make and rely on the assumptions set out in section 129(5) of the Corporations Act 2001 (Cth);

(ii) a reference to "a document" and "the document" in sections 127(1) and 129(5) includes a reference to the electronic data file containing this instrument in electronic form; and

(iii) a reference to "signed" or "signs" in sections 127(1) and 129(5) includes a signature in electronic form.

(d) where this instrument is signed electronically, a hard copy print out of the electronic form of the fully signed instrument is an original copy of this instrument.

2.3. Electronic signatures warranty

Where this instrument or any counterpart is signed electronically by or on behalf of a party:

(a) that party represents and warrants that it or anyone signing on its behalf has:

(i) been duly authorised to enter into and execute this instrument and to create obligations that are valid and binding obligations on the party; and

(ii) affixed their own electronic signature; and

(b) no person may challenge the validity of this instrument by virtue only of the fact that it has been electronically signed by or on behalf of that party, and each party is estopped from asserting otherwise.

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Terms of easement, restriction, or positive covenant numbered 1 in the plan:

1. Objective

The objective of this covenant is to ensure that the Registered Proprietor of the Lot Burdened does not carry out any Development on the Lot Burdened which:

(a) is not compatible with the ongoing use of the Lot Benefited as a Facility; or
(b) otherwise presents any unacceptable risks having regard to the ongoing use of the Lot Benefited as a Facility and the operational requirements of the Registered Proprietor of the Lot Benefited.

2. Definitions and Interpretation

2.1. Definitions

For the purposes of this covenant, the following words are defined as follows:

(a) **Ancillary Use** means a use that is subordinate or subservient to the dominant purpose.

(b) **Best Practice Risk Assessment** means risk assessment techniques and processes which:

(i) use recognised methods and practices that could reasonably be expected from experienced and competent persons having regard to recognised good practice in national and international risk assessment; and

(ii) comply with all relevant guidelines and standards for land use safety planning adopted by the Department of Planning, Industry and Environment as at the relevant time;

(c) **Claims** means any actions, claims, losses, costs and charges (including legal costs on a full indemnity basis), liabilities, judgments, orders, damages and expenses;

(d) **Development** has the same meaning given to it under the *Environmental Planning & Assessment Act 1997* (NSW);

(e) **Facility** means a facility:

(i) which is a Major Hazard Facility; and/or

(ii) on or from which bulk fuel is stored or distributed;

(f) **Liabilities** means any Claims of any kind and however arising, including penalties, fines and interest and including those which are prospective or contingent and those the amount of which for the time being is not ascertained or ascertainable but not including internal costs, including management costs;

(g) **Lot Benefited** means the whole or any part of a lot having the benefit of this restriction;

(h) **Lot Burdened** means the whole or any part of a lot having the burden of this restriction;

(i) **Major Hazard Facility** has the same meaning given to it under the *Work Health and Safety Regulation 2017* (NSW);

(j) **Proposed Development** means the proposed Development of the Lot Burdened for the construction and operation of any or all of the following uses:

(i) asphalt production facility;

(ii) construction material recycling facility;

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(iii) road detritus processing facility;

(iv) bitumen products manufacturing facility; and

(v) any Ancillary Uses to the uses described in (i)-(iv) above; and

(k) **Registered Proprietor** means the registered proprietor of the relevant lot from time to time.

2.2. Interpretation

In interpreting this covenant, a reference to any act, regulation, rule, guidelines or similar instrument includes any consolidations, amendments or re-enactments of it, any new statute, regulation, rule or guidelines or similar instrument which replaces it upon its repeal.

3. Restriction

(a) Subject to clause 3(b), the Registered Proprietor of the Lot Burdened may not:

(i) carry out any Development on the Lot Burdened (**New Development**); or

(ii) permit any New Development to be carried out on the Lot Burdened,

unless the prior written consent of the Registered Proprietor of the Lot Benefited is obtained.

(b) The restriction in clause 3(a) does not apply to the Proposed Development.

(c) The Registered Proprietor of the Lot Benefited may:

(i) withhold its consent to any New Development; or

(ii) grant its consent to any New Development on a conditional basis,

if the New Development, in the reasonable opinion of the Registered Proprietor of the Lot Benefited, has the potential to interfere with the safe, lawful and/or efficient operation of the Facility or other operational requirements carried out on or in connection with the Lot Benefited.

(d) If there is any dispute as to whether the Registered Proprietor of the Lot Benefited is entitled to withhold its consent or grant a conditional consent under clause 3(c) then:

(i) The Registered Proprietor of the Lot Burdened may issue the Registered Proprietor of the Lot Benefited with a notice of dispute which must:

(A) specify the New Development proposed; and

(B) attach an assessment, prepared by a suitably qualified consultant (at the cost of the Registered Proprietor of the Lot Burdened), assessing the risks associated with the New Development having regard to the Facility or other operational requirements carried out on or in connection with the Lot Benefited in accordance with Best Practice Risk Assessment,

(**Notice of Dispute**).

(ii) Within 21 days of the receipt of a Notice of Dispute from the Registered Proprietor of the Lot Burdened, representatives of the Registered Proprietor of the Lot Benefited and the Registered Proprietor of the Lot Burdened must meet to attempt to resolve the dispute.

(iii) Failing resolution of the dispute within 42 days of receipt of a Notice of Dispute, the dispute may be referred by either party for determination by a suitably qualified and independent expert in land use safety planning risk assessment as either:

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(A) agreed by the parties; or

(B) failing agreement within 49 days of receipt of a Notice of Dispute, appointed by the President for the time being of the Institute of Engineers Australia (or if that body does not exist or is unable to make such an appointment then a succeeding body or where there is no succeeding body, a body serving similar objects),

(**Independent Expert**).

(iv) The Independent Expert appointed must:

(A) apply Best Practice Risk Assessment; and

(B) act as an expert and not as an arbitrator.

(v) Each party may be legally represented at a hearing before the Independent Expert and will be entitled to produce to the Independent Expert one set of written submissions and any materials or evidence which that party believes is relevant to the matter in dispute.

(vi) Each party will, to the extent possible, make available to the Independent Expert all materials requested by the Independent Expert and all other materials which are relevant to the Independent Expert's determination.

(vii) Unless otherwise agreed by the parties, the Independent Expert will be required to keep confidential all material and evidence made available for the purposes of the determination.

(viii) The Independent Expert is not to make a determination until he or she has first used his or her best endeavours to bring the parties to a settlement acceptable to them both. If the parties come to such a settlement, the Independent Expert must make a determination that gives effect to the terms of the settlement.

(ix) Subject to clause 3(d)(viii), the Independent Expert will make a determination on:

(A) whether the New Development is incompatible with the ongoing use of the Lot Benefited as a Facility or otherwise presents any unacceptable risks having regard to the ongoing use of the Lot Benefited as a Facility or the operational requirements of the Registered Proprietor of the Lot Benefited (in which case the New Development must not be carried out or permitted to be carried out);

(B) whether there should be any conditions imposed on the way on which the New Development should operate in light of the Independent Expert's findings under clause 3(d)(ix)(A) (in which case those conditions must apply if the New Development is carried out or permitted to be carried out); and

(C) the liability of each party (if any) for the Independent Expert's costs.

(x) The determination of the Independent Expert will be final and binding upon the Parties other than in the case of fraud or manifest error.

4. Assignment

(a) Before the Registered Proprietor of the Lot Burdened assigns or transfers its interest in the whole or any part of the Lot Burdened, the Registered Proprietor of the Lot Burdened must first:

(i) notify the Registered Proprietor of the Lot Benefited; and

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(ii) procure that the proposed transferee enters into a deed with the Registered Proprietor of the Lot Benefited, in a form reasonably required by the Registered Proprietor of the Lot Benefited, under which the proposed transferee agrees to be bound by this covenant (or, in the case of a disposal of a lesser interest in the land than ownership, the provisions of this covenant as are relevant to that interest) (**New Deed**), with effect from the date of completion of the disposal, as if the proposed transferee were the Registered Proprietor of the Lot Burdened.

(b) The Registered Proprietor of the Lot Burdened indemnifies and keeps indemnified the Registered Proprietor of the Lot Benefited against any Liabilities which the Registered Proprietor of the Lot Benefited may suffer as a result of the Registered Proprietor not complying with clause 4(a).

5. Application of Restriction

The Registered Proprietor of the Lot Burdened must comply with the terms and conditions of this covenant notwithstanding whether or not it is registered on the title to the Lot Burdened and/or the Lot Benefited.

6. Release of the Restriction

(a) Subject to clause 6(b), the prior written consent of the Registered Proprietor of the Lot Benefited is required to release or vary the restriction in clause 3.

(b) If the Registered Proprietor of the Lot Benefited permanently ceases to use the Lot Benefited as a Facility then:

(i) the restriction in clause 3(a) will cease to apply; and

(ii) the Registered Proprietor of the Lot Benefited must, upon request from the Registered Proprietor of the Lot Burdened, promptly execute all documents required to release this covenant.

Terms of easement, restriction, or positive covenant numbered 2 in the plan:

An easement for services within the meaning of schedule 8, part 11 of the *Conveyancing Act 1919* (NSW).

Terms of easement, restriction, or positive covenant numbered 3 in the plan:

1. Definitions

"**Easement**" means this easement;

"**Lot Burdened**" means the whole or any part of a lot having the burden of this Easement; and

"**Proprietor of the Lot Burdened**" means every person (including a corporation) who is at any time entitled to an estate or interest in the Lot Burdened, including without limitation any freehold or leasehold estate or interest in possession in the Lot Burdened and each part of the Lot Burdened.

2. Grant of easement

The Proprietor of the Lot Burdened grants to the City of Parramatta Council at all times an unrestricted right to the passage of the natural flow of surface water along or through all surface water courses, pits or pipes intended to transport surface water which pass through or are situated on the Lot Burdened, in accordance with the terms of this easement, to the extent to which those water courses are capable of being used for that purpose.

3. Power to release, vary or modify

The name of the authority empowered to release, vary or modify this modify this easement is City of Parramatta Council.

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Plan: Plan of Subdivision of Lot 100 in DP1168951 covered by Subdivision Certificate No. ……. Dated ……..

Execution clauses

VE Property Pty Ltd

Executed by VE Property Pty Ltd
ACN 623 469 625
pursuant to Sec 127(1) of the Corporations Act, 2001

_____	_____
Director	Director/Secretary
_____	_____
Print Name	Print Name

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Plan: Plan of Subdivision of Lot 100 in DP1168951 covered by Subdivision Certificate No. ……. Dated ……..

Sydney Water Attestation

Executed by **Sydney Water Corporation** ABN: 49 776 225 038 Pursuant to section 50(3)(a) of the Interpretation Act 1987 by an authorised delegate:

_____	_____
Signature of Witness	Signature of Authorised Delegate
_____	_____
Name of Witness	Name of Authorised Delegate
_____	_____
Address of Witness	Title of Authorised Delegate
	_____
	Date

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Plan: Plan of Subdivision of Lot 100 in DP1168951 covered by Subdivision Certificate No. ……. Dated ……..

Endeavour Energy Network Asset Partnership

I certify that the attorney signed this instrument in my presence.

Signed by the attorney named below who signed this instrument pursuant to the power of attorney specified for **Endeavour Energy Network Asset Partnership (ABN 30 586 412 717)** on behalf of **Epsilon Distribution Ministerial Holding Corporation (ABN 59 253 130 878)** pursuant to section 36 of the *Electricity Network Assets (Authorised Transactions) Act 2015* (NSW)

Signature of witness:

Name of witness:

Address of witness:
c/- Endeavour Energy
51 Huntingwood Drive
Huntingwood NSW 2148

Signature of attorney:

Name and position of attorney:
Simon Lawton
Strategic Property Manager

Power of attorney:
Book 4768 No 870

Signing on behalf of:
Endeavour Energy Network Asset Partnership ABN 30 586 412 717

Endeavour Energy reference:

Date of signature:

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Plan: Plan of Subdivision of Lot 100 in DP1168951 covered by Subdivision Certificate No. ……. Dated ……..

Parramatta City Council

I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Signature of witness:

Name of witness:

Address of witness:

Certified correct for the purposes of the Real Property Act 1900 by the delegate / authorised officer named below who signed this instrument pursuant to the authority specified.

Signature of delegate / authorised officer:

Delegate / authorised officer's name:

Signing on behalf of: **PARRAMATTA CITY COUNCIL**

Authority of officer: Pursuant to s.377 Local Government Act 1993 / s.378 Local Government Act 1993

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INSTRUMENT SETTING OUT TERMS OF EASEMENTS OR PROFITS À PRENDRE INTENDED TO BE CREATED OR RELEASED AND OF RESTRICTIONS ON THE USE OF LAND OR POSITIVE COVENANTS INTENDED TO BE CREATED PURSUANT TO SECTION 88B CONVEYANCING ACT 1919.

Plan: Plan of Subdivision of Lot 57 in DP covered by Subdivision Certificate No. ……. Dated …….

Full name and address of the owner of the land: VE Property Pty Ltd
ACN: 623 469 625
Level 16, 720 Bourke Street
Docklands Vic 3008

Part 1 (Creation)

Number of item shown in the intention panel on the plan	Identity of easement, profit à prendre, restriction or positive covenant to be created and referred to in the plan	Burdened lot(s) or parcels:	Benefited lot(s), road(s), bodies or Prescribed Authorities
1.	Easement for access (H) 21 metres wide and variable width	64	City of Parramatta Council

Part 2 (Terms)

1. Interpretation

In this Instrument:

(a) a reference to a party to this Instrument or any other document or agreement includes the party's successors, permitted substitutes and permitted assigns;

(b) a reference to legislation or to a provision of legislation (including subordinate legislation) is to that legislation as amended, re-enacted or replaced, and includes any subordinate legislation issued under it; and

(c) headings are for convenience only and do not affect interpretation.

2. Definitions

For the purposes of this Instrument, the following words are defined as follows:

"**Associates**" means authorised officers, employees, consultants, contractors, advisers and agents;

"**Claim**" means any claim, action, proceeding, demand, liability, loss, damage, expense or cost (including legal costs on a full indemnity basis);

"**Easement**" means each easement in this Instrument;

"**Easement Site**" means, in relation to an Easement, the site of the Easement identified in the Plan;

"**Instrument**" means this section 88B instrument;

"**Lot Burdened**" means the whole or any part of a lot having the burden of an Easement;

"**Plan**" means the plan to which this Instrument relates;

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"**Prescribed Authority**" means City of Parramatta Council;

"**Proprietor of the Lot Burdened**" means every person (including a corporation) who is at any time entitled to an estate or interest in a Lot Burdened, including without limitation any freehold or leasehold estate or interest in possession in the Lot Burdened and each part of the Lot Burdened; and

"**Road**" means a paved road made for travelling by foot, motor vehicle or bicycle.

3. Counterparts and electronic signatures

3.1 Counterparts

(a) This Instrument may be executed in any number of counterparts, each of which is an original. All of the counterparts together constitute the one document, as if the signatures on the counterparts were on a single copy of this Instrument. A counterpart may be physically signed in hard copy, or other electronic form, or by any combination of these.

(b) Without limiting this clause or how a party may execute this Instrument:

(i) a party may sign a counterpart by executing a signature page and electronically transmitting the executed counterpart of this Instrument in its entirety (that is, not just the signature page) to each other party or their authorised representative. Each other party will be taken to have received that signed counterpart from the signing party at the time they would be taken to have received it if it were a notice given under this Instrument; and

(ii) signatures on behalf of one party that are on different counterparts will be taken to be, and have the same effect as, signatures on the same counterpart and on a single copy of this Instrument.

3.2 Electronic signatures

The parties acknowledge and agree that:

(a) this Instrument, including any counterpart, may be electronically signed, including by using software or a platform for the electronic execution of documents;

(b) any electronic signatures of or on behalf of the parties in this Instrument are intended to authenticate this Instrument and to have the same legal force and effect as if they were handwritten signatures on this Instrument;

(c) without limiting the ways in which this Instrument may be validly executed by a party, this Instrument or any counterpart may be signed electronically by a party which is a corporation under section 127(1) of the *Corporations Act 2001* (Cth) and if any such party does so:

(i) each other party may make and rely on the assumptions set out in section 129(5) of the *Corporations Act 2001* (Cth);

(ii) a reference to "a document" and "the document" in sections 127(1) and 129(5) includes a reference to the electronic data file containing this Instrument in electronic form; and

(iii) a reference to "signed" or "signs" in sections 127(1) and 129(5) includes a signature in electronic form.

(d) where this Instrument is signed electronically, a hard copy print out of the electronic form of the fully signed instrument is an original copy of this Instrument.

3.3 Electronic signatures warranty

Where this Instrument or any counterpart is signed electronically by or on behalf of a party:

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(a) that party represents and warrants that it or anyone signing on its behalf has:

(i) been duly authorised to enter into and execute this Instrument and to create obligations that are valid and binding obligations on the party; and

(ii) affixed their own electronic signature; and

(b) no person may challenge the validity of this Instrument by virtue only of the fact that it has been electronically signed by or on behalf of that party, and each party is estopped from asserting otherwise.

4. Terms of easement, restriction, or positive covenant numbered 1 in the plan:

(a) Subject to the terms of this Easement, the Proprietor of the Lot Burdened grants the Prescribed Authority a right of access within the Easement Site.

(b) Subject to clause 4(c), the Prescribed Authority and any of its Associates may:

(i) by any reasonable means, pass and repass the Lot Burdened over the Easement Site; and

(ii) do anything reasonably necessary at is cost for the purpose of constructing or maintaining a Road within the Easement Site including:

(A) entering, passing and re-passing the Lot Burdened within the Easement Site;

(B) taking anything to or from the Easement Site, including materials for the construction or maintenance of the Road; and

(C) carrying out the work within the Easement Site to construct, maintain, or repair the Road.

(c) The Prescribed Authority must comply with the following in exercising its rights under this Easement:

(i) the Prescribed Authority, at its cost, must:

(A) provide the Proprietor of the Lot Burdened with 20 business days' notice prior to commencing the construction of the Road;

(B) ensure all work is done properly and in a workmanlike manner;

(C) cause as little inconvenience as is practicable to the Proprietor of the Lot Burdened;

(D) cause as little damage as is practicable to the Lot Burdened and any improvement on it;

(E) restore the Lot Burdened and any improvement (other than the Road) as nearly as is practicable to its former condition;

(F) maintain the Road in good and trafficable condition;

(G) maintain (and ensure its Associates maintain) appropriate insurances for the carrying out of the works and the use of the Easement Site by the Prescribed Authority and its Associates;

(H) make good the Lot Burdened to the condition that it was in prior to the construction of the Road in the event that the Prescribed Authority no longer requires the Road within the Easement Site;

(I) make good any collateral damage; and

(J) comply with all relevant laws regarding the design, construction and maintenance of the Road;

(ii) the Prescribed Authority must rectify any defects in the 3 months following completion of the construction of the Road, at the cost of the Prescribed Authority; and

DRAFT

5. Indemnity

The Prescribed Authority indemnifies and must keep indemnified the Proprietor of the Lot Burdened and its Associates against all Claims that may be brought against Proprietor of the Lot Burdened or its Associates or which Proprietor of the Lot Burdened or its Associates, may pay, sustain or incur as a direct or indirect result of any one or more of the following:

(a) any breach or non-performance of this Instrument by the Prescribed Authority; or

(b) any wrongful, wilful or negligent act or omission of Prescribed Authority or any of its Associates.

DRAFT

Plan: Plan of Subdivision of Lot 5 in DP covered by Subdivision Certificate No. ……. Dated ……..

Execution Clauses

VE Property Pty Ltd

Executed by VE Property Pty Ltd
ACN 623 469 625
pursuant to Sec 127(1) of the Corporations Act, 2001

_____	_____
Director	Director/Secretary
_____	_____
Print Name	Print Name

DRAFT

Plan: Plan of Subdivision of Lot 5 in DP covered by Subdivision Certificate No. ……. Dated ……..

Parramatta City Council

I certify that the person(s) signing opposite, with whom I am personally acquainted or as to whose identity I am otherwise satisfied, signed this instrument in my presence.

Signature of witness:

Name of witness:

Address of witness:

Certified correct for the purposes of the Real Property Act 1900 by the delegate / authorised officer named below who signed this instrument pursuant to the authority specified.

Signature of delegate / authorised officer:

Delegate / authorised officer's name:

Signing on behalf of: **PARRAMATTA CITY COUNCIL**

Authority of officer: Pursuant to s.377 Local Government Act 1993 / s.378 Local Government Act 1993

DRAFT



APPENDIX C

REVISED SURFACE WATER AND CIVILS REPORT

Costin Roe Consulting

PRECISION | COMMUNICATION | ACCOUNTABILITY

CIVIL ENGINEERING REPORT INCORPORATING WATER CYCLE MANAGEMENT STRATEGY

SSD 10459

CENTRAL SYDNEY INDUSTRIAL ESTATE SSD

PART LOT 100 DP 1168951
9 DEVON STREET, CLYDE NSW

Prepared For:

VE Property Pty Ltd

Level 16, 720 Bourke Street

Docklands VIC 3008

Prepared by:
Costin Roe Consulting
Level 1, 8 Windmill Street
WALSH BAY NSW 2000

***Rev*: B**

DOCUMENT VERIFICATION

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Document Title	Civil Engineering Report for CSIE SSD
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Description	Civil Engineering Report for CSIE SSD
Client Contact	VE Property c/- Mr Jeffrey Lord, DBL Property

	Name	**Signature**
Prepared by	Xavier Cure	
Checked by	Mark Wilson	
Issued by	Xavier Cure	
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GLOSSARY OF TERMS

Table (i) Key terms

Key terms	Definition
The Applicant	VE Property Pty Ltd
The CSIE Site	The Central Sydney Industrial Estate (CSIE) SSD to be developed across Part Lot 100 DP1168951, 9 Devon St, Clyde.
The Site	The area occupied by the CSIE located on the Western Area of the former Oil Refinery at Clyde on Part Lot 100 DP1168951, 9 Devon St, Clyde.
The previous site	SSD 5147 was approved in 2015 comprising conversion of the former Oil Refinery at Clyde into a finished petroleum product import, storage and distribution terminal. Works were approved to improve terminal efficiency and to consolidate the operational footprint including demolition and clearing of the old refinery. The Western Area lands were identified as future surplus industrial land for future reuse. The project will be on this land (the CSIE site).
The Proposal	VE Property Pty Ltd (VEP) proposes the staged development of the Central Sydney Industrial Estate on lands known as the Western Area of the former Oil Refinery at Clyde. The proposal will include the staged subdivision of the western area of Lot 100 DP 1168951 into fourteen new industrial lots. Prepare the lots via earthworks and civil works for future re-development (by future applications). Stage 1 of the development will comprise the Sustainable Road Resource Centre, to be operated by Downer on the newly created Lot 6 including the following: • RAP processing operations; • Asphalt plant; • Reconomy Facility; and • A modern bitumen product manufacturing plant.

Table (ii) Glossary

Term	Definition
CBD	Central Business District
CEMP	Construction Environmental Management Plan
Council	City of Parramatta
CSIE	Central Sydney Industrial Estate
DA	Development Application
DCP	Development Control Plan
Downer	Downer EDI Works Pty Ltd
DP	Deposited Plan
DPIE	Department of Planning, Industry and Environment
e.g.	for example
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPA	Environment Protection Authority
EPL	Environmental Protection Licence
ha	hectares
i.e.	that is
km	kilometre
LGA	Local Government Area
m	metres
m2	square metres
MUSIC	Model for Urban Stormwater Improvement Conceptualisation
NSW	New South Wales

Term	Definition
OEH	Office of Environment and Heritage
RAP	Reclaimed Asphalt Pavement
SEARs	Secretary Environmental Assessment Requirements
SSD	State significant development
tpa	tonnes per annum
VEP	VE Property Pty Ltd
WARP	Western Area Remediation Project
WCM	Water Cycle Management
WCMS	Water Cycle Management Strategy

EXECUTIVE SUMMARY

VE Property Pty Ltd (VEP – the Applicant) are seeking to subdivide the western portion of Lot 100 into fourteen (14) industrial lots on a staged basis. Works associated with the subdivision include a new public road, site servicing (as required and approved by relevant authorities), stormwater trunk drainage and benching to suit future industrial development.

In 2015, *State Significant Development Approval* 5147 (SSD 5147) gave approval to the conversion of the former Shell Oil Refinery at Clyde into a finished petroleum product import, storage and distribution terminal. Works were approved to improve terminal efficiency and to consolidate the operational footprint.

Works involved the demolition and clearing of the Western Area of the old refinery. It is this area that is now proposed for a new lot subdivision.

State Significant Development Approval 9302 (SSD 9302) was lodged in 2018 for the Western Area Remediation Project (WARP). This application has been determined and will result in the remediation and issuance of site audit certification (SASA) of the site. The activities will progressively occur on remediated areas once they are certified as appropriate for development.

A new development on newly created Lot 6 (Stage 1 of the Subdivision) is proposed to be occupied and operated by Downer. The development will include RAP processing operations, an asphalt plan, a Reconomy facility and a modern bitumen product manufacturing plant.

The Proposal would be considered a State Significant Development (SSD) under the *State Environmental Planning Policy (State and Regional Development) 2011*. Accordingly, an Environmental Impact Statement (EIS) has been prepared to support the SSD Application for the Proposal. This *Civil Engineering Report* has been prepared by Costin Roe Consulting to support the preparation of the EIS and assess the Proposal's impact on the surrounding environment in relation to the civil works, stormwater and stormwater management.

Revision B of this report includes updates resulting from the Response to Submission (RtS) information request from various government agencies.

Proposal overview

The application proposes:

- The staged subdivision of the western area of Lot 100 DP 1168951 into fourteen (14) new industrial lots.
- Prepare the lots via earthworks and civil works for future re-development (by future applications).
- Stage 1 (Sustainable Road Resource Centre) – occupy the newly created Lot 6 and construct and operate the following on the lot:
    - RAP processing operations.
    - Asphalt plant.
    - A Reconomy facility.
    - A modern bitumen product manufacturing plant.

Purpose of this assessment

This *Civil Engineering Report* has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) as they related to soil and water, including:

- Earthworks;
- Stormwater Management including stormwater quantity and quality;
- Flooding consideration; and
- Erosion & Sediment Control.

Construction impacts

During the construction phase, a Sediment and Erosion Control Plan will be in place to ensure the downstream drainage system and receiving waters are protected from sediment laden runoff.

Operational impacts

During the operational phase of the development, the proposed stormwater quality treatment system incorporating the use of a treatment train of gross pollutant traps and bio-retention filtration is proposed to mitigate any increase in stormwater pollutant load generated by the development. Best management practices have been applied to the development to ensure that the quality of stormwater runoff is not detrimental to the receiving environment.

Conclusion

The hydrological assessment of the local site drainage confirms that recommended water quality and quantity measures will ensure that no adverse impacts result on receiving waterways as a result of the development.

The details contained in this report provides sufficient information to show the consent authority that legal points of discharge and a suitable stormwater management strategy is available for the development and the requirements associated with the strategy. It is recommended the management strategies in this report be approved and incorporated into the future detailed design.

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1 INTRODUCTION

1.1 Background

This *Civil Engineering Report and Water Cycle Management Plan* has been prepared by Costin Roe Consulting in support of an Application, for the staged subdivision of Part Lot 100 DP 1168951, on the western portion of the former Clyde Refinery located at 9 Devon Street, Clyde, NSW.

'The Site' encompasses the subdivision of the western portion of Lot 100 into fourteen (14) industrial lots. Works associated with the subdivision include a new public road, site servicing (as approved by servicing Authorities), stormwater trunk drainage and benching to suit future industrial development.

We understand that the industrial lot subdivision of the former site is a first step in the future development of the Site for alternate industrial uses in accordance with the current zoning.

The newly created Lot 6 is proposed to be occupied and operated by Downer as the Sustainable Road Resource Centre. The Downer development will include RAP processing operations, an asphalt plant, a Reconomy facility and a modern bitumen product manufacturing plant. The Clyde site is noted to be in response to operation of Downers Camelia sites and Unwin Street Rosehill coming to an end and requiring relocation.

The Proposal would be considered State significant development (SSD) under the State Environmental Planning Policy (State and Regional Development) 2011. Accordingly, an Environmental Impact Statement (EIS) has been prepared to support the SSD Application (SSDA) for the Proposal.

Revision B of this report includes updates resulting from the Response to Submission (RtS) information request from various government agencies.

1.2 Site History

In *2015, State Significant Development Approval 5147 (SSDA 5147)* gave approval to the to the conversion of the former Shell Oil Refinery at Clyde into a finished petroleum product import, storage and distribution terminal. Works were approved to improve terminal efficiency and to consolidate the operational footprint.

State Significant Development Approval 9302 (SSDA 9302) was lodged in 2018 for the Western Area Remediation Project (WARP). This application has been determined and will result in the remediation and issuance of site audit certification of the site. The activities will progressively occur on remediated areas once they are certified as appropriate for development.

1.3 Location & Site Description

The proposed development is located on the western portion of Lot 100, DP 1168951, 9 Devon Street, Clyde, NSW, as shown in **Figure 1.1**.

The site is bounded by Duck River along its southern border, industrial developments along its western, northern border and Viva Clyde Terminal to the east. The Rosehill Gardens raceway is also located to the northwest of the site and the confluence of Duck River with the Parramatta River is approximately 1.4 km east of the development site.

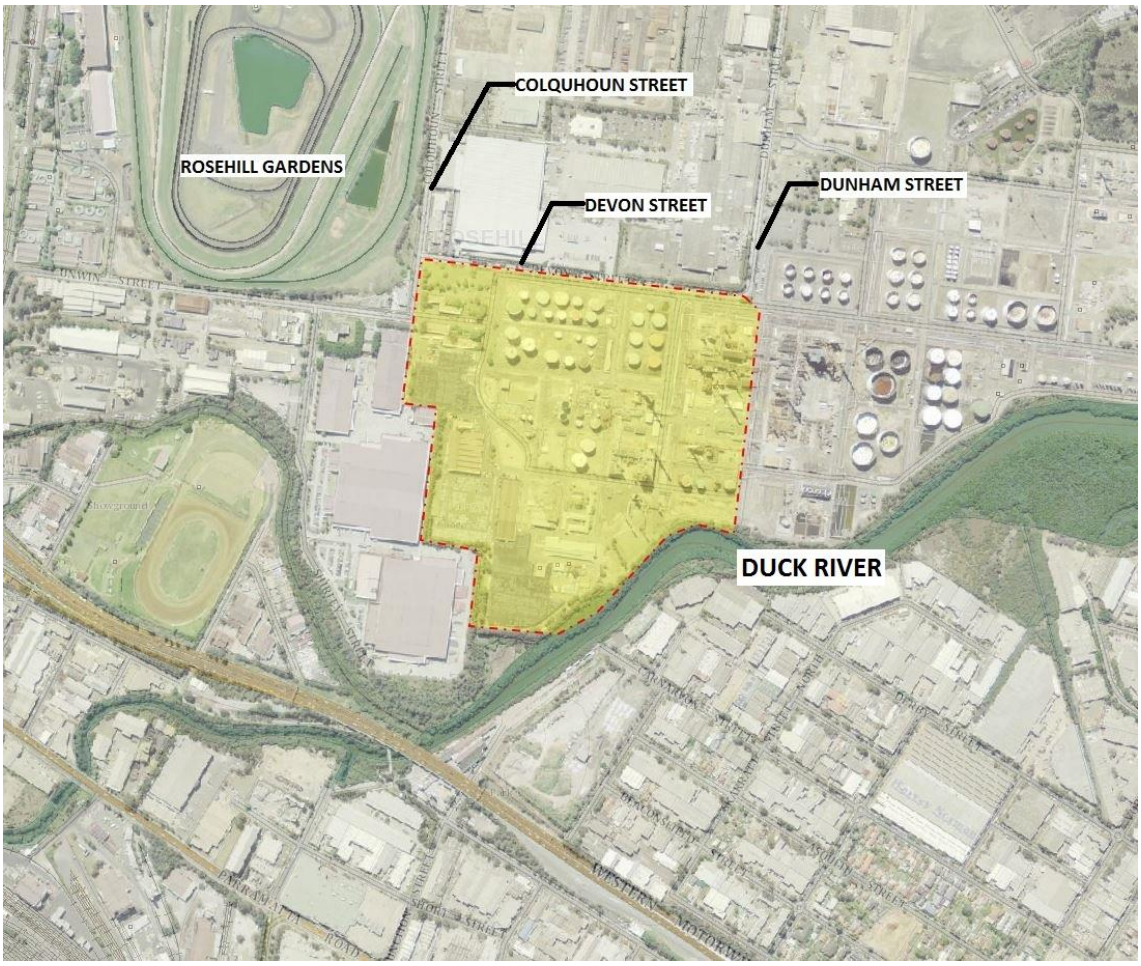


Figure 1.1. Locality Map (Source: SIX Maps)

The land is approximately 35 Ha and was formerly used as part of the Shell Oil Refinery. It was recently cleared of refinery structures and infrastructure and is pending remediation works.

Existing levels through the site vary between RL 3.7m AHD and RL 6.5m AHD.

Surrounding levels on Colquhoun Street range from approximately RL 4.6m to 4.9m AHD. Surrounding levels on Devon Street range from approximately RL 4.5m to 5.1m AHD.

1.4 Proposed Development (Estate)

The proposed development is for an industrial lot subdivision of land into fourteen, as shown in **Figure 1.2**, that can be delivered on a staged basis and remediation works proceed to allow the managed delivery of Site Audit Certificates (SAS A) across the site as remediation works are completed.

Lot 6 is proposed to be occupied and operated by Downer as described below.

Lots 51 to 56 and 58 to 64 will then be the subject of future development approvals for new industrial development and or further subdivision in accordance with the current IN3 Industrial zoning.

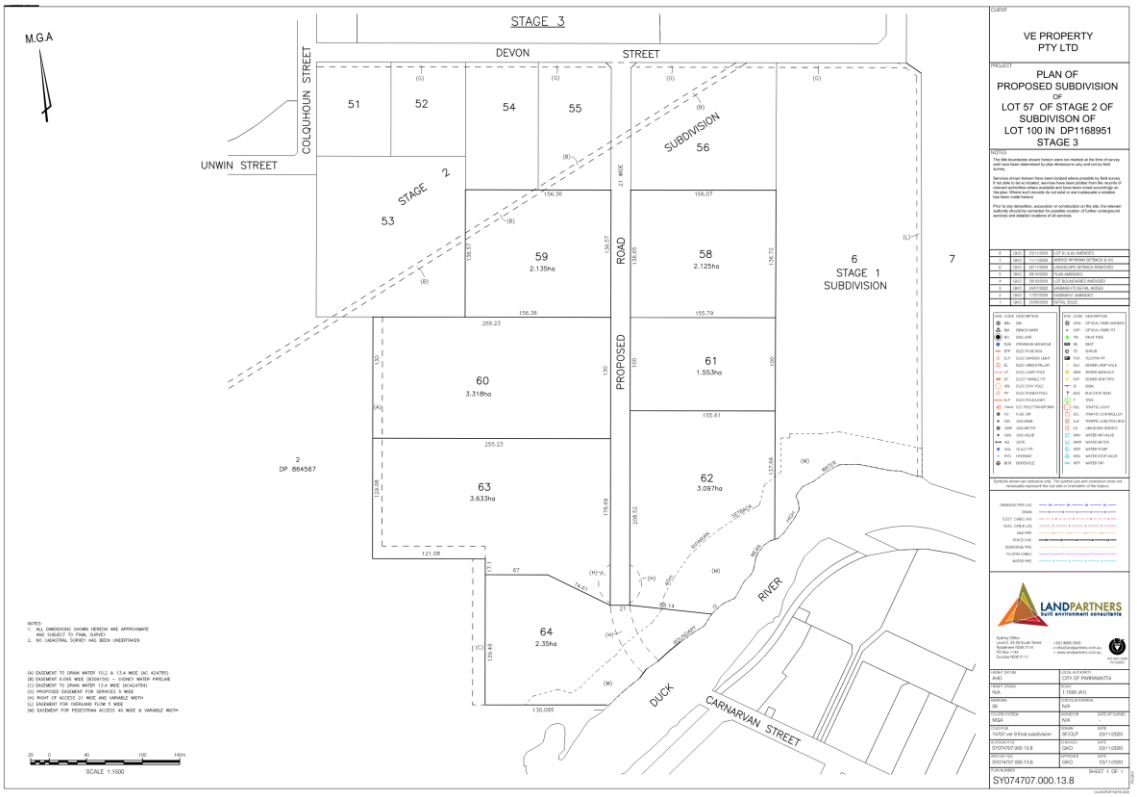


Figure 1.2. Proposed Lot Subdivision (Source: Land Partners)

VE Property Pty Ltd (VEP) proposes the staged development of the Central Sydney Industrial Estate on lands known as the Western Area of the former Oil Refinery at Clyde. Stage 1 of the development will comprise the Sustainable Road Resource Centre, to be operated by Downer, described in the following section.

VE Property proposes the following on the site:

- The staged subdivision of the site into fourteen lots. Development of the lots for new industrial uses (in accordance with current zoning), which will be subject to future applications.
- Earthworks/filling to bench the lots to form a flat pad in the northern half of the site then gradually grading down to towards Duck River in the southern half of the site.

- Construction of a new public access road running south from an intersection with Devon Street, providing access to those lots that don't front onto Devon Street, in accordance with Parramatta Council specifications.
- Implementation of erosion and sediment controls to manage water quantity and quality over the lots until they are sold and developed, when permanent water management infrastructure will be installed.
- The extension of key municipal services to suit the needs of each of the lots comprising as approved by the relevant Authorities:
  - Potable water – potentially construction of a ring main linking the main under Colquhoun Street to the main under Durham Street (subject to separate approval by Sydney Water).
  - Wastewater (sewer) – extension of the rising main along Devon Street and minor sideline extension of the gravity sewer along Colquhoun Street (subject to separate approval by Sydney Water).
  - Electricity – supply may be required to each lot from the high voltage line along Devon Street (subject to separate approval by Endeavour Energy).
- A 40 m riparian corridor (using averaging rule) along Duck River.
- Development of Lot 6 (Stage 1) for the land uses described below.

1.5 Proposed Development – Proposed Lot 6 (Sustainable Road Resources Centre)

The conceptual layout is shown in **Figure 1.3**. It will be aligned north-south as per the Lot 6 orientation and will comprise the separate facilities described below.

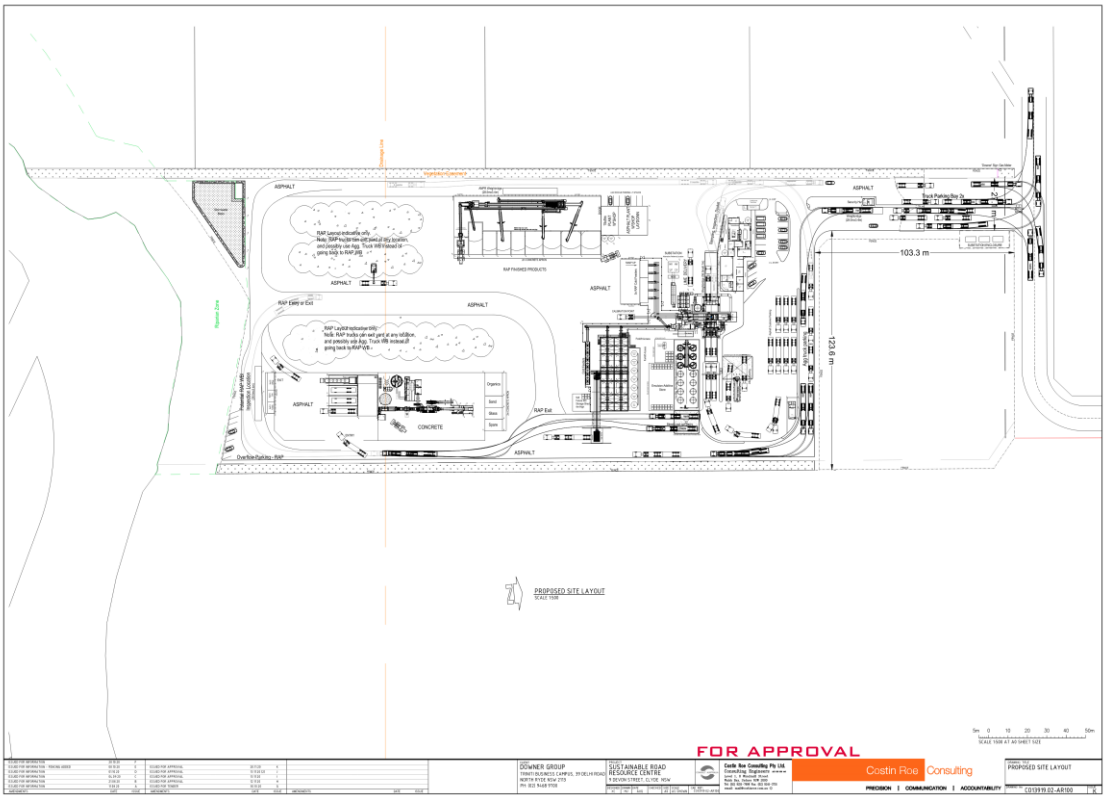


Figure 1.3. Proposed Lot 6 Layout

Site preparation and construction

Site preparation (civil works) will take approximately 30 weeks and will comprise:

- Site establishment – installation of site office, generator and toilet.
- Earthworks/filling - to bench the lot to form two flat pads, one in the northern third of the lot and the other in the southern two thirds of the lot.
- Drainage – stormwater management structures will be constructed.
- Services – water, sewer, electrical, gas and telecommunications services will be installed.
- Footings and slabs – after the ground surface is prepared, footings will be excavated/piled and filled with concrete in areas where structures will require stabilisation, and concrete building pads will be poured.
- Pavement areas of Lot 6 requiring extra stabilisation and strengthening (eg heavily trafficked areas) will be paved with concrete and remaining areas will be paved with asphalt.
- Barriers – aluminium, concrete and/or water filled plastic barriers will be installed in areas where traffic must be separated from pedestrian areas and/or to prevent vehicles crossing lanes/protect structures.
- Line marking and signage – lines will be marked on internal roads and speed limit and other signs will be erected.
- The Lot 6 components will be constructed simultaneously and some activities will overlap with the civil works. Construction of the Stage 1 components will typically comprise:
- Construction of concrete foundations including piled foundations for certain plant.
- Construction of frames for sheds.
- Erection and installation of plant.
- Installation of tanks and silos.
- Wall and roof cladding
- Stormwater connection.

Asphalt plant

A fixed Ammann Universal HRT Stationary asphalt plant will be constructed on Lot 6, which will produce up to 550,000 tpa of asphalt and will comprise:

- Cold feed bins to receive aggregate, sand and RAP.
- Conveyors to transport aggregates to a dryer.
- Conveyors to transport RAP to a mixer.
- Hot aggregate storage bins.
- Hot RAP storage bins.
- A mixer for mixing materials in weighted proportions.
- A batch tower with a screen deck for sizing the hot aggregates.
- Weigh hoppers for aggregates, bitumen, lime baghouse fines and RAP weighing.
- Enclosed bucket elevator for elevating the heated aggregates to the top of the batch plant.

- Hot bitumen storage tanks with bitumen pumped from these to the batch plant.
- Lime filler silo to receive lime and pneumatic conveyors to convey lime to the batch plant.
- Fabric filter baghouse for cleaning exhaust gases from the dryer.
- Fan and stack for exhausting the gases from the baghouse.
- Recycled filler silo for storage of baghouse reclaimed fines and pneumatic conveyors to convey recycled filler to the batch plant.
- Control room containing plant switchboard and controls.
- Soap spray station for lining truck trays with an anti-stick film.

The asphalt plant is 41 m high at its tallest point.

The asphalt manufacturing process will comprise drying and mixing aggregates and combining them in specified quantities with heated bitumen and a filler and discharging the resulting 'hot' and 'warm' mix into trucks. Operation of the asphalt plant will comprise:

- Delivery of virgin aggregates and sand from offsite, tipped into an underground hopper and transferred via conveyor for temporary storage in one of 16 vertical silos. Virgin aggregates and sand are then transferred to the cold feeder bins via conveyor. Reclaimed aggregates, sand and glass produced by the on-site Reconomy facility and processed RAP is temporarily stored in above ground storage bays, then transferred to the asphalt plant cold feeder bins by front end loader.
- Imported filler material will be pneumatically pumped into silos from tankers and bitumen will be stored in heated/insulated tanks at approximately 160˚C.
- Aggregates in the cold feeder bins will be metered by belt feeders into the rotary dryer.
- Filler will be pneumatically conveyed and bitumen pumped into a weigh hopper then discharged into a pugmill mixer for mixing with aggregates. Exhaust emissions will be drawn off into a bag house for treatment with recovered fines reused in the asphalt process.
- Asphalt will be transferred to hot asphalt storage bins.
- The inside of the truck bodies are sprayed with bitumen release agent at the spray station (truck spray gantry), then trucks drive below the hot storage bins and are loaded. Pre-mix (cold mix asphalt) can be loaded into trucks as required.

Reclaimed asphalt pavement facility

As Downer's lease at the Camellia site is coming to an end, it is proposing to relocate the RAP operations to Lot 6.

Up to 250,000 tpa of RAP will be cold planed from pavements with specialist equipment and transported in tip trucks (truck and trailers or semi-trailers) to the site. It will then be stored on gravel hard stand areas.

The RAP plant will be inside an approximately 12 m high shed that will be enclosed on the north, west and south sides. The east side will be open so the front-end loader can feed the RAP plant and remove the finished products.

The RAP will be crushed and screened on an as required basis for use in the onsite production of asphalt (as a substitute for aggregates and bitumen) or for export for pavement materials. Up to 90,000 tpa of RAP will be stored on site at any one time on a 10,000 m2 stockpile area. Stockpiles will be a maximum 10 m high.

Bitumen products plant

A next generation, co-located bitumen emulsion plant is proposed on Lot 6 to produce approximately 15,000 tpa of bitumen products for use in onsite asphalt production and export offsite. This investment would mark a first for Downer to have not only a combined blending facility but also situating the investment on the same site as its asphalt and Reconomy plant.

The bitumen products plant will comprise:

- Maximum 6 m high shed with roller door access on the southern side containing:
- 150 t emulsifier and emulsion additives store containing up to 150 intermediate bulk containers.
- 60 kilolitre (kl) kerosene store.
- Office and toilet.
- An additional 8 m high shed for the overflow storage of emulsifier and emulsion additives.
- Maximum 6 m high toner additive storage shed with roller door access on the southern and western sides.
- Two 80 kl 12 m high (total 160 t) bitumen tanks.
- Six 80 kl 12 m high warm emulsion and six 60 kl 12 m high cold emulsion tanks (total 740 t).

Reconomy facility

Downer proposes to replicate the Reconomy facility from the Unwin Street site at Lot 6. The facility will process up to 40,000 tpa of road sweepings, gully waste and mud from non-destructive excavation, and will comprise:

- Receipt of incoming material into handling pits adjacent to the resource recovery plant. The handling pits will be impermeable and partially sunk into the ground.
- Material will be separated during the recovery process and temporarily stockpiled adjacent to the recovery plant at the separation points and removed as required. Recovered aggregates will be beneficially reused almost immediately in the adjacent asphalt plant and will require an external storage bay as a collection point prior to transport to the asphalt plant by front end loader.

The Reconomy facility will comprise:

- Conveyors.
- Hoppers.
- Trommel.
- Log washer.

- Clarifier.
- Water tanks.
- Water pumps.
- Centrifuge.
- Screen deck (with vibrator).
- Wash screens (with vibrator).
- Eddy current separator.
- Hydrocyclone and ferromagnetic separator.

The maximum height of fixed equipment will be 8 m and an in-ground pit will be 2 m below ground surface.

Downer intends to beneficially reuse the recovered aggregates and sand (approximately 20,000 tpa) in asphalt production and application to road surfaces. The proposed beneficial reuse of recovered aggregate and sand will reduce the use of virgin aggregate and sand from quarries in NSW. Recovered plastics, toner cartridges, glass and rubber are also likely to be incorporated into the production of asphalt, replacing filler and/or aggregate.

Downer does not propose to reuse the recovered organic material in the production of asphalt. The recovered organic material will be transported to an approved composting facility for beneficial reuse. Recovered metals will be transported to an appropriate metal recycling facility for beneficial reuse.

Any remaining recovered material which cannot be directly reused in the asphalt plant could be transported to recycling facilities near the site.

There will be a water recycling plant to treat water used during the process and a storage tank for future re-circulation of treated water or disposal as trade waste. The water loss factor for the resource recovery plant is low due to a portion of the incoming waste material being wet or semi-dry.

Ancillary infrastructure

The Sustainable Road Resources Centre will also comprise the following ancillary infrastructure to facilitate the above land uses:

- 34 car parking bays.
- 25 truck parking bays.
- Site offices.
- Laboratory.
- Workshop building.
- Weighbridges.
- Stormwater management infrastructure.
- Services and utilities including an electrical substation.
- Landscaping, fencing and signage.

The Sustainable Road Resources Centre is proposed to operate 24-hours a day, seven days a week, 365 days a year. This reflects the demand for asphalt to be provided at night due to government demands that road works minimize interference with traffic.

1.6 Purpose of this report & SEARs

This *Civil Engineering Report and Water Cycle Management Plan* is to support the EIS in relation to impacts associated with the following components of the proposal:

- Stormwater Management including stormwater quantity and quality;
- Earthworks; and
- Erosion & Sediment Controls during construction.

The objectives for the assessment are to ensure that potential for detrimental impacts on the environment are mitigated through provision of development which, based on the proposed Development Layout:

- responds to the topography and site constraints, considers flooding and flood planning requirements; and
- provides an appropriate and economical stormwater management system which incorporates best practice in water sensitive urban design consistent with and mitigates impact to receiving waters through provision of water quality improvement measures to reduce pollutants from stormwater runoff from the development.

A set of drawings (refer to **Appendix A**) have been prepared to accompany the impact assessment and show how the development and proposed civil engineering components (including site levels, stormwater drainage layout and water quantity and quality requirements) of the development can manage the potential for impact to the environment. These drawings are for development approval and impact assessment only and subject to change during detail design. Outcomes of the impact assessment would remain consistent in any future detail design process.

The consent authority is The NSW Department of Planning, Industry& Environment (DPIE) as the proposal is considered a State Significant Development (SSD). However as the subject site is located within City of Parramatta local government area (LGA), the requirements of the City of Parramatta *Development Engineering Design Guidelines* (June 2018) have also been considered in setting proposed design and mitigation measures. Council has been consulted in the civil engineering design of the site.

The DPIE has provided Secretary's Environmental Assessment Requirements (SEAR's) dated 28 May 2020, Ref: SSD-10459. In addition to providing a general summary of civil engineering aspects of the proposal, this report addresses the Soil and Water items included in the SEAR's.

Table 1.1 provides a summary of the relevant SEARs which relate to water and hydrology, and where these have been addressed in this report.

Table 1.1. SEARs

SEARs	Where Addressed
6. Soil and Water	
A description of the catchment and proximity of the site to waterways, including Duck River	Refer **Section 1** for background conditions relating to the development site.
An assessment of potential surface and groundwater impacts associated with the development, including potential impacts on watercourses, riparian areas, groundwater, and groundwater-dependent communities nearby	Refer **Section 2** for assessment of stormwater quality and water quality criteria at discharge. Refer to **Section 6.7** for assessment of groundwater.
A detailed site water balance including a description of the water demands and breakdown of water supplies, and any water licensing requirements	Refer **Sections 4** for assessment of water balance considerations. At the time of preparation of this report, no water licensing requirements apply to the proposed development. Any water licensing required as part of this development application assessment will be incorporated into the stormwater management during detailed design development.
Details of stormwater/wastewater management system including the capacity of onsite detention system(s), onsite sewage management and measures to treat, reuse or dispose of water	Refer **Sections 1, 2, 3, 4 & 5** for assessment of stormwater management systems during construction and operations. Refer EIS relating to onsite sewage management and wastewater disposal systems.
Description of the measures to minimise water use	Refer **Sections 4** for assessment of water balance considerations.
Detailed flooding assessment	Refer to separate report prepared by WMA Water. The surface water and civil engineering drawings have been completed with consideration to the WMA Water

SEARs	Where Addressed
	flood assessment and impact assessment.
Description of the proposed erosion and sediment controls during construction	Refer **Sections 5 & Appendix C** for assessment of erosion and sediment controls during construction.
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)	Refer **Section 2** for assessment of stormwater quality and water quality criteria at discharge. Refer to Section 2.4.4 for description of contaminants which may leach from the material on site during operations. A cut-off valve prior to discharge to receiving waters is proposed to be installed to the drainage network to manage any impacts to receiving waters.
Characterisation of the nature and extent of any contamination on the site and surrounding area	Refer to EIS.
Demonstration the site is suitable for the proposed development.	Refer to EIS.
10. Infrastructure Requirements	
A detailed written and/or graphical description of infrastructure required on the site, including any upgrades	Refer **Section 6.1** for description of infrastructure requirements.
Identification of any infrastructure upgrades required onsite or off-site to facilitate the development, and describe any arrangements to ensure that the upgrades will be implemented in a timely manner and maintained	Refer **Section 6** for identification of infrastructure upgrades required.
An infrastructure delivery and staging plan, including a description of how infrastructure on and off-site will be co-ordinated and funded to ensure it is in	Refer **Section 6.7** services delivery for the infrastructure upgrades.

SEARs	Where Addressed
place prior to the commencement of construction	
An assessment of the impacts of the development on existing utility infrastructure and service provider assets surrounding the site, and a description of how any potential impacts would be avoided and minimised.	Refer **Section 6** & the EIS for impact of the development on existing infrastructure.

Further to the above, the following require further details on specific requirements relating to their authority:

- Fisheries Group of DPIE;
- Endeavour Energy;
- Environmental, Energy and Science Group (EES) Group of DPIE;
- Safe Work NSW;
- Sydney Water;
- Transport Roads & Maritime Services (RMS) NSW;
- Transport for NSW (tfNSW);
- City of Parramatta Council;
- Sydney Metro; and
- The EPA.

These requirements are discussed throughout the report as indicated in **Table 1.2**.

Table 1.2 Local and State authority requirements and relevant report sections

Water and Hydrology	Where Addressed
Fisheries Group (DPIE)	
The activities proposed for the site would require a storm water retention system that would ensure that no contamination from onsite activities reached natural waterways.	Refer **Section 2** for assessment of stormwater quality and water quality criteria at discharge.
Endeavour Energy	
Address the existing capacity of the site to service the proposed development and any augmentation requirements for utilities, including arrangements for	Refer **Section 6** for assessment of the infrastructure requirements.

Water and Hydrology	Where Addressed
electrical network requirements, drinking water, wastewater and recycled water.	
EES Group (DPIE)	
The EIS must describe background conditions for any water resource likely to be affected by the development, including: Existing surface and groundwater.	Refer **Section 2** for assessment of water quantity management. Refer **Section 7** for proposed site works.
Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations.	Refer **Section 2** for assessment of water quantity management. It is noted that no water intake is proposed for the development.
Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters.	Refer **Section 2** for assessment of water quantity management. Refer **Section 7** for proposed site works.
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.	Refer **Section 2.1.2** for adopted indicators and trigger values/ criteria for the water cycle management objectives including water quality objectives.
Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning	A risk-based framework for considering waterway health is achieved by the adoption of the Council DCP local objectives for water quality objectives. Refer **Section 2** for water cycle management objectives including water quality and quantity criteria.

Water and Hydrology	Where Addressed
The EIS must assess the impacts of the development on water quality, including: 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 contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.	The performance of the proposed stormwater quality improvement devices has been modelled in MUSIC and confirm compliance with the Council DCP objectives for water quality. Refer **Section 2** for water cycle management objectives including water quality and quantity criteria.
Identification of proposed monitoring of water quality.	Refer **Appendix C** for Maintenance and Monitoring requirements associated with the specified drainage system and water quality measures.
Consistency with any relevant certified Coastal Management Program (or Coastal Zone Management Plan).	Refer to biodiversity assessment report and EIS.
The EIS must assess the impact of the development on hydrology, including: Water balance including quantity, quality and source.	Refer **Sections 5** for water cycle management and supporting assessments.
Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas. Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems. 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	Refer **Sections 5** for water cycle management objective and Section **2 & 3** for supporting assessments. The Proposal would include appropriate water quality management during both construction and operation. As such the potential for adverse impacts to the water quality of Duck River, Parramatta River

Water and Hydrology	Where Addressed
habitat for spawning and refuge (e.g. river benches).	and Sydney Harbour is considered to be low. Following from this, the potential for impacts upon downstream flora, fauna and groundwater dependent ecosystems is also low.
Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water.	There are no changes associated with water availability as a result of the development.
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.	Refer **Sections 5** for water cycle management objective and Section **2 & 3** for supporting assessments. There is no change to existing flow or discharge volumes or rates, hence no impact from the Proposal.
Identification of proposed monitoring of hydrological attributes.	Refer **Appendix C** for DRAFT Maintenance and Monitoring requirements associated with the specified drainage system and water quality measures.
City of Parramatta Council	
Assessment and Design Principles to be demonstrated in the EIS and the Proposal No significant adverse impacts on adjoining land, the locality and the environment (including Duck Creek and the riparian zone) caused by the development in all floods up to the Probable Maximum Flood from both riparian flooding and overland flow and including an allowance for climate change.	Refer **EIS** and report by WMAwater.

Water and Hydrology	Where Addressed
No significant adverse cumulative impacts on adjoining land, the locality and the environment from similar development in the locality.	Refer **EIS** and report by WMAwater.
No significant adverse impacts on adjoining land, the locality and the environment (including Duck Creek and the riparian zone) caused by the developments as a result of the lower range of more frequent stormwater flows that are likely to transport pollution, sediments and cause other negative environmental consequences. Means of achieving the above Design Principles. For a list to include, refer to letter dated 19.05.20	Refer **EIS** and report by WMAwater.
A Flood and Water Management Strategy must be prepared to address all of this for the entire site so that all of the future developments may be accommodated within the overarching strategy.	Refer **Sections 1, 2, 3, 4 & 5** for assessment of Water Management Strategy during construction and operations. Refer **EIS** and report by WMAwater for Flood Management Strategy.
A sustainability report (including water efficiency) should be provided. Energy efficient design should address the following objectives: • To promote sustainable development which uses energy efficiently and minimises non-renewable energy usage in the construction and use of buildings. • To ensure that development contributes positively to an overall reduction in energy consumption and greenhouse gas emissions. Water efficiency should address the following objectives:	Refer **EIS** for sustainability report to address energy efficient design. Refer **Sections 5** for water cycle management objective.

Water and Hydrology	Where Addressed
• To reduce consumption of potable water. • To harvest rainwater and urban stormwater turnoff for use. • To reduce waste water discharge. • To capture, treat and reuse wastewater where appropriate.	
The EPA	
Water management – It is considered best practice by the EPA for facilities to retain all water on site and not discharge any water in order to limit pollution and contamination. The EPA requires a proponent first demonstrate that all practical and reasonable alternatives to discharge have been considered and implemented before other options are reviewed. Where discharge of polluted water is unavoidable, the proponent must: • identify all pollutants that pose a risk of non-trivial harm and the potential impact of those pollutants on the environment; • implement all practical measures that can be taken to prevent, control, abate or mitigate the pollution and protect the environment from harm; • consider the environmental values of water affected by the proposed discharge; and implement all practical measures that can be taken to restore or maintain those values.	During construction, all water will be retained on site in sediment basins to limit pollution and contamination to receiving waters. The intent is to use all the water in the sediment basins for dust suppression during construction activities. Any excess water from sediment basins will be treated as noted in **Section 5** prior to discharge. This is in accordance with the requirements of the Blue Book and considered best practice for construction works. During operations, the use of non-potable water will be limited to toilet flushing, irrigation and stockpile dust suppression. We have explored the option of retaining all water on site with no discharge to the receiving waters We note that annual rainfall of 856mm for Parramatta North, would result in 60,000m^3 of water retention per year. It is not considered practical that the Lot 6 facility will require 60,000kL of annual

Water and Hydrology	Where Addressed
	non-potable reuse as part of their operations. It is considered that water discharge from the development is unavoidable for the above reason. Below are measures put in place to mitigate the risk of pollutant waters leaving the site: • Refer to **Section 2.4.4** for description of contaminants which may leach from the material on site during operations. • Refer **Section 2** for water cycle management objectives including water quality and quantity criteria. • A cut-off valve prior to discharge to receiving waters is proposed to be installed to the drainage network to manage any impacts to receiving waters. This will retain all polluted or contaminated water on site and not discharge any water to the receiving waters.
The EPA expects that assessment of impacts to water be included in the EIS. This must include at a minimum characterisation of any proposed discharges from the Premises (both volume and quantity), assessment of the potential impacts from these discharges and proposed mitigation measures to manage any impacts. Discharges	Refer **Section 2** and **3** for water cycle management objectives including water quality and quantity criteria.

Water and Hydrology	Where Addressed
includes, but is not limited to stormwater (contaminated and uncontaminated), and wastewater (such as from dewatering). Details should be provided of any trade waste agreements in place with Sydney Water. Please refer to Attachment B for further detail of what is to be included in assessment of water impacts.	
Details of stormwater management during both construction and operation must be included in the EIS. The scoping report refers to 'Managing Urban Stormwater: Soils and construction'. Please note that while this reference may be appropriate during construction works it is not appropriate for the operation of facilities.	Refer **Sections 1, 2, 3, 4 & 5** for assessment of Water Management Strategy during construction and operations.
The EPA would expect that all material handling and waste management buildings be constructed to exclude all stormwater and that internal surfaces be graded inwards to contain any contaminated water (being any water that has come into contact with waste or other materials which have the potential to cause contamination). The EPA notes that even where all waste and material storage and processing is conducted within an enclosed building, materials may be tracked on to external surfaces leading to the generation of contaminated water. Any external areas where vehicles travel or wait for loading/unloading must drain to a stormwater quality treatment device sufficient to remove any contaminants, both solid and dissolved, prior to discharge offsite.	Refer **Section 2** for water cycle management objectives including water quality and quantity criteria.

1.7 Structure of Report & Key Objectives

Water Cycle Management (WCM) is a holistic approach that addresses competing demands placed on a region's water resources, whilst optimising the social and economic benefits of development in addition to enhancing and protecting the environmental values of receiving waters.

Developing a WCM Strategy (WCMS) at the SSDA stage of the land development process provides guidance on urban water management issues to be addressed for the estate and development as a whole. This assists estate infrastructure planning for the industrial development proposed on the land.

This WCMS has been prepared to inform the DPIE and Council that the development is able to provide and integrate WCM measures into the stormwater management strategy for the development. It presents guiding principles for WCM across the precinct which includes establishing water management targets and identifying management measures required for future building developments to meet these targets.

Several WCM measures have been included in the WCMS and engineering design, which are set out in this report and the attached drawings. The key WCM elements and targets which have been adopted in the design are included in **Table 1.3** following.

Table 1.3. WCM Objectives

Element	Objectives	Reference
Water Quality	Load-based pollution reduction targets based on an untreated urbanised catchment: Gross Pollutants 90% Total Suspended Solids 85% Total Phosphorus 60% Total Nitrogen 45%	*Section 3.3.6* of Council *DCP 2011*
Water Quantity	Council may require OSD to be provided "*Prevent any increase in downstream peak flows resulting from new developments or redevelopments by temporarily storing on-site the additional and quicker runoff generated*". Council however will not accept "*On site detention systems within areas affected by 100 year ARI mainstream flood events, subject to demonstration by an applicant that OSD would adversely impact the catchment or have no hydrological benefit".*	*Section 2* of Council *Development Engineering Design Guidelines 2018*
Flooding	Buildings and habitable areas set 500mm above the 1% AEP storm event. No affectation to upstream downstream or adjoining properties as a result of development	Council *Development Engineering Design Guidelines 2018* NSW Floodplain Development Manual. Council *Development Engineering Design Guidelines 2018*
Water Supply	Reduce Water Demand for non-potable water uses. Provide rainwater tanks which result in a reduction in non-potable demand of 80% for toilet flushing.	DPIE *Section 3.3.6* of Council *DCP 2011*

Element	Objectives	Reference
Erosion and Sediment Control	Appropriate erosion and sedimentation control measures must be described in the environmental assessment for all stages of construction to mitigate potential impacts to Duck River.	Landcom Blue Book Council DPIE

A summary of how each of the WCM objectives will be achieved and where they are addressed in the report are described below. Reference to the relevant sections of the report should be made for further and technical details relating to the WCM measures:

- *Stormwater Quality Management (Refer **Section 2**)*

  There is a need to target pollutants that are present in stormwater runoff to minimise the adverse impact these pollutants could have on downstream receiving waters.

  The required pollutant reductions are included in **Table 1.3** of this document and MUSIC modelling has been completed to confirm the reduction objectives can be met for the development.

  A series of Stormwater quality improvement devises (SQID's) have been incorporated in the design of the proposal. The proposed management strategy will include the following measures:

  - Initial/ primary treatment via gross pollutant traps (GPT's);
  - Rainwater tank harvesting from rooves which removes water from the network;
  - Tertiary treatment via filter media in the bio-retention basin.

  Reference to **Section 2** of this document should be made for detailed Stormwater Quality modelling and measures.

  Management of stormwater measures are necessary to ensure effectiveness of the specified water quality treatment train. Refer to **Appendix C** for draft Maintenance and Monitoring of water quality measures during operational period of the development.

- *Stormwater Quantity Management (Refer **Section 3**)*

  The intent of this criterion is to reduce the impact of urban development on existing drainage system by limiting post-development discharge within the receiving waters to the pre-development peak, and to ensure no affectation of upstream, downstream or adjacent properties.

  An assessment of detention and attenuation requirements has been made for the overall development. The assessment shows that, due to timing of discharge from the site in conjunction with the flow from the larger catchment within the Duck River, that the provision of traditional OSD results in adverse effect. Further that negation of OSD results in improved combined peak flows within the Duck River channel. As such no OSD is proposed for the development. This is noted to be consistent with the current site and adjoining sites which also discharge directly to the River and the approach is consistent with the discussions held with Council during consultation.

Refer to **Section 3** of the document for further discussion on water quantity management.

- *Water Cycle Management/ Rainwater Reuse (refer **Section 4**)*

  Rainwater reuse measures will be provided as part of future building development designs. Rainwater reuse will be required to reduce demand on non-potable uses by at least 80%. The reduction in demand will target non-potable uses such as toilet flushing and irrigation.

- *Erosion and Sediment Controls (refer **Section 5 & Appendix B**)*

  An erosion and sediment control program will be employed during construction period to ensure that sediment laden runoff is contained on site and discharge runoff meets acceptable criteria. Measures will be provided in accordance with Landcom Blue Book. A draft Soil and Water Management Plan has been included for information in **Appendix B**.

1.8 Policy Framework

The below sets out the legislation and planning instruments considered in the preparation of this sub plan. **Table 1.4** lists regulatory guidelines and documents relevant to the assessment.

Table 1.4. Regulatory Documents and Guidelines

Legislation	Description	Relevance to the assessment
Environmental Planning and Assessment Act 1979	This Act establishes a system of environmental planning and assessment of development Projects for the State.	Obligations issued under Part 4 of the EP&A Act which sets out requirements for development assessment and consent are addressed in this plan.
Protection of the Environmental Operations Act 1997	The objectives of this Act relate to the protection of the environment through pollution prevention and cleaner production, among others.	Relevant sections of the Act, including duties to report pollution incidents and disposal regulations have been incorporated into this plan and incident response procedures. A key legislative requirement applicable to construction soil and water management is Section 120 of the Protection of the Environment Operations Act 1997 which relates to pollution of waters and the need to implement all reasonable and feasible measures to minimise the risk of pollution of waters. Part 5.7 of the Act requires that a pollution incident causing or threatening material harm to the environment be notified to EPA and other relevant authorities. Material harm constitutes actual or potential harm to the health or safety of humans and/or ecosystems that is not trivial, or results in actual or potential loss or property damage of amounts in excess of $10,000 in total.
Contaminated Land Management Act 1979	The general object of this Act is to establish a process for investigating and (where	Contamination on site must be assessed and managed in accordance with this Act.

Legislation	Description	Relevance to the assessment
	appropriate) remediating land that the EPA considers to be contaminated significantly enough to require regulation under Division 2 of Part 3, and to ensure that contaminated land is managed with regard to the principles of ecologically sustainable development.	Division 2, Part 3, Section 11-17 of this Act details requirements for the Management of Contaminated Land.
Water Management Act 2000	The objects of this Act are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations.	Although sections 90 and 91 of this Act don't apply to SSD and it is envisaged that minimal construction activities would be undertaken on waterfront land, any waterfront activities that do occur would be conducted generally in accordance with the DPIE Water's Guidelines for Controlled Activities.
Fisheries Management Act 1994	The objectives of this Act seek to conserve fishery resources, fish stocks and key fish habitats.	This assessment has been prepared to maintain existing flow regimes surrounding the site and to contain water onsite within sediment basins until discharged with strict water quality requirements. No impacts to fisheries are envisaged as a result of Project construction. No impacts to fisheries are envisaged as a result of the strict water quality requirements to be implemented during operations of Lot 6. Permits under section 201, 205 and 2019 of this Act don't apply to SSD.
Dangerous Goods Regulation (Road and Rail Transport) 2014	The main objects of this Regulation are to give effect to the standards, requirements and procedures of the Code so far as they apply to the transport of dangerous goods by land transport, and to promote consistency between the standards, requirements and procedures applying to the transport of dangerous goods by land transport and other modes of transport.	Provisions relating to the storage and transport of dangerous goods, such as fuelling procedures and fuel storage, are to be considered in this CSWMP.
Commonwealth Environmental Protection and Biodiversity Conservation Act 1999	The objectives of this Act seek to promote environmental protection, ecologically sustainable development, biodiversity conservation and the promotion of heritage, among others.	Requirements have been considered during the preparation of this CSWMP.

Additional guidelines and standards considered in relation to the management of soil and stormwater include:

- Managing Urban Stormwater – Soils and Construction Volume 1, 4th Edition (Landcom 2004);

- Managing Urban Stormwater: Soils and Construction − Installation of Services, Volume 2A (OEH 2008); and
- Australian Rainfall and Runoff – Volume 1 (2001), Engineers Australia.
- Managing Urban Stormwater: Source Control – 1998 (NSW EPA);
- Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);
- Managing Urban Stormwater: Soils & Construction – 2004(LANDCOM);
- Development Engineering Design Guidelines – 2018 (City of Parramatta);
- City of Parramatta Development Control Plan 2011 Part 3 Development Principles;
- Water Sensitive Urban Design – "Technical Guidelines for Western Sydney" by URS Australia Pty Ltd, May 2004;
- Guidelines for Fresh and Marine Water Quality – 2000 (ANZECC)

2 SURFACE WATER QUALITY MANAGEMENT

2.1 Objectives and Performance Targets

The objectives and performance targets for the Proposal have been derived from the following key documents:

- **Development Engineering Design Guidelines** (City of Parramatta June 2018)
- **Development Control Plan 2011** (City of Parramatta 2011)
- **Water Sensitive Urban Design Technical Guidelines for Western Sydney** (URS Australia 2004)
- **Guidelines for Fresh and Marine Water Quality** (ANZECC 2000)

2.1.1 Objectives

There is a need to provide a design which incorporates the principles of Water Sensitive Urban Design (WSUD) and to target pollutants that are present in the stormwater so as to minimise the adverse impact these pollutants could have on receiving waters and to also meet the requirements specified by Council.

Council has nominated, in *Section 3.3.6* of their DCP 2011 in particular *Appendix 7 - Water Sensitive Urban Design Strategy Guide*, the requirements for stormwater quality to be provided for all new developments with reference to such documents as the EPA's Manual on Managing Urban Stormwater (Treatment Techniques) and relevant Australian Standards.

The key objectives for stormwater management for the Proposal include:

- To minimise the quantity of stormwater run-off including changes in flow rate and duration by disconnecting impervious areas.
- To protect and enhance existing natural or constructed drainage networks including channel bed and banks by controlling the magnitude and duration of erosive flows.
- To ensure that downstream flora and fauna are protected from stormwater impacts during and post construction.
- To minimise surcharge from the existing drainage systems.
- To minimise and control nuisance flooding and to provide for the safe passage of less frequent floods.
- To ensure that on-site stormwater management measures are operated and maintained in accordance with design specifications.
- Incorporate a Water Sensitive Urban Design (WSUD) approach.

2.1.2 Performance Targets

Indicators and trigger values/criteria for the water quality objectives environmental values are based on the targets identified in the Upper Parramatta River Catchment Trust's *Water Sensitive Urban Design Technical Guidelines for Western Sydney*. The technical guidelines have been prepared specifically for Western Sydney and includes post-construction phase objectives for new developments. It has been identified that industrial site trigger criteria for water quality objectives are to target litter, coarse sediment, fine particles, total phosphorus, total nitrogen and hydrocarbons.

The WSUD technical guidelines for Western Sydney have been adopted as part of the DCP for City of Parramatta and these objectives have been implemented as part of this proposed development.

The water quality objectives proposed to be adopted for the Proposal are based on the objectives set out in the **City of Parramatta DCP 2011**. These are presented in terms of annual percentage pollutant reductions on a developed catchment as follows:

Gross Pollutants	90%
Total Suspended Solids	85%
Total Phosphorus	60%
Total Nitrogen	45%
Total Hydrocarbons	90%

Water quality for the catchment will require provision of a treatment train of water quality improvement devices. Proposed and constructed systems include gross pollutant traps to surface drainage systems and bio-retention filtration systems for final water polishing. Water quality measures will need to be provided for the whole of catchment in accordance with this document.

2.2 Operational Water Quality Management Features

2.2.1 Existing Drainage

The existing site has residual drainage systems on site as part of previous operations. These include an existing interceptor on the south-east of the property at the existing discharge location.

Existing underground and above ground site drainage remains in place from the former Oil Refinery use. This drainage infrastructure will be removed or decommissioned from site during the remediation works.

Following the remediation works, the existing discharge location on the south-east of the property will no longer be utilised and new discharge locations to Duck River will be required.

Public infrastructure/ inter-allotment drainage from Colquhoun Street is also present on the site and this drainage will be retained.

The general arrangement of the existing drainage is shown in **Figure 2.1**. The legal point of discharge is at the south western corner of the site, draining directly into Duck River.

The site currently has public stormwater drainage infrastructure along the north western corner of the land, at the corner of Colquhoun Street and Unwin Street. This infrastructure is proposed to be relocated to be parallel to the site boundary maintaining existing drainage capacity to public infrastructure. Reference to drawing **Co13919.01-DA41 and DA42** (Appendix A) should be made for the proposed concept layout of the drainage modification.

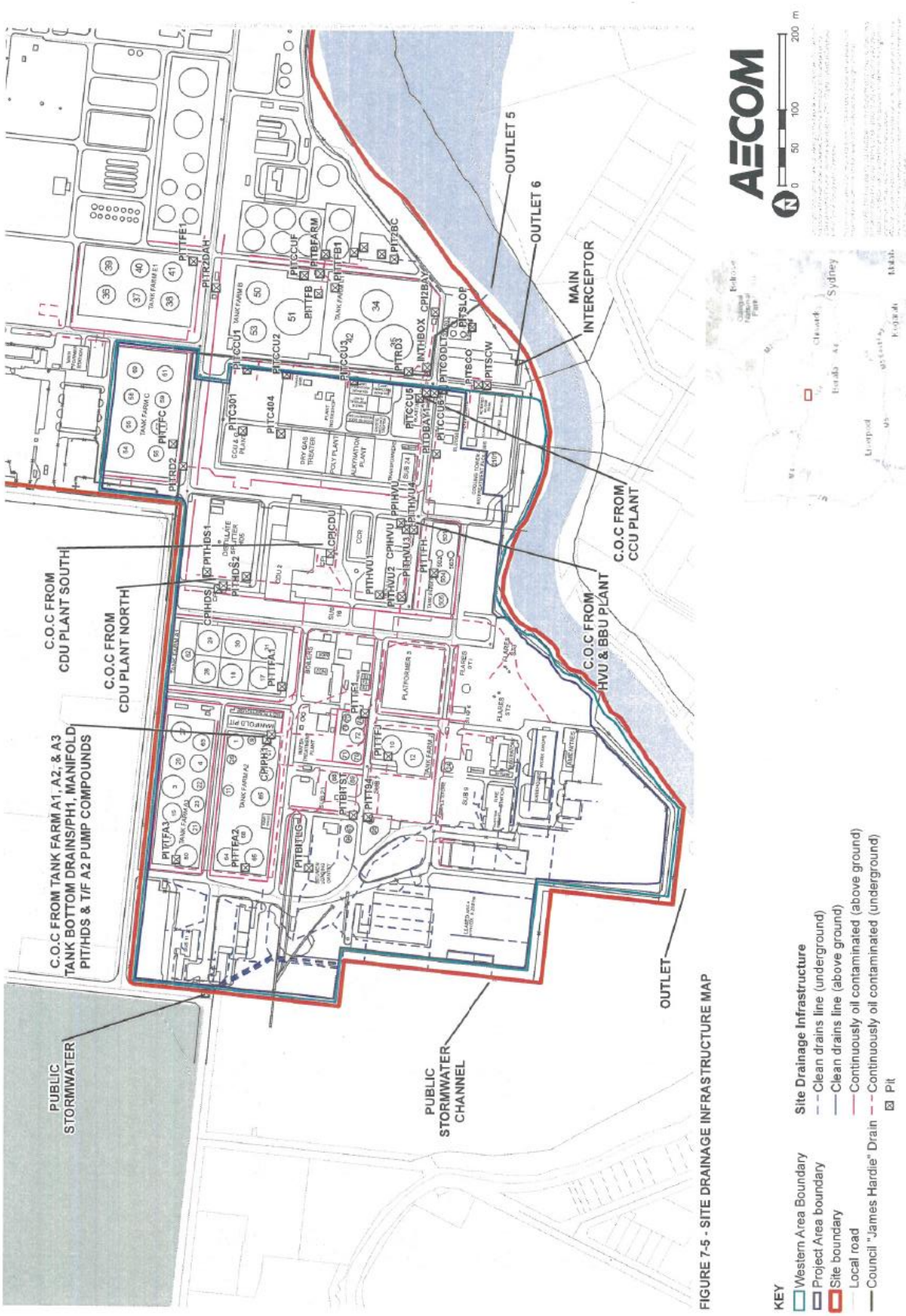


Figure 2.1 Site Drainage Infrastructure Map (Source: AECOM)

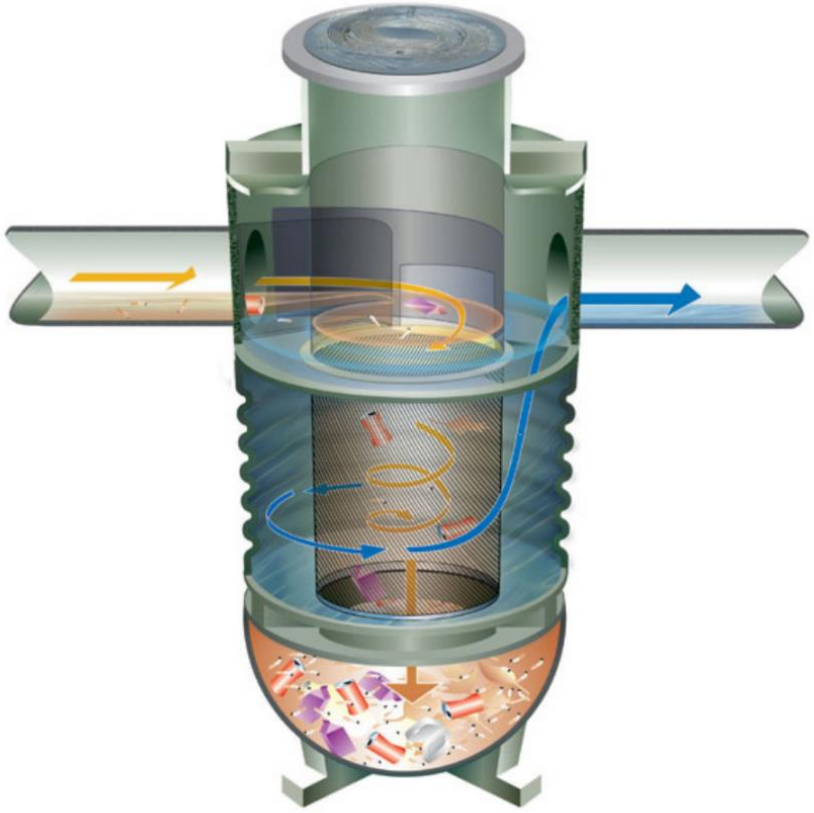
2.2.2 Proposed Drainage for Lot 6

Proposed in-ground drainage network is proposed for the development on Lot 6 as shown on drawing **Co13919.01-DA41**. This will consist of series of pits and pipes to drain the stormwater run-off for Lot 6 towards stormwater quality improvement devices as noted below.

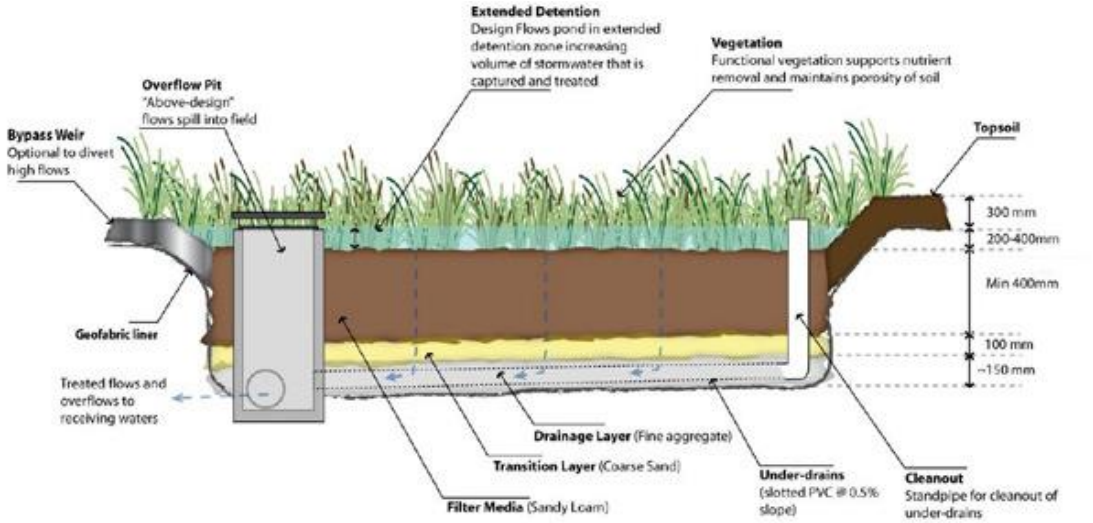
Roof, hardstand, car parking, roads and other extensive paved areas proposed for the Downer facility on Lot 6 are required to be treated by the Stormwater Treatment Measures (STM). The STM shall be sized according to the Lot 6 catchment area of the Site. The STM's for the development are based on a treatment train approach as discussed in the NSW EPA document *Managing Urban Stormwater: Treatment Techniques* to ensure that all of the objectives above are met.

Primary treatment of stormwater runoff from the Downer Proposal during the operational phase is proposed to be made via a vortech style gross pollutant trap (Rocla CDS or similar) with oil baffle, in conjunction with tertiary treatment via a bio-retention filtration basin. The existing interceptor described above is also proposed to remain in the adjoining site.

Reference to drawing **Co13919.01-DA41** (Appendix A) show the location of the proposed STM for Lot 6 with visual representation shown in **Figure 2.2** below.



Typical Gross Pollutant Trap



© Copyright , Healthy Waterways Limited
(Construction and Establishment Guidelines V1.1 April 2010; Image 3.1, Typical cross section through a bioretention system)

Typical Bio-retention filtration basin

Figure 2.2. Visual Representation of Treatment Measures

Additional measures to those nominated in this plan may be required for the containment of firewater to avoid impact on the Duck River in the event of a fire.

A cut-off valve at the furthest downstream drainage pit is also proposed as part of the drainage network. This will provide an automated emergency cut-off to contain any potential contaminants or firewater in the basin and mitigate the risk of polluted waters entering the downstream receiving waters.

The below strategies for management of pollutants are to be implemented in the Lot 6 stormwater drainage to limit pollutants entering the stormwater network as shown on **Figure 2.3**:

- *Bitumen tanks, Bitumen Emulsion tanks, Emulsion tanks and Kerosene tank*
  The bitumen, bitumen emulsion, emulsion and kerosene is proposed to be contained in enclosed tanks. The tanks will be placed on ground with a freestanding bund wall placed around the tanks.
  This will ensure that all accidental spillage from the tanks are contained within the bund walls and do not contribute to stormwater runoff.
  Rainfall within the bund wall enclosure will be generally 'clean' rainfall and will not be contaminated by additional pollutants. The rainfall runoff generated within the bitumen emulsion tank area is to drain to a sump pit capable to containing any spillage and a pumped system to discharge 'clean' water back into the stormwater drainage network.
- *RAP stockpiles*
  The RAP stockpiles area is to drain to centralised stormwater pits which will be fitted with pit inserts. The additional pollutants generated with the processed RAP and unprocessed RAP can be classified as gross pollutant (GP) and total suspended solids (TSS). It is not expected that these areas would contribute to

additional phosphorus and nitrogen concentration due to the RAP material being mainly stable reclaimed asphalt from pavements.
The rainfall runoff generated within those areas are to drain to stormwater pits fitted with pit inserts to capture GP and TSS which may have been collected by the surface drainage. The pit inserts will be capable to capturing removable coarse and fine grade (200 micron) material with the use of filtration bags fitted inside the stormwater pits.

- *RAP Shed, Workshop, Cold Feed Bunkers, Office/Amenities Block, Toner & Liquid Additive Store, Emulsion Additive Store, Storage Bunkers, IBC Storage, Reconomy Plant (Receival Bays) Reconomy Plant (Processed Bunkers for organics, sand, glass and trash bins)*
  All the above will be placed under a roof structure. This will prevent pollutants from being captured in the stormwater system. We note that for operational purposes, openings and penetration will be required to walls of the above structures to allow for machinery or equipment access. In addition to a roof structure above, the bunkers, sheds, store, and plants are to be graded to drain to a sump pit capable of containing any coarse material collected by wind-driving rain. The sump pits are to include a pumped system or overflow system to discharge settled 'clean' water back into the stormwater drainage network free of sediments.
- *Aggregate tipping bay*
  The potential pollutants generated by those material can be classified as coarse grade material (gross pollutant). The tipping bay is located underground and is to be graded to drain to a sump pit capable of containing any coarse material collected within those areas. The sump pits are to include a pumped system or overflow system to discharge settled 'clean' water back into the stormwater drainage network free of coarse sediments.
- *Reconomy Plant (Open area)*
  The potential pollutants generated by those material can be classified as suspended solids, heavy metals and hydrocarbons. The Reconomy Plant is to drain to a sump pit and a first flush system to capture sediments and pollutants generated in this area. The first flush pit will hold sediments/pollutants and a pumped system will be required to remove all settled sediments and pollutants. The first flush pit is also to include a separate pumped system or overflow system to discharge settled 'clean' water back into the stormwater drainage network free of sediments.
- *Bitumen products plant Load-out Bay and Diesel Refuelling Bay*
  The bay for load-out and refuelling will consist of a concrete pad with falls towards a first flush pit system and include a drivable bund along its perimeter. This will capture any pollutants which may accidentally fall off during load-out and also include for accidental spillage of fuel by draining to a puraceptor or similar system prior to connecting back into the stormwater system.
- *Solvent store container and fuel container*
  The solvent store container and fuel container are self-bunded containers which will not allow the stored material to be in contact with rainfall runoff. No additional sediment or pollutants will be generated by the rain over the solvent store and fuel container.

The above strategies will be implemented in the Lot 6 stormwater drainage to limit pollutants entering the stormwater network. A strategy has been put in place to remove any additional pollutants from areas open to rainfall events. As such, the surface type for the open areas have been modelled as roads surface type in the MUSIC model.

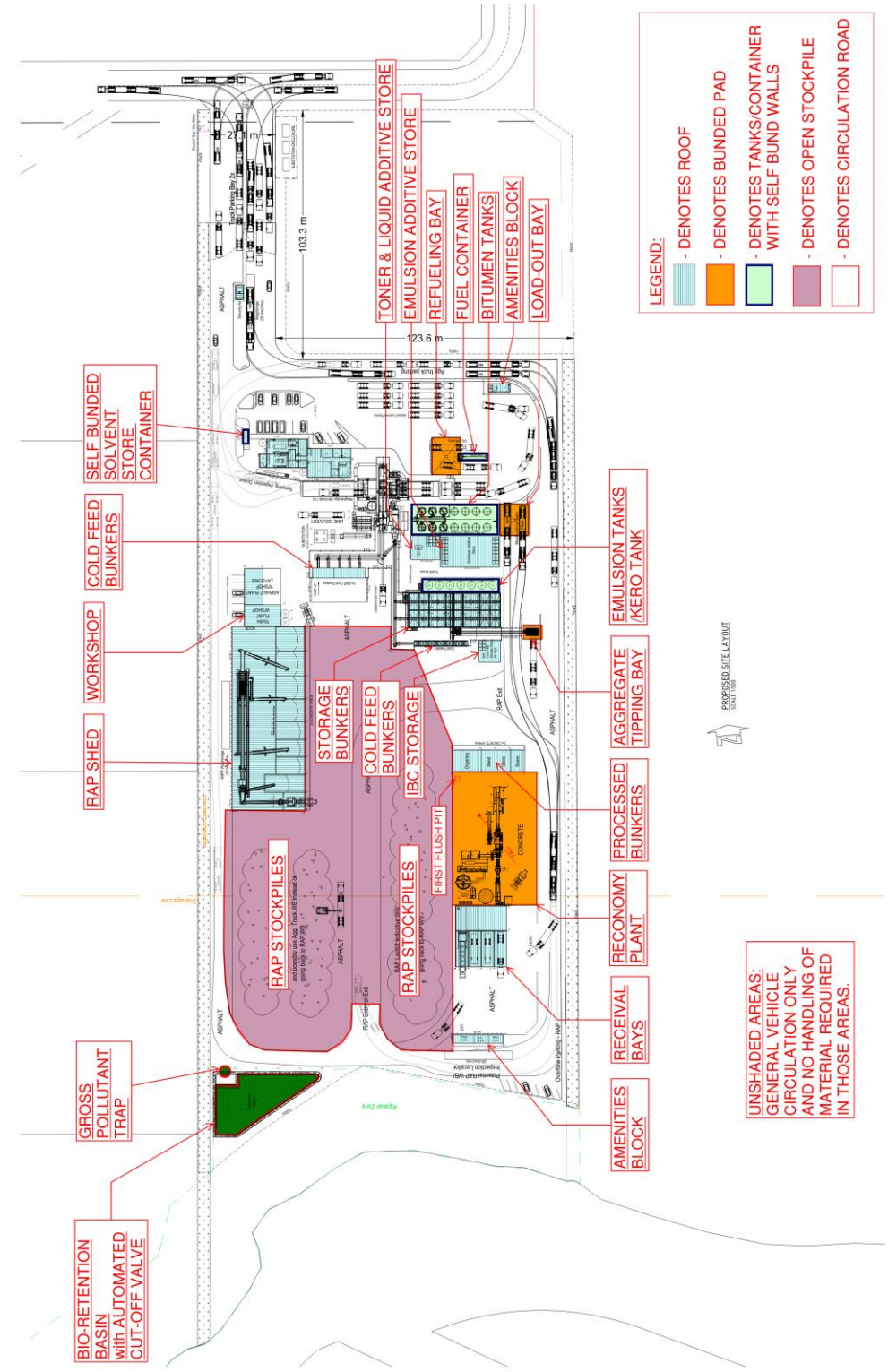


Figure 2.3. Lot 6 Pollutant Management Strategy

2.2.3 Proposed Drainage for Subdivision

Inter-allotment drainage is proposed to provide a single stormwater connection point to each lot of the proposed subdivision. The proposed inter-allotment drainage is shown on drawing **Co13919.01-DA42**.

Future treatment measures for lots other than Lot 6 (subject to future development designs and applications) would be subject to the particular development type, layout and use. Typical treatment train measures could include gross pollutant traps (GPT), proprietary filtration systems, bio-retention basins, buffer strips, swales or other acceptable methods of treatment.

2.2.4 Stormwater Discharge Arrangement

The legal point of discharge is a point specified by Council or the consent authority where stormwater from a property can be discharged. The legal point of discharge is usually Council's stormwater infrastructure (where available), the street kerb and channel for smaller developments or downstream receiving waters like an existing stream or gully, lake, pond or waterbody.

Legal discharge for the entire development land is Duck River on the southern side of the development site. The design and construction of the proposed outlet structure to Duck River has been completed in accordance with the Department of Primary Industry document *Controlled Activities: Guidelines for Outlet Structures.*

The stormwater outlets to Duck River will need to consist of a reinforced concrete pipe and 'natural' energy dissipater. The outlet is to be aligned with the vegetated banks of the creek to remove the potential for bank scour and shall include rip rap energy dissipaters constructed in accordance with the Outlet Structures Guidelines as published by the Department of Primary Industry and The Blue Book. This is shown in **Figure 2.4** below and engineering detail on drawing **Co13919.01-DA46** in **Appendix A**.

The proposed outlet allows for flow velocity reduction and filtration controls (i.e. bedded boulders and native sedges / rushes) to provide for a smooth transition between constructed drainage and natural flow regimes, and minimise scouring. Nutrient control is provided through the nominated water quality treatment train for the Downer Stage 1 development (including for bio-retention, gross pollutant traps, filter baskets) and future Phase 2 subdivision land.

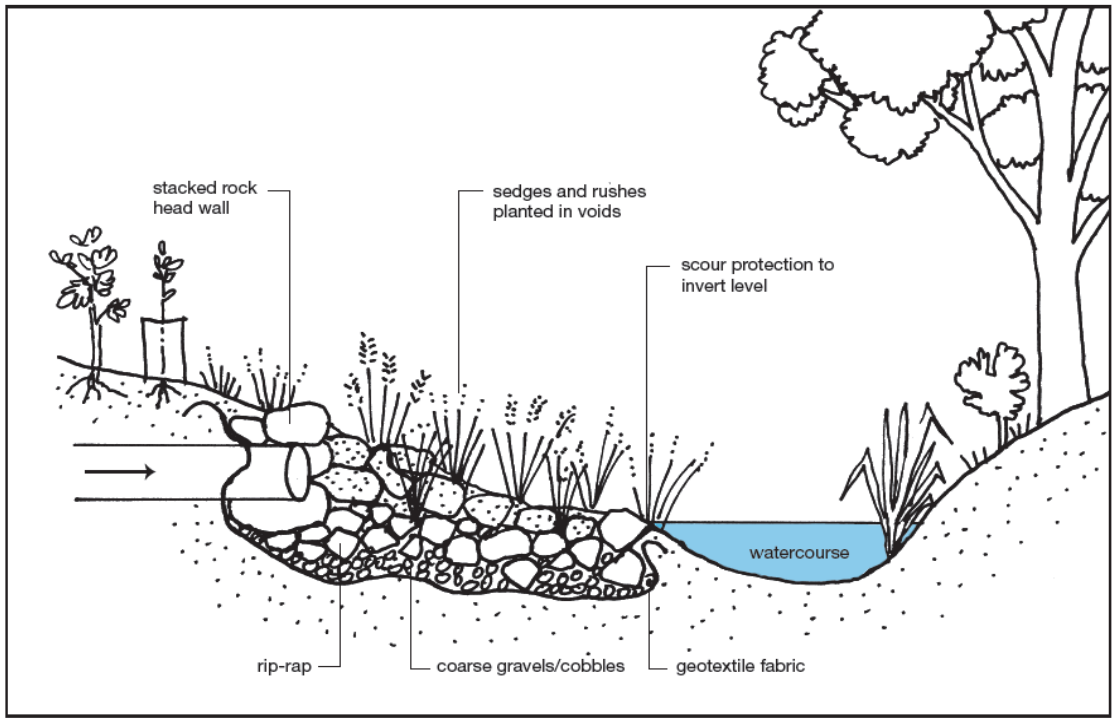


Figure 2.4. Typical Natural Outlet Structure Components

Consideration in the design of the outlet has been made to the following principles as set out in the *Controlled Activities: Guidelines for Outlet Structures* document:

- *The infrastructure/ drainage route has been defined and the specific point of discharge nominated on the submitted drawings. The route is to be selected to be along an area that avoids trees/ vegetation, and where possible is beyond their drip line.*
    - The outlet structures have been positioned clear of existing vegetation which has been confirmed by survey. Refer to drawings **CO13919.01-DA41** and **DA42** for extent of vegetation and location of outlets.
- *The direction of discharge is to be directed downstream;*
    - The direction of discharge is generally downstream and is alignment with the existing tree line. Refer to drawings **CO13919.01-DA41** and **DA42** for extent of vegetation and location of outlets.
- *Where possible, a stable section of the waterbody is to be chosen for the discharge point, which is considered to be away from bends and sensitive vegetation.*
    - The entire Duck River frontage is considered sensitive vegetation and the outlet has been designed to be clear of the vegetation. Energy dissipators will be designed to ensure scouring velocities of the existing ground cover is not exceeded.
- *The construction footprint and proposed extent of disturbance to soil and vegetation within the watercourse or waterfront land is to be minimised. The recommended maximum construction allowance of 3.5m either side of the proposed outlet is recommended.*

- The construction footprint is to be determined on site during construction to limit disturbance to 3.5m either side of the outlet pipe.

- *Changes to the hydrology of the receiving watercourse is to be assessed and ensure acceptable changes to discharge volumes and channel velocities. Discharge velocities and flow rates should mimic 'natural' flows and not initiate erosion. The design of the system is noted to ensure velocities for design flow and more regular flows are below accepted velocity thresholds.*
  - Discharge volumes and channel velocities have been designed to match existing conditions and to not exceed scouring velocities to not initiate erosion.
- *The outlet does not protrude beyond the streambank and ties in with the adjoining bank alignment.*
  - The outlet has been designed to tie into the exiting vegetation/tree line. Aligning the outlet to the existing bank alignment is not appropriate for this development due to the sensitive ecological value of the vegetation.
- *Determination of appropriate rock size requirements for the structure has been calculated utilising methods described in the Blue Book. Rock size is based on tractive stresses generated from outlet discharges and from bank full discharges.*
  - Rock rip-rap is the preferred material to provide a 'natural' outlet and this has been nominated on drawings **Co13919.01-DA46**. The rip-rap will extend for the full extent of the design scour apron and adjoining flanks/streambank. Rip-rap must be appropriately 'keyed in' (to withstand the velocities of runoff or discharge from the site) and cut-off trenches should be provided where necessary.
- *Rip-rap is to consist of durable, angular run-of-quarry rock placed over a bedding layer of angular cobbles over geotextile. Vegetation such as sedges and rushes into scour management is to be provided for further stability.*
  - Refer to detail included on **Co13919.01-DA46**.
- *The scour apron is to be graded to bed level of the watercourse or just below any permanent water created by any stable feature such as a rock bar within the watercourse.*
  - The outlet has been designed to tie into the exiting vegetation/tree line. Aligning the outlet to the existing bank alignment is not appropriate for this development due to the sensitive ecological value of the vegetation.
- *Stabilise and rehabilitate all disturbed areas including topsoiling, revegetation/regeneration, mulching, weed control and maintenance as per the VMP and Erosion and Sediment Control Drawings.*
  - Stabilisation and rehabilitation requirements will form part of the VMP part of the detailed design and post-approval documentation.

Energy dissipators will reduce discharge velocity by great than 75% of the piped velocity at the outlet of the pipe. The energy dissipators are expected to result in flow velocity of less than 0.3m/s for storms up to the 1 year ARI event, and less than 0.6m/s for the design storm event and a low tailwater condition (i.e. low tide and Duck River/ Parramatta River not in flood). The noted design velocities at the end of the dissipator are less than or equal to a moderately erodible clay-loam soil threshold of 0.6m/s and below a vegetated bank

with sparse ground cover threshold of 1.0-1.5m/s. Hence mitigation measure relating to erodibility and erosion has been provided in the form of a rock rip-rap energy dissipator.

It is noted that when in 1% AEP flood conditions, the water level in Duck River will be 2.76m above the outlet discharge invert. Velocity and scour potential noted above will be reduced if the local storm and regional flood conditions coincide.

Engineering details are included on drawing **Co13919.01-DA46** in **Appendix A** which confirm dimensions of outlet scour aprons, rip-rap sizing and construction requirements for the outlets.

2.3 Soil and Water Management (for Construction Phase)

Section 1 of this report provides a summary of the construction works for the Proposal. While all construction activities have the potential to impact on water quality, the key activities are:

- Erosion and sediment control installation.
- Grading of existing earthworks to suit building layout, drainage layout and pavements.
- Stormwater and drainage works.
- Service installation works.
- Building construction works.

Without any mitigation measures and during typical construction activities, site runoff would be expected to convey a significant sediment load. A *Soil and Water Management Plan* (SWMP) and *Erosion and Sediment Control Plan* (ESCP), or equivalent, would be implemented for the construction of the Proposal. The SWMP and ESCPs would be developed in accordance with the principles and requirements of *Managing Urban Stormwater – Soils & Construction Volume 1 'Blue Book' (Landcom, 2004)*.

In accordance with the principles included in the Blue Book, a number of controls have been incorporated into a preliminary ESCP (refer to accompanying Drawings in **Appendix A**) and draft SWMP in **Appendix C**.

The sections below outline the proposed controls for management of erosion and sedimentation during construction of the Proposal.

Sediment Basins

Sediment basins have been sized (based on 5 day 85th percentile rainfall) and located to ensure sediment concentrations in site runoff are within acceptable limits. Preliminary basin sizes have been calculated in accordance with the Blue Book and are based on 'Type D' soils. These soils are fine dispersive soil and require a relatively long residence time to allow settling.

The soils on the site can be classified into 4 units, being fill soil, alluvium soil, residual soil and shale bedrock. All the civil works activities will likely occur through the top two units being the fill soil and alluvium soil. The fill soil is mainly comprised of mixtures of gravelly sand or sandy gravel or sandy clay with thickness between 0.5m to 1.9m starting

at the existing ground surface. The alluvium fill is manly comprised of mixtures of sandy clay or sandy/silty clay of medium to high plasticity with consistency of firm to hard. The alluvium fill varies in thickness between 7.3m and 11.8m starting 1.1m below existing ground surface.

The residual soil is found generally 9.1m below the existing ground level with shale bedrock starting at a depth of 11.5m.

The fill soil and alluvium soil are classified as 'Type D' soils in accordance with the Blue Book due to the significant portion of fine (<0.005mm) dispersible materials that will never settle unless flocculated. 'Type D' soils have been adopted for the sizing of the sediment basins during construction activities.

Refer to drawing **Co13919.01-DA23** for sizing and locations of the proposed sediment basins.

As the majority of the Site drains to the south, the sediment basins have been located generally along the southern boundary of the site. An additional basin is proposed near the south eastern corner of the site to treat any flows that may be attributed to the Lot 6 Stage 1 works.

Sediment basins for 'Type D' soils are typically wet basins which are pumped out following a rainfall event when suspended solids concentrations of less than 50 mg/L have been achieved from flocculation treatments.

The quality of discharge from the site to satisfy the Landcom Blue Book requirements are as followed:

- Water pH released from a controlled sediment basin outflow shall be within the range 6.5 to 8.5.
- Suspended Solids released from controlled sediment basin outflows will be no greater than 50mg/L, 75 NTU's (Nephelometric Turbidity Units) or other Turbidity measurement based on confirmed laboratory correlation. Any correlation should be confirmed through laboratory assessment
- Oils and Grease – no visible films or odour.
- Litter – no visible litter washed or blown from the site.

Sediment Fences

Sediment fences are located around the perimeter of the site to ensure no untreated runoff leaves the site. They have also been located around the existing drainage channels to minimise sediment migration into waterways and sediment basins.

Stabilised Site Access

For the proposal, stabilised site access is proposed at two locations at the entry to the works area. Stage 1 of the works will include a stabilised site access from Devon Street onto Lot 6 and Stage 2 will include a stabilised site access between Lot 55 and Lot 56. A typical design of a stabilised site access is shown on drawing **Co13919.01-DA25** and includes an approximately 10m long 'truck shaker' comprised of an area of 50mm aggregate, followed by a cattle grid and then 75-100mm aggregate. All construction vehicles will have to pass over this 'truck shaker' when exiting the site. This will limit the risk of sediment being transported onto Devon Street and other public roads.

Other Management Measures

Other management measures that will be employed are expected to include:

- Minimising the extent of disturbed areas across the site at any one time.
- Progressive stabilisation of disturbed areas or previously completed earthworks to suit the proposal once trimming works are complete.
- Regular monitoring and implementation of remedial works to maintain the efficiency of all controls.
- Utilising the water retained in the sediment basins as dust suppression during the construction activities.
- Hydroseed installation following completion of construction activities.

It is noted that the controls included in the preliminary ESCP are expected to be reviewed and updated as the design, staging and construction methodology is further developed for the Proposal.

2.4 Stormwater Quality Modelling (for Operational Phase)

2.4.1 Stormwater Quality Modelling Methodology

A MUSIC (Model for Urban Stormwater Improvement Conceptualisation) model has been utilised to model the effectiveness of the proposed water quality system. This model has been released by the Cooperative Research Centre for Catchment Hydrology (CRCCH) and is a standard industry model for this purpose. MUSIC is suitable for simulating catchment areas of up to 100 km^2 and utilises a continuous simulation approach to model water quality.

By simulating the performance of stormwater management systems, MUSIC can be used to predict if these proposed systems and changes to land use are appropriate for their catchments and are capable of meeting specified water quality objectives (CRC 2002). The water quality constituents modelled in MUSIC and of relevance to this report include Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN).

The pollutant retention criteria nominated in **Section 2.1.2** of this report were used as a basis for assessing the effectiveness of the selected treatment trains.

MUSIC model "*13919.01_RevA.sqz*" was set up to examine the effectiveness of the water quality treatment train and to predict the load-based pollution reduction requirements have been achieved for Stage 1 development on Lot 6.

The models were set up using the NSW MUSIC Modelling Guide. The layout of the MUSIC model is presented in **Figure 2.5**.

2.4.2 Rainfall Data

Six-minute pluviographic data was sourced from the Bureau of Meteorology (BOM) as nominated below for nearby Parramatta North weather station. Evapo-transpiration data for the period was sourced from the Sydney Monthly Areal PET data set supplied with the MUSIC software.

Input	**Data Used**
Rainfall Station	Parramatta North (Masons Drive)
Rainfall Period	
Mean Annual Rainfall (mm)	856
Evapotanspiration	Parramatta Monthly Areal PET
Model Timestep	6 minutes

2.4.3 Rainfall Runoff Parameters

Parameter	**Value**
Rainfall Threshold	0.3 for roof; 1.5 for roads
Soil Storage Capacity (mm)	119
Initial Storage (% capacity)	25
Field Capacity (mm)	89
Infiltration Capacity Coefficient a	180
Infiltration Capacity exponent b	3.0
Initial Depth (mm)	10
Daily Recharge Rate (%)	25
Daily Baseflow Rate (%)	25
Daily Seepage Rate (%)	0

2.4.4 Pollutant Concentrations & Source Nodes

Pollutant concentrations for source nodes are based on Sydney Catchment Authority land use parameters as per the **Table 2.1**. Reference should be made to Section 2.2.2 of this report which outlines the management strategies for stormwater pollutant on the Lot 6 development site.

Pollutants in open areas

It should be noted that open paved areas where handling of material is to occur, there is the potential for additional sediment and suspended solids to be generated during a rainfall event. Those areas include the bitumen emulsion tanks, the unprocessed reclaimed asphalt pavement (RAP) stockpiles, the Reconomy Plant (excluding the receival bay and processed bunkers), the non-destructive digging truck wet offload pit, the sweeper truck

offload/dry stockpile area, the aggregate unloading hopper (underground) and the diesel refuelling area.

The bitumen tanks will be located in bunded areas surrounded by walls and will not directly contribute to the stormwater runoff. Similarly, the offload pit and hopper will be set down with sump pits and will not directly contribute to stormwater runoff.

The RAP stockpiles will consist generally of TSS and GP sediment and will be treated by the use of pit inserts, OceanGuard or similar (220micron mesh) to ensure all sediment is removed prior to runoff from those areas joining the stormwater system.

The Reconomy Plant open area will be subject to rainfall event which will drain to a first flush pit. Testing conducted by Downer at a similar facility in Rosehill indicates that the presence of hydrocarbons and heavy metals in quantities are comparable to a typical industrial facility as noted in **Section 2.4.9** and **2.4.10**. Refer to the Section **2.4.9** and **2.4.10** of this report which outlines the performance of the gross pollutant trap and the bio-retention basin for removal of hydrocarbons and heavy metals from the stormwater system prior to discharge from the site.

The MUSIC modelling is based on the operational activities on the site which will incorporate stormwater drainage sumps, pit inserts and bunded areas provided to the above areas to mitigate the risk of additional pollutant contributing to the stormwater runoff contamination.

Pollutants in enclosed areas

We note that the large majority of pollutants (other than as noted above) to be used on this facility will be handled in areas which are not exposed to rainfall and hence would not contribute to the stormwater runoff. This includes all handling of material in the RAP shed, the plant workshop and the asphalt plant workshop and laydown and other areas as noted in **Section 2.2.2** of this report. Similarly, the emulsion additive store, IBC storage toner and liquid additive store are all proposed to be placed in enclosed buildings which will be sheltered from rainfall and hence not contribute to stormwater runoff.

The facility will also utilise pollutants such as emulsion, kerosene and diesel which are all proposed to be contained in bunded areas.

As such, the surface type for the enclosed areas have been modelled as roof surface type in the MUSIC model.

Table 2.1. Pollutant Concentrations

Flow Type	Surface Type	TSS (log_{10} values)		TP (log_{10} values)		TN (log_{10} values)	
		Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Baseflow	Roof	-	-	-	-	-	-
	Roads	1.20	0.17	-0.85	0.19	0.11	0.12
	Landscaping	1.2	0.17	-0.85	0.19	0.11	0.12
Stormflow	Roof	1.30	0.32	-0.89	0.25	0.30	0.19
	Roads	2.43	0.32	-0.30	0.25	0.34	0.19
	Landscaping	2.15	0.32	-0.6	0.25	0.30	0.19

The MUSIC model has been setup with a treatment train approach based on the pollutant concentrations in **Table 2.1** above and the catchments shown on **Co13919.01-DA43**.

2.4.5 Treatment Nodes

GPT, rainwater tanks, pit inserts, and bio-retention filtration basin nodes have been used in the modelling of the ultimate conditions. Typical visual representation of the treatment measures is shown in **Figure 2.5** below.

2.4.6 Modelling Layout

The model layout is included in **Figure 2.5** below.

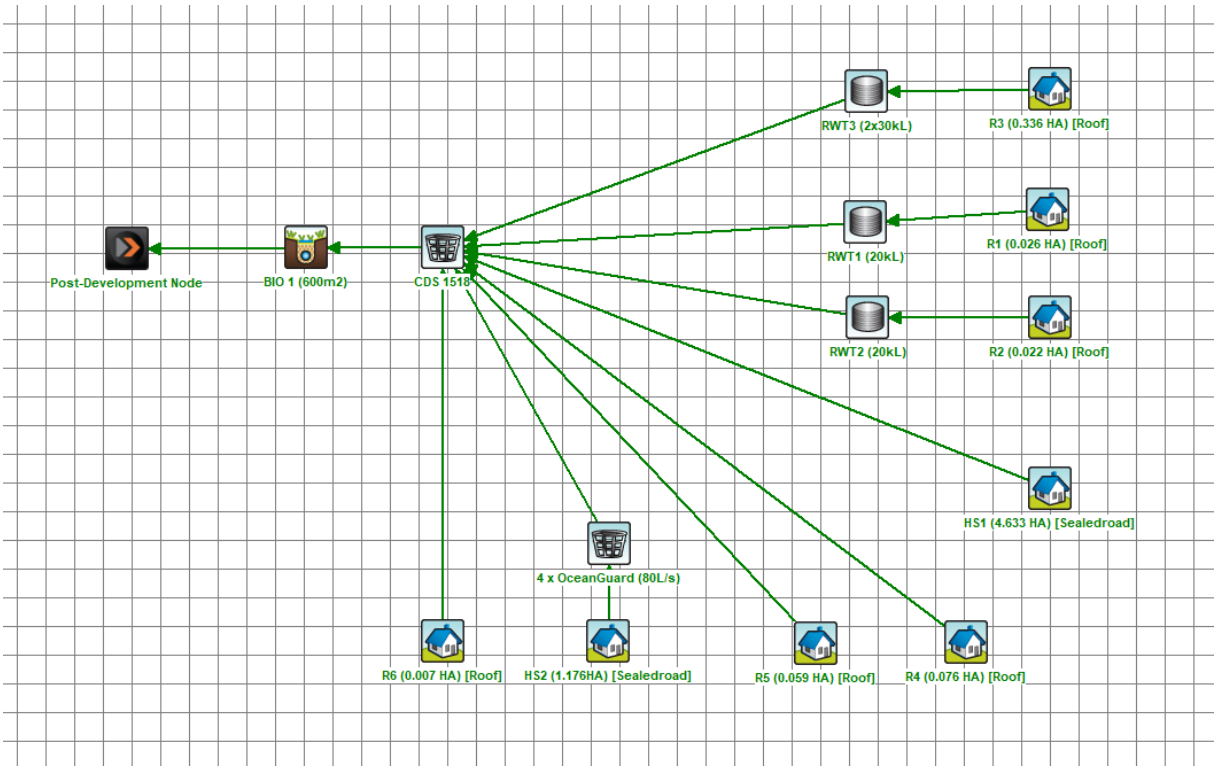


Figure 2.5. MUSIC Model Layout

2.4.7 Modelling Results

Table 2.2 shows the results of the MUSIC analysis for Stage 1 development on Lot 6.

The reduction rate is expressed as a percentage and compares the post-development pollutant loads without treatment versus post-development loads with treatment over the modelled catchment.

Table 2.2. MUSIC analysis results

	Source	Residual Load	% Reduction	Target Met
Flow (ML/yr)	43.9	41.3	5.8	
Total Suspended Solids (kg/yr)	14200	1300	90.8	Y
Total Phosphorus (kg/yr)	24.0	5.99	75.1	Y
Total Nitrogen (kg/yr)	105	54.6	47.9	Y
Gross Pollutants (kg/yr)	1180	0	100	Y

2.4.8 Modelling Discussion

MUSIC modelling has been performed to assess the effectiveness of the selected treatment trains and to ensure that the pollutant retention requirements have been met.

The model results in **Table 2.2** indicate that, through the use of the STM's in the treatment train, pollutant load reductions for Total Suspended Solids, Total Phosphorous, Total Nitrogen and Gross Pollutants will meet the target reductions for ultimate conditions.

As can be seen, the proposed treatment train achieves reductions greater than the required pollutant reduction objectives. This will ensure any variance in assumed arrangements in the final building layouts will not affect the overall outcomes of the solution, and also to ensure overall reduction values are met.

Hydrocarbon and other pollutant removal cannot be readily modelled with MUSIC software. Discussion on hydrocarbon removal has been included in the following subsections of the report

2.4.9 Hydrocarbon Treatment Efficiency

The proposed facility, outside of bunded and processing areas, would be expected to produce relatively low source loadings of hydrocarbons. Potential sources of hydrocarbons would be limited to leaking engine sumps. The potential for hydrocarbon pollution is low and published data from the CSIRO indicates that average concentrations from Industrial sites are in the order of 10mg/L and we would expect source loading from this site to be near to or below this concentration as further discussed below.

Hydrocarbon removal cannot be readily modelled with MUSIC software however there is sufficient information on the expected source loads and treatment.

Hydrocarbon Sources

The average storm flow concentration of hydrocarbons in an industrial facility is 9.5mg/L (3 & 30mg/L 95% confidence limits) sourced from Fletcher T, Duncan H, Poelsma P & Lloyd S, 2004: *Stormwater Flow and Quality, and the Effectiveness of Non-Proprietary Stormwater Treatment Measures - A review and Gap Analysis. Cooperative Research Centre for Catchment Hydrology, Technical Report 04/8*;

Bio-retention Filtration Treatment

Removal of hydrocarbons within the bio-retention system is shown to occur due to several mechanisms.

Removal of oil, grease and hydrocarbons will take place due to entrainment to sediments.

Research by Hseih (2005) has also shown that 97% of hydrocarbons are trapped and contained in the first few centimetres of a filtration system (i.e. filter swales and bio-retention systems). These are then broken down via organic processes in a period of 2-3 days.

GPT Treatment

The vortech type GPT is reported to provide between 82-94% reduction in hydrocarbons and free oils.

The following information relating to the performance of a CDS GPT has been provided by the product suppliers, Rocla (noting similar equivalent GPT units could be considered for the proposal subject to final detail design):

> *As with nutrient capture there is also a high correlation of oils and grease removal with sediment capture in CDS Units.*
>
> *UCLA have reported 50-80% of oil and grease may be attached to sediments.*
>
> *Hoffman 1982: "Our data confirm the observations of the workers in that hydrocarbons are primarily associated with particulate material (83 – 93%)".*
>
> *CRCCH 1999: "Colwill found 70% of oil and approximately 85% PAH to be associated with solids in stormwater. That study subsequently demonstrated that over a period of dry weather conditions, increasing concentrations of oil become associated with particulates with the highest oil content found in the sediment range of 200µm to 400µm.*
>
> *CSIRO 1999: In the category of "attached pollutants" CDS Units were the only GPT device to even be considered capable of capturing anything.*
>
> *CDS Units can also capture free floating oil spills. However, when most of the oil is associated with fine particulates and sediments, CDS Units remove very high levels of oils and greases due to their very high capture rate of those fine particles.*

Hydrocarbon Treatment Conclusion

Overall, when combining a treatment train of CDS and filtration systems, a reduction of greater than 90% of hydrocarbons is achieved. It is noted that the hydrocarbon removal could be achieved with the CDS alone.

Given the expected low source loadings of hydrocarbons and removal efficiencies of the treatment devices any small amounts of hyrdocarbons that do enter the stormwater systems from drips from heavy vehicles and machinery will be captured and treated within the proposed stormwater management system.

2.4.10 Heavy Metal Treatment Efficiency

The proposed Reconomy facility would be expected to produce relatively low source loadings of heavy metals. Potential sources of hydrocarbons would be expected to be related to particles which are entrained to fine and some course sediments.

Heavy metal removal cannot be readily modelled with MUSIC software however there is sufficient information on the expected source loads and treatment.

Heavy Metal Sources

The average storm flow concentration of heavy metals (copper, zinc, lead & Chromium) in an industrial facility would typically be in the order of:

- Lead – 0.41mg/L
- Zinc – 0.73mg/L
- Copper – 0.17mg/L
- Cadmium – 0.0064mg/L
- Chromium – 0.014mg/L

Sourced from Duncan H, 1999: *Urban Stormwater Quality: A Statistical Overview, Cooperative Research Centre for Catchment Hydrology, Technical Report 99/3*;

Filtration Treatment

Removal and retainment of metals will normally be a result of entrainment of fine sediments.

Removal of heavy metals in a bio-retention system would typically be similar to that of the total suspended solids.

GPT Treatment

The vortech type GPT is reported to provide between 80-90% reduction in heavy metals based on treatment of fine sediments.

Heavy Metal Treatment Conclusion

Overall, when combining a treatment train of CDS/ vortech type GPT and bio-retention filtration systems, a reduction of around 90% of heavy metals could be expected. Please note, the TSS concentration, particle size distribution (PSD) and heavy metal concentrations on a particular site will impact the ability for a device to capture and retain metals.

Given the expected low source loadings of heavy metals and removal efficiencies of the treatment devices we consider that the proposed system addresses potential impacts relating to heavy metals for the Proposal.

2.5 Construction impact assessment

Section 2.3 discusses proposed soil and water quality measures to be provided during typical construction activities, to reduce significant sediment loads from leaving the site.

A *Soil and Water Management Plan* (SWMP) and *Erosion and Sediment Control Plan* (ESCP), or equivalent, would be implemented for the construction of the Proposal. The SWMP and ESCPs would be developed in accordance with the principles and requirements of *Managing Urban Stormwater – Soils & Construction Volume 1 ('Blue Book')(Landcom, 2004)*.

Based on the provision of noted measures it is concluded that potential for water quality impacts can be mitigated during construction and that any impacts would be minor.

Following completion of the construction activities on the subdivision lots, it is proposed to hydroseed the subdivision lots.

2.6 Operational impact assessment

Section 2.1 and **2.4** discusses proposed soil and water quality measures to be provided during operational phase, and confirmation through MUSIC modelling that the proposed STM's meet recommended target pollutant reductions and water quality objectives for the Proposal

Based on the provision of noted measures it is concluded that potential for water quality impacts will be mitigated during operational phase of the Proposal.

3 SURFACE WATER QUANTITY MANAGEMENT

3.1 Water Quantity Objectives

Water quantity criteria has been based on the following key documents:

- **Development Engineering Design Guidelines** (City of Parramatta June 2018)
- **The Upper Parramatta River Catchment Trust On-site Detention Handbook** (UPRCT 2005)

Council adopts the principles of water quantity management. "On-site Detention (OSD)" may be required where an increase in stormwater runoff, from a new development site, has an adverse effect to the receiving stormwater system.

Council adopts the principles of Water Quantity Management, commonly termed "On-site Detention (OSD)", to ensure the cumulative effect of development does not have a detrimental effect on the existing stormwater infrastructure and watercourses located within their LGA downstream from the site.

The requirements for OSD for development are set out in the City of Parramatta *Development Engineering Guidelines* (June 2018) and *The Upper Parramatta River Catchment Trust On-site Detention Handbook* (2005).

Council may require OSD to be provided to "*Prevent any increase in downstream peak flows resulting from new developments or redevelopments by temporarily storing on-site the additional and quicker runoff generated*".

Council however note that OSD may not be required where "*On site detention systems within areas affected by 100-year ARI mainstream flood events, subject to demonstration by an applicant that OSD would adversely impact the catchment or have no hydrological benefit"*.

Given the location of the site being an existing developed property, at the bottom of the Duck River catchment, having direct discharge to Duck River (being tidally influenced) and flood considerations, there is limited to no hydrological benefit in providing OSD for the development. The following discussion confirm this position.

We also note that a meeting was held with Parramatta Council on 13 May 2020 as part of the consultation process for the development. Discussion during the meeting on the need for OSD confirmed that Council (Mr Paul Clarke) could accept negation of OSD given the reasoning included in the above paragraph.

3.2 Water Quantity Management Features

3.2.1 Existing

Existing underground and above ground site drainage is currently present on the site as part of the previous land use and public infrastructure/ inter-allotment drainage from Colquhoun Street and from Durham Street.

The general arrangement of the existing drainage is shown in **Figure 2.1**. The stormwater point of discharge is at the south east corner of the site through the existing EPL licensed discharge, draining directly into Duck River.

The site currently has Council stormwater drainage infrastructure along the north western corner of the land, at the corner of Colquhoun Street and Unwin Street. This infrastructure is proposed to be relocated to be parallel to the site boundary maintaining existing drainage capacity to public infrastructure. Reference to drawing **Co13919.01-DA41** and **DA42** should be made for the proposed concept layout of the drainage modification.

3.2.2 Proposed Subdivision

There are no proposed water quantity measures based on the outcomes of the assessment included in **Section 3.6** and consultation with Council.

Discharge locations are proposed to be utilised at the south of the Proposal for the subdivision inter-allotment drainage. Refer drawing **Co13919.01-DA41** and **DA42** for discharge location and **Co13919.01-DA46** for outlet details.

To service the development lots, piped drainage (and associated easements) is proposed to be constructed to convey runoff from each lot to the ultimate property discharge to Duck River.

Drainage is proposed along the southern boundaries of Lots 52, 55 & 59, converging at the junction of Lots 52 & 54, with 58 & 59. The piped drainage then traverses south, in an easement which straddles the common boundary of Lot 62 and 64. These will ultimately discharge into Duck River at the site discharge point in the south-west corner of Lot 62.

Existing public stormwater drainage infrastructure that currently traverses through Lot 53 will be relocated to match the outline of the site boundary.

Reference to drawings **CO13919.01-DA41** and **DA42** should be made for the concept stormwater layout.

3.2.3 Lot 6 Development

As per general engineering practice and the guidelines of Council, proposed stormwater drainage systems for the development on Lot 6 will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development.

The minor system is to consist of a piped drainage system which has been designed to accommodate the 1 in 20-year ARI storm event (Q20). This will result in the piped system being able to convey all stormwater runoff up to and including the Q20 event. The major system will be designed to cater for storms up to and including the 1 in 100-year ARI storm event (Q100). The major system will employ the use of defined overland flow paths to safely convey excess run-off from the site.

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, the Council standards and accepted engineering practice. Runoff from buildings will generally be designed in accordance with AS 3500.3 National Plumbing and Drainage Code Part 3 – Stormwater Drainage. Overall site runoff and stormwater management will generally be designed in accordance with the Institution of Engineers, Australia publication "*Australian Rainfall and Runoff*" (2016 Edition), Volumes 1 and 2 (AR&R).

3.2.4 Future Developments on Lots 51 to 56 & Lots 58 to 64

Future developments on Lots 51 to 56 & Lots 58 to 64, are expected to comprise industrial development. Each building design will need to meet the minimum capacity requirements noted in **Section 1.7** & **Table 1.3**, and stormwater management measures discussed in **Section 2** and **Section 3.**

A summary of the requirements for future developments in terms of stormwater quality and quantity objectives are provided in **Section 2** and **Section 3** of this report respectively.

Additional items such as rainwater reuse, WSUD measures and details of stormwater management, and/ or other site-specific measures associated with Lots 51 to 56 & Lots 58 to 64 would form part of future separate development applications and designs, and not considered in this application.

3.3 Construction impact assessment

Section 2.4 discusses proposed mitigation measures to be provided during typical construction activities, site runoff to reduce significant sediment loads from leaving the site.

A *Soil and Water Management Plan* (SWMP) and *Erosion and Sediment Control Plan* (ESCP), or equivalent, would be implemented for the construction of the Proposal. The SWMP and ESCPs would be developed in accordance with the principles and requirements of *Managing Urban Stormwater – Soils & Construction Volume 1 ('Blue Book')(Landcom, 2004)*.

The ESCP (refer to drawings **Co13919.01-DA21**, **DA22**, **DA23** and **DA25** in **Appendix A**) includes provision of sediment control basin which will capture and manage runoff during construction to the 85th percentile rainfall event, prior to discharge in a controlled manner.

Based on the provision of noted mitigation measures it is concluded that potential for water quantity impacts can be mitigated during construction.

3.4 Operational impact assessment

In relation to the water runoff assessment, as discussed in **Section 3.2.1**, the existing site can be considered to be predominately comprised of developed surfaces. Following construction of the Proposal, the extent of impermeable surface remains consistent with recent/existing use of the site as a refinery/terminal, hence the change in peak flows associated with the development is negligible.

The Proposal is located in the bottom end of Duck River and associated catchment. Duck River is noted to be a tidally influenced waterway and approximately 1.5km from its confluence with Parramatta River. Given the waterway is tidally influenced inclusion of, or negation of OSD would have no effect on the ability for the water to receive runoff from the site. As such there would be no impact in relation to the site relating to the ability for Duck River to convey flow from the development site.

A review of the proposal has also been made in relation to the Duck River system in conjunction with local runoff from the site. The assessment considers the developed site runoff (from a small contributing catchment) in conjunction with the upstream flow from the Duck River catchment (being a relatively large catchment) and comparing this to a developed site with runoff attenuated to pre-development flows.

Local un-attenuated flows from the site are noted to peak in advance of the main flood hydrograph coming from the larger upstream catchments within Duck River. The combined hydrograph results in double peaks (small initial peak followed by larger extended peak) in the shorter duration storms, which reduces as the storm duration increases.

The inclusion of traditional OSD would show that, although local flows would be reduced, the peak of flow from the site is drawn out over a longer period. The drawn-out peak from site then coincides with that of the larger and delayed peak flow within Duck River. This would result in an overall increase in peak flows, hence an adverse effect results. Overall it would be considered that provision of traditional OSD would result in a hydrological impact, and negation of OSD would not result in impact.

It is considered that the combined peak flow runoff (from the local catchment and larger upstream catchment) will not increase as a result of the development (with the proposed flood management measures and without traditionally sized on-site detention). Hence the development (with the negation of OSD) will not adversely impact flooding upstream or downstream of the property.

Based on the assessment it is concluded that additional mitigation measures are not required to mitigate impact associated with water quantity during operational phase of the Proposal. This is consistent with the discussion held in the meeting with Parramatta Council on 13 May 2020. Discussion during the meeting on the need for OSD confirmed that Council (Mr Paul Clarke) could accept negation of OSD given the reasoning set out above.

4 WATER CYCLE MANAGEMENT

4.1 Water Balance Objectives

A daily water balance analysis was undertaken to determine the feasibility of the proposed rain and stormwater harvesting scheme and in particular the effects of various storage sizes for stormwater harvesting along with changes to demand.

The water balance utilised flows generated using a simple runoff calculation using historical rainfall data, analysed for various rainfall patterns including dry, mean and wet rainfall years. The purpose for modelling dry, mean and wet years was to assess the performance of various tank sizes given the changes to rainfall patterns.

The water balance assessment has been completed for the Downer 'Stage 1 – Sustainable Road Resources Centre' development. No assessment of Lots 51 to 56 and 58 to 64 has been included in the report. Assessment of Lots 51 to 56 and 58 to 64 would be subject to future development applications.

4.2 Water Use Management Features

4.2.1 Existing

Existing water use features comprise Sydney Water Mains supply.

There are no existing rainwater harvesting systems, or water extractions as the Proposal site is currently vacant.

There are no current irrigated landscaped areas.

4.2.2 Proposed

Proposed management measures for water use on the Stage 1 – Sustainable Road Resources Centre are as follows:

- Existing Sydney Water mains supply is proposed to be maintained throughout the duration of the Proposal;
- Potential use of Recycled Water, available from the nearby Aquanet facility, and reticulated past the site along Devon Street;
- Stormwater harvesting through rainwater reuse to reduce demand on non-potable water uses;
- Fire sprinkler water storage via Sydney Water mains.

A concept diagram for the proposed re-use scheme on site is shown in **Figure 4.1** below.

Landscaping plans have been prepared by Geoscapes for the Proposal, it is proposed that an allowance to irrigate up to 500m2 of landscape areas will be included in the proposal.

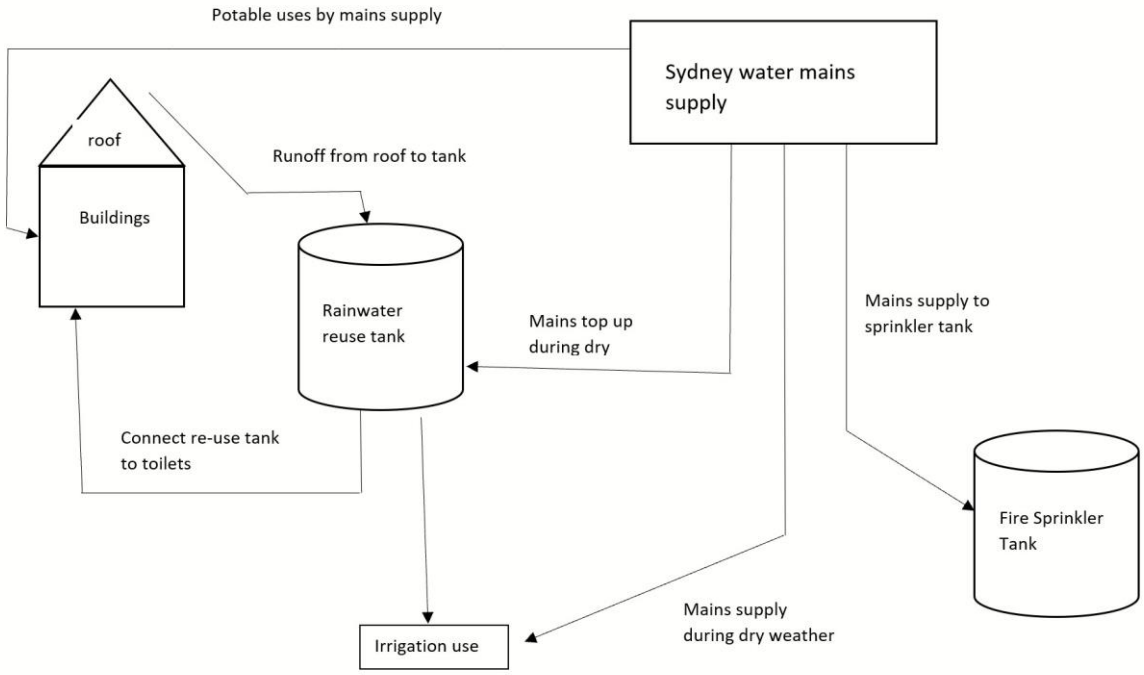


Figure 4.1. Water Cycle Management Schematic

A short description of the expected stormwater harvesting for the Stage 1 – Sustainable Road Resources Centre development is described below.

Stormwater Harvesting

Stormwater harvesting refers to the collection of stormwater from the developments internal stormwater drainage system for re-use in non-potable applications. Stormwater from the stormwater drainage system can be classified as either rainwater, where the flow is from roof areas only, or stormwater where the flow is from all areas of the development.

Rainwater harvesting is proposed for this development, and rainwater tank sizing will be designed during detail design stage by the hydraulic consultant via a water balance assessment. Rainwater tanks are to be sized with reference to the NSW Department of Environment and Conservation document *Managing Urban Stormwater: Harvesting and Reuse*, using a simple water balance analysis to balance the supply and demand, based on the base water demands and the requirements of Council.

The water balance assessment will be based on local rainfall data and specific utilisation rates for the facility for re-use of non-potable applications. The expected reuse applications include internal uses such as toilet flushing, and external applications including irrigation. The aim is to reduce the water demand for the development and to satisfy the requirements of Council.

In general terms the rainwater harvesting system will comprise the following elements:

- In-line tank for the collection and storage of rainwater.
- Overflow to the in-ground stormwater drainage system sized to cater for the catchment being drained to the tank. This will operate at times when the rainwater

storage tank is full so that rainwater can pass through the tank and continue to be discharged via gravity into the stormwater drainage system.

- Rainwater from the storage tank will be pumped for distribution throughout the development in a dedicated non-potable water reticulation system to toilets and external irrigation areas, and any other uses as defined in the Construction Certificate stage of the design.
- Mains top up from Sydney Water system for prolonged periods of dry weather.
- First flush diverter and filters to ensure adequate quality of reuse water.
- Tank material will be steel or polymer and appropriately located to minimise visual impact.

Refer drawings in **Appendix A**.

It should be noted that Downer is also currently exploring options to potentially utilise recycled water from Aquanet as an existing Aquanet infrastructure is present in close proximity to the Lot 6 development.

4.3 Water Balance Assessment

4.3.1 Internal Base Water Demand

Indoor water demand has been based on MUSIC Modelling Guideline for an industrial/ commercial development which requires an allowance of 0.1kL/day/ toilet or urinal. No allowance is required for disable toilets.

The above rates result in the following internal non-potable demand:

RWT 1 (LAB)	3 Toilets	0.3 kL/day
RWT 2 (Control + Production Office)	3 Toilets	0.3 kL/day
RWT 3 (RAP Shed)	5 Toilets	0.5 kL/day

4.3.2 Fire Services Base Demand

Based on the preliminary fire services report, sprinkler and fire service tanks require a total storage of 500 kL. These are expected to be serviced twice yearly, hence total yearly demand of 1000 kL has been allowed.

Sprinkler Tank	2.74 kL/day

4.3.3 Irrigation Base Water Demand

External water consumption within each landscaping system varies depending upon the nature of the irrigation system, species of planting, and the prevailing climate. For this development, the base case outdoor potable water demand has been modelled using a simple rainwater balance. The proposed irrigation system will be a drip-fed system with application rates averaging 10 l/m^2 (i.e. 10 mm/m^2). For the purposes of our analysis the average of this application rate has been used, in conjunction with the application regime shown in **Table 4.1**, to determine the monthly and total yearly demand.

Allowance to irrigate landscaped setback areas has been made.

Table 4.1. External Irrigation Application Schedule

Month	No. of Applications
January	12
February	12
March	10
April	9
May	8
June	4
July	4
August	4
September	8
October	9
November	10
December	12

The above regime for the landscaped area for the site gives the following yearly outdoor water demands:

Landscaping Area=500m^2 510 kL/year

4.3.4 Rainwater Tank Sizing

The use of rainwater reduces the mains water demand and the amount of stormwater runoff. By collecting the rainwater run-off from roof areas, rainwater tanks provide a valuable water source suitable for flushing toilets and landscape irrigation.

Rainwater tanks have been designed, using a simple water balance calculation to balance the supply and demand, based on the calculated base water demands and proposed roof catchment areas. Allowances in the calculation have been made for efficiency of collection, absorption/ evaporation losses.

Table 4.2. Rainwater Reuse Requirements

Tank	Roof Catchment to Rainwater Tank (m^2)	Tank Size (kL)	Predicted Non-Potable Demand Reduction (%)
RWT 1	260	20	94.96%
RWT 2	220	20	93.50%
RWT 3	3360	2x30	64.52%

The water balance assessment predicts an average of 68% reduction in non-potable water use will be met for the Stage 1 development with the provision of two 20kL and two 30kLrainwater tanks which equates to a total rainwater harvesting capacity of 100kL.

We note that the final configuration and sizing of the rainwater tanks is subject to detail design considerations and optimum site utilisation.

There may be opportunities to also include non-potable water uses in the operations of the Downer asphalt, reclaimed asphalt pavement and Reconomy operations. This will be reviewed during detailed design phase.

4.3.5 Overall Water Cycle Management

The following **Table 4.3** shows overall water cycle and each water source.

Table 4.3. Overall Water Cycle

Area	**Daily Demand (kL/ Day)**	
	Via Harvesting/ Reuse	**Via Mains**
Internal	0.888	0.212
External	0.903	0.497
Fire	-	2.740
Total	1.736	3.504

4.4 Construction Impact Assessment

Construction works will require minimal water demand to service site sheds, dust suppression and other construction related operations.

Water supply for these activities during the construction period will be made via existing Sydney Water supply with the exception of dust suppression.

Dust suppression during construction works is proposed to be completed using the sediment basins on site. The sediment basins will be fitted with a submersible pump as shown on the detail on drawing **Co13919.01-DA25**. The submersible pump will be located at the top of 'storage zone' on the sediment storage marker and will be able to feed water from the settling zone to the water carts for dust suppression activities. It is expected that the majority of the water in the sediment basin will be utilised for dust suppression between successive rainfall event.

It is considered that impact associated with water use during construction is limited and an existing supply is available through the whole of the construction works period.

4.5 Operational Impact Assessment

Rainwater harvesting is proposed to reduce demand on non-potable applications in accordance with the Council requirements.

In addition to the above Council requirements for irrigation and toilets flushing, it is proposed to supplement the dust suppression activities with the rainwater harvesting system. Any additional harvested water stored within the rainwater tanks will be utilised for dust suppression activities which will reduce the demand on the water mains.

An existing and reliable water supply is available during operations.

Impact on environment from water use is considered to be acceptable.

5 ADDITIONAL MITIGATION MEASURES

This report describes a number of design features that will be incorporated into the Proposal to manage water quality and hydrology impacts. The features are considered suitable to mitigate all construction and operation impacts related to the Proposal. Notwithstanding this, the below measures will be incorporated into the CEMP and OEMP to mitigate any residual impacts.

5.1 Construction

A Soil and Water Management Plan (SWMP) and Erosion and Sediment Control Plan (ESCP), or equivalent, will be incorporated into the CEMP for the construction of the Proposal. The SWMP and ESCPs would be developed in accordance with the principles and requirements of *Managing Urban Stormwater – Soils & Construction Volume 1 ('Blue Book') (Landcom, 2004)* and Volume 2 (DECC 2008) and consider the Preliminary ESCPs (**Appendix C**). The following aspects will be addressed within the SWMP and ESCPs:

- Construction traffic restricted to delineated access tracks, and maintained until construction complete
- Appropriate sediment and erosion controls to be implemented prior to soil disturbance
- Stormwater management to avoid flow over exposed soils which may result in erosion and impacts to water quality •
- Location of stockpiles outside of flow paths on appropriate impermeable surfaces
- Inspection of all permanent and temporary erosion and sedimentation control works prior to and post rainfall events and prior to closure of the construction area

5.2 Operation

Reference should be made to **Appendix B** of this report for the stormwater maintenance to be implemented during the operations of the facility.

The stormwater drainage network and the Water Sensitive Urban Design (WSUD) assets require both proactive and reactive maintenance to ensure long term system health and performance.

Proactive maintenance refers to regular scheduled maintenance tasks, whereas reactive maintenance is required to address unscheduled maintenance issues. If an asset is not functioning as intended, then rectification may be required to restore the asset back to its intended functionality.

The preferred and recommended approach is for proactive maintenance.

An OEMP will be prepared for the Proposal to minimise water and hydrology impacts and will include the following: Emergency response and incident management protocols will cover the following types of emergency or incident:

- On-site spills or leaks
- Off-site discharges
- Flooding

6 INFRASTRUCTURE SERVICES

6.1 Services Introduction

The subject site has been serviced with key municipal services as part of its previous use as Clyde Refinery and Terminal. However, the site will require service extensions to suit the new development layouts.

An overview of the existing and proposed infrastructure requirements for the development is outlined in the following sections. The report considers the supply and management of the following services required for the development of the property:

- Potable Water (Drinking water);
- Wastewater (Sewer);
- Recycled Water;
- Electricity; &
- Communications

Specifically, the report provides an overview of the following information:

- Layout of existing service networks based on a general service plan prepared by Costin Roe Consulting, as shown on drawing **CO13919.01-DA15**;
- Dial Before You Dig (DBYD) information; and
- Indicative utility demands for the current development proposals where available.

An assessment of existing services infrastructure has been undertaken to determine the suitability of existing supply and the need for augmentation and or extensions to suit the super lot proposal and the future development of the Lots.

6.2 Potable Water (Drinking water)

Sydney Water is the servicing authority for potable water in the suburb of Rosehill/Clyde.

The existing potable water Sydney Water assets within the site area include:

- A 1200mm Cast Iron Cement Lined (CICL) main traversing diagonally through the north western corner of the site along a 6.09m wide Sydney Water easement;
- A 375mm CICL main in Colquhoun Street;
- A 200mm DICL line in Durham Street;
- A 150mm DICL line in Unwin Street and Colquhoun Street that connects with the 375mm CICL main in Colquhoun Street; and

Connection to the water main along Colquhoun Street is available to the proposed Lot 51. However, no other connections are currently available to any other Lots.

LandPartners have been engaged as the Sydney Water Servicing Coordinators (SWSC) to coordinate the delivery of potable water services to the site.

LandPartners have approached Sydney Water regarding the proposed development.

LandPartners advise that formal advice from Sydney Water will come in the form of a Notice of Requirements at the issuance of a Development Approval for the subdivision. This will confirm connections requirements to the subject site and the new lots.

Meanwhile, LandPartners advise that potable water supply can be provided to each lot in the subdivision by way of appropriate mains connection along Devon Street. However, LandPartners advise that Sydney Water will likely take the opportunity to link the existing 375mm main in Colquhoun Street with the 200mm main in Durham Street along Devon Street. This would provide a "ring main", providing a higher level of reliability for lots in this area in case of a main break/shutdown. Sydney Water may potentially fund some portion of these works.

Detailed design to the requirements of Sydney Water will be prepared and approved by Sydney Water following the receipt of the Notice of Requirements, post development approval.

6.3 Wastewater (Sewer)

Sydney Water is the servicing authority for sewage disposal in the suburb of Rosehill.

The existing Sydney Water wastewater assets within the site area include:

- A rising sewer main in Durham Street and Devon Street; and
- A gravity main in Colquhoun Street.

LandPartners, as the SWSC, will also coordinate the delivery of wastewater services to the site.

LandPartners confirm that the following wastewater extensions will be required:

- A proposed sewer rising main/pressure main running from Colquhoun Street to service all lots.

Sydney Water will confirm the required extensions following issuance of the SSD Consent by way of the Notice of Requirements.

6.4 Recycled Water

- A recycled water service operated by Water Utilities Australia (Aquanet) is available to the site that traverses along Devon Street and Durham Street;
- Contact has been made with Water Utilities Australia to enquire about capacity and water quality; and
- Water Utilities Australia have advised that supply could be made available and have indicated that the water is suitable for industrial uses, irrigation, wash down, cooling towers and boilers and use in Recycling Plant processes.

Discussions are continuing with Water Utilities Australia on their ability to service and supply the new Downer facility and to extend their current supply along the new public road to all lots in the subdivision and to therefore make recycled water available to all future users.

6.5 Electricity

Endeavour Energy is the Electrical Authority in the site area. Endeavour Energy will issue approvals for the required electrical extensions for the lots.

Existing electricity infrastructure is currently available to all proposed subdivisions lots allowing the required extensions of infrastructure.

The site is in a highly advantageous location for electrical supply given its proximity to Camellia Zone Substation and the Rosehill Zone Substation. This reflects the supply requirements of the site's previous use as an oil refinery. Thus, there is ample capacity in the zone substation for the new lots and their future development.

JDG Consulting (JDG) have been engaged to review electrical supply and any required extensions.

JDG have contacted Endeavour Energy, and an Offer of Supply has been provided by Endeavour (attached in Appendix B).

The Offer of Supply confirms there is an existing HV line running near the site (on Devon Street) supplied from Rosehill Zone Substation. Based on lot sizes provided along with application, HV reticulation can be supplied to all fourteen of the Lots. The developer is required to engage the service of ASP Level 3 to investigate and to propose a method of supply for this site, following the lodging of the Development Application.

We are also advised that there is an Ausgrid underground protection and control cables located within the site (generally running along the boundary of proposed Lot 6). Those cables are part of Ausgrid's 132kV protection systems for Electrical Transmission Feeder Numbers 926 and 927.

Recent advice from Ausgrid is that these cables are no longer required and will be removed from the proposed Lot 6.

6.6 Communications

NBN Co is the relevant Communications Authority, as confirmed by JDG.

JDG Consulting has been engaged to prepare the design for communications extensions to each Lot.

Existing NBN services are available in Devon Street and can be readily extended to each Lot as part of the development works. The need for minor extensions will be confirmed with NBN Co following issuance of the Development Approval.

6.7 Groundwater

Reference to the MET Service All Groundwater Map (2020) indicates more than 20 registered groundwater wells in the area of the site, though no groundwater data was available. In accordance with available reviewed information, groundwater level might be encountered in fill at depths varying between 0.5m and 3.0m below ground level. Groundwater levels are expected to respond to rainfall and tidal influences of the adjacent Duck River.

There will be no extraction or injection of Groundwater as part of the proposed civil works and therefore there will not be any water licensing requirements under the *Water Act 1912* or *Water Management Act 2000*. If any water extraction is required as part of the construction works due to shallow groundwater, these will be required to be approved in accordance with the licensing requirements of the DPIE Water / NRAR.

7 SITE WORKS

7.1 Bulk Earthworks

The proposed works require benching of fourteen (14) proposed lots in two stages (No works are proposed on Lot 64 that is to be maintained as is).

Earthworks pads will prepare the land for future industrial use by future applications.

Bulk earthworks will include the benching of the sites, with the construction of two flat pads at RL 4.5m AHD in the northern half of the site. The proposed earthworks will then gradually grade down to 4.0m AHD towards Duck River in the southern half of the site.

Bulk earthworks for (Lot 6) will include grading of the site, and the construction of tiered pads to suit the proposed Downer facility.

Soil Erosion and Sediment Control measures will also be provided for the development as referenced on drawing **CO13919.01-DA21, DA22 & DA25**.

7.2 Embankment Stability & Retaining Walls

To assist in maintaining embankment stability, permanent batters slopes will be no steeper than 3 horizontal to 1 vertical, while temporary batters will be no steeper than 2 horizontal to 1 vertical.

Retaining walls will be required on the development site for Lot 6 to suit the masterplan layout and level differences on the property.

The construction type for the walls will need to be masonry or other suitable durable retaining wall system. It is expected that walls in fill and in cut will be formed using concrete masonry block cantilever construction.

The final wall solution will depend on available structural zones, and a balance between construction cost and developable area availability.

7.3 Access

Access to Lot 6 will be made from existing Devon Street.

Access to Lots 51 to 56 and 58 to 64 will be via a new private entry driveway subject to future applications. Lots 51, 52, 54 and 55 will have future access to Devon Street or via the new public road, again with access locations agreed in future applications

The new access road will encompass a connection to Devon Street and comprise an industrial road with asphaltic surface and kerb and guttering to the standards of Parramatta City Council and is proposed to be dedicated to Council as a Public Road.

The proposed subdivision also includes provision via a ‘right of access’ easement for the new access road to connect to Carnarvan Street with a future bridge crossing over Duck River. The bridge crossing over Duck River and connection to Carnarvan Street does not form part of this application and will be subject to subsequent approval.

8 CONCLUSION

This impact assessment has been prepared to support the Proposal for the subdivision and servicing of Part Lot 100 DP 1168951, on the western portion of the former Clyde Refinery located at 9 Devon Street, Clyde, NSW and for a development on newly created Lot 6 (Stage 1) to be occupied and operated by Downer. The development will include RAP processing operations, an asphalt plant, a Reconomy facility and a modern bitumen product manufacturing plant.

An assessment of the impacts relation to soil and water has been prepared which provides a best practice solution within the constraints of the existing landform and proposed development layout. Within this strategy a stormwater quantity and quality management strategy has been developed to reduce both peak flows and pollutant loads in stormwater leaving this site. The stormwater management for the development has been designed in accordance with *City of Parramatta Development Engineering Design Guidelines June 2018.*

The hydrological assessment of the local site drainage confirms that recommended water quality and quantity measures will ensure that no adverse impacts result on receiving waterways as a result of the development.

During the operational phase of the development, the proposed stormwater quality treatment system incorporating the use of a treatment train of GPTs and bio-retention filtration is proposed to mitigate any increase in stormwater pollutant load generated by the development on Lot 6. Stormwater quality modelling was undertaken which demonstrated that implementation of the WSUD measures would result in improved water quality outcomes consistent with the Council Requirements and that stormwater runoff is not detrimental to the receiving environment. WSUD measures on future development lots will be subject to separate applications.

During the construction phase, a Sediment and Erosion Control Plan will be in place to ensure the downstream drainage system and receiving waters are protected from sediment laden runoff.

The detail contained in this report provides sufficient information to show the consent authority that legal points of discharge and a suitable stormwater management strategy is available for the development and the requirements associated with the strategy. It is recommended the management strategies in this report be approved and incorporated into the future detailed design.

9 REFERENCES

- Managing Urban Stormwater: Source Control – 1998 (NSW EPA);
- Managing Urban Stormwater: Treatment Techniques – 1997 (NSW EPA);
- Managing Urban Stormwater: Soils & Construction – 2004(LANDCOM);
- Water Sensitive Urban Design – "Technical Guidelines for Western Sydney" by URS Australia Pty Ltd, May 2004
- Parramatta Development Control Plan – 2011 (City of Parramatta Council)
- City of Parramatta *Development Engineering Guidelines* (June 2018)
- Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book, Landcom

Appendix A

DRAWINGS BY COSTIN ROE CONSULTING

Refer to Appendix B3 of response to submissions report.

Appendix B

DRAFT

STORMWATER MAINTENANCE AND MONITORIING RECOMMENDATIONS

1 MAINTENANCE AND MONITORING

It is important that each component of the water quality treatment train is properly operated and maintained. In order to achieve the design treatment objectives, an indicative maintenance schedule has been prepared (refer to **Table B.1** below).

Note that inspection frequency may vary depending on site specific attributes and rainfall patterns in the area. In addition to the maintenance requirements below it is also recommended that inspections are made following heavy rainfall or major storm events. Event heavy rain inspections should be carried out as soon as practicable following an intense period of rainfall, (i.e. greater than 100mm over 48 hours), as measured at Parramatta North Weather Station No. 66124.

1.1 Types of Maintenance

Water Sensitive Urban Design (WSUD) assets require both proactive and reactive maintenance to ensure long term system health and performance.

Proactive maintenance refers to regular scheduled maintenance tasks, whereas reactive maintenance is required to address unscheduled maintenance issues. If an asset is not functioning as intended, then rectification may be required to restore the asset back to its intended functionality.

The preferred and recommended approach is for proactive maintenance.

1.1.1 Proactive Maintenance

Proactive maintenance is a set of scheduled tasks to ensure that the WSUD asset is operating as designed.

Proactive maintenance involves:

- Regular inspections of the WSUD asset;
- Scheduled maintenance tasks for issues that are known to require regular attention (e.g. litter removal, weed control); and
- Responsive maintenance tasks following inspections for issues which require irregular attention (e.g. sediment removal, mulching, and scour management).

Proactive maintenance in the first two years after the establishment period (construction and planting phases) are the most intensive and important to the long-term success of the treatment asset.

Proactive maintenance is a cost-effective means of reducing the long-term costs associated with operating stormwater treatment assets.

Maintenance activities specific to each WSUD asset type are detailed in the inspection and maintenance schedules and checklists provided in the report. The frequency of scheduled maintenance depends on the asset type and the issue being managed.

As a general guide, scheduled maintenance should be completed on a three to four-month cycle. The checklists provided should be used as a minimum guide to scheduled

maintenance tasks and should be amended to suit site conditions and maintenance requirements.

Treatment assets should also be inspected at least once a year during or immediately after a significant rainfall event. This is important to confirm that the treatment system is functioning correctly under wet conditions.

A higher level of scheduled maintenance may be arranged for some treatment assets. This is often the case for treatment assets which are located in high profile locations (e.g. streetscapes and parklands), and where public amenity is considered to be a high priority. In these cases, a more frequent maintenance regime may be required to remove litter and weeds and to ensure vegetation health and cover is maintained to a high level.

1.1.2 Reactive Maintenance

Reactive maintenance is undertaken when a problem or fault is identified that is beyond the scope of proactive maintenance. Reactive maintenance may occur following a complaint about the WSUD asset (e.g. excessive odours or litter). Reactive maintenance often requires a swift response and may involve specialist equipment or skills.

1.1.3 Rectification

Rectification of a WSUD asset is undertaken when the system is not functioning as intended, and proactive and reactive maintenance activities are unable to return the asset to functional condition.

The lack of functional performance and therefore failure of a stormwater treatment asset may be related to many factors including inappropriate design, poor construction, and lack of regular maintenance or end of life cycle. In many cases, the design of assets has not included adequate consideration of the maintenance requirements, in terms of the system's ability to cope with catchment pollutant loads (i.e. sediments) and the frequency of maintenance required to maintain the system at a functional level.

Maintenance planning at the design phase is therefore crucial to both the long-term operating costs and the expected life cycle of the treatment system. In general, the expected lifecycle of a stormwater treatment asset (e.g. a bio-retention system) that has been well designed and constructed and is regularly maintained should be at least 15-20 years.

However, the lifecycle for each treatment system will be different and related to:

- whether the system has been designed, constructed and maintained according to best practice;
- catchment characteristics (influences the quality of the stormwater);
- the age and general health of the system; and
- the type of plants that have been used in the system.

Regular asset condition assessments should be undertaken to monitor the system condition and to inform where an asset is in terms of its expected lifecycle. Renewal of a system refers to replacing the main elements of the system including:

- infrastructure;
- removing deposited sediment, removing and replacing the topsoil (or filter media in the case of a bio-retention system) and profiling the topsoil level back to the design levels;
- re-planting; and
- pavement and sub-layers (in the case of permeable pavements).

A WSUD specialist may be required to assess whether a treatment system has reached the end of its life cycle and to provide advice on the renewal works.

Asset condition assessments can also identify assets that need to be rectified. The decision to continue with an increased maintenance regime or to rectify an asset, and over what timeframe, can be a difficult one to make. This is because certain maintenance items are more important to overall system function than others. For example, extended ponding on the surface of a bio-retention system or persistent scouring of a swale should be addressed more rapidly than recurrent weed problems.

1.2 Routine Inspections and Maintenance Schedule for General Stormwater System

Routine inspections are to be carried out to assess the need for maintenance and are primarily concerned with checking the functionality of the stormwater drainage facilities; items such as drains, drainage pits, box culverts, detention tanks and rainwater reuse tank systems. Maintenance of these items is vitally important for the ongoing drainage and treatment of stormwater.

Should the inspection reveal that maintenance of any item is required, this is to be reported to the building management for action.

Items that are to be subject to Routine Inspections for Maintenance may comprise, but not be limited to those listed in the table below. This table is to be read in conjunction with the Stormwater design drawings.

It is vitally important that each component of the stormwater system is properly operated and maintained. In order to achieve the modelled and design treatment outcomes, a maintenance schedule has been prepared (below) to assist in the effective operation and maintenance of the various drainage and water quality components.

Table B.1. Indicative Maintenance Schedule

MAINTENANCE ACTION	FREQUENCY RANGE	RESPONSIBILITY	PROCEDURE
SWALES/ LANDSCAPED AREAS			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Between six months and one year	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Inspect swale for excessive litter and sediment build up	Between six months and one year	Maintenance Contractor	Remove sediment and litter and dispose in accordance with local authorities' requirements.
Check for any evidence of channelisation and erosion	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed swale profile is maintained
Weed Infestation	Three to six Monthly	Maintenance Contractor	Remove any weed infestation ensuring all root ball of weed is removed. Replace with vegetation where required.
Inspect swale surface for erosion	Between six months and one year	Maintenance Contractor	Replace top soil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate.
RAINWATER TANK			
Check for any clogging and blockage of the first flush device	3 Monthly/ After Major Storm	Maintenance Contractor	First flush device to be cleaned out
Check for any clogging and blockage of the tank inlet - leaf/litter screen	Between six months and one year	Maintenance Contractor	Leaves and debris to be removed from the inlet leaf/litter screen
Check the level of sediment within the tank	Every two years	Maintenance Contractor	Sediment and debris to be removed from rainwater tank floor if sediment level is greater than the maximum allowable

MAINTENANCE ACTION	FREQUENCY RANGE	RESPONSIBILITY	PROCEDURE
			depth as specified by the hydraulic consultant
INLET & JUNCTION PITS			
Inside Pit	Six Monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of Pit	Four Monthly/ After Major Storm	Maintenance Contractor	Clean grate of collected sediment, debris, litter and vegetation.
STORMWATER SYSTEM			
General Inspection of complete stormwater drainage system	Bi-annually	Maintenance Contractor	Inspect all drainage structures noting any dilapidation in structures and carry out required repairs.
BIO-RETENTION BASIN			
Check all items nominated for SWALES/ LANDSCAPED AREAS above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above	Refer to SWALES/ LANDSCAPED AREAS section above.
Check for sediment accumulation at inflow points	Six monthly/ After Major Storm	Maintenance Contractor	Remove sediment and dispose in accordance with local authorities' requirements.
Check for erosion at inlet or other key structures.	Six monthly/ After Major Storm	Maintenance Contractor	Reinstate eroded areas so that original, designed profile is maintained
Check for evidence of dumping (litter, building waste or other).	Six monthly	Maintenance Contractor	Remove waste and litter and dispose in accordance with local authorities' requirements.
Check condition of vegetation is satisfactory (density, weeds, watering, replating, mowing/ slashing etc)	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications

MAINTENANCE ACTION	FREQUENCY RANGE	RESPONSIBILITY	PROCEDURE
Check for evidence of prolonged ponding, surface clogging or clogging of drainage structures	Six monthly/ After Major Storm 5-10 years	Maintenance Contractor	Remove sediment and dispose in accordance with local authorities' requirements. Replace filter media & planting – refer to appropriately qualified engineer or stormwater specialist
Check stormwater pipes and pits	Six monthly/ After Major Storm	Maintenance Contractor	Refer to INLET/ JUNCTION PIT section.
WATER QUALITY DEVICE (GPT)			
Refer to manufacturer operation and maintenance manual.	Refer to manufacturer operation and maintenance manual.	Maintenance Contractor	Refer to manufacturer operation and maintenance manual.

Appendix C

DRAFT

SOIL AND WATER MANAGEMENT PLAN DURING CONSTRUCTION

1 EROSION & SEDIMENT CONTROLS

An erosion and sediment control plan (ESCP) is shown on drawings **Co13919.01-DA21 & DA22** with details on **DA25**. These are conceptual plans only providing sufficient detail to clearly show that the works can proceed without undue pollution to receiving waters. A detailed plan will be prepared once consent is given and before works start.

1.1 General Conditions

1. The ESCP will be read in conjunction with the engineering plans, and any other plans or written instructions that may be issued in relation to development at the subject site.
2. Contractors will ensure that all soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in Managing Urban Stormwater, Soils and Construction (1998) and City of Parramatta specifications.
3. All subcontractors will be informed of their responsibilities in minimising the potential for soil erosion and pollution to down slope areas.

1.2 Land Disturbance

1. Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in **Table C.1**.

Land Use	Limitation	Comments
Construction areas	Limited to 5 (preferably 2) metres from the edge of any essential construction activity as shown on the engineering plans.	All site workers will clearly recognise these areas that, where appropriate, are identified with barrier fencing (upslope) and sediment fencing (downslope), or similar materials.
Access areas	Limited to a maximum width of 5 metres	The site manager will determine and mark the location of these zones onsite. They can vary in position so as to best conserve existing vegetation and protect downstream areas while being considerate of the needs of efficient works activities. All site workers will clearly recognise these boundaries.
Remaining lands	Entry prohibited except for essential management works	

Table C.1 Limitations to access

1.3 Erosion Control Conditions

1. Clearly visible barrier fencing shall be installed as shown on the plan and elsewhere at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only those essential for construction work and they shall enter the site only through the stabilised access points.
2. Soil materials will be replaced in the same order they are removed from the ground. It is particularly important that all subsoils are buried and topsoils remain on the surface at the completion of works.
3. Where practicable, schedule the construction program so that the time from starting land disturbance to stabilisation has a duration of less than six months.
4. Notwithstanding this, schedule works so that the duration from the conclusion of land shaping to completion of final stabilisation is less than 20 working days.
5. Land recently established with grass species will be watered regularly until an effective cover has properly established and plants are growing vigorously. Further application of seed might be necessary later in areas of inadequate vegetation establishment.
6. Where practical, foot and vehicular traffic will be kept away from all recently established areas
7. Earth batters during temporary works shall be constructed in accordance with the Geotechnical Engineers Report or as general requirement, a gradient as practical but not steeper than:
    - 2H:1V where slope length is less than 7 meters
    - 2.5H:1V where slope length is between 7 and 10 meters
    - 3H:1V where slope length is between 10 and 12 meters
    - 4H:1V where slope length is between 12 and 18 meters
    - 5H:1V where slope length is between 18 and 27 meters
    - 6H:1V where slope length is greater than 27 meters
8. All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event.
9. During windy weather, large, unprotected areas will be kept moist (not wet) by sprinkling with water to keep dust under control. In the event water is not available in sufficient quantities, soil binders and/or dust retardants will be used or the surface will be left in a cloddy state that resists removal by wind.

1.4 Pollution Control Conditions

1. Stockpiles will not be located within 5 meters of hazard areas, including likely areas of high velocity flows such as waterways, paved areas and driveways. Silt/ sediment fences and appropriate stabilisation of stockpiles are to be provided as detailed on the drawings.

2. Sediment fences will:
    a) Be installed where shown on the drawings, and elsewhere at the discretion of the site superintendent to contain the coarser sediment fraction (including aggregated fines) as near as possible to their source.
    b) Have a catchment area not exceeding 720 square meters, a storage depth (including both settling and settled zones) of at least 0.6 meters, and internal dimensions that provide maximum surface area for settling, and
    c) Provide a return of 1 meter upslope at intervals along the fence where catchment area exceeds 720 square meters, to limit discharge reaching each section to 10 litres/second in a maximum 20 year t_c discharge.
3. Sediment removed from any trapping device will be disposed in locations where further erosion and consequent pollution to down slope lands and waterways will not occur.
4. Water will be prevented from directly entering the permanent drainage system unless it is relatively sediment free (i.e. the catchment area has been permanently landscaped and/or likely sediment has been treated in an approved device). Nevertheless, stormwater inlets will be protected.
5. Temporary soil and water management structures will be removed only after the lands they are protecting are stabilised.

1.5 Waste Management Conditions

Acceptable bind will be provided for any concrete and mortar slurries, paints, acid washings, lightweight waste materials and litter. Clearance service will be provided at least weekly.

1.6 Site Inspection and Maintenance

1. A self-auditing program will be established based on a Check Sheet. A site inspection using the Check Sheet will be made by the site manager:
    - At least weekly.
    - Immediately before site closure.
    - Immediately following rainfall events in excess of 5mm in any 24 hour period.

The self audit will include:

- Recording the condition of every sediment control device
- Recording maintenance requirements (if any) for each sediment control device
- Recording the volumes of sediment removed from sediment retention systems, where applicable
- Recording the site where sediment is disposed

- Forwarding a signed duplicate of the completed Check Sheet to the project manager/developer for their information

2. In addition, a suitably qualified person will be required to oversee the installation and maintenance of all soil and water management works on the site. The person shall complete a short monthly written report with records kept on site as part of the contractor Quality Assurance Documentation. The responsible person will ensure that:

   - The plan is being implemented correctly
   - Repairs are undertaken as required
   - Essential modifications are made to the plan if and when necessary

   The report shall carry a certificate that works have been carried out in accordance with the plan.

3. Waste bins will be emptied as necessary. Disposal of waste will be in a manner approved by the Site Superintendent.
4. Proper drainage will be maintained. To this end drains (including inlet and outlet works) will be checked to ensure that they are operating as intended, especially that,

   - No low points exist that can overtop in a large storm event
   - Areas of erosion are repaired (e.g. lined with a suitable material) and/or velocity of flow is reduced appropriately through construction of small check dams of installing additional diversion upslope.
   - Blockages are cleared (these might occur because of sediment pollution, sand/soil/spoil being deposited in or too close to them, breached by vehicle wheels, etc.).

5. Sand/soil/spoil materials placed closer than 2 meters from hazard areas will be removed. Such hazard areas include and areas of high velocity water flows (e.g. waterways and gutters), paved areas and driveways.
6. Recently stabilised lands will be checked to ensure that erosion hazard has been effectively reduced. Any repairs will be initiated as appropriate.
7. Excessive vegetation growth will be controlled through mowing or slashing.
8. All sediment detention systems will be kept in good, working condition. In particular, attention will be given to:

   a) Recent works to ensure they have not resulted in diversion of sediment laden water away from them

   b) Degradable products to ensure they are replaced as required, and

   c) Sediment removal, to ensure the design capacity or less remains in the settling zone.

9. Any pollutants removed from sediment basins or litter traps will be disposed of in areas where further pollution to down slope lands and waterways should not occur.

10. Additional erosion and/or sediment control works will be constructed as necessary to ensure the desired protection is given to down slope lands and waterways, i.e. make ongoing changes to the plan where it proves inadequate in practice or is subjected to changes in conditions at the work site or elsewhere in the catchment.
11. Erosion and sediment control measures will be maintained in a functioning condition until all earthwork activities are completed and the site stabilised
12. Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.

Appendix D

ENDEAVOR ENERGY OFFER OF SUPPLY



APPENDIX D

AIR QUALITY TECHNICAL RESPONSE

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19 November 2020

Neville Hattingh
Director
Element Environment
Via email: neville@elementenvironment.com.au

RE: Response to Submissions – Central Sydney Industrial Estate Incorporating Downer Sustainable Road Resource Centre

Dear Neville,
The following outlines additional information and clarification to address the Department of Planning, Industry & Environment (DPIE), New South Wales (NSW) Environment Protection Authority (EPA) and Endeavour Energy requests for further information relating to the *Air Quality Impact and Greenhouse Gas Assessment Central Sydney Industrial Estate Incorporating Downer Sustainable Road Resource Centre* (AQIA) (**Todoroski Air Sciences, 2020**).

Each of the key comments is shown in grey italics, and is followed by our response to the comment.

DPIE

9. What is the current extent of existing annual PM10/2.5 exceedances in the locality?

A review of the existing annual average PM_{10} and $PM_{2.5}$ levels are presented in Section 6.3.1 and 6.3.2 of the AQIA. Ambient PM_{10} and $PM_{2.5}$ monitoring data recorded at the Parramatta North and Chullora air quality monitoring stations from 2015 to 2019 are reviewed in the AQIA.

The available data indicates the annual average PM_{10} levels were typically below the criterion of 25µg/m^3 with an average level of approximately 19.8µg/m^3 for 2015 to 2018. During 2019, the Parramatta North monitor recorded a level of 25.5µg/m^3 and the Chullora monitor recorded a level of 24.6µg/m^3. Persistent drought conditions and widespread bushfire events occurring later in the year is the likely cause behind the elevated level.

Annual average $PM_{2.5}$ levels are recorded at the criterion of 8µg/m^3 for all years except for the Chullora monitor in 2017 and at both the Parramatta North and Chullora monitors in 2018 and 2019. The elevated $PM_{2.5}$ levels are found to be attributed to an increase in hazard reduction burns during the cooler months in these years compared to the previous years and also the widespread bushfire events which occurred in late 2019.

10. Did the air quality assessment give consideration to workers being onsite throughout the day at Receiver C1? It reads differently to the way the assessment considered the industrial receivers and that it applied impacts to visitors to the site and not workers. The EIS states there are no additional exceedance days due to the development but there is no evidence in the EIS to support this statement – for example Table 10.9 and 10.10 show increases at receiver C1 from compliant to an exceedance. Are there existing backgrounds levels available for the information in these two tables?

The assessment locations in the AQIA include residential, future residential, a public school, industrial, churches and community receptors. The industrial receptors and churches and community receptors are considered separately to the residential, future residential and public school receptors on the basis the workers and visitors at these location would not reside for more than 24-hours or for an annual period and hence the NSW EPA impact assessment criteria are not considered applicable. We also note that sensitive individuals such as the sick, frail, elderly or young who are most susceptible to harm would potentially be at residential, future residential and public school receptors for extended periods of time. However, these sensitive individuals are unlikely to be at industrial receptors, churches and community receptors for extended periods.

The AQIA and EIS present the modelling predictions at the industrial receptors and churches and community receptors however it has inadvertently not been set out clearly in the AQIA and EIS that the churches and community receptors (i.e. C1) are also not subject to the NSW EPA impact assessment criteria.

The background levels applied in Table 10.9 and 10.10 of the EIS (Table 8-1 and Table 8-2 of the AQIA) are summarised in Table 6-4 of the AQIA. The background levels are 7µg/m^3 for annual average $PM_{2.5}$ and 21.6µg/m^3 for annual average PM_{10}. We note that the modelling predictions for C1 Table 10.9 and 10.10 of the EIS (Table 8-1 and Table 8-2 of the AQIA) indicate marginally elevated annual average $PM_{2.5}$ levels for Scenario 1 (0.5µg/m^3 above the NSW EPA impact assessment criteria), Scenario 2 (0.6µg/m^3 above the NSW EPA impact assessment criteria) and elevated annual average PM_{10} levels for Scenario 2 (0.6µg/m^3 above the NSW EPA impact assessment criteria). As mentioned people are not expected to be present at this community receptor for an annual period of time and hence the NSW EPA impact assessment criteria does not apply.

It is also worth noting that Scenario 2 includes Stage 1 operating in conjunction with the subdivision earthworks occurring adjacent to Stage 1 and that the subdivision earthworks would only occur over a 9-month period. For the modelling assessment, the subdivision earthworks are assumed to occur over the entire modelling period (i.e. 12-months) and therefore is a conservative prediction of the annual dust level.

11. Are the exceedances in Table 10.9 and 10.10 pre or post mitigation measure as listed in Table 10.13?

The modelling predictions in Table 10.9 and 10.10 of the EIS includes the potential dust mitigation achieved through the design features and specific control factors outlined in Appendix C of the AQIA which include a control for the enclosure of the RAP processing activities and a control for water application on the RAP stockpiles.

The dust and odour management measures in Table 10.13 of the EIS (Table 9-1 of the AQIA) include a range of operational measures which would be applied to the actual operation of the site. The measures where a quantifiable control factor is available has been accounted for in the modelling. However, for the other measures, these are dependent on a range of variables and conditions at the time of the actual operation and the level of control achieved cannot be quantified and as such the modelling results in Table 10.9 and 10.10 of the EIS are likely to be conservative.

13. If EPA criteria doesn't apply to industrial sites why are the results being reported as non-compliances in the EIS?

The EIS and the AQIA have reported the modelling predictions for the industrial sites to provide an indication of the air quality levels at these locations. The predicted levels are compared to the NSW EPA impact assessment criteria to gauge the predicted level at these locations, however are not to be considered as non-compliances. As noted in the AQIA, the NSW EPA impact assessment criteria do not apply at these locations.

Additional request – Presentation of cumulative modelling predictions at receiver locations

Table 1 and **Table 2** present the predicted cumulative particulate dispersion modelling results at selected receiver locations for Scenario 1 and Scenario 2 respectively. The modelling results are identical to the results presented in Table 8-1 and Table 8-2 of the AQIA with the inclusion of cumulative 24-hour average $PM_{2.5}$ and PM_{10} results. For the assessment of cumulative 24-hour average $PM_{2.5}$ and PM_{10} concentrations, a Level 2 contemporaneous assessment was undertaken (refer to Section 8.2 of the AQIA) and the results presented correspond to the highest measured background level below the criteria with the corresponding predicted incremental level.

The cumulative particulate dispersion modelling results indicate the predicted levels would be below the relevant criteria for each of the assessed dust metrics at all receivers except for C1. The predicted levels for C1 are 1µg/m³ and 0.5µg/m³ above the criteria for 24-hour average and annual average $PM_{2.5}$ in Scenario 1, 1.1µg/m³ and 0.6µg/m³ above the criteria for 24-hour average and annual average $PM_{2.5}$ in Scenario 2 and 0.6µg/m³ above the criteria for annual average PM_{10} in Scenario 2.

Table 1: Cumulative dust modelling results for assessment locations – Scenario 1

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD* (g/m²/mth)
		Cumulative				
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria					
	25	8	50	25	90	4
R1A	23.5	7	44.1	21.7	77.9	3.5
R1B	23.5	7.1	44.0	21.7	77.9	3.5
R2A	23.8	7.3	44.0	22.2	78.8	3.5
R2B	23.7	7.2	43.9	22	78.4	3.5
R3A	23.6	7.1	43.7	21.8	78	3.5
R3B	23.5	7.1	43.7	21.7	77.9	3.5
FR01	23.5	7	43.9	21.7	77.9	3.5
Sch1	23.5	7	43.7	21.7	77.8	3.5
AR1	23.6	7.2	43.8	22.1	78.7	3.5
C1	**26.0**	**8.5**	46.0	25	84.7	3.6
Wor1	24.1	7.4	44.0	22.5	79.2	3.5
Wor2	23.9	7.2	44.0	22	78.5	3.5

*Deposited dust

Table 2: Cumulative dust modelling results for assessment locations – Scenario 2

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD* (g/m²/mth)
		Cumulative				
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria					
	25	8	50	25	90	4
R1A	23.5	7.1	44.1	21.7	77.9	3.5
R1B	23.5	7.1	44.0	21.7	77.9	3.5

Receptor ID	$PM_{2.5}$ (µg/m³)		PM_{10} (µg/m³)		TSP (µg/m³)	DD* (g/m²/mth)
		Cumulative				
	24-hr ave.	Ann. ave.	24-hr ave.	Ann. ave.	Ann. ave.	Ann. ave.
	Air quality impact criteria					
	25	8	50	25	90	4
R2A	23.9	7.3	44.0	22.4	79.1	3.6
R2B	23.7	7.2	43.9	22.1	78.6	3.5
R3A	23.7	7.1	43.7	21.9	78.2	3.5
R3B	23.6	7.1	43.7	21.9	78.2	3.5
FR01	23.5	7.1	44.3	21.8	78	3.5
Sch1	23.5	7.1	43.7	21.8	78	3.5
AR1	23.7	7.5	44.6	23.1	80.2	3.7
C1	**26.1**	**8.6**	46.0	**25.6**	85.7	3.9
Wor1	24.1	7.5	44.0	22.7	79.6	3.6
Wor2	23.9	7.2	44.0	22.1	78.6	3.5

*Deposited dust

NSW EPA

Management and control of fugitive gaseous emissions

Principal air toxics

Bitumen and asphalt production processes result in the emissions of principal air toxics (such as benzene). Emissions of principal air toxics could occur from:

- *Asphalt plant dryer discharge;*
- *Asphalt loading to trucks;*
- *Bitumen storage, handling or transfer tanks. Particular when tanks are required to be heated to enable handling of bitumen;*
- *Emulsion production, where bitumen is handled, stored or transferred.*

As per Section 6.2.1 of the Approved Methods for Modelling and Assessment of Air Pollutants in NSW, principal toxic air pollutants must be minimised to the maximum extent achievable through the application of best-practice process design and/or emission control. The AQIA does not benchmark the proposal against best practice, hence it has not been demonstrated that principal air toxics have been minimised to the maximum extent achievable.

The Project proposes to replace the old existing asphalt facility and equipment located at 1A Unwin Street, Rosehill with a new modern asphalt facility equipped with improved emissions controls and which is also located further away from sensitive residential receptors. This is considered a best practice approach and would minimise air emissions and reduce impacts in the surrounding environment.

The proposed RAH100 asphalt plant that will be erected at the site is designed and manufactured by Ammann Group in Switzerland. Ammann specialise in the design and manufacture of state-of-the-art asphalt plants that meet strict European noise, dust and odour standards and are also energy efficient. As outlined in the EIS, Downer considered the installation of a 41 metre (m) full vertical design asphalt plan vs a 26-32m split design. Downer selected the 41m Ammann RAH100 asphalt plant as it:

- is more energy efficient;
- produces significantly lower CO_2 emissions;

- costs less to build, run and maintain;
- has greater production and storage capacity;
- can incorporate up to 90% RAP;
- has improved stack emissions dispersion resulting in improved air quality.

In addition to the above, the proposed asphalt plant demonstrates a best practice approach to minimise the extent of air pollutants associated with asphalt production as the design and emission controls associated with the asphalt plant include:

- A 40m high dryer stack to disperse air emissions generated from the asphalt mixing and drying. The air emissions are passed through a dust filter prior to discharge in the stack.
- A partially enclosed asphalt loadout area equipped with a bitumen vapour evacuation system to capture any fugitive emissions associated with the loadout process (refer to odour response below for further discussion on the proposed asphalt plant bitumen vapour evacuation system).
- An encapsulated skip for reducing air emissions during the mixing prior to the loadout phase.
- Bitumen is stored in individual storage silos and pumped to the asphalt plant in a closed system when required. Feedstock bitumen is supplied to the storage silos at approximately 150-160 degrees Celsius (°C) and transferred from tankers via a suction process. Excess air within the storage silos are vented from a breather pipe at the top and passed through a carbon filter prior to discharge to air.
- Bitumen emulsion is the combination of bitumen, water and other additives which are pumped to emulsion tanks and stored at a lower temperature compared to the bitumen, at approximately 80°C. The emulsion tanks are sealed with a breather pipe at the top of the tank with minimal discharge (water vapour) to air.

It is noted that the modelling predictions for the air pollutants associated with the asphalt plant are well below the respective NSW EPA impact assessment criteria and thus demonstrates that the air emissions generated and the range of air emissions controls incorporated into the asphalt plant are effective.

Odour

The AQIA predicts a maximum ground level odour concentration of 6 Odour units (OU) which is above the 2 OU impact assessment criteria applied in urban areas.

Fugitive odour emissions from loading asphalt to the trucks is the highest fugitive odour emissions accounted for in the assessment. The asphalt loading accounts for approximately 88 % of modelled ground level fugitive odour emissions. Ground level fugitive emissions have potential to impact offsite at a greater degree than point source discharges. As such the predicted offsite ground level concentrations for odour are likely to be heavily influenced by the asphalt loading emissions.

Other asphalt plants in NSW have incorporated enclosed truck loading areas with fugitive emission capture. As such there are measures available to mitigate the impacts caused by fugitive odour from asphalt plants. Fugitive odour capture would also assist in minimising potential ground level fugitive emissions of principal air toxics.

The EPA requires the Applicant to benchmark the proposed design against best practice and revise the AQIA incorporating all feasible and reasonable best practice mitigation measures to:

- *Demonstrate principal air toxic emissions are minimised to the maximum extent achievable; and*
- *Demonstrate compliance with the odour impact assessment criteria.*

Section 5.2.2 of the AQIA defines an applicable odour criterion of 2OU for the residential areas as they are representative of an urban area. For the other assessment locations as they are within an existing industrial precinct an odour criterion of 6OU is applied.

The location of the odour impact is important in defining the context in which it occurs. Generally, there is a higher expectation of odour amenity in the residential areas and that industrial areas are not considered to be odour sensitive locations and the odour amenity expectations in these areas are much lower than that for residences; odour from industry in these areas is not considered to be out of place.

The expectations for what may be reasonable interference with the comfort and repose of a person working in an industrial area is obviously going to be less, relative to a person taking respite in their own home. This difference needs to be considered when determining the offensiveness beyond the boundary of a premises. The nature of the odour beyond the boundary of the premises under normal operation cannot be considered offensive odour that could unreasonably interfere with the comfort or repose of any reasonable person in the neighbouring industrial areas.

The predicted odour levels for the Project show compliance with the applicable odour criteria for the location.

Proposed asphalt plant bitumen vapour evacuation system

Downer is proposing to build a state of the art Ammann RAH100 asphalt plant that incorporates a fully cladded loadout area for asphalt truck loading (see **Figure 1** to **Figure 4**). Downer has worked closely with the plant manufacturer Ammann to incorporate this European technology over a number of years to assist and define industry best practice.

The Ammann RAH100 asphalt truck loading features incorporate:

- A fully cladded loadout area for asphalt truck loading;
- Extended roof cover design on truck entrance and exit; and,
- Bitumen vapour evacuation system.



Figure 1: Photo of fully clad loadout area at one of Downer's other asphalt plants

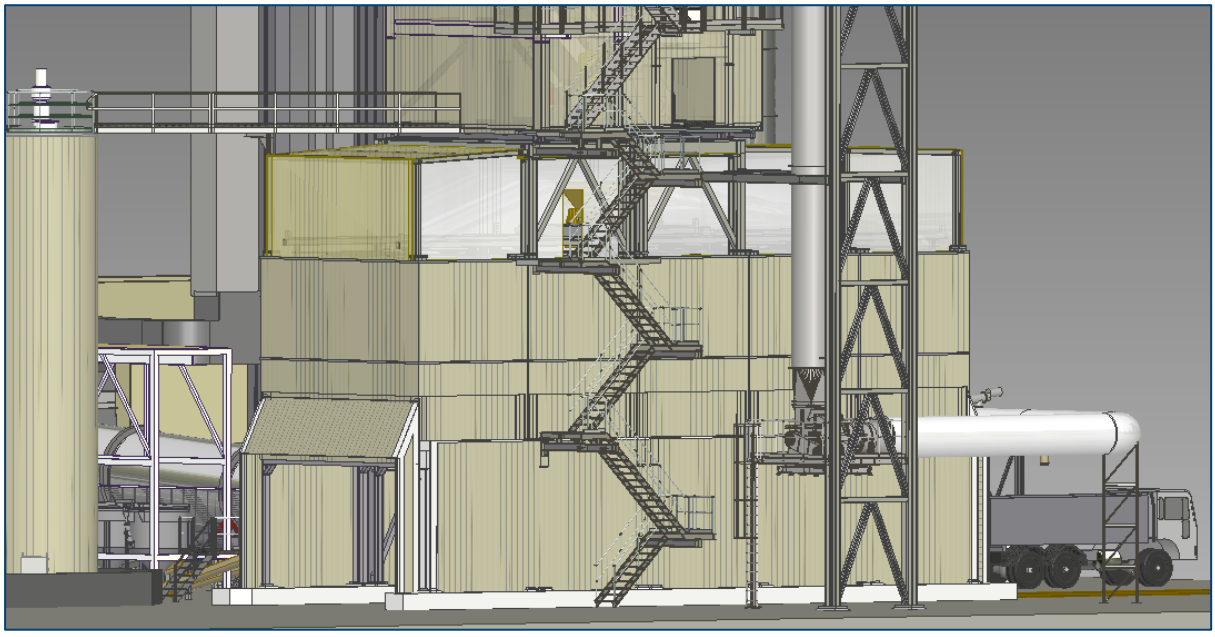


Figure 2: The proposed Ammann RAH100 asphalt plant proposed for Downer's Rosehill site showing enclosed asphalt loadout area

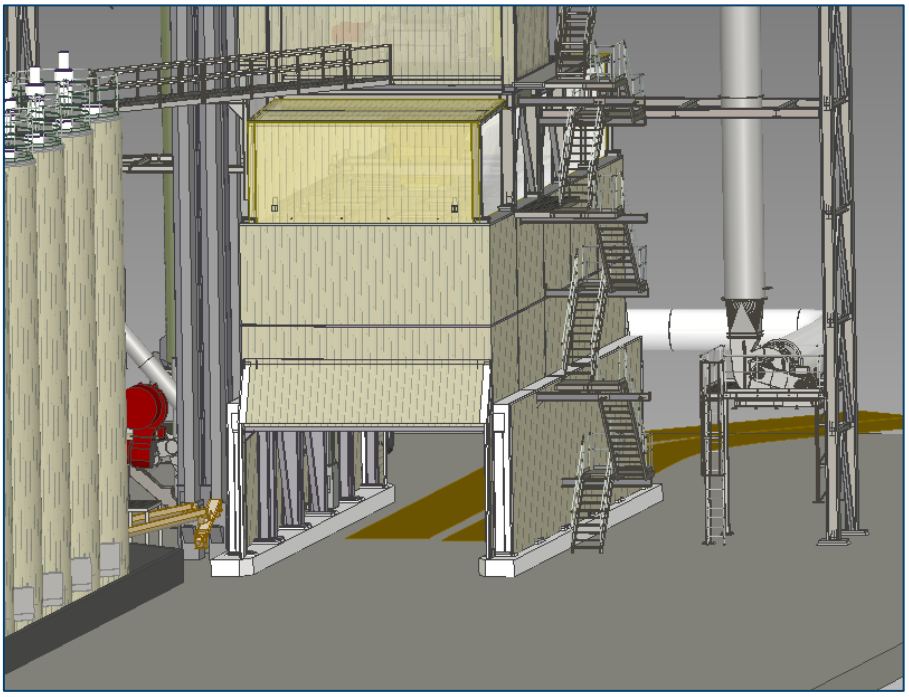


Figure 3: Truck entrance to RAH100 asphalt plant loadout area

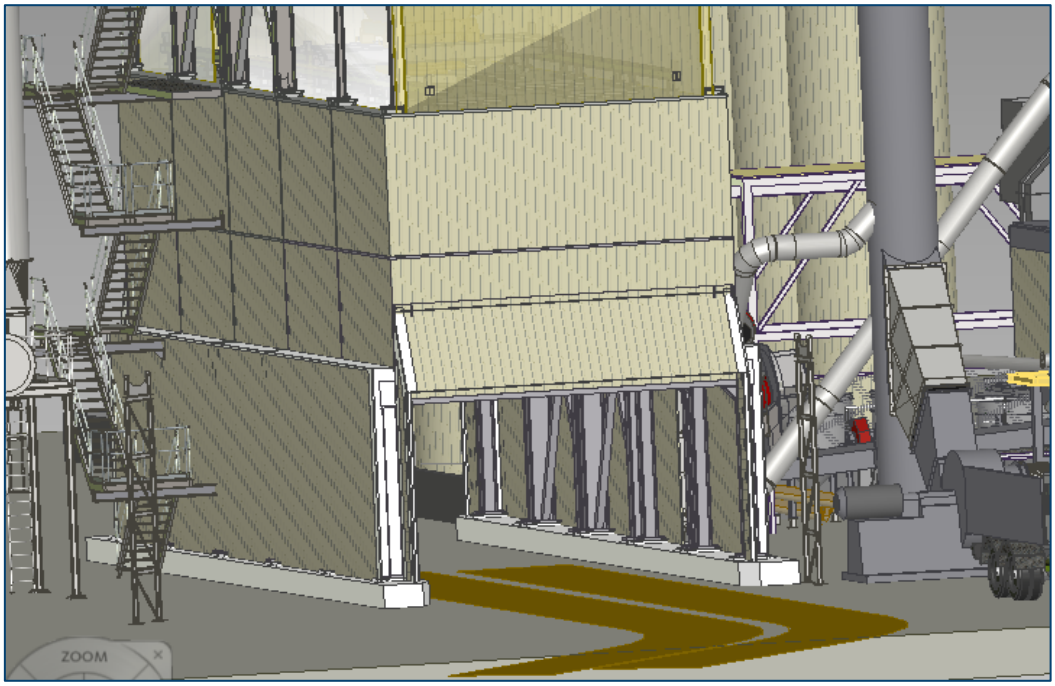


Figure 4: Truck exit from RAH100 asphalt plant loadout area

The bitumen vapour evacuation system is designed to extract bitumen vapour steam (created during discharging/loading asphalt into trucks) within the enclosed loadout area of the plant.

The evacuation system utilises a high suction (negative pressure) fan, which extracts bitumen vapour via specifically designed ducting within the ceiling of the plant loadout area (the 'rangehood' principle).

Figure 5 to **Figure 7** present the design of the bitumen vapour evacuation system fitted to the asphalt plant loadout area.

The bitumen vapour evacuation system consists of:

- High capacity 20,000Nm³/h extraction blower for evacuation;
- Suction pipe divided into two lines, one to the discharge flaps and one to the discharge chute on the skip level;
- Stainless steel ducting for corrosion resistance; and,
- Extraction exhaust line equipped with electro-pneumatic flaps to duct captured exhaust fumes and Volatile Organic Compounds (VOC's) from the loadout asphalt area to the plant filter system.

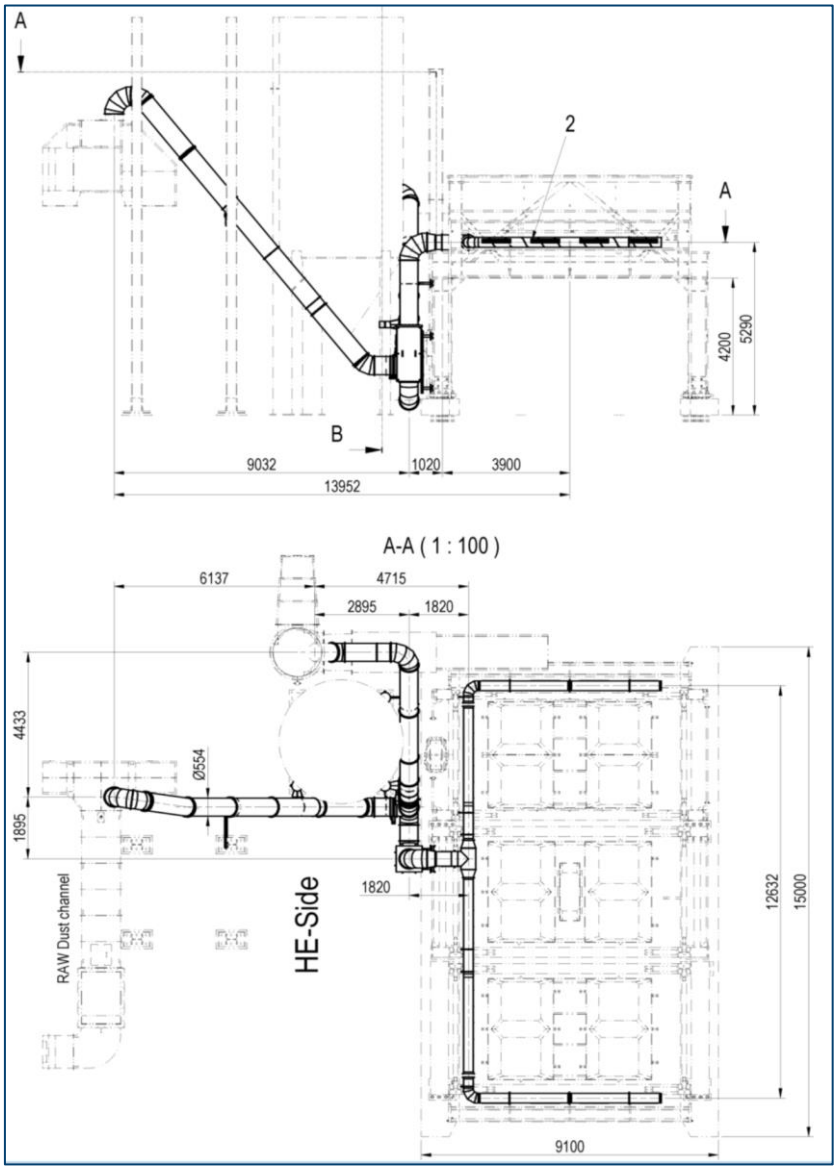


Figure 5: Elevation and plan view of bitumen vapour evacuation system fitted to the asphalt plant loadout area

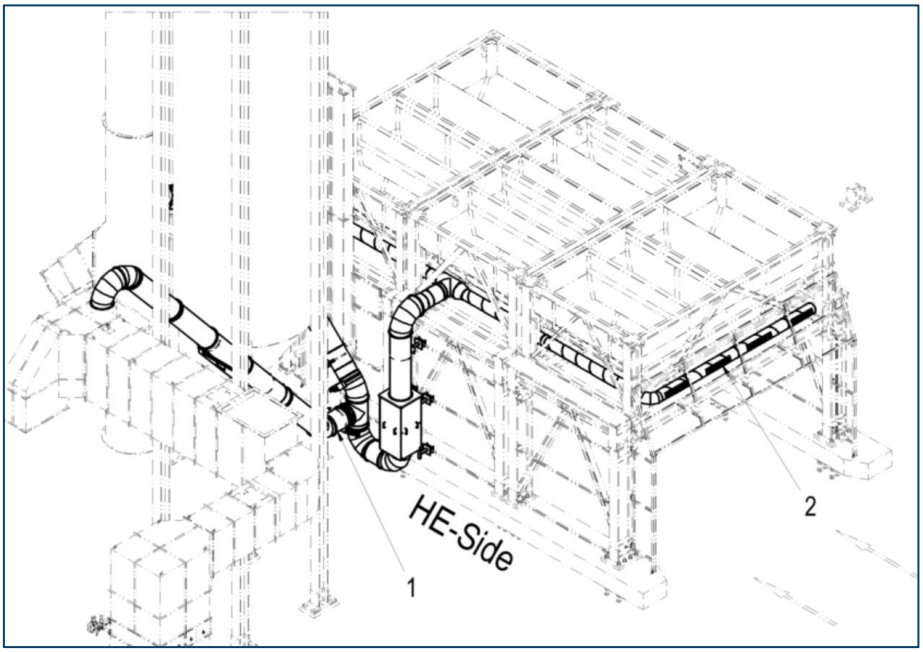


Figure 6: Oblique view of extraction exhaust line to duct exhaust fumes and VOC's from asphalt plant loadout area to the plant filter system

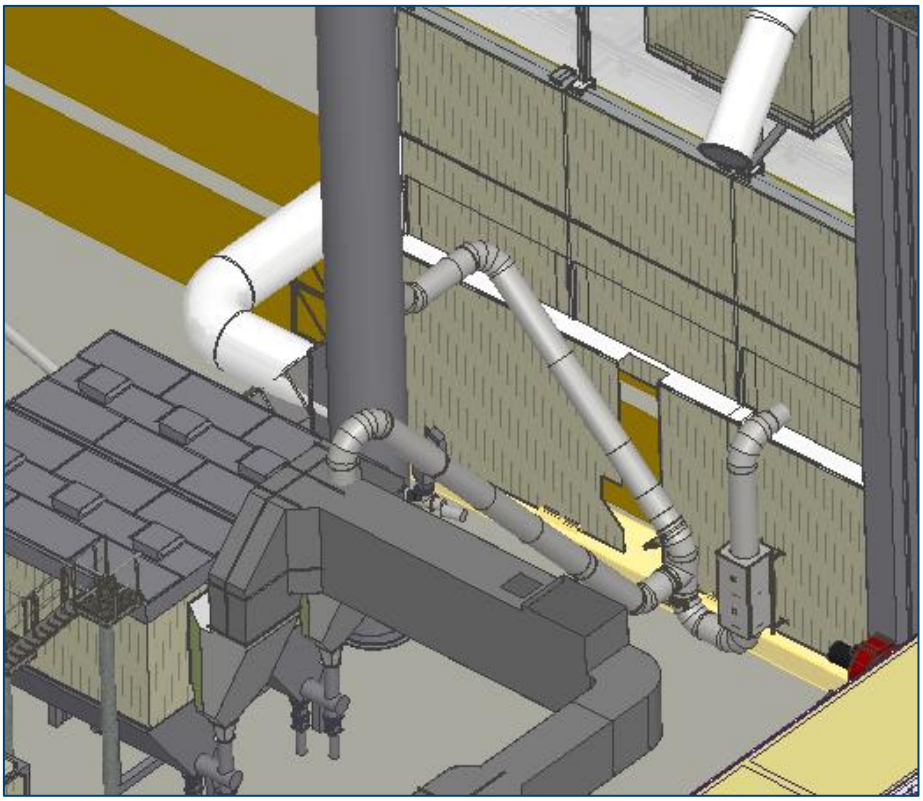


Figure 7: Isometric view of extraction exhaust line to duct exhaust fumes and VOC's from the asphalt plant loadout area to the plant filter system

It should be noted that the AQIA did not take into consideration the air emission control associated with the proposed bitumen vapour evacuation system. The fugitive emissions associated with the asphalt loadout were assumed without control and the predicted odour levels are conservative.

The level of control achieved by the bitumen vapour evacuation system is estimated by the amount of air extracted and the potential flow through the asphalt plant loadout area when a truck is being loaded.

The average windspeed for wind travelling along the axis of the asphalt plant loadout area is calculated from the CALMET modelling data as 2.2m/s and would pass through the space above the truck where the asphalt is loaded along the length of the alley resulting in a flow rate of 6.2m^3/s (2.8m^2 x 2.2m/s). The bitumen vapour evacuation system achieves a flow of 20,000m^3/hr (5.56m^3/s) and thus we could expect a level of control of approximately 89% ((5.56m^3/s ÷ 6.2m^3/s) x 100) for this activity.

As a sensitivity analysis we have applied this level of control to the loading asphalt to the truck activity for the dispersion modelling and revised the odour modelling predictions. As the loading asphalt to the truck activity accounts for approximately 88 % of modelled ground level fugitive odour emissions in the AQIA, applying the control associated with the bitumen vapour evacuation system would result in a significant reduction in the ground level fugitive odour emissions and modelled predictions.

Figure 8 present an isopleth diagram showing the 99th percentile nose-response ground level odour concentrations with the application of the bitumen vapour evacuation system. The results indicate levels of 2OU, applicable for urban residential areas, would be achieved at all assessment locations and the 6OU level, applicable for assessment locations within an existing industrial precinct, would be largely constrained to the site.

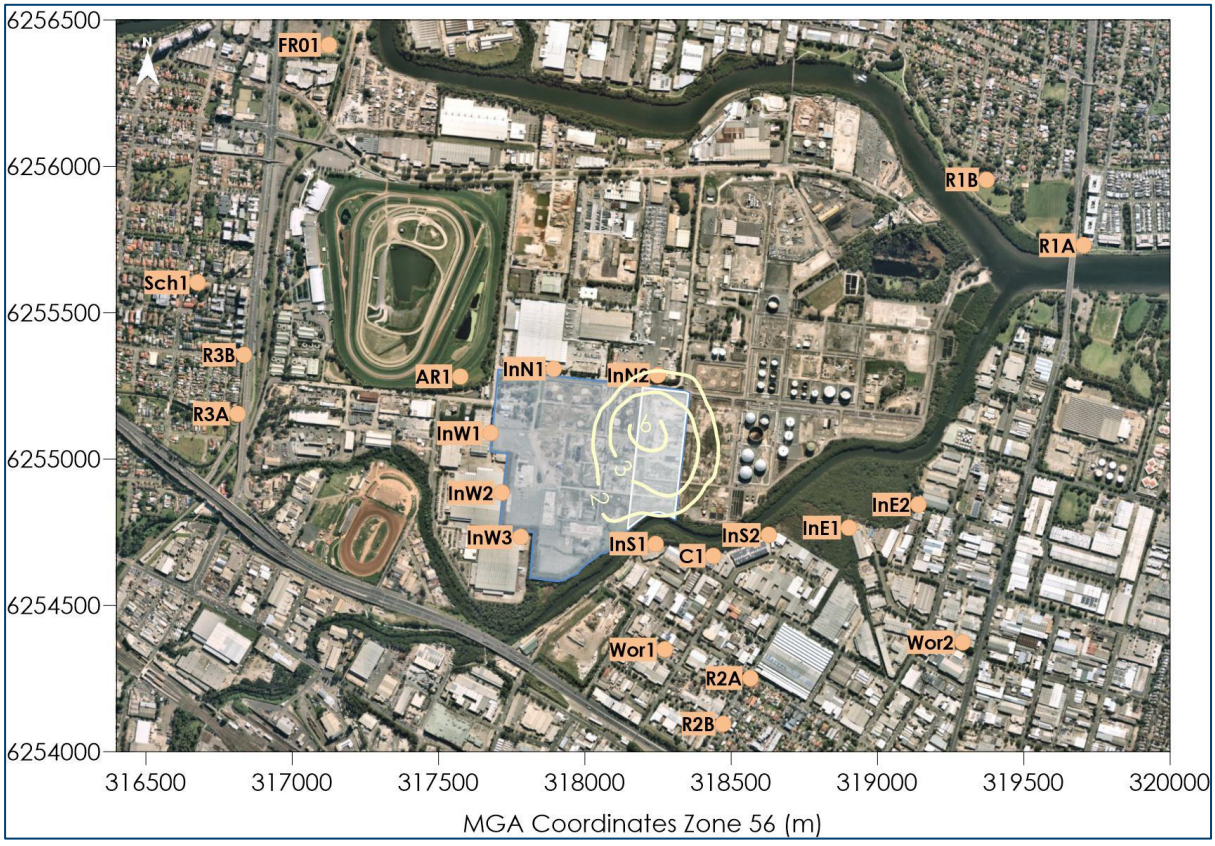


Figure 8: Predicted 99th percentile noise-response average ground level odour concentrations

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Management and control of fugitive particulate matter emissions

Scenario 2 as presented in the AQIA assesses potential impacts associated with the Road Resource Centre operations and construction earthworks associated with the subdivision and lot preparation. The AQIA predicts exceedances of the annual average PM_{10} and $PM_{2.5}$ impact assessment criteria.

The Road Resource Centre operations account for approximately 33% and 45% of modelled PM10 and PM2.5 emissions for Scenario 2. Based on scaling of the predicted GLCs, the EPA estimates that potential incremental contributions from the Road Resource Centre operations could be approximately:

- *2.1 ug/m^3 of annual average PM_{10}, which is approximately 8% of the impact assessment criteria, which is not considered insignificant;*
- *1.1 ug/m^3 of annual average $PM_{2.5}$, which is approximately 14% of the impact assessment criteria, which is considered significant.*

Of the $PM_{2.5}$ emissions estimated from the Road Resource Centre operations, exhaust emissions account for 52% of total $PM_{2.5}$ emissions. Presumably these are emissions from proposed non-road emissions sources, such as front-end loaders. Exhaust emissions also account for a proportion of PM_{10} emissions (approximately 18%).

Where exceedances of the impact assessment criteria are predicted, the Applicant must demonstrate that all feasible and reasonable mitigation measures have been implemented. The AQIA does not benchmark proposed mitigation measures against best practice.

The EPA considers that there are measures available to minimise emissions from industrial plant. This could include committing to using non-road vehicles that meet the highest available emission performance. Alternatively retrofitting older style fleet with particulate matter filters to achieve an equivalent level of performance could be considered.

The Applicant must benchmark the Proposal against best practice to demonstrate that all feasible and reasonable best practice mitigation measures have been incorporated into the design of the proposal. This should include consideration of:

- *Utilising non-road vehicles that achieve the highest available particulate matter emission performance;*
- *Retrofitting non-road vehicles with particulate matter filters, where new equipment is not feasible to be purchased for the proposal;*
- *Other fugitive emission mitigation measures which could be relevant to the proposed material handling activities, such as complete enclosure.*

The AQIA concludes that "*all the assessed air pollutants generated by the operation of the Project would comply with the relevant assessment criteria at the applicable receptor locations*" and there are no predicted exceedances of the annual average $PM_{2.5}$ and PM_{10} impact assessment criteria at the residential receptor locations.

The predicted incremental contribution from the Road Resources Centre operations (Stage 1) is presented in Scenario 1 which includes all activity associated with Stage 1 and there is no need to scale the predicted levels from Scenario 2. The maximum predicted level at the residential receptor locations for Scenario 1 indicate an annual average PM_{10} level of 0.6µg/m^3 which is approximately 2% of the impact assessment criteria and an annual average $PM_{2.5}$ level of 0.3µg/m^3 which is 4% of the impact assessment criteria. The predicted levels indicate the Stage 1 does not have significant impact at these locations.

The exhaust emissions from Stage 1 include all diesel plant and equipment operating at the site. This includes both non-road vehicles and road vehicles accessing the site to import and export materials. We note that there is a potential double counting of the $PM_{2.5}$ emissions in the emissions inventory as the emission factors applied for the activities already include a potential contribution from exhaust emissions of the equipment and hence the emissions estimates are conservative.

Based on the proposed activities associated with Stage 1 it is not unexpected that for the $PM_{2.5}$ emissions, a significant portion is comprised of exhaust emissions as the majority of these particles are often only generated through combustion processes. The Project would apply operational mitigation measures to minimise the generation of the exhaust emissions including:

- Switching engines of on-site vehicles and plant off when not in use for extended periods of time.
- Having all on-site vehicles and plant fitted with pollution reduction devices where practicable.
- Maintaining and servicing on-site vehicles and plant according to manufactures specifications to ensure optimal performance.

It must also be re-iterated that Stage 1 has been designed with specific thought as to how exhaust emissions can be reduced including:

- The asphalt plant is positioned at the front of the site to minimise the overall travel distance on-site and associated asphalt truck exhaust emissions, as asphalt trucks make up the largest component of the total number of operational heavy vehicle movements to and from the site.
- The modern RAP processing plant will use conveyors to minimise the use of the front-end-loader and associated exhaust emissions.
- The RAP processing plant receiving hopper/feeder is positioned at the southern end of the RAP processing shed, immediately adjacent to (as close as possible to) the unprocessed RAP stockpiles, minimising the distance required for the front-end loader to travel when loading unprocessed RAP into the RAP processing plant, reducing exhaust emissions.
- The processed RAP storage bunkers are positioned immediately adjacent to (as close as possible to) the asphalt plants processed RAP cold feeders, minimising the distance required for the front-end loader to travel when loading processed RAP into the asphalt plant, reducing exhaust emissions.
- The Reconomy facility recovered materials storage bunkers/bays are positioned immediately adjacent to (as close as possible to) the asphalt plant, minimising the distance required for the front-end loader to travel when transferring recovered materials (aggregate, sand, organics) from the asphalt plant to the storage bunkers.
- The Reconomy facility recovered materials storage bunkers/bays are positioned as close as possible to the asphalt plants raw material cold feeders, minimising the distance required for the front-end loader to travel when loading recovered Reconomy materials into the asphalt plant, reducing exhaust emissions.

- All virgin aggregates (stone and sand) used in the manufacture of asphalt are tipped into an underground hopper where the materials are transferred to silos (by covered belt feeders) and then transferred to the asphalt plant (by covered belt feeders). At many conventional asphalt plant operations, both of these raw aggregate transfer activities are undertaken by front-end loader, whereas at Stage 1 they will be undertaken by belt feeder, preventing the need for another front-end loader and significantly reducing the amount of exhaust emissions from the site.

- The diesel tank for refuelling trucks and mobile plant is positioned at the front of the site thereby allowing any vehicle entering the site to fill up with fuel without travelling any further than necessary. If the diesel storage tank was positioned at the rear (southern end of the site), asphalt trucks would need to complete a full loop of the entire perimeter of the site to fill up with fuel, before travelling back to the front of the site to load asphalt. By locating the diesel tank at the front of the site the asphalt trucks can fill up with diesel on route to the load alley (also positioned at the front of the site), reducing the heavy vehicle travel distance to a minimum and reducing exhaust emissions.

- The main light vehicle and visitor parking area is at the site entrance, allowing the majority of light vehicle's visiting the site to enter and exit without travelling around the full perimeter of the site, reducing light vehicle travel distance and reducing exhaust emissions.

- As the largest constituents of asphalt are aggregates, sand and bitumen, it makes sense to use recovered aggregates and sand where possible and to co-locate these resource recovery facilities as well as bitumen products manufacturing on the same site as the asphalt plant.

  RAP makes up around 20% of new asphalt and this percentage is likely to increase as road design specifications allows. Therefore, RAP storage and processing facilities should be co-located with or be close to asphalt plants to minimise heavy vehicle traffic on Sydney roads and associated exhaust emissions.

  Co-locating an asphalt plant, bitumen products plant, RAP storage and processing facility and a road sweepings and non-destructive excavations resource recovery plant is an Australia and world first, significantly reducing heavy vehicle exhaust emissions as follows:

  - Reduction of up to 5,400,000 tonne (t) kilometres (km) of RAP transport per annum on Sydney roads - If the RAP processing facility was not co-located on the same site as the asphalt plant and with Downer's lease at 12 Grand Avenue coming to an end, they would only likely be able to secure an appropriate site to lease for RAP storage and processing in another industrial area in the outskirts of western Sydney. This would require 180,000 tonnes per annum (tpa) of processed RAP to be transported approximately 30km from the off-site RAP processing facility, to the new asphalt plant site in Devon Street, Rosehill. Workings: 180,000tpa of RAP x 30 km = 5,400,000 t km.

  - Reduction of up to 18,000,000 t km of virgin aggregates per annum on Sydney and regional roads – With the use of a minimum of 180,000tpa of RAP (comprised predominantly of aggregates) in the manufacture of asphalt, a similar volume of virgin aggregates need to be trucked to the site from current suppliers approximately 100km from the site (outside the Sydney basin). Workings: 180,000tpa of virgin aggregates x 100 km = 18,000,000 t km.

- Reduction of up to 900,000 t km of virgin aggregates per annum on Sydney and regional roads – With the use of a minimum of 12,000tpa of reclaimed aggregates recovered by the proposed Reconomy facility (sourced from street sweepings and non-destructive digging in Sydney, within an average haulage distance of 25km from the new Devon Street site) a similar volume of virgin aggregates doesn't need to be trucked to the site from current suppliers approximately 100km from the site (outside the Sydney basin). Workings: 1,200,000 t km (12,000tpa of virgin aggregates x 100 km) - 300,000tpa (12,000tpa of recovered aggregates in street sweepings/NDD x 25km) = 900,000 t km.

- Constructing a bitumen emulsion products plant in Sydney will significantly reduce heavy vehicle exhaust emissions by:

  - Reduction of up to 12,750,000 t km of bitumen emulsion that doesn't need to be transported from interstate. Currently Downer transport all their bitumen emulsion required by local clients (predominantly councils) from either Melbourne (~800km) or Brisbane (~900km) to Sydney. Workings: 15,000tpa of bitumen emulsion x 850km (average distance assuming a 50/50 split transported from Melbourne and Brisbane) = 12,750,000 t km.

- Locating Stage 1 in one of the last remaining heavy industrial zoned industrial precincts in central Sydney, close to the markets that the facility services rather than outside or on the outskirts of the Sydney basin, significantly reduces heavy vehicle exhaust emissions by:

  - reducing the haulage distance for heavy vehicles delivering asphalt to construction projects in the central parts of Sydney by as much as 12,500,000 t km. Workings: 500,000tpa x 25km (extra distance trucks would have to travel if asphalt plant based in outskirts of Sydney) = 12,500,000 t km.

  - reducing the haulage distance for street sweeping and non-destructive digging trucks by as much as 1,000,000 t km. Workings: 40,000tpa x 25km (extra distance trucks would have to travel if Reconomy plant based in outskirts of Sydney) = 1,000,000 t km.

  - reducing the haulage distance for RAP trucks by as much as 6,250,000 t km. Workings: 250,000tpa x 25km (extra distance trucks would have to travel if RAP processing facility based in outskirts of Sydney) = 6,250,000 t km.

It is therefore considered that Stage 1 is setting the benchmark in:

- how to deliver asphalt for the construction of roads in the most overall sustainable way by considering all reasonable and feasible ways to design Stage 1 to minimise exhaust emissions by minimising the number of mobile plant required and minimising the distance that mobile plant, heavy vehicles (trucks) and light vehicles need to travel on-site; and,

- how to co-locate resource recovery facilities that recover raw materials used in asphalt production on the same site as the asphalt plant, to minimise the distance heavy vehicles need to travel off-site.

In addition to the design and operational controls to reduce vehicle emissions from the operation, Stage 1 has also adopted design and operational controls to minimise other particulate matter emissions. The

following sections describe the main sources of emissions from the various components of Stage 1 and the proposed design and operational controls to minimise particulate matter emissions.

Unprocessed RAP stockpile area

RAP material is old asphalt pavements that have past their useful life cycle and has been extracted from road surfaces either by being milled up, or by being removed as slabs of asphalt by heavy machinery. RAP is then transported to Stage 1 by truck and stockpiled in the unprocessed RAP stockpile area.

RAP is bound material with an average of 4.5% bitumen and 2-3% moisture. RAP particle size distribution tests undertaken by Downer indicate that only a very small component (approx. 4-6%) of RAP is of an approximately 0.5mm particle size. These particles can still become mobile, however due to their size are not able to be entrained in the atmosphere and they typically fallout soon after lift-off.

The frequency of wind speeds greater than 4m/s (wind speed at which there is some potential for wind erosion on the stockpiles) at the site is approx. 6% of the time which is not significant.

Also, in the process of stockpiling unprocessed RAP, the smaller particles are likely to travel to the bottom of the stockpile through gaps made by the larger particles and settle on the bottom of the pile. As wind hits the stockpile only the larger particles would be subject to the wind and unlikely to be lifted-off from the surface.

Therefore, wind erosion from the unprocessed RAP stockpiles is not a significant source of dust, providing further justification from an air quality perspective for why these stockpiles don't need to be enclosed/covered.

Regardless, the RAP stockpile area will be fitted with a dust suppression system in the form of water sprinklers that will be permanently fitted to structures surrounding this area. These can be used if there is ever any visible dust in the unprocessed RAP stockpile area. This sprinkler system, combined with the bound material properties and minimal fines fraction of RAP, will minimise the potential for fugitive dust emissions from the unprocessed RAP stockpiles.

Housing the RAP stockpile area within a large industrial warehouse/shed is unreasonable and unfeasible. There would be significant risk of plant and trucks hitting or damaging the warehouse walls or support piers/posts whilst tipping, loading and navigating in an enclosed space, resulting in possible building collapse if damaged. A single span structure would therefore be required spanning an area of nearly 2 hectares with a significant height of approx. 18-20m. Construction of such a large structure is unviable and unnecessary. The management of RAP stockpiles in a shed due the tipping height of trucks and the reach height of heavy plant and equipment creates significant safety risks.

It must be noted that the site development plan included in the EIS proposed a gravel hard stand base for the RAP stockpile area. The revised site development plan includes a sealed asphaltic concrete surface in the RAP stockpile area and RAP stockpiles will be restricted to the western and eastern sides of the RAP stockpile area reserving a roadway through the middle of the RAP stockpile area for RAP delivery trucks to enter and exist this area. This roadway will be swept regularly along with the rest of the sites internal roadways to keep them free from debris, minimising dust emissions from heavy vehicles travelling on the internal roads and preventing the tracking of material onto local roads.

RAP processing facility

The RAP processing facility is located within the confines of an industrial shed 12m in height, 76m in length by 30m wide (refer to **Figure 9** and **Figure 10**). The southern, western and northern faces are fully clad and enclosed with access for maintenance being through roller doors. The eastern side of the shed is partially open to 7m above the ground to allow front-end loader access to load unprocessed RAP into the receiving hopper/feeder and to transfer processed RAP from the processed RAP storage bunkers/bays to the adjacent asphalt plant RAP feeders.

This regular access to several finish product bays on a constant basis is required as part of the integrated and sustainable process of operations whilst also managing production to ensure quality and stockpile management.

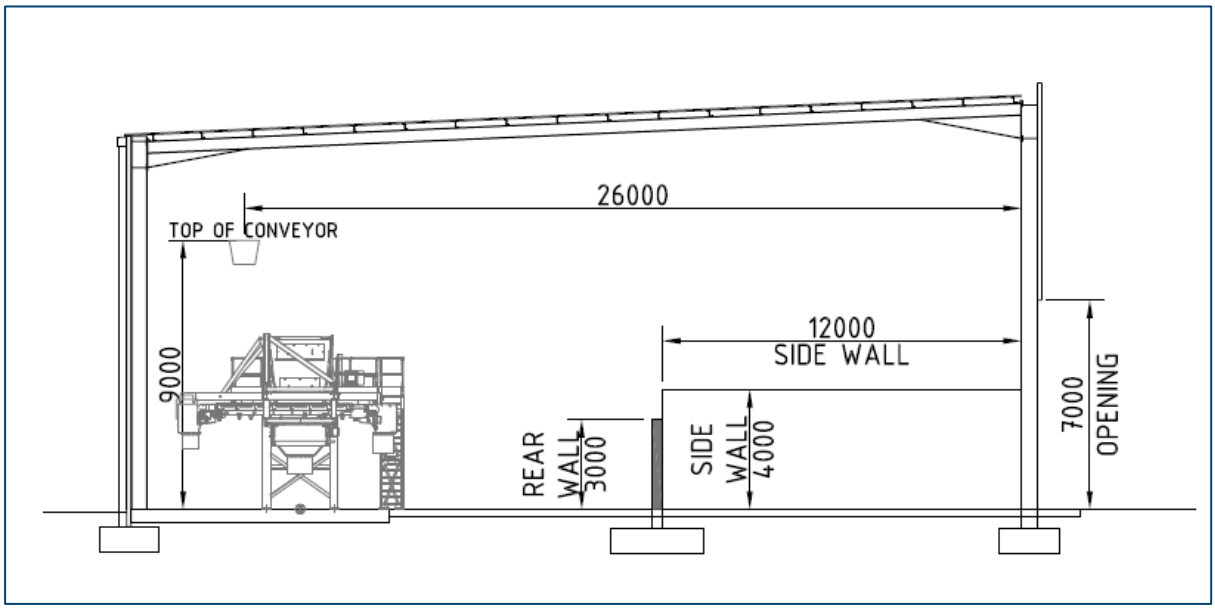


Figure 9: Cross-section of RAP processing facility

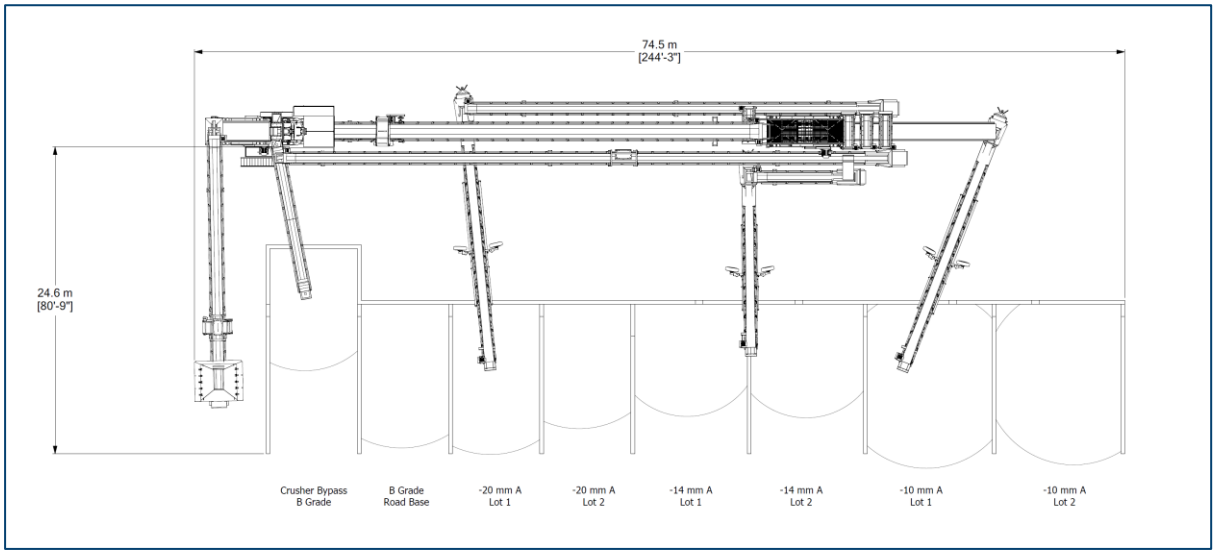


Figure 10: Plan view of RAP processing facility

Furthermore, the granulating and separating/screening process is positioned against the clad western wall of the RAP processing shed, as far (25m) from the partly open eastern side of the RAP processing shed as possible. The granulating process involves a horizontal impactor, which is a rotating rotor with hard wearing impact blades, fully enclosed inside a housing that contains hard wearing impact curtains. The unprocessed RAP material enters the fully enclosed granulator whereby the rotor impacts the RAP material and throws it forward into the impact curtains, thus separating the bound material.

In this RAP processing technique, the rotor speed is normally run a lot slower than in traditional hard rock quarrying processes. The key intention with RAP processing is to only separate the conglomerates of asphalt, and not to break the original source materials (e.g. hard rock) apart from where they are bound together with bitumen (the binder). If the original source aggregates were to be fractured like in hard rock crushing plants, then virgin faces of aggregate would be exposed, which would not be coated in bitumen, resulting in the overall average bitumen content of RAP being reduced and the benefit of using RAP also being reduced. Running the rotor at a lower speed and by not fractionating the source aggregates reduces any additional fines and dust being generated. An additional reason for running the horizontal impactor at a slower speed is to reduce heat generation from frictional resistance, as generating too much heat can cause the bitumen within the material to become tacky or sticky causing issues with screening the material and maintenance of the RAP processing plant.

The processed finish RAP product is then transferred to the finished product bunkers along the eastern side of the RAP processing shed by radial transfer conveyors. The concrete bunkers will be approximately 3-4m in height and 12m deep allowing sufficient space (depth) for the processed RAP to be fully contained within the perimeter of the shed. The radial transfer conveyors are fully enclosed (as described further below and shown in **Figure 11**). Just prior to release from the transfer conveyor into the finish product bunkers, a spray mist is applied to the newly crushed RAP (as shown in **Figure 12**). This process eliminates any risk of dust/particulate emissions when the RAP drops from the end of the transfer conveyor into the finish product bays and would add moisture to the stockpiled material.

Whilst the processing plant will be contained within the confines of the shed structure, all of the conveyors will also have roll top type belt covers to form two functions:

1. Guarding - preventing persons from becoming entangled in plant and equipment.
2. Dust or particulate mitigation - covers will prevent any cross-wind disturbance that may occur during strong easterly winds that could cause any finer fractions of the processed RAP to become airborne, even though unlikely (see earlier discussion on limited dispersion distance of finest RAP fractions)

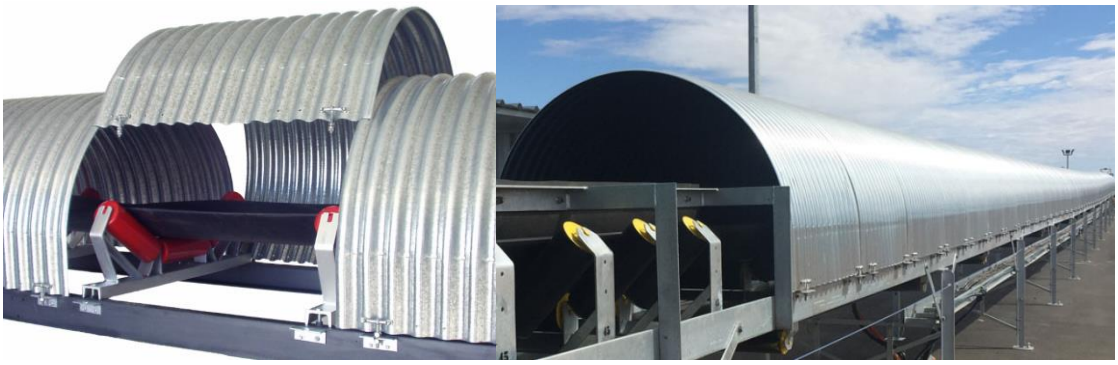


Figure 11: Examples of conveyor roll top covers



Figure 12: Example of micro sprays at conveyor discharge

The newly processed RAP material (temporarily stored in the concrete product bunkers) is now ready to be loaded by front-end loader into the asphalt plants' RAP cold feeders for incorporation into asphalt production. This RAP material is still bound in bitumen (unlike crushed hard rock quarry materials such as aggregates, manufactured sand or crusher dust), contains a certain percentage of moisture and is unlikely to emit dust.

Asphalt plant

The asphalt plant has a number of inherent design elements (some of which have been mentioned previously) that minimise emissions including:

- A 40 metre high dryer stack to disperse air emissions generated from the asphalt mixing and drying. The air emissions are passed through a dust filter prior to discharge in the stack.
- A partially enclosed asphalt loadout area equipped with a bitumen vapour evacuation system to capture any fugitive emissions associated with the loadout process (refer to odour response above for further discussion on the proposed asphalt plant bitumen vapour evacuation system).
- An encapsulated skip for reducing air emissions during the mixing prior to the loadout phase.
- All virgin aggregates (stone and sand) used in the manufacture of asphalt are tipped into an underground hopper where the materials are transferred to silos (by covered belt feeders) and then transferred to the asphalt plant (by covered belt feeders). At many conventional asphalt plant operations, aggregates, sand and crusher dust are tipped into open storage bays from where they are loaded by front-end loader and transferred to and tipped into the asphalt plant cold feeders. The activity of tipping aggregates from trucks into open storage bunkers and handling this material with the front-end loader can generate dust, which is eliminated at the Sustainable Road Resource

Centre by incorporation of the underground receival hopper, covered conveyor system and storage of all types of aggregates in silos.

Bitumen emulsion plant

The bitumen storage and emulsion plant has a number of inherent design elements (some of which have been mentioned previously) that minimise emissions including:

- Bitumen is stored in individual storage silos and pumped to the asphalt plant in a closed system when required. Feedstock bitumen is supplied to the storage silos from tankers via a suction process with excess air within the storage silos are vented from a breather pipe at the top and passed through a carbon filter prior to discharge to air.
- Ingredients for the bitumen emulsion are pumped into sealed emulsion tanks and stored at a lower temperature which minimises air emissions.

The AQIA discusses mitigation and management measures, however limited detail has been provided regarding how these will be implemented. These include:

- *Exposed areas and stockpiles being covered and dampened with water as far as practicable;*
- *Dampen material when excessively dusty during handling; and*
- *A sweeper unit to be regularly deployed to the operational site to sweep/clean internal roads periodically to prevent any tracking of debris.*

The Applicant must provide further detailed information regarding the mitigation measures including the measures listed above. The Applicant must provide detailed information regarding how fugitive particulate emissions will be managed at each of the proposed facilities for the operation of the Road Resource Centre.

The above sections thoroughly describe the specific air quality controls inherent in the design of the proposed Stage 1 and in the concept of collocating asphalt production with a bitumen emulsion plant as well as resource recovery facilities that recover resources from road waste that are used as raw materials in asphalt production.

Table 3 summarises, elaborates on and adds to the other construction and operational management measures that were included in the EIS and AQIA that will be implemented at Stage 1 as well as during the construction of the earthworks and services associated with the rest of the proposed industrial estate.

As noted in the AQIA and EIS, a Construction and Operational Environment Management Plan (CEMP and OEMP) will be developed for the site. The CEMP and OEMP would include a specific chapter which outlines the measures to manage dust emissions at the site and include aspects such as key performance indicators, response mechanisms and complaints management. This would include the following and further specific details on how potential fugitive particulate emissions would be managed at the site beyond those already incorporated into the design and that are inherent in Stage 1.

As part of the measures to manage dust emissions at the site, training would be provided to on-site personnel to identify visible dust generation when handling material during construction and operation. The identification of visible dust will require the application of water to dampen the material or will require activities to be stopped or modified, to prevent or at least minimise visible dust.

Table 3: Construction and operational management measures

Source	Management measure
Construction	Weather forecast to be checked prior to undertaking material handling or processing and appropriate management measures implemented prior to adverse weather to minimise dust e.g. dampening exposed surfaces and haul roads, dampening or covering temporary stockpile with high fines fractions. If adverse weather conditions occur during construction, activities are to be assessed and modified as required. Cease activity where reasonable levels of dust cannot be maintained using available means.
	Engines of on-site vehicles and plant to be switched off when not in use.
	Vehicles and plant are to be fitted with pollution reduction devices where practicable.
	Vehicles are to be maintained and serviced according to manufacturer's specifications.
	Visual monitoring of activities is to be undertaken to identify dust generation.
	The extent of exposed surfaces and stockpiles is to be kept to a minimum.
	Exposed areas and stockpiles are either to be covered or are to be dampened with water as far as is practicable if dust emissions are visible, or there is potential for dust emissions outside operating hours. Stockpiles of material that are going to remain in place for an extended period of time and have the potential to generate dust are to either be covered or vegetated.
	Dampen material when excessively dusty during handling.
	Reduce drop heights from loading and handling equipment where practical.
	Vehicle traffic is to be restricted to designated routes.
	Co-ordinate the delivery schedule to avoid a queue of incoming or outgoing trucks that will be idling for extended periods of time.
	Speed limits are to be enforced.
	Vehicle loads are to be covered when travelling off-site.
Asphalt plant (operations)	Ensure all emission controls built into the design of the asphalt plant (e.g. the stack exhaust controls and the bitumen vapour evacuation system at the loadout area) are being maintained to operate as per manufacturers specifications.
	Clean up any aggregates that spill onto the road surface at the underground aggregate loading hopper (immediately after the spill) to prevent them being tracked onto the internal and external roads.
RAP stockpile and processing facility (operations)	The unprocessed RAP material must be dampened using the proposed sprinkler system when visible dust is evident from the stockpiles or during handling of the RAP material.
	The unprocessed RAP stockpiles must be restricted to the designated stockpile areas and not be allowed to encroach onto the truck access road through the centre of the stockpile area. This central unprocessed RAP stockpile area access road must be swept on a regular basis to remove spilt RAP material.
	The volume of unprocessed RAP must be regularly monitored and receival of unprocessed RAP stopped, when the stockpile area reaches capacity, to prevent RAP being stockpiled outside the designated stockpile area.
	Maintenance access roller doors on the RAP processing shed must remain closed at all times during RAP processing.
	All dust controls built into the design of the RAP processing facility (e.g. roll top type belt covers on conveyors and spray misters at discharge points of the radial transfer conveyors) must be maintained to operate as per manufacturers specifications.
	The volume of processed RAP in the finished product bunkers must be regularly monitored and processing stopped, when the bunkers reach capacity, to prevent RAP spilling out of the bunkers and RAP processing shed.
Bitumen emulsion plant (operations)	Ensure all emission controls built into the design of the bitumen plant (e.g. the carbon filter on bitumen storage tanks) are being maintained to operate as per manufacturers specifications.
Reconomy facility (operations)	Organic material recovered from road sweepings in the Reconomy plant must be removed from site on a regular basis to reduce level of decomposition and associated odour.
General site (operations)	Weather forecast to be checked daily and appropriate management measures implemented prior to adverse weather to minimise particulate emissions from the site. If adverse weather conditions occur during operations, activities are to be assessed and modified as required. Cease activity where reasonable levels of dust cannot be maintained using available means.
	Engines of on-site vehicles and plant to be switched off when not in use.

Source	Management measure
	Vehicles and plant are to be fitted with pollution reduction devices where practicable.
	Vehicles are to be maintained and serviced according to manufacturer's specifications.
	Visual monitoring of activities is to be undertaken to identify dust generation.
	Maintain an odour complaint logbook and in the event of a complaint conduct an immediate investigation of any odour sources, together with appropriate actions to eliminate any identified excessive odour.
	Reduce drop heights from loading and handling equipment where practical.
	Spills on trafficked areas to be cleaned immediately.
	Driveways and hardstand areas to be swept/cleaned regularly as required. A road sweeper will be regularly deployed to the operational site to sweep/clean internal roads periodically to prevent any tracking of fine debris.
	Co-ordinate the delivery schedule to avoid a queue of incoming or outgoing trucks that will be idling for extended periods of time.
	Speed limits are to be enforced.
	Vehicle loads are to be covered when travelling off-site.

Demonstrating compliance with the Protection of the Environment Operations Clean Air Regulation

The proposed Road Resource Centre operations include a proposed asphalt plant. A point source discharge is proposed for the asphalt production processes. All point sources must comply with the relevant prescribed concentrations contained in the Protection of the Environment Operations Clean Air Regulation (Clean Air Regulation) as a minimum.

As per section 3.5 of the Approved Methods for Modelling and Assessment of Air Pollutants in NSW, emission estimates for proposed projects must be used to demonstrate compliance with the Clean Air Regulation can be achieved.

The AQIA does not estimate pollutant concentration discharges through the proposed point source and does not demonstrate compliance with the Clean Air Regulation.

The AQIA must be revised to demonstrate emissions from the proposed asphalt plant can comply with the Clean Air Regulation.

The point source at Project is associated with the asphalt plant stack exhaust. The in-stack concentrations for the plant were inadvertently not set out in the AQIA.

Table 4 presents the applicable standards of concentration for non-scheduled activity as per the *Protection of the Environment Operations (Clean Air) Regulation 2010* (POEO) alongside the commensurate stack concentration for the stack source associated with the asphalt plant. The comparison shows that the source emissions comply with the applicable concentration standards.

Table 4: Comparison of applicable POEO standards of concentration with modelled in-stack concentrations (mg/m³)

Pollutant	Standard of concentration for non-schedule activity – Group C	Asphalt plant stack exhaust
Solid particles	100	7.3

Assessment of impacts at proposed industrial lots

The EPA notes that the AQIA has not considered the proposed lots of the industrial estate as potential sensitive receivers for the operation of the Road Resource Centre. The Applicant must revise the AQIA to assess the potential impacts from the operation of the Road Resource Centre at neighbouring industrial receptors.

As noted in the AQIA, places where people work such as at industrial facilities, would only have healthy adults present who are unlikely to reside for more than 24-hours (based on typical working hours) and would also not be present for an annual period (unlike a residence).

Workplace air quality standards are set at suitable levels to manage the health of adult workers present at industrial facilities and the NSW EPA impact assessment are not applicable.

Nevertheless, the predicted air quality levels associated with the Project at the proposed industrial lots can be inferred from the isopleth diagrams for Scenario 1 in the AQIA.

Endeavour Energy

Potential impacts on local Endeavour Energy assets

As previously advised, Endeavour Energy is aware that electricity infrastructure is not defined/regarded as sensitive land use in the traditional sense. Nonetheless the impacts of hazardous and offensive development, air quality and flooding may all significantly affect electricity infrastructure and place supply at risk - particularly for such significant substation assets any such potential impacts should be mitigated so as not to increase the risk above the existing conditions.

The Endeavour Energy assets are located on the corner of Unwin Street and Colquhoun Street and the corner of Devon Street and Colquhoun Street. Whilst the locations were not specifically assessed in the AQIA, the potential for any air quality impacts at these locations can be inferred using the nearest discrete receptors located at InN1, InW1 and AR1 (located near the corner of Unwin Street and Colquhoun Street on the Rosehill Racecourse). The location of these discrete receptors is shown in Figure 2-1 of the AQIA. We note that these discrete receptors represent location closer to the Project than the Endeavour Energy assets and the predicted air quality levels are likely to be conservative.

The predicted air quality results for InN1, InW1 and AR1 indicate compliance with the NSW EPA impact assessment criteria for the assessed pollutants and a similar level would be achieved at the Endeavour Energy asset locations. The NSW EPA impact assessment criteria are designed to protect the health of sensitive individuals who are most susceptible to harm and also to prevent nuisance deposition of dust on surfaces. Thus, on the basis of the modelling predictions there would be no expected air quality impacts associated with the Project at these locations and hence does not indicate any risk above the existing conditions.

Please feel free to contact us if you would like to clarify any aspect of this letter.

Yours faithfully,
Todoroski Air Sciences



Philip Henschke

References

Todoroski Air Sciences (2020)

"Air Quality Impact and Greenhouse Gas Assessment Central Sydney Industrial Estate Incorporating Downer Sustainable Road Resource Centre", prepared for Element Environment Pty Ltd by Todoroski Air Sciences, September 2020.

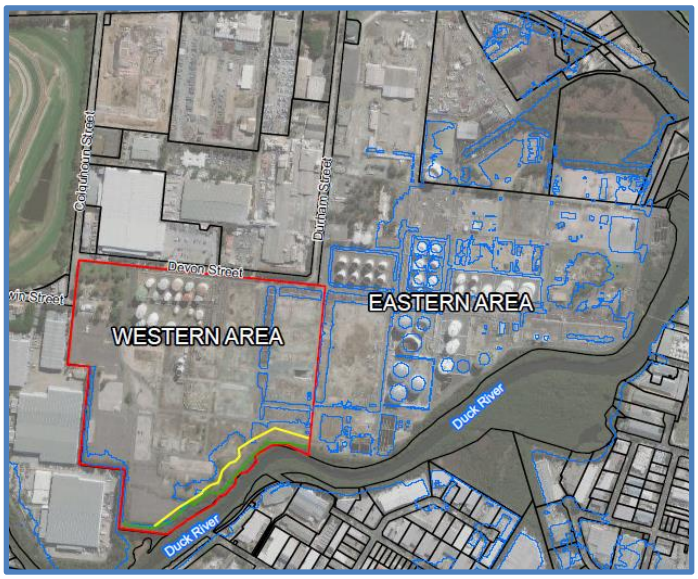


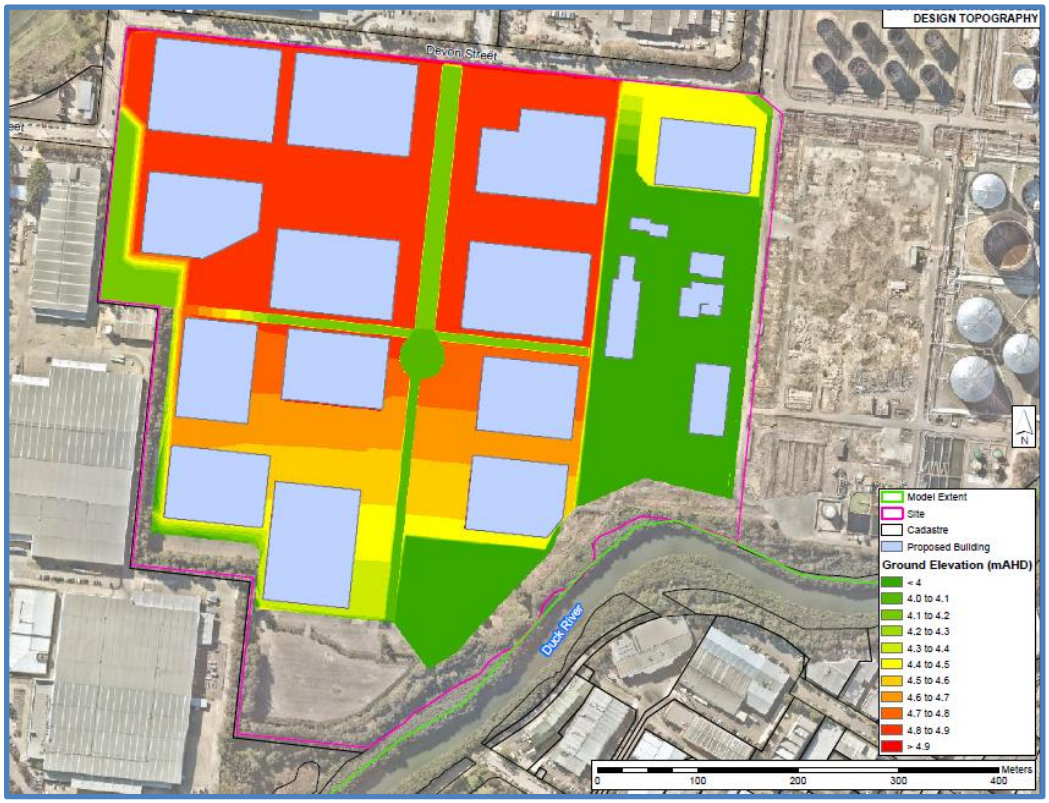
APPENDIX E

FLOODING TECHNICAL RESPONSE

VE PROPERTY PTY LTD Pty Ltd

CENTRAL SYDNEY INDUSTRIAL ESTATE INCORPORATING DOWNER SUSTAINABLE ROAD RESOURCE CENTRE
REVIEW OF FLOODING SUBMISSIONS





wma water

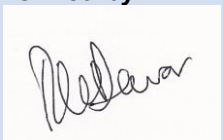
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CENTRAL SYDNEY INDUSTRIAL ESTATE INCORPORATING DOWNER SUSTAINABLE ROAD RESOURCE CENTRE REVIEW OF FLOODING SUBMISSIONS

NOVEMBER 2020

Project **Central Sydney Industrial Estate Incorporating Downer Sustainable Road Resource Centre Review of Flooding Submissions**	**Project Number** **119043**
Client **VE PROPERTY PTY LTD**	**Client's Representative** J Lord - DBL Property Pty Ltd
Authors Richard Dewar	**Prepared by** 
Date **17 NOVEMBER 2020**	**Verified by** 

Revision	Description	Distribution	Date
1	Draft Review	J Lord	10 November 2020
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3			

CENTRAL SYDNEY INDUSTRIAL ESTATE INCORPORATING DOWNER SUSTAINABLE ROAD RESOURCE CENTRE REVIEW OF FLOODING SUBMISSIONS

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LIST OF ACRONYMS

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AR&R	Australian Rainfall and Runoff (note there is a 1987, 2016 and 2019 version - released in May 2019)
ALS	Airborne Laser Scanning sometimes known as LiDAR
BoM	Bureau of Meteorology
CSSI	Critical State Significant Infrastructure
DPIE	Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EPA	Environment Protection Authority
GIS	Geographic Information System
IFD	Intensity, Frequency and Duration of Rainfall
m	metre
m^3/s	cubic metres per second (flow measurement)
m/s	metres per second (velocity measurement)
PMF	Probable Maximum Flood
SEARS	Secretary of DPIE Environmental Assessment Requirements
SSD	State Significant Development
TUFLOW	one-dimensional (1D) and two-dimensional (2D) flood and tide simulation software program (hydraulic computer model)
1D	One dimensional hydraulic computer model
2D	Two dimensional hydraulic computer model

1. REVIEW OF SUBMISSIONS

1.1. Background

WMAwater's Flooding Assessment Report of 21 August 2020 was included as Appendix G of the Environmental Impact Statement (EIS), for the proposed Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre (SSD-10459), at part Lot 100 DP 1168951 known as 9 Devon Street, Rosehill, NSW, 2142.

Following public exhibition of the EIS, submissions were received from NSW state government authorities, Parramatta City Council and public service providers. This present report provides those submissions relating to flooding and a response.

Stormwater drainage matters have not been considered as part of this report and have been addressed in a separate report by Costin Roe Consulting.

1.2. Submission by Parramatta City Council

1.2.1. Low and High Volume Stormwater and Overland Flows

> Consultation was held between Council and the applicant prior to the exhibition of the EIS. As part of this advice it was requested that the low and high volume stormwater and overland river flows be dealt with together within a Flood and Water Management Strategy. It is noted that this has not been provided within the SSDA submission.

Overland flooding has been addressed in WMAwater's report in Appendix G of the EIS (refer Section 3.2.1 and Appendix B of that report) and incorporated within the design of the works. We consider that the design of the site in conjunction with preparation of a Flood Evacuation and Flood Emergency Response Plan – refer Section 1.2.9 below adequately provides a Flood Management Strategy compatible with best practice.

A Water Management Strategy will be provided in Costin Roe's stormwater management report.

1.2.2. Management of Flood Flows

> The report supplied by WMA has provided flood modelling output maps for both overland flow and for the river flooding from Duck Creek (and at higher levels, Parramatta River). These reaffirm that the site is severely affected by flooding in 1% AEP and PMF events both from overland flow and from the river system. This includes a large area of 'high hazard' flooding. However, the documentation does not provide detailed information about how the site would be designed to manage these flood flows with the necessary degree of safety.

TUFLOW modelling has demonstrated the extent of both mainstream and overland flooding

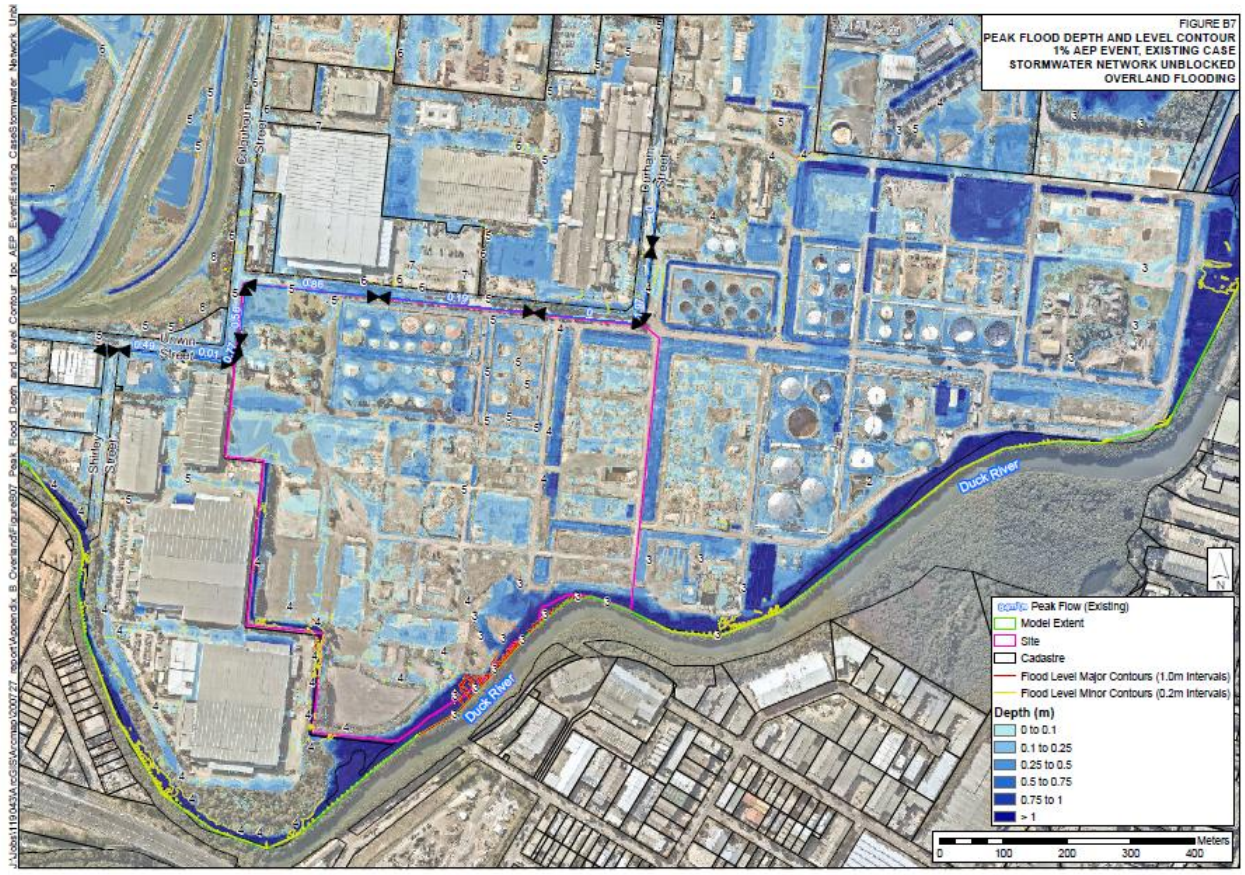
across the site for existing conditions. The existing conditions 1% AEP overland depths and hazard are shown in Image 1 and the 1% AEP mainstream depths and hazard are shown in Image 2 (both taken from Appendix G of the EIS – Figures B7 & B9 and C1 & C5).

Overland flooding refers to flooding due to runoff from the small upstream catchment entering the site and from within the site itself. Mainstream refers to flooding from Duck River overtopping its northern bank and entering the site.

The 1% AEP overland flooding indicates a high percentage of the site is inundated; however, the hazard is predominantly H1 (lowest category). There are two reasons why overland flow "appears" to cover the entire site. Firstly, the overland modelling has been undertaken using the "Rainfall on the Grid" or "Direct Rainfall" approach (refer Section 2.3.4 of Appendix G of the EIS). This approach means the entire study area is "wet" in TUFLOW (as it is in reality). However, for clarity depths below 50mm have been eliminated in all figures. This means that large parts of the site have depths of say 50mm to 100mm which will typically occur throughout Sydney in large open space areas in a 1% AEP event. Secondly, the existing site contained many low lying and bunded areas around tanks, this meant that water would pond across the existing site more than expected across similar large urban lots which were designed to accommodate overland flooding.

In design, the approach to management of overland flows has been achieved by directing runoff along roads and defined water conduits through effective grading of the site (i.e directs runoff downstream towards Duck River). A sub surface drainage system will also be constructed (which has not included in the design modelling as a requirement of Parramatta City Council was to assume all stormwater pipes are blocked – refer Point 7, Page 6 of Appendix G of the EIS), and will further reduce overland flow. The design therefore allows development to occur in a manner compatible with the overland flows from upstream.

Our view is that the existing site is not severely affected by flooding in the 1% AEP overland flow event and is typical of all large areas of gently sloping land with an upstream catchment in a 1% AEP event. Overland flow can be managed but can never be eliminated from such a large site with an upstream catchment.



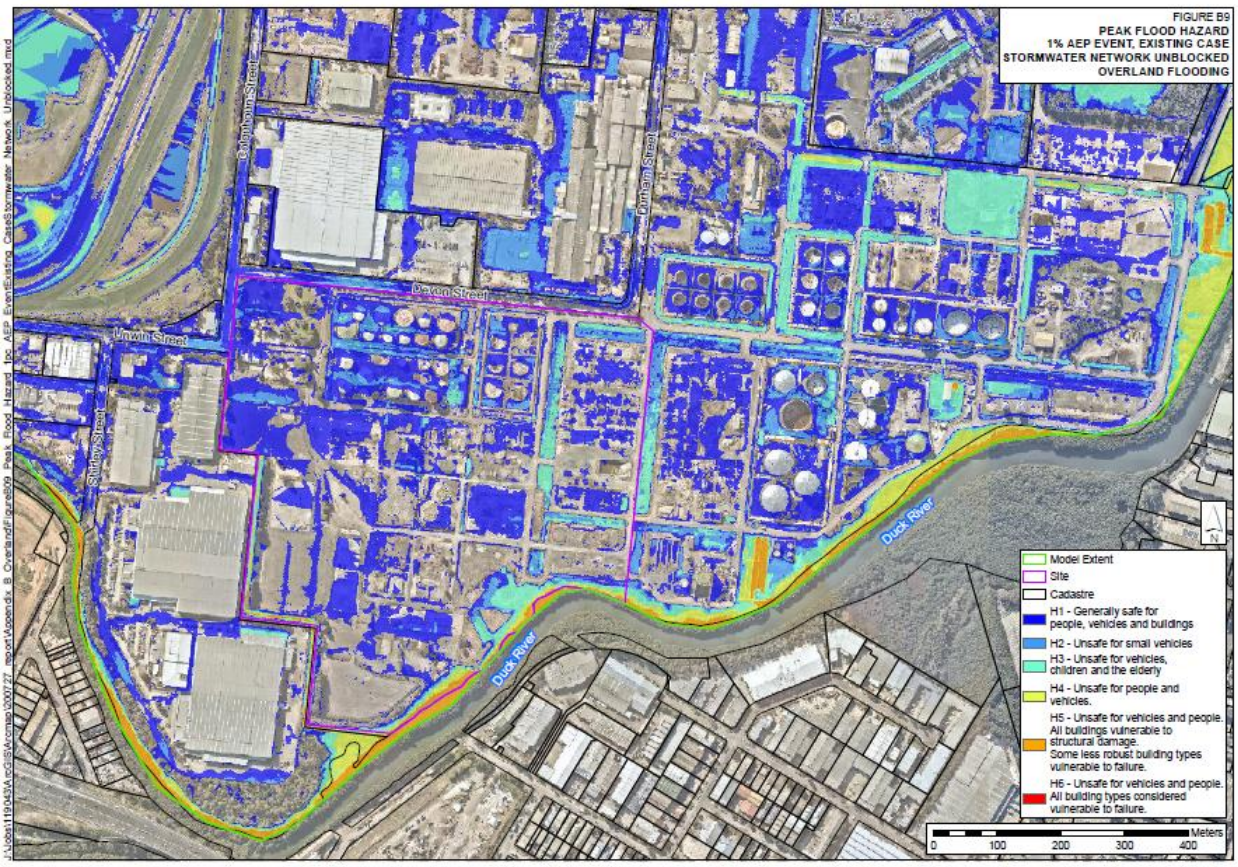
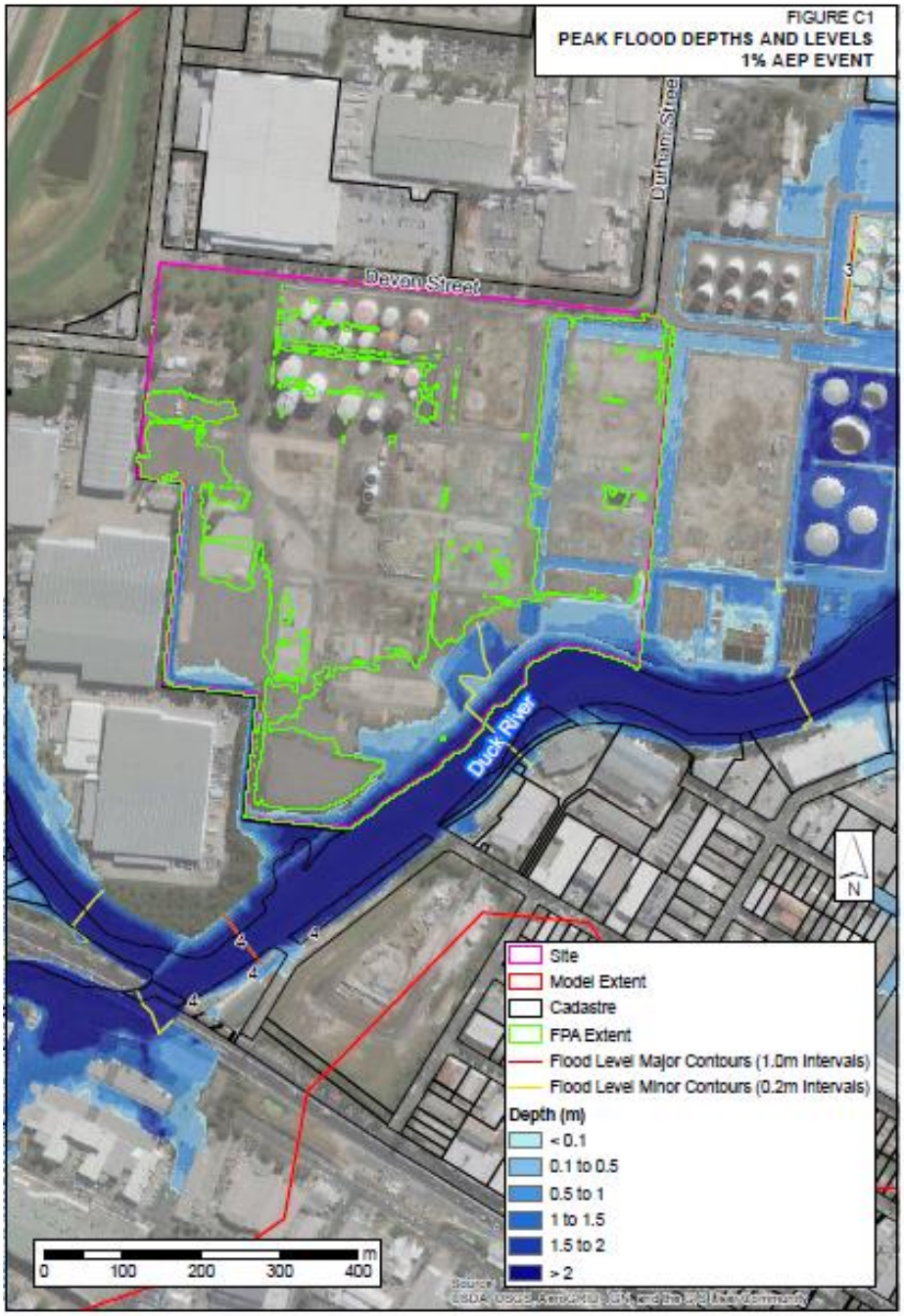


Image 1: 1% AEP Existing Overland Flooding depths (top) and Hazard (bottom) (Figures B7 & B9 from Appendix G of the EIS)


FIGURE C1
PEAK FLOOD DEPTHS AND LEVELS
1% AEP EVENT
Devon Street
Duck River
N
Site
Model Extent
Cadastre
FPA Extent
Flood Level Major Contours (1.0m Intervals)
Flood Level Minor Contours (0.2m Intervals)
Depth (m)
< 0.1
0.1 to 0.5
0.5 to 1
1 to 1.5
1.5 to 2
> 2
0
100
200
300
400
m

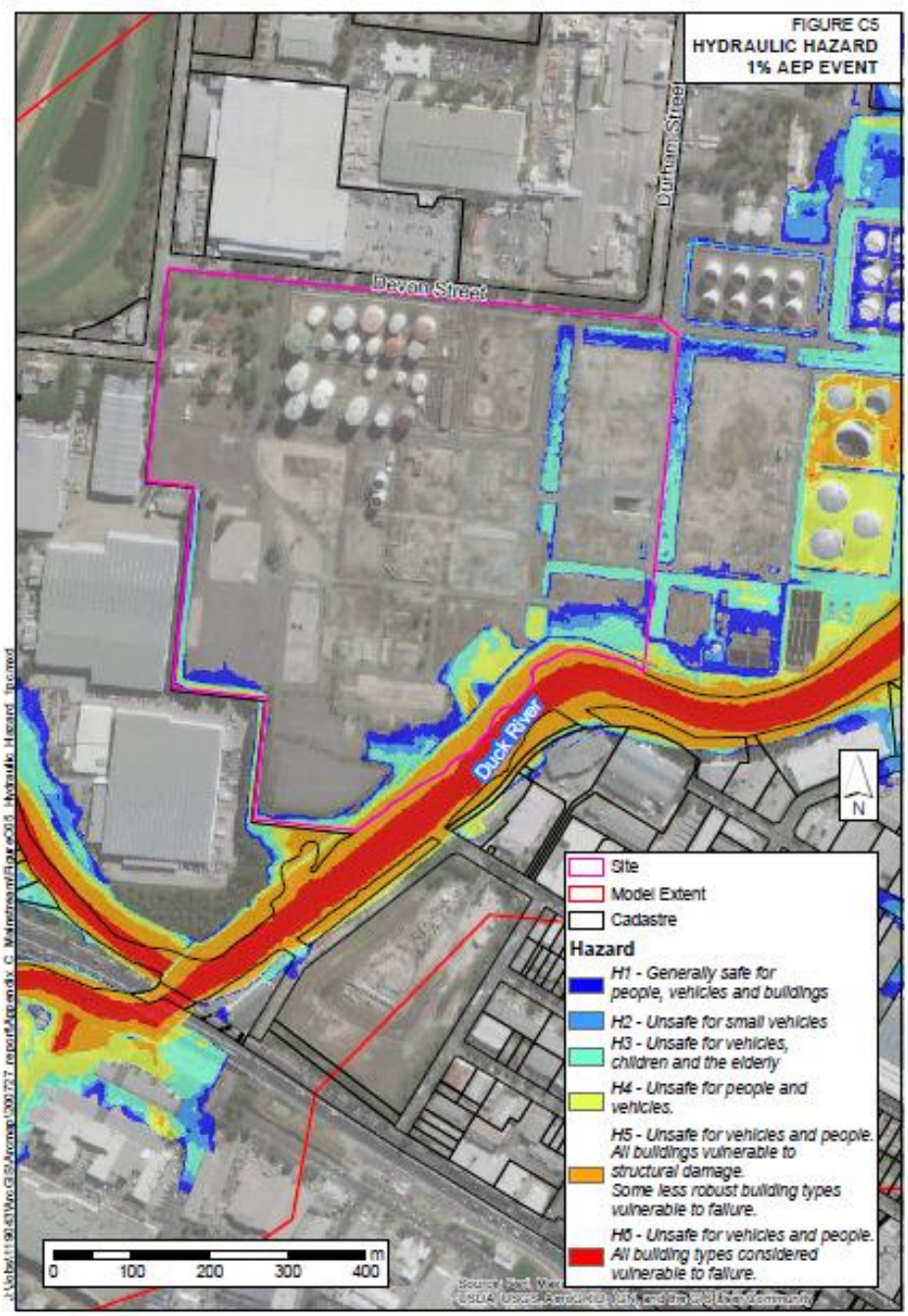


Image 2: 1% AEP Existing Mainstream Flooding Depths (top) and Hazard (bottom) (Figures C1 & C5 from Appendix G of the EIS)

The 1% AEP mainstream flooding is on the perimeter of Duck River and in excavated pipe channels in the north east part of the site. Development is not proposed in the 1% AEP floodplain on the perimeter of the Duck River, thus in a 1% AEP mainstream event there will be no increase in flood level, re-direction of flow or velocity on other 1% AEP floodplain users and nor will the proposed development be affected in a 1% AEP event. The north east part of the site is only shown as inundated as these were pipe channels (as part of the previous oil refinery works) filled by water entering along other low lying pipe channels. These will be filled to prevent inundation in this way. However, the total volume of temporary floodplain storage across the entire site remains the same for existing and design. Our view is therefore that the future land use is not on land severely affected by 1% AEP mainstream flooding in existing or design conditions. In larger

mainstream events the site will be affected as shown in Appendix G of the EIS (Figures C2, C3 & C4).

A Flood Evacuation and Flood Emergency Response Plan will be prepared for each land use activity on each lot (refer Page 25 of Appendix G of the EIS), however, it is agreed that this advice should have been clearly stated in the main section of Appendix G of the EIS. This plan can presently only be undertaken for the Downer site (Lot 6), as the use of the other sites is unknown.

1.2.3. Flooding in Events Greater than the 0.2% AEP

> In addition to this, increased flooding is expected at Devon, Colquhoun and Unwin Streets due to the proposed development and the impact to surrounding properties for larger flood events above 0.2% AEP up to the PMF event. Further consideration should be applied for flood events greater than 0.2% AEP given the significant depth of flooding for the PMF is reported to be 2m above ground surface levels.

A 0.2% AEP (or 1 in 500 year ARI event) is a very rare event. It is unknown in which design event (rarer than a 0.2% AEP) the proposed development will increase flood levels (outside the subject property) by greater than 10mm. Any development within the mainstream PMF floodplain will constrict flow paths and reduce the temporary floodplain storage, thus increasing flood levels, unless built on piers above the PMF level. As far as we are aware, no Council in Sydney requires building floors (except critical facilities) to be built on piers with floors above the PMF level. This development has nil flood affectation in events up to the 0.2% AEP and beyond (as noted above we do not know the design event which will first create an impact greater than 10mm outside the property – it could be a 1 in 1,000 year event or rarer). This is a much greater standard (0.2% AEP) than most Councils in Sydney which only require nil impact in the 1% AEP.

In a PMF mainstream event the increase in depth is of the order of 0.2m (refer Image 3 which is Figure C16A from Appendix G of the EIS). This increase in depth occurs as land above the mainstream 1% AEP flood level has been filled and large buildings placed on each Lot. Thus, the flow path across the site in the PMF has been constricted. To eliminate any increase in level in the PMF, all buildings would have to be on piers approximately 2m above the existing ground. This would make use of the site for commercial / industrial developments impractical and the land could only be used for flood compatible uses, such as recreation or open space. All buildings on all floodplains (e.g the Hawkesbury River floodplain), which have floor levels above the 1% AEP flood level will restrict flow paths and result in an increase in the PMF flood level.

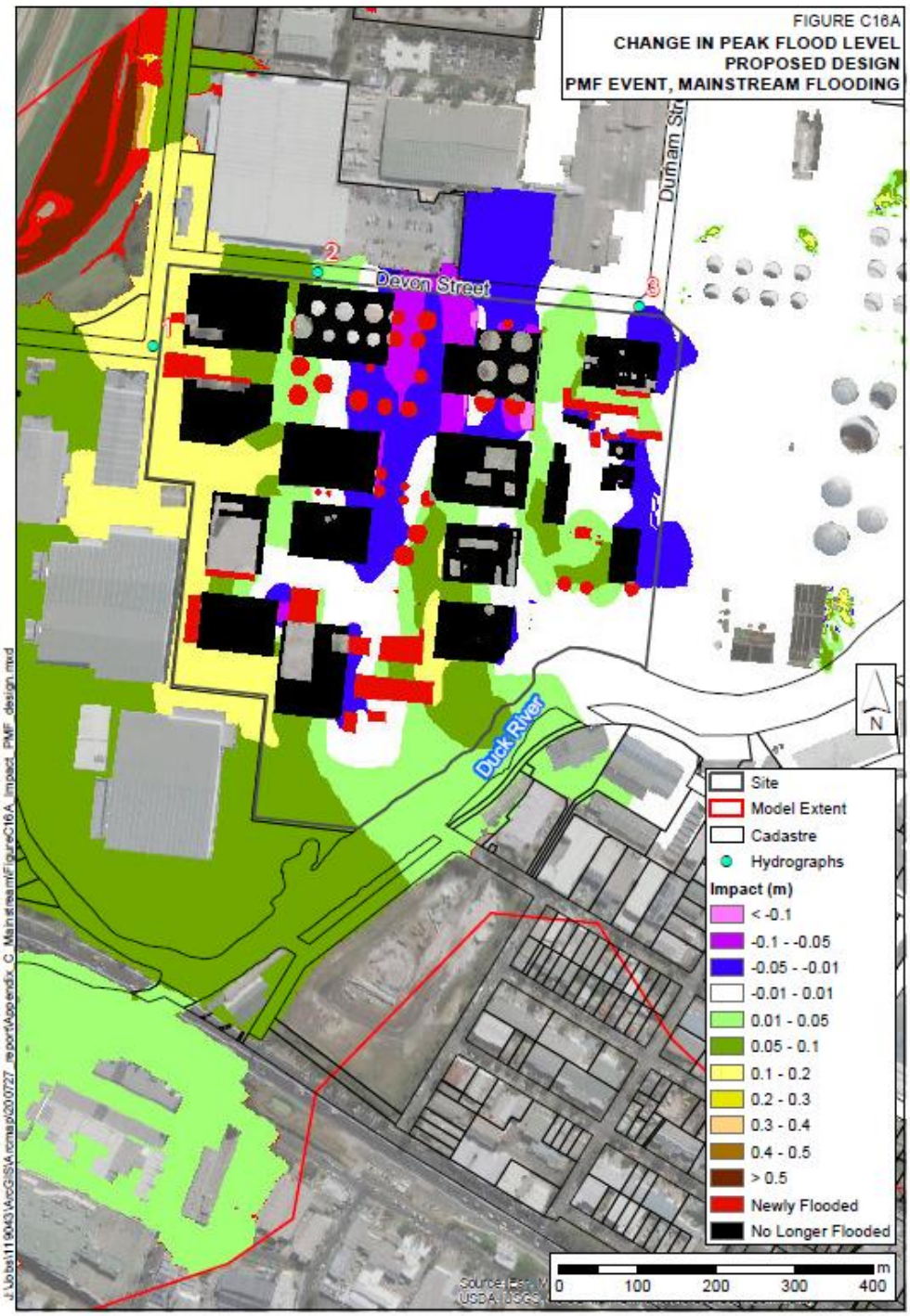


Image 3: Change in Mainstream Peak Flood Level in the PMF (copy of Figure C16A from Appendix G of the EIS)

It is agreed that 2m depth of water in the PMF over large parts of the site represents a significant increase in hazard to that experienced in the 1% AEP event (effectively nil depth in mainstream flooding). However, similar and greater depths will be experienced in the Parramatta CBD and on the Hawkesbury River floodplain much greater depths will be experienced in a PMF. The PMF event will cause significant damage and loss of life wherever it occurs in an urban (or rural) area. All-natural hazards (bush fires, tsunami, cyclones) of similar rarity to a PMF will cause similar levels of devastation.

To eliminate the flood risk in the PMF in the Parramatta CBD would require no further development. The proposed construction of the Power House Museum on the foreshore of the Parramatta River in the CBD has faced similar flooding issues, however we understand it is proceeding. In summary, best practice floodplain management has reduced the risk to life and property in these areas to what is considered reasonable. However, it is unrealistic to expect that urban development can be eliminated from affectation by floods or any of these other natural hazards.

1.2.4. Management of Flooding for Individual Lots

> It appears the report defers much of the management of the impact of flooding to future development applications for individual lots. The flood report should provide detail in designing the whole precinct to manage the severe flood conditions and flood waters to meet current standards - if this is possible. In addition, there is minimal information about overland flow paths on both the roads and swales and how the large volumes of displaced floodwaters will be accommodated.

It is not entirely correct to say that the management of the impact of flooding has been deferred to future DAs, as the management of overland flow and mainstream flooding across the site have been addressed. The proposed earthworks for the entire industrial estate have been designed to ensure the Downer development on Lot 6 and all future development on the rest of the industrial lots, will not be affected by, or will affect the 1% AEP mainstream or overland flood event on others. Thus, all future owners of the remaining land can develop with the full knowledge that mainstream and overland flooding matters have been adequately addressed. These owners would then only need to ensure that their works comply with the appropriate Parramatta City Council flood planning requirements and include a Flood Evacuation and Flood Emergency Response Plan (refer Section 1.2.9) for their development.

We would also not describe the site as “severe flood conditions”. Yes, overland flow crosses the site but as mentioned above, this will occur in all similar sites and the risk to life and consequent damages due to overland flow (even in a PMF) is manageable.

Image 4 (copy of Figure C15 from Appendix G of the EIS) below indicates that in a 0.2% AEP event, the majority of the proposed site is unaffected, thus in our view the site does not experience “severe flood conditions”. In a PMF the entire site would be inundated, as would the entire Parramatta CBD and large parts of Sydney CBD. It is impossible to implement flood management measures to eliminate or even reduce mainstream or overland design flood levels across the site. Overland flow will be accommodated within dedicated swales and along roadways, as it is in all urban areas. These are acceptable means of managing overland flow. Further details of the design of these overland flow paths are available from Costin Roe.

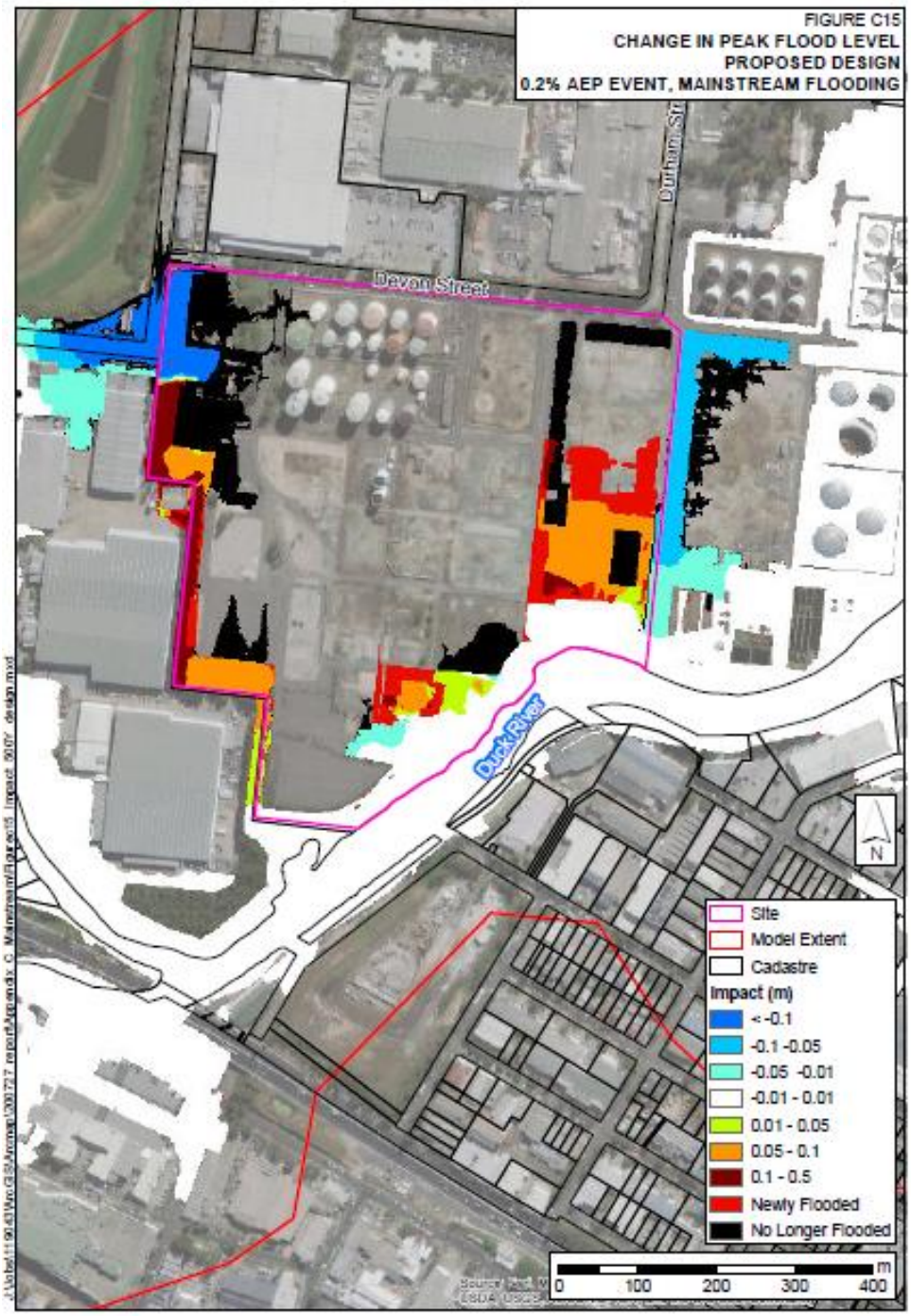


Image 4: Proposed Design: Inundation in a 0.2% AEP Mainstream Event (copy of Figure C15 from Appendix G of the EIS)

1.2.5. Evacuation and a Flood Emergency Response Plan

The report prepared by WMA recommends that evacuation should be undertaken prior to inundation of the road network. As part of preliminary comments with Council it is noted that the Applicant was requested to liaise with SES as it was considered that an Evacuation and a Flood Emergency Response Plan should be established for this high hazard flood site.

We agree that an Flood Evacuation and Flood Emergency Response Plan is required and will be prepared and submitted to DPIE prior to the commencement of operation of Downer's Stage 1

development on Lot 6 and prior to the operation of all future developments on the remainder of the proposed industrial lots.

Again, we disagree for the reasons provided above, that this is a high hazard flood site or should be referred to as exhibiting “severe flood conditions”. In a PMF event these conditions will apply, as they do in the Parramatta CBD and across Sydney. However, the risk to life and damages in events up to the 0.2% AEP are minimal (if not zero - refer Image 4 - copy of Figure C15 from Appendix G of the EIS) and thus this site is more suited to development than many other flood liable (as defined by the PMF extent) sites in the Sydney basin.

There is a risk to life and potential for damages on all flood liable land (as defined by the PMF extent), society must therefore agree upon what is an acceptable level of risk as they do for all other natural disasters. With the implementation of a Flood Evacuation and Flood Emergency Response Plan, all personnel will either be evacuated from the industrial estate well in advance of flood waters along the local road network or undertake “shelter in place”, thereby significantly reducing the risk of loss of life in a flood greater than a 0.2% AEP event.

1.2.6. H4 and H5 Hazard

> In addition, Figure C8 within the WMA Report showcases hydraulic hazard conditions for the proposed developed area to be predominantly H4 and H5. This indicates it is unsafe for people and vehicles and where structural damage to buildings and building failure is possible.

Figure C8 and Figure C21 (refer Image 5 and Image 6 – copy of Figure C8 and C21 from Appendix G of the EIS) shows the hazard in a PMF event for pre-development and design conditions respectively. Buildings and other structures or works on the Downer Lot 6 are set at the appropriate Parramatta City Council flood planning level.

As noted previously, a PMF event which has a probability of occurrence in any year of rarer than 1 in 100,000 (comparable probability of occurrence of say the South East Asia tsunami of December 2004 hitting Sydney) it is agreed that there will be risk to life issues and damage to buildings and equipment. However, this risk cannot be negated unless society prohibits development within the PMF extent. To do so would sterilise a large proportion of the urban area within the Sydney Basin.

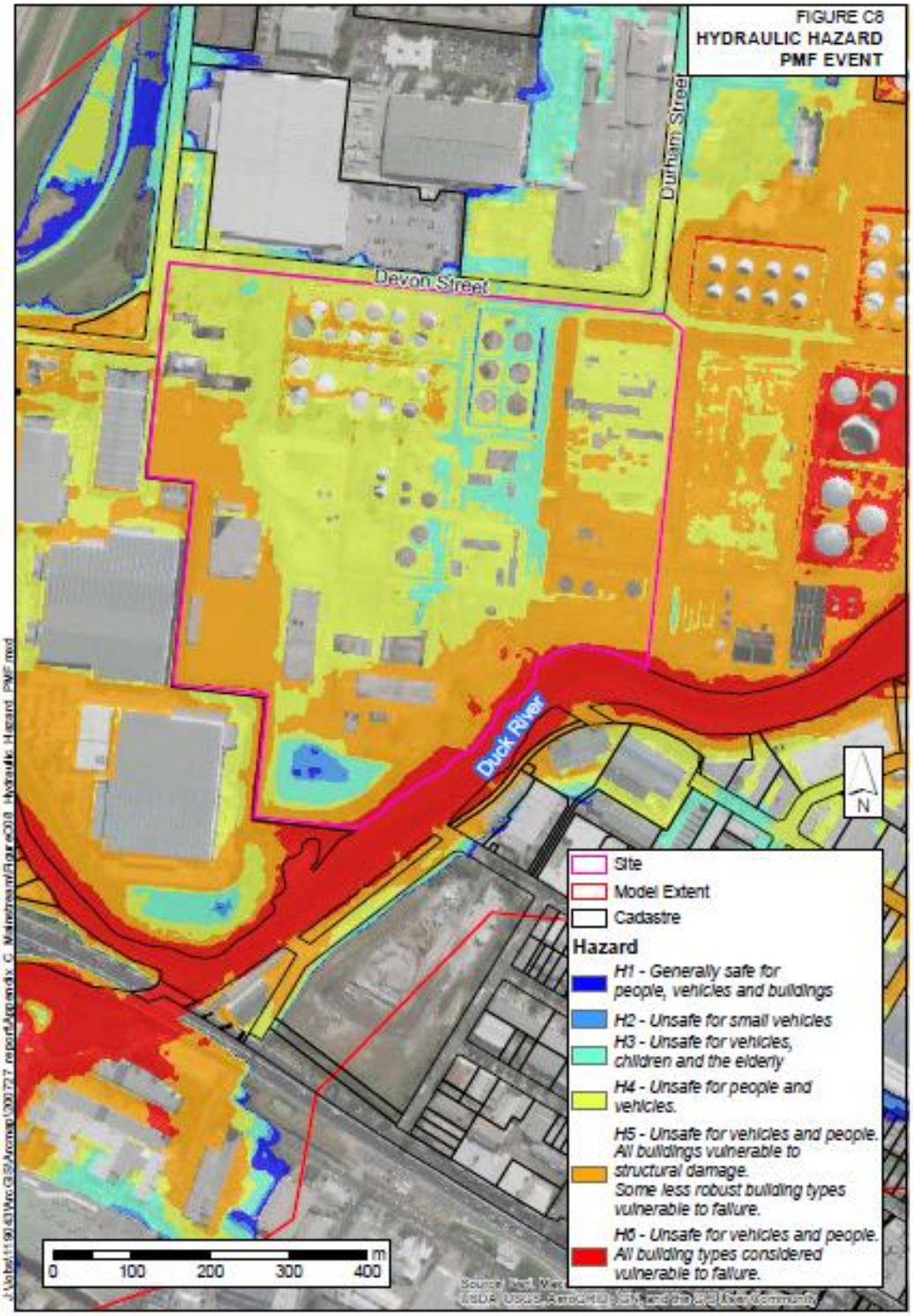


Image 5: Existing Conditions: Hazard in a PMF Mainstream Event (copy of Figure C8 from Appendix G of the EIS)

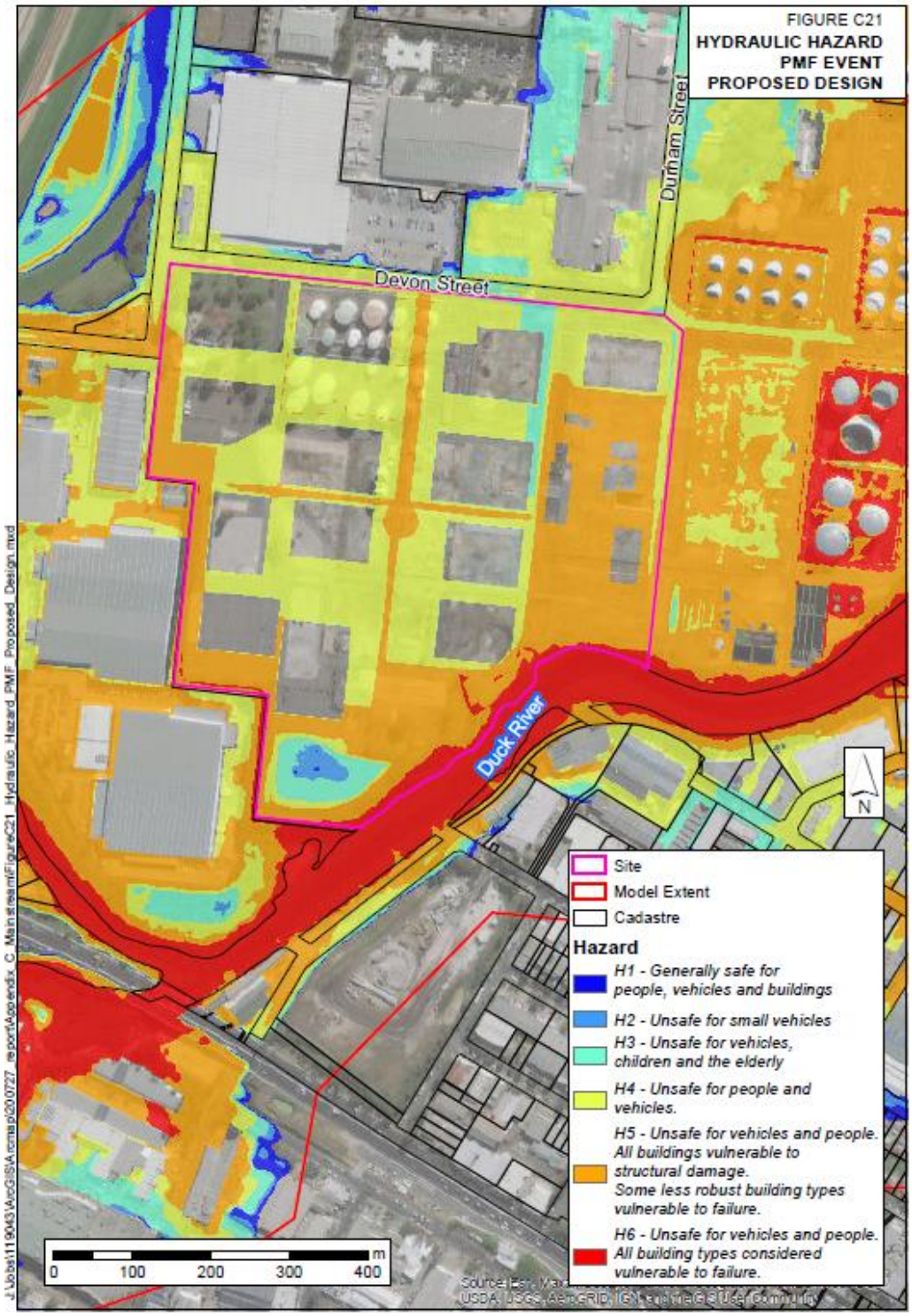


Image 6: Design Conditions: Hazard in a PMF Mainstream Event (copy of Figure C21 from Appendix G of the EIS)

1.2.7. Water Sensitive Urban Design

Similarly the surface water impact assessment does not address Council's pre-exhibition comments. Further detail is required concerning the site as a whole given the scope of the project. There are diagrams for erosion control sediment basins and the like, but no overall WSUD concept for this large tract of land that drains directly into the river.

WSUD and related stormwater issues will be addressed in Costin Roe's submission.

1.2.8. Anthropomorphic Climate Change Rainfall Increase

The WMA Water report also states that only increase rainfall subject to climate change has been considered and that *"The proposed design has not specifically considered a climate change rainfall increase as any increase can be accommodated within the freeboard allowance for building floors."* This is not considered an acceptable approach. The freeboard of 500 mm is intended to consider unknown impacts and acts as a factor of safety. Given that there are recommended guidelines for future change in climate it is recommended that this should be considered on top of the 500 mm freeboard requirement.

It is accepted that there are guidelines for rainfall increase in AR&R2019, however, as indicated in Appendix G of the EIS (Page 11) all modelling has assumed AR&R1987 rainfall and temporal patterns. Reasons were provided in Appendix G of the EIS why AR&R2019 was not adopted. Our main reason for not including a separate anthropomorphic climate change rainfall increase in the freeboard for the Downer Lot 6 is that Appendix G of the EIS indicates that the adoption of AR&R2019 methodology (as will be undertaken in the current Parramatta River Flood Study) will lower flood levels provided in Appendix G of the EIS due to reduced rainfall intensities of up to 20% (refer Image 7 – copy of Image 3 from Appendix G of the EIS).

Our recommendation is that for all future developments on the remaining lots on the property, the freeboard above the 1% AEP level should include a separate anthropomorphic climate change rainfall increase determined using the AR&R2019 methodology, with the 1% AEP design flood levels taken from the to be completed Parramatta River Flood Study prepared by Cardno for Parramatta City Council (this study should be completed early in 2021).

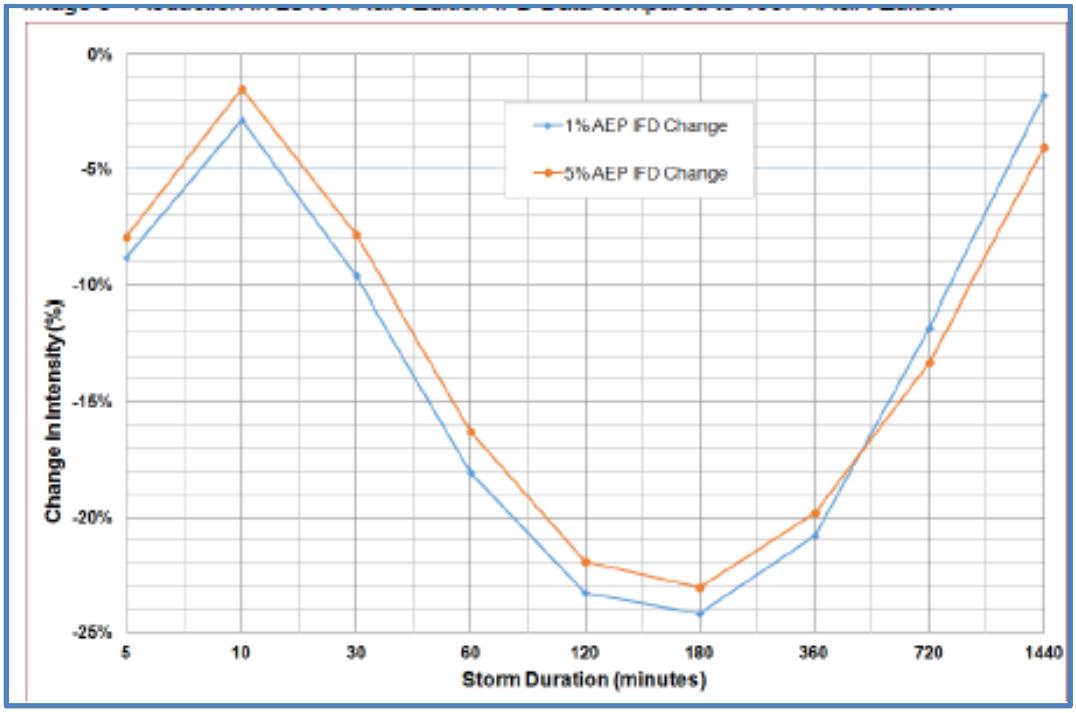


Image 7: Reduction in 2019 AR&R Edition IFD Data compared to 1987 AR&R Edition (copy of Image 3 from Appendix G of the EIS)

1.2.9. Recommendations of Parramatta City Council

It is recommended that the following matters are also addressed:

- A Flood and Water Management Strategy be developed for the site including overland flow, riverine flooding and Water Sensitive Urban Design; and
- An Evacuation and Flood Emergency Response Plan be provided in consultation with SES; and
- Implementation of Council's preliminary comments which were incorporated in the SEARs request and further comments dated 4.09.2020.

A Water Management Strategy will be provided in Costin Roe's report, this will include WSUD and the management of overland flows. The Flood Management Strategy is in summary: to not develop land below the existing 1% AEP flood level; to not increase flood levels outside the subject property in events up to (and beyond) the 0.2% AEP and to undertake a Flood Evacuation and Flood Emergency Response Plan for each property.

A Flood Evacuation and Flood Emergency Response Plan will be prepared and submitted to DPIE prior to the commencement of operation of Downer's Stage 1 development on Lot 6 and prior to the operation of all future developments on the remainder of the proposed industrial lots.

Council's comments dated 4.09.2020 will be addressed in Costin Roe's report.

1.3. Planning, Industry and Environment

> Flooding
> The Flooding Assessment (revision 3) prepared by WMA water dated 21 August 2020 has satisfactorily considered mainstream flooding from Duck River and Parramatta River and overland flooding for the full range of floods. In section 4.2 of Appendix G each of the DPIE EES Environmental Assessment Requirements has been addressed.
>
> Due to the consequences of flooding from rare to extreme floods the flood assessment recommends a Flood Emergency Plan is prepared in consultation with the NSW SES. EES supports this recommendation. Although not stated it is expected that this Plan will include education and awareness of owners and occupiers of each lot.
>
> Climate change due to rainfall increase has been investigated. Sea level rise impacts are not applicable. For overland flooding, this has been undertaken by considering a 10%, 20% and 30% rainfall increase. For mainstream flooding flood levels for the 0.5% and 0.2% AEP events have been adopted as a proxy. The proposed development has not been specifically designed to include a climate change rainfall increase as it is assumed that any increase in peak level would be within the freeboard allowance. EES considers that the freeboard should not be eroded to account for climate change impacts.

We agree that a Flood Emergency Plan should be prepared for each site and this will be undertaken (refer Section 1.2.9).

The issue of climate change due to rainfall increase and inclusion within the freeboard is discussed in Section 1.2.8.

1.4. Transport for NSW

> It is requested that the applicant:
>
> - Undertakes an assessment of cumulative traffic impacts, flooding and construction/operational noise and vibration impacts as part of the Response to Submissions;

Cumulative impact assessment in floodplain management was introduced because it was assumed that each development would provide some small incremental increase in flood level (which generally could not be accurately defined), and over time the cumulative impact of all these small increases would combine to produce a large cumulative impact. However, this reasoning has much less validity today, as Councils generally require nil (taken as < 10mm) impact in the 1% AEP event, and the modelling today can determine the hydraulic effects with a high degree of certainty. Thus, in theory there should be nil cumulative impact in the 1% AEP.

For the development under consideration there is nil (taken as < 10mm) increase in the 0.2% AEP event for mainstream flooding and nil in any event for overland flooding. If all other developments produce similar increases, there will only be a cumulative increase in events greater than the mainstream 0.2% AEP event.

It is likely that there will be a cumulative impact in events greater than the 0.2% AEP, as houses and other buildings will be constructed on land above the 1% AEP, thus constricting flow paths and reducing temporary floodplain storage. However, to model this we would require details of

the extent of likely future changes to the entire Parramatta River and Duck River catchments. This can only be provided by planning authorities and Councils.

1.5. Endeavour Energy

1.5.1. Increase in Flood Level

particular concern. Appendix G 'Flood Impact Assessment Report' the figures indicate there will be changes in the various flooding scenarios that will impact the as shown by the following example where an up to 50 mm increase in flood levels is indicated. In this regard Endeavour Energy believes that the proposed development of the site should not have any impact / increase in flood affectation of the surrounding area and appropriate measures should be incorporated on site to ensure this is achieved.

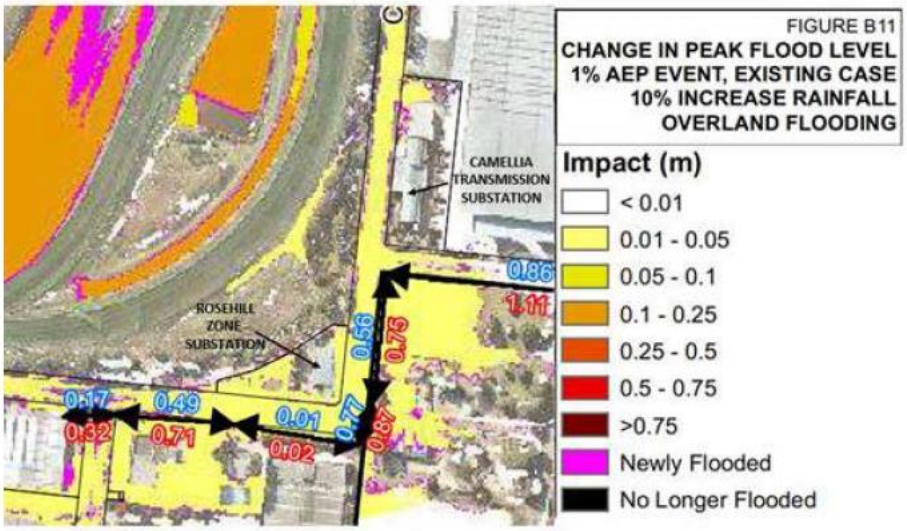


Figure B11 (taken from Appendix B of Appendix G of the EIS) above represents the impact of an assumed 10% anthropomorphic climate change increase in existing (ARR&R1987) rainfall intensity. Figure B12 and B13 (also from Appendix B of Appendix G of the EIS) represents the impact of a respective 20% and 30% increase to the existing rainfall intensity. These increases in rainfall intensity and resulting flood levels are not due to the proposed development and obviously cannot be mitigated by any form of mitigation works on the development site.

Figures B14 to Figure B17 (from Appendix B of Appendix G of the EIS) indicate that the proposed works on the site will reduce flood levels on Unwin and Colquhoun Streets for the 1% AEP to PMF overland flow events, thus benefitting those flood affected external land users.

1.5.2. General Flooding and Drainage Issues

- Flooding and Drainage

The electricity network required to service an area / development must be fit for purpose and meet the technical specifications, design, construction and commissioning standards based on Endeavour Energy's risk assessment associated with the implementation and use of the network connection / infrastructure for a flood prone site. Risk control has focused typically on avoiding the threat, but where this is not possible, reducing the negative effect or probability of flood damage to assets by implementing good design and maintenance practices.

Padmount substation cubicles are weatherproof not flood proof and the cable pits whilst designed to be self draining should not be subject to excessive ingress of water. Section 7 'Substation and switching stations' of Endeavour Energy's Mains Construction Instruction MCI 0006 'Underground distribution construction standards manual' provides the following details of the requirements for flooding and drainage in new padmount substation locations.

The above flood and drainage issues will be addressed by JDG Electrical in their detailed design of the electrical network for the project. The customer connection process is currently being completed and the development will adhere to all of Endeavour Energy's requirements including those associated with flooding and drainage, handed down by Endeavour Energy's Network Connections Branch.

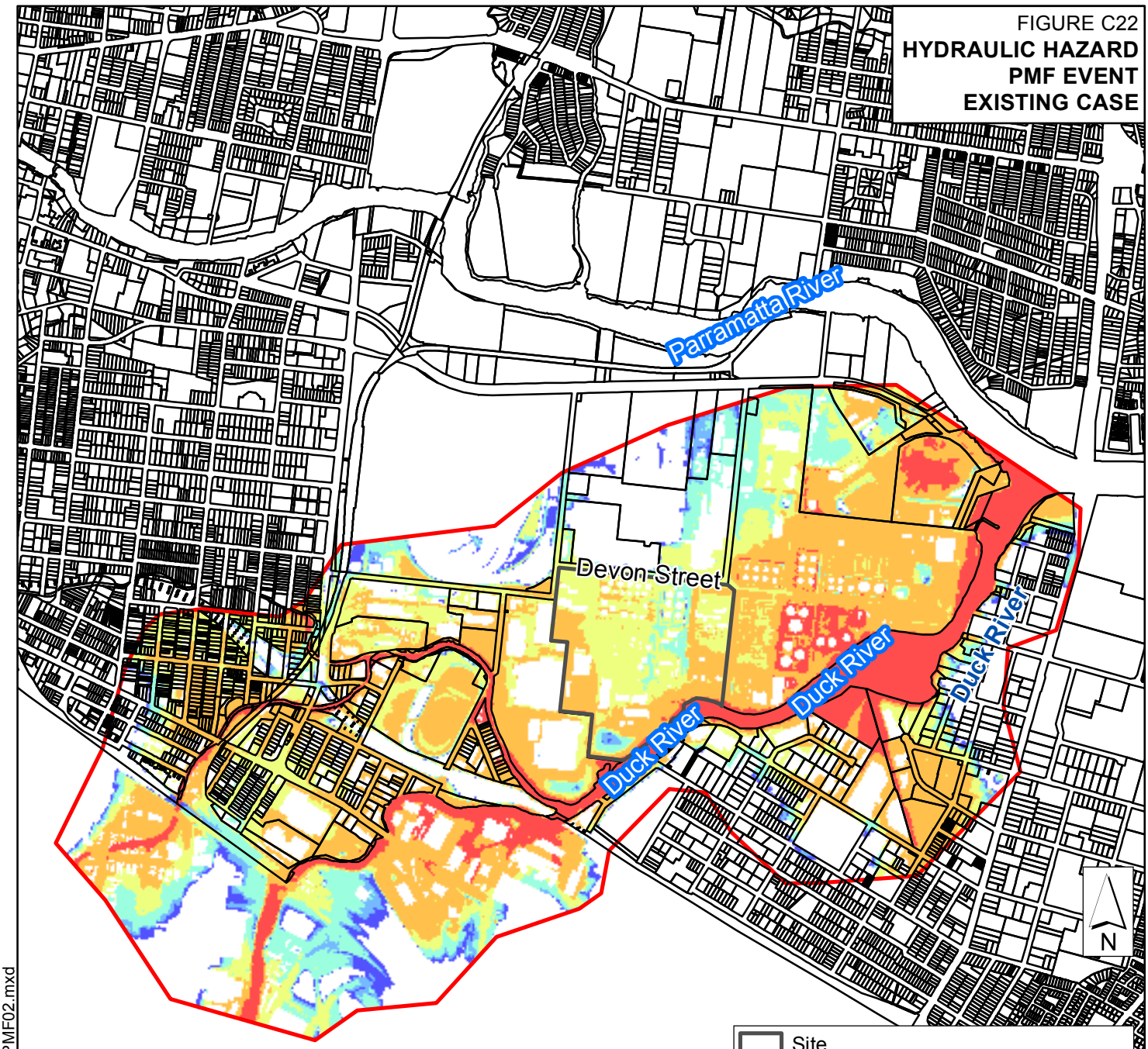
1.6. Additional Request by DPIE

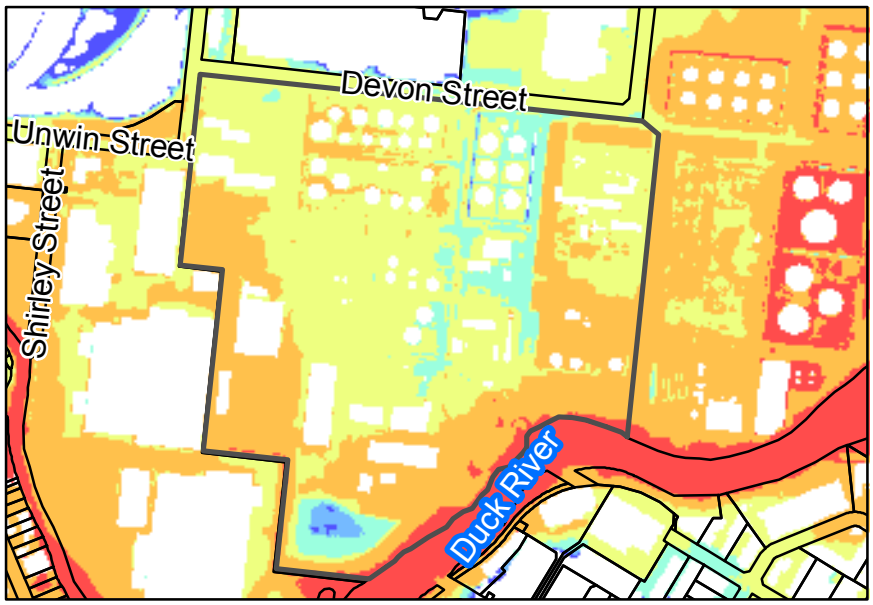
Subsequent to the submissions on the EIS, DPIE requested that further detail be provided on the change in hazard for the PMF event between existing and design. This information is provided on Figures C22 and C23 which are attached below (these were not provided in Appendix G of the EIS). These figures show that there are only very minor changes in the hazard from existing to design beyond the extent of the site (within the site there are changes due to the siting of the proposed development). Being minor these changes can only be seen by comparing the hazard mapping for existing and design shown in Image 8.



Image 8: Comparison of PMF Hazard figures for Existing (left) and Design (right) taken from Figures C22 and C23 shown below.

FIGURE C22
HYDRAULIC HAZARD
PMF EVENT
EXISTING CASE





Site
Model Extent
Cadastre

Hazard

H1 - Generally safe for people, vehicles and buildings

H2 - Unsafe for small vehicles

H3 - Unsafe for vehicles, children and the elderly

H4 - Unsafe for people and vehicles.

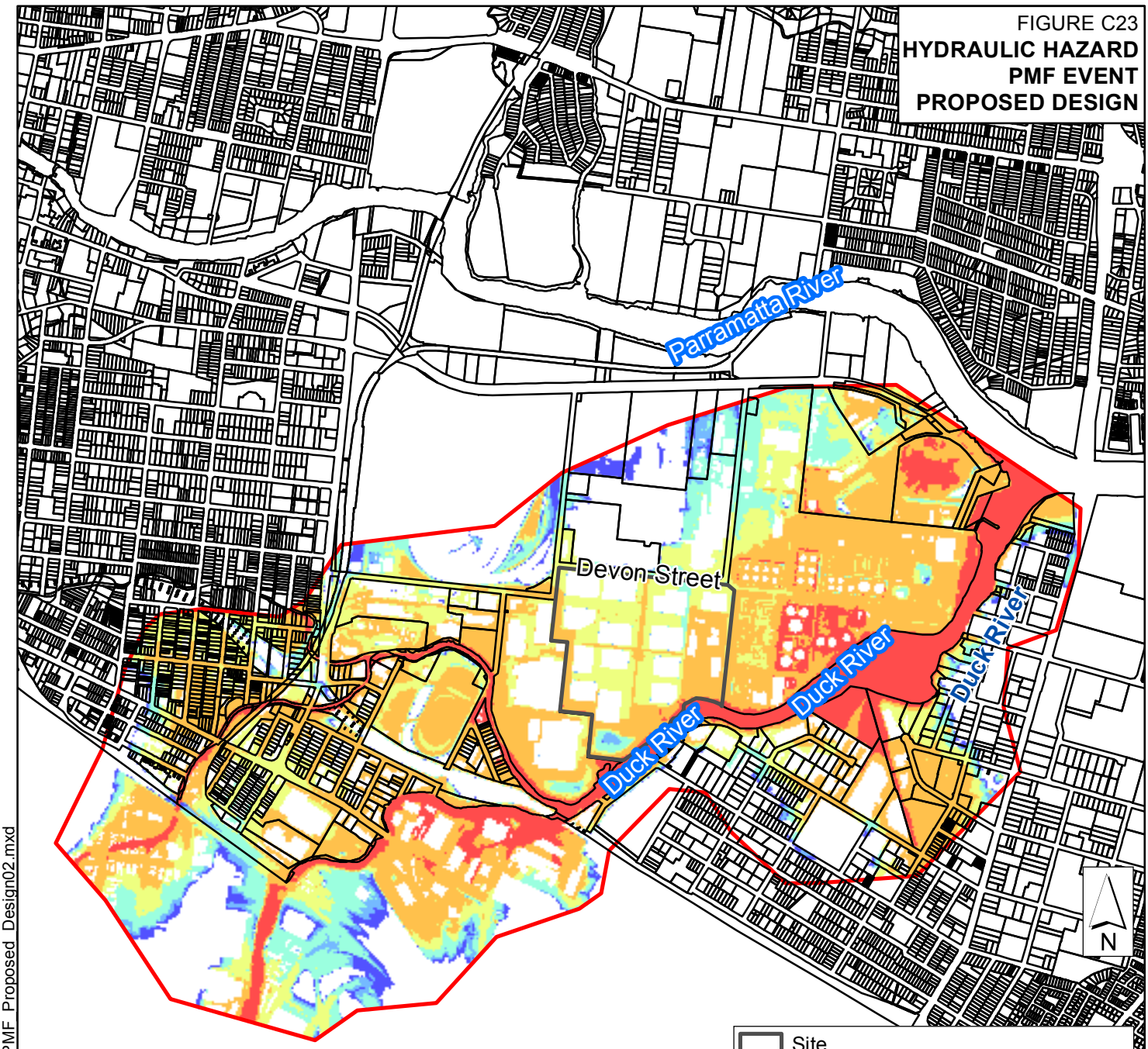
H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust building types vulnerable to failure.

H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

Kilometers
0 0.5 1 1.5 2

J:\Jobs\119043\ArcGIS\Arcmap\201113_Hazard\FigureC22_Hydraulic_Hazard_PMF02.mxd

FIGURE C23
HYDRAULIC HAZARD
PMF EVENT
PROPOSED DESIGN





Site
Model Extent
Cadastre

Hazard

H1 - Generally safe for people, vehicles and buildings

H2 - Unsafe for small vehicles

H3 - Unsafe for vehicles, children and the elderly

H4 - Unsafe for people and vehicles.

H5 - Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust building types vulnerable to failure.

H6 - Unsafe for vehicles and people. All building types considered vulnerable to failure.

Kilometers
0 0.5 1 1.5 2

J:\Jobs\119043\ArcGIS\Arcmap\201113 Hazard\FigureC23 Hydraulic Hazard PMF Proposed Design02.mxd



APPENDIX F

HAZARDS TECHNICAL RESPONSE

RESPONSE TO DPIE QUERIES ON EIS - HAZARD AND RISK

SEPP33 AND PHA

CENTRAL SYDNEY INDUSTRIAL ESTATE INCORPORATING DOWNER SUSTAINABLE ROAD RESOURCE CENTRE

VE PROPERTY PTY LTD AND DOWNER EDI WORKS PTY LTD

Rev	Date	Description	Prepared	Checked	Approved	Method of issue
A	10-Nov-2020	Draft	J. Polich	-	-	Email [PDF]
0	17-Nov-2020	Final Issue	J Polich	G Peach	G Peach	Email [PDF]

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This technical note is issued pursuant to an Agreement between SHERPA CONSULTING PTY LTD ('Sherpa Consulting') and VE Property Pty Ltd and Downer EDI Works Pty Ltd which agreement sets forth the entire rights, obligations and liabilities of those parties with respect to the content and use of the report.

Reliance by any other party on the contents of the technical note shall be at its own risk. Sherpa Consulting makes no warranty or representation, expressed or implied, to any other party with respect to the accuracy, completeness, or usefulness of the information contained in this technical note and assumes no liabilities with respect to any other party's use of or damages resulting from such use of any information, conclusions or recommendations disclosed in this technical note.

QA verified	**G Peach-**
Date	**17 Nov 2020**

Sherpa Consulting Pty Ltd (ABN 40 110 961 898)
Phone: 61 2 9412 4555
Web: www.sherpaconsulting.com

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1.2. Response to SEPP33 / PHA queries 3

1.3. Effect of layout changes on SEPP 33 / PHA 3

1. ADDITIONAL INFORMATION – RESPONSE ON HAZARDS AND RISK

1.1. Scope

Sherpa Consulting Pty Ltd prepared a combined SEPP33 assessment and PHA report[1] for inclusion in the EIS for Downer Sustainable Road Resource Centre, or Stage 1 of VE Property's (VEP) Central Sydney Industrial Estate.

The EIS was submitted and additional information sought by the approval agencies.

Since the EIS was submitted the design has progressed including layout changes and relocation of some storages of Dangerous Goods (DG). Downer has requested that Sherpa provide responses to the queries raised and also assess whether the changes in design result in any changes to the hazard analysis conclusions.

This technical note covers:

- Sherpa's responses to queries raised relating to the SEPP33 / PHA report by DPIE's Hazard Branch.
- An assessment of the effect of the proposed changes in layout on the SEPP33 and PHA outcomes.

1.2. Response to SEPP33 / PHA queries

Table 1.1 summarises the responses to DPIE's hazard team queries. No changes are required to the hazard analysis and these items do not affect the SEPP33 / PHA outcomes.

1.3. Effect of layout changes on SEPP 33 / PHA

Table 1.3 summarises the changes to layout as relevant to DGs and associated SEPP33 screening / PHA. Figure 1.1 shows the updated layout and Figure 1.2 the layout included in the EIS / PHA. DG locations are highlighted in colour as per the legend on both figures.

There has been minimal change to the total quantities of DGs as presented in Table 4.1 of the SEPP33 / PHA report. As summarised in Table 1.2 the main change is that the kerosene storage volume has been slightly reduced and the self bunded tank has been relocated from the Emulsion Additives storage area (i.e. close to corrosives and combustibles) to the bituminous emulsion product storage area (non DG, not combustible).

These changes do not affect the conclusions of the SEPP33 / PHA and an update is not required.

[1] Included in EIS, Reference: Sherpa Consulting Pty Ltd, "SEPP 33 AND PRELIMINARY HAZARD ANALYSIS CENTRAL SYDNEY INDUSTRIAL ESTATE INCORPORATING DOWNER SUSTAINABLE ROAD RESOURCE CENTRE VE PROPERTY PTY LTD AND DOWNER EDI WORKS PTY LTD doc ref 21344 RP-002," Rev D, 14 Aug 2020.

Table 1.1: Response to DPIE hazard branch queries (email from DPIE David Koppers 21 Oct 2020)

Item	Response	Effect on SEPP33 screening / PHA
Further information is requested on the usage of kerosene and diesel in the bitumen manufacturing process. It is unclear in the submitted document that whether kerosene or diesel will be blended with the bitumen and subsequently lowering the flash point of the bitumen blend below 60 degrees Celsius in the blending tank and product tanks. Please clarify:	Diesel will be used only for refuelling trucks and other vehicles/plant/equipment. It is not used for bitumen blending / product formulation. Kerosene will not be blended directly with bitumen in bulk. Kerosene will be pre-mixed into the soap line (aqueous phase). The soap/kerosene mixture is non-flammable due to the water component. This aqueous phase is then blended / emulsified with bitumen in the mill to produce bituminous emulsion products. The bituminous emulsion product has a flash point greater than 60^{o}C throughout the process.	None
a. Whether kerosene will be blended with bitumen. If so, what is the percentage composition of kerosene bitumen mixture	As noted above there is no direct blending of kerosene into bitumen. Typical bituminous emulsion product compositions are 10-15% kerosene, 20-25% bitumen and 60-70% soap / water.	None

Item	Response	Effect on SEPP33 screening / PHA
b. In accordance with Applying SEPP 33, if C1 product is to store together with Class 3 material, the entire inventory will be considered as Class 3 material. It is noted that the storage of Class 3 and C1 is fairly separated from the submitted document. Refer to above point a, please clarify whether the process of bitumen manufacturing may potentially introduce Class 3 material in the system and thus deem the processing inventory (including those in the pipework) as Class 3, and update the PHA if necessary ; and	Bituminous emulsion products are not Dangerous Goods and are not combustible. Due to the aqueous component blended with kerosene, the flashpoint of the product cannot drop below the bitumen flashpoint. Therefore, the only Class 3 system is the kerosene storage tank and the small amount of piping leading to the soap line. The kerosene piping route to the soap solution area is separated from combustibles / bitumen locations.	None
c. Provide MSDS of the final bitumen products for Department's confirmation on its DG classification.	Refer to example Safety Data Sheet (SDS) for bituminous emulsion products in Attachment A. These products are not DGs as per the SDS. The SDS notes that although the material is non-combustible, evaporation of water from the mixture, caused by heat of a nearby fire, may produce floating layers of combustible substances.	None

Table 1.2: SEPP 33 hazardous material storage screening summary – comparison with EIS/ PHA

DG			Quantities in tonnes			Potentially hazardous?	Location changed?
Class	**PG**	**Materials**	**Stored as per EIS (i.e. PHA Table 4.1)**	**Quantity change**	**Threshold in Applying SEPP 33 guideline, Ref [1]**		
2.1	-	Various, e.g. acetylene	0.035	No change	0.1[(a)]	No	Yes DG Store / gas cage relocated as per Figure 1.1
2.1	-	LPG	0.018	No change	10 [(b)]	No	
3	II	Various hydrocarbons	1.6	No change	5[(c)]	No	
3	III	Kerosene	48	45 (Reduced 65kL to 60kL tank size)	Quantity is 'potentially hazardous' if less than 8 m from site boundary. Separation distance is more than 25m from tank to boundary. [(c). (d)]	No	Yes Relocated self-bunded kerosene tank to bituminous emulsion product storage area as per Figure 1.1
8	II/III	Mixed corrosives, primarily caustic materials	62	No change	25[(e)]	Yes	No change (in Emulsion Additive Store)

Notes:

(a) Class 2.1 - pressurised (excluding LPG)

(b) Class 2.1 LPG aboveground

(c) Class 3 PGII and PGIII not cumulated as PG III is in a different separately contained location (more than 50m away)

(d) Flammables in self-bunded aboveground storage

(e) Class 8 PGII is the most hazardous subclass. PGIII is stored in the same location as PGII, so PGIII quantity is cumulated with PGII and the total compared to PGII screening threshold.

(f) Miscellaneous dangerous substances and articles, including environmentally hazardous substances (Class 9) are not considered to be hazardous.

Table 1.3: Layout changes – effect on SEPP33 screening / PHA

Change	Effect	Effect on SEPP33 screening / PHA outcomes.
Kerosene storage (60kL / 45 tonnes) relocated from Emulsion Additive storage area to bituminous emulsion product compound (see 'kerosene (60KL) x 1 tank' on Figure 1.1). Kerosene tank will be vertical self-bunded design instead of horizontal self-bunded tank.	New location is approximately 28m from the site boundary (compared to 40m in previous design). This remains compliant with AS1940:2017 Table 5.4 separation distance to offsite protected place (8.5m for 60kL). Increased separation from bitumen storage (combustible) further reducing any escalation risk. Kerosene is in self bunded tank. Adjacent bituminous emulsion products are non-combustible. Therefore, SEPP33 screening remains based on kerosene inventory only. Total Class 3PGIII exceeds SEPP 33 threshold for evaluation however is separated by more than 8 m from site boundary as per Applying SEPP33 guideline Figure 9 so not potentially hazardous.	None
Small quantities of DG (gases, small packages) for lab use consolidated to new dedicated location to west of lab (see 'gas cage and DG store' on Figure 1.1). Lab store will be used for non DG substances.	Greater separation distance to lab. Reduced separation distance to western boundary (approximately 10m rather than 20m) but still meets AS1940 and AS3780 requirements (maximum is 5m from AS9140 Table 4.1 for up to 4kL of Class 3 PGI or PGII).	None

Change	Effect	Effect on SEPP33 screening / PHA outcomes.
Downer is discussing two options for the location of the three electrical substations required on the site. 1) Locate all three substations on the western edge of the front elevated pad at the northern end of Lot 6; or 2) Relocate two of the substations adjacent to the asphalt plant within the Downer site (between the RAP cold feeders and the lime delivery area) and retain one of the substations on the western edge of the front elevated pad at the northern end of Lot 6 (see 'substation' on Figure 1.1.	New location is well separated from DGs therefore: • No identified scenarios involving DG that could affect / damage the relocated substations. • Substations not an ignition source for Class 3 flammables	None

Figure 1.1: Updated Layout

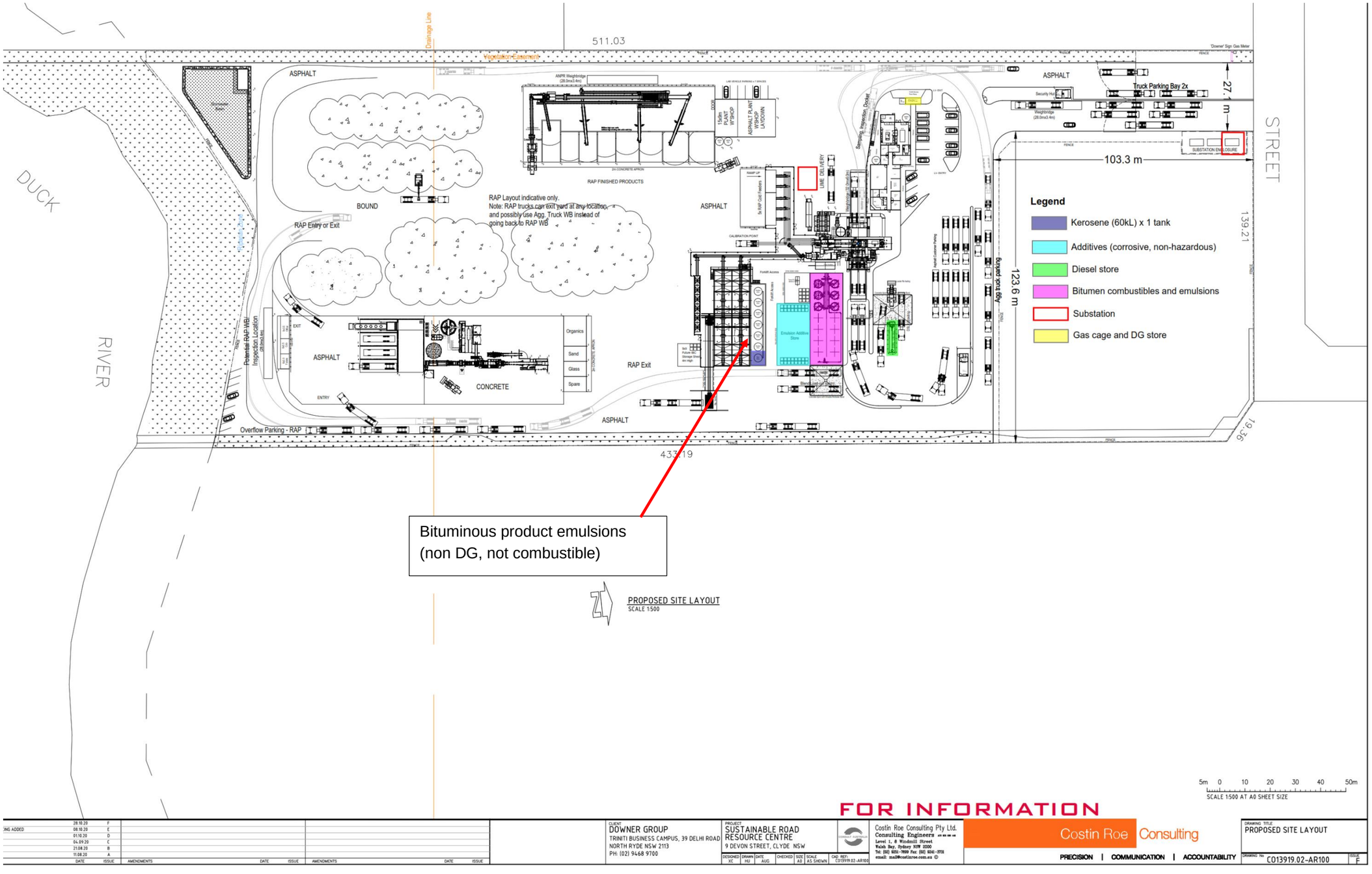
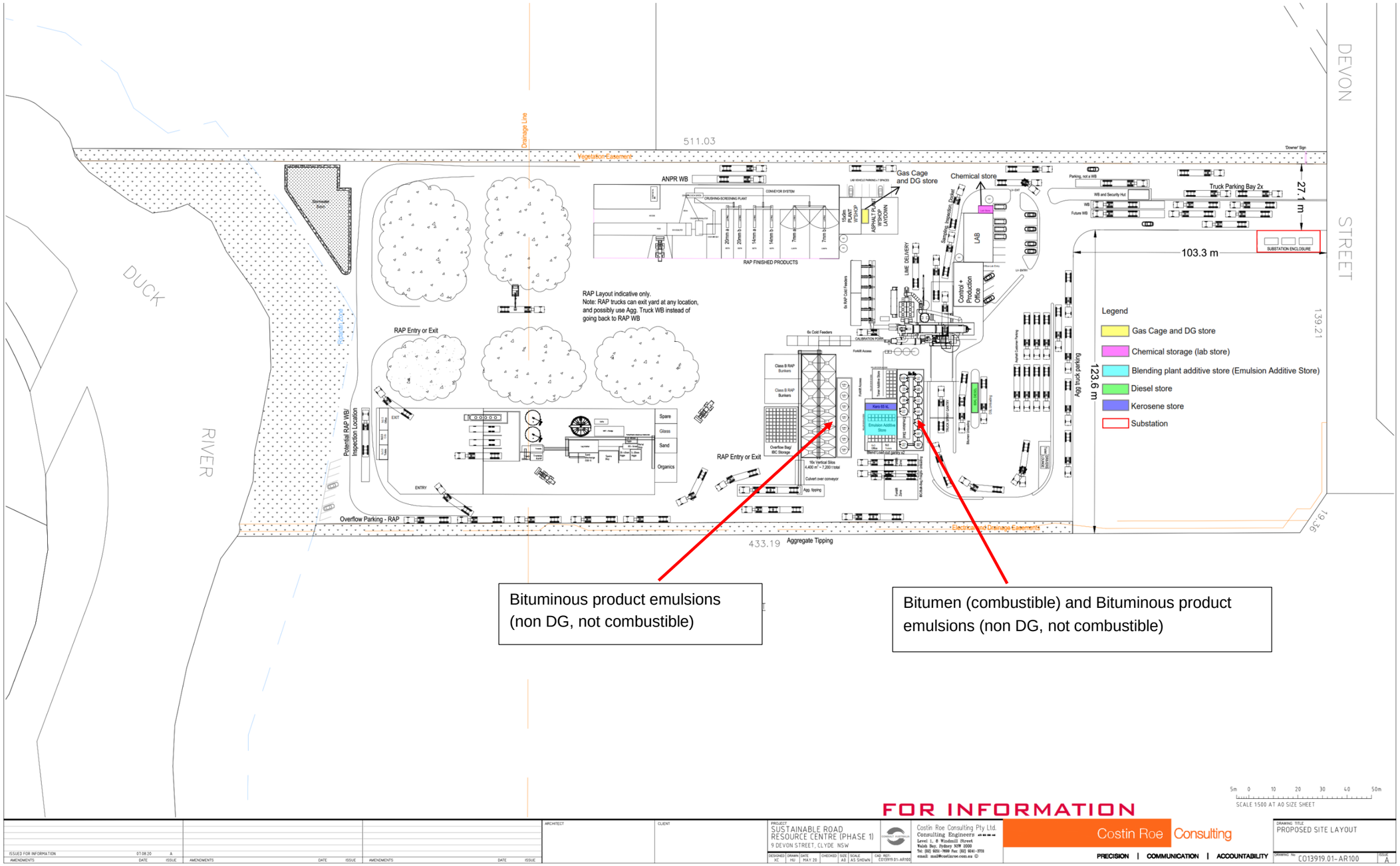


Figure 1.2: Layout from EIS SEPP33 / PHA



ATTACHMENT A: Bituminous Emulsion Product Example MSDS

ASS
Downer Australia

Chemwatch Hazard Alert Code: **1**

Chemwatch: **12983**
Version No: **10.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **01/11/2019**
Print Date: **04/11/2020**
L.GHS.AUS.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	ASS
Synonyms	Not Available
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Bitumen emulsion for road surfacing applications. In normal use, product is to be sprayed at ambient temperature with no heat.

Details of the supplier of the safety data sheet

Registered company name	**Downer Australia**
Address	Triniti Business Campus, 39 Delhi Road, North Ryde NSW 2113 Australia
Telephone	0294689700
Fax	Not Available
Website	www.downergroup.com
Email	info@downergroup.com

Emergency telephone number

Association / Organisation	**Chemwatch ER**	**CHEMWATCH EMERGENCY RESPONSE**
Emergency telephone numbers	**02 9186 1132**	**+61 2 9186 1132**
Other emergency telephone numbers	**Not Available**	**+61 1800 951 288**

Once connected and if the message is not in your prefered language then please dial 01

SECTION 2 Hazards identification

Classification of the substance or mixture

NON-HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

ChemWatch Hazard Ratings

	Min	Max
Flammability	1	
Toxicity	0	
Body Contact	0	
Reactivity	1	
Chronic	0	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	Not Applicable
Classification [1]	Not Applicable

Label elements

Hazard pictogram(s)	Not Applicable
Signal word	**Not Applicable**

Hazard statement(s)

Not Applicable

Supplementary statement(s)

Page 1 continued...

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	60-80	bitumen emulsions, general
8052-42-4		bitumen (petroleum)
Not Available	0.1-5	Ingredients determined not to be hazardous
7732-18-5	30-50	water

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

The product contains a substantial proportion of water, therefore there are no restrictions on the type of extinguishing media which may be used. Choice of extinguishing media should take into account surrounding areas.
Though the material is non-combustible, evaporation of water from the mixture, caused by the heat of nearby fire, may produce floating layers of combustible substances.
In such an event consider:

- foam.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Use water delivered as a fine spray to control fire and cool adjacent area.
Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ On combustion, may emit toxic fumes of carbon monoxide (CO).

Continued...

	Combustion products include: carbon dioxide (CO_2) hydrogen chloride phosgene nitrogen oxides (NO_x) sulfur oxides (SO_x) other pyrolysis products typical of burning organic material.
HAZCHEM	Not Applicable

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	Moderate hazard. ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ No smoking, naked lights or ignition sources. ▸ Store in a cool, dry, well-ventilated area.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	▸ Avoid reaction with oxidising agents

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	bitumen (petroleum)	Bitumen fumes	5 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
bitumen (petroleum)	Petroleum asphalt; (Bitumen)	30 mg/m3	330 mg/m3	2,000 mg/m3

Ingredient	Original IDLH	Revised IDLH
bitumen emulsions, general	Not Available	Not Available
bitumen (petroleum)	Not Available	Not Available
water	Not Available	Not Available

MATERIAL DATA

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.

Continued...

Personal protection	
Eye and face protection	‣ Safety glasses with side shields ‣ Chemical goggles. ‣ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience.
Skin protection	See Hand protection below
Hands/feet protection	The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care. ‣ Wear chemical protective gloves, e.g. PVC. ‣ Wear safety footwear or safety gumboots, e.g. Rubber
Body protection	See Other protection below
Other protection	‣ Overalls. ‣ P.V.C apron. ‣ Barrier cream. ‣ Skin cleansing cream.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
ASS

Material	CPI
BUTYL	A
NEOPRENE	A
VITON	A
NATURAL RUBBER	C
PVA	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	A-AUS P2	-	A-PAPR-AUS / Class 1 P2
up to 50 x ES	-	A-AUS / Class 1 P2	-
up to 100 x ES	-	A-2 P2	A-PAPR-2 P2 ^

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Black liquid with a mild odour; emulsifies in water.

Physical state	Liquid	**Relative density (Water = 1)**	1.01
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	0	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	100	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	>150	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available

Continued...

Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	2.4 @ 20C	**Gas group**	Not Available
Solubility in water	Partly miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	>2.0	**VOC g/L**	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Not normally a hazard due to non-volatile nature of product
Ingestion	Overexposure is unlikely in this form. Ingestion may result in nausea, abdominal irritation, pain and vomiting
Skin Contact	The liquid may be miscible with fats or oils and may degrease the skin, producing a skin reaction described as non-allergic contact dermatitis. The material is unlikely to produce an irritant dermatitis as described in EC Directives . Open cuts, abraded or irritated skin should not be exposed to this material
Eye	Although the liquid is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).
Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Chronic exposure to bitumen/ asphalt fumes, over extended periods, may cause central nervous system depression, and liver and kidney changes. Chronic bitumen/ asphalt poisoning may result in a decrease in the number of white and red blood cells. [*ILO Encyclopedia*] Prolonged contact with bitumens may produce irritation, inflammation, dermatitis, acne-like lesions, keratoses, melanosis and photosensitisation. Animal inhalation studies do NOT yield sufficient evidence of bitumen/ asphalt-induced lung cancer.

ASS	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
bitumen emulsions, general	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
bitumen (petroleum)	**TOXICITY**	**IRRITATION**
	Not Available	Eye: no adverse effect observed (not irritating)[1]
		Skin: no adverse effect observed (not irritating)[1]
water	**TOXICITY**	**IRRITATION**
	Oral (rat) LD50: >90000 mg/kg[2]	Not Available
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

BITUMEN (PETROLEUM)	Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.

Continued...

BITUMEN EMULSIONS, GENERAL & BITUMEN (PETROLEUM) & WATER	No significant acute toxicological data identified in literature search.

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✗
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

SECTION 12 Ecological information

Toxicity

ASS

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

bitumen emulsions, general

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

bitumen (petroleum)

Endpoint	Test Duration (hr)	Species	Value	Source
LC50	96	Fish	>1-mg/L	2
EC50	72	Algae or other aquatic plants	>1-mg/L	2
NOEL	504	Crustacea	>=1-mg/L	2

water

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
water	LOW (KOC = 14.3)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:
- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use.
- **DO NOT** allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

Continued...

SECTION 14 Transport information

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

bitumen emulsions, general is found on the following regulatory lists

Not Applicable

bitumen (petroleum) is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B : Possibly carcinogenic to humans

water is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

National Inventory Status

National Inventory	Status
Australia - AIIC	Yes
Australia - Non-Industrial Use	No (bitumen (petroleum); water)
Canada - DSL	Yes
Canada - NDSL	No (bitumen (petroleum); water)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (bitumen (petroleum))
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - ARIPS	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 Other information

Revision Date	01/11/2019
Initial Date	01/11/2009

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level

Continued...

LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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TEL (+61 3) 9572 4700.

Cationic Rapid Set Emulsion
Downer Australia

Chemwatch Hazard Alert Code: **1**

Chemwatch: **6608-33**
Version No: **7.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **01/11/2019**
Print Date: **04/11/2020**
L.GHS.AUS.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	Cationic Rapid Set Emulsion
Synonyms	Not Available
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Bitumen emulsion for the binding/stabilisation of haul and unsealed roads. In normal use, product is to be sprayed at ambient temperature with no heat. Use according to manufacturer's directions.

Details of the supplier of the safety data sheet

Registered company name	**Downer Australia**
Address	Triniti Business Campus, 39 Delhi Road, North Ryde NSW 2113 Australia
Telephone	0294689700
Fax	Not Available
Website	www.downergroup.com
Email	info@downergroup.com

Emergency telephone number

Association / Organisation	**Chemwatch ER**	**CHEMWATCH EMERGENCY RESPONSE**
Emergency telephone numbers	**02 9186 1132**	**+61 2 9186 1132**
Other emergency telephone numbers	**Not Available**	**+61 1800 951 288**

Once connected and if the message is not in your prefered language then please dial 01

SECTION 2 Hazards identification

Classification of the substance or mixture

NON-HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

ChemWatch Hazard Ratings

	Min	Max
Flammability	1	
Toxicity	0	
Body Contact	1	
Reactivity	0	
Chronic	0	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	Not Applicable
Classification [1]	Not Applicable

Label elements

Hazard pictogram(s)	Not Applicable
Signal word	**Not Applicable**

Hazard statement(s)

Not Applicable

Page 1 continued...

Supplementary statement(s)

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	60-80	bitumen emulsions, general
8052-42-4		bitumen (petroleum)
64742-81-0	<10	kerosene, (petroleum), hydrodesulfurised
Not Available	0.1-5	Ingredients determined not to be hazardous
7732-18-5	30-50	water

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

The product contains a substantial proportion of water, therefore there are no restrictions on the type of extinguishing media which may be used. Choice of extinguishing media should take into account surrounding areas.
Though the material is non-combustible, evaporation of water from the mixture, caused by the heat of nearby fire, may produce floating layers of combustible substances.
In such an event consider:

- foam.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid reaction with oxidising agents

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Use water delivered as a fine spray to control fire and cool adjacent area.

Continued...

Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ On combustion, may emit toxic fumes of carbon monoxide (CO). Other combustion products include: carbon dioxide (CO_2) nitrogen oxides (NOx) sulfur oxides (SOx) other pyrolysis products typical of burning organic material.
HAZCHEM	Not Applicable

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Contain and absorb spill with sand, earth, inert material or vermiculite.
Major Spills	Moderate hazard. ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ No smoking, naked lights or ignition sources. ▸ Store in a cool, dry, well-ventilated area.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	▸ Avoid reaction with oxidising agents

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	bitumen (petroleum)	Bitumen fumes	5 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
bitumen (petroleum)	Petroleum asphalt; (Bitumen)	30 mg/m3	330 mg/m3	2,000 mg/m3

Ingredient	Original IDLH	Revised IDLH
bitumen emulsions, general	Not Available	Not Available
bitumen (petroleum)	Not Available	Not Available
kerosene, (petroleum), hydrodesulfurised	Not Available	Not Available
water	Not Available	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
kerosene, (petroleum), hydrodesulfurised	E	≤ 0.1 ppm

Continued...

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
Notes:	*Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.*	

MATERIAL DATA

NOTE H: Special requirements exist in relation to classification and labelling of this substance. This note applies to certain coal- and oil -derived substances and to certain entries for groups of substances in Annex VI. European Union (EU) List of harmonised classification and labelling hazardous substances, Table 3.1, Annex VI, Regulation (EC) No 1272/2008 (CLP) - up to the latest ATP

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care.
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. ▸ Skin cleansing cream.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
Cationic Rapid Set Emulsion

Material	CPI
BUTYL	A
NEOPRENE	A
VITON	A
NATURAL RUBBER	C
PVA	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	A-AUS P2	-	A-PAPR-AUS / Class 1 P2
up to 50 x ES	-	A-AUS / Class 1 P2	-
up to 100 x ES	-	A-2 P2	A-PAPR-2 P2 ^

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Continued...

Appearance	Black liquid; mixes with water.

Physical state	Liquid	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Not normally a hazard due to non-volatile nature of product
Ingestion	Overexposure is unlikely in this form. Ingestion may result in nausea, abdominal irritation, pain and vomiting
Skin Contact	Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.
Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Chronic exposure to bitumen/ asphalt fumes, over extended periods, may cause central nervous system depression, and liver and kidney changes. Chronic bitumen/ asphalt poisoning may result in a decrease in the number of white and red blood cells. [*ILO Encyclopedia*] Prolonged contact with bitumens may produce irritation, inflammation, dermatitis, acne-like lesions, keratoses, melanosis and photosensitisation. Animal inhalation studies do NOT yield sufficient evidence of bitumen/ asphalt-induced lung cancer.

Cationic Rapid Set Emulsion	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
bitumen emulsions, general	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
bitumen (petroleum)	**TOXICITY**	**IRRITATION**
	Not Available	Eye: no adverse effect observed (not irritating)[1]
		Skin: no adverse effect observed (not irritating)[1]
kerosene, (petroleum), hydrodesulfurised	**TOXICITY**	**IRRITATION**
	Inhalation (rat) LC50: >5.2 mg/l/4H[2]	Eye: no adverse effect observed (not irritating)[1]

Continued...

	Oral (rat) LD50: >5000 mg/kg[2]	Skin: adverse effect observed (irritating)[1]
water	**TOXICITY**	**IRRITATION**
	Oral (rat) LD50: >90000 mg/kg[2]	Not Available
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

BITUMEN (PETROLEUM)	Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
KEROSENE, (PETROLEUM), HYDRODESULFURISED	Studies indicate that normal, branched and cyclic paraffins are absorbed from the mammalian gastrointestinal tract and that the absorption of n-paraffins is inversely proportional to the carbon chain length,with little absorption above C30. With respect to the carbon chain lengths likely to be present in mineral oil, n-paraffins may be absorbed to a greater extent that iso- or cyclo-paraffins. The major classes of hydrocarbons have been shown to be well absorbed by the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with dietary lipids. The dependence of hydrocarbon absorption on concomitant triglyceride digestion and absorption,is known as the "hydrocarbon continuum hypothesis", and asserts that a series of solubilising phases in the intestinal lumen, created by dietary triglycerides and their digestion products, afford hydrocarbons a route to the lipid phase of the intestinal absorptive cell (enterocyte) membrane. The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. For "kerosenes" **Acute toxicity:** Oral LD50s for three kerosenes (Jet A, CAS No. 8008-20-6 and CAS No. 64742-81-0) ranged from > 2 to >20 g/kg The dermal LD50s of the same three kerosenes were all >2.0 g//kg. Inhalation LC50 values in Sprague-Dawley rats for straight run kerosene (CAS No. 8008-20-6) and hydrodesulfurised kerosene (CAS No. 64742-81-0) were reported to be > 5 and > 5.2 mg/l, respectively. No mortalities in rats were reported in rats when exposed for eight hours to saturated vapor of deodorised kerosene (probably a desulfurised kerosene). Six hour exposures of cats to the same material produced an LC50 of >6.4 mg/l When tested in rabbits for skin irritation, straight run kerosene (CAS No. 8008-20-6) produced “moderate” to “severe” irritation.
BITUMEN EMULSIONS, GENERAL & BITUMEN (PETROLEUM) & WATER	No significant acute toxicological data identified in literature search.

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✗
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

SECTION 12 Ecological information

Toxicity

Cationic Rapid Set Emulsion	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
bitumen emulsions, general	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
bitumen (petroleum)	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	LC50	96	Fish	>1-mg/L	2
	EC50	72	Algae or other aquatic plants	>1-mg/L	2
	NOEL	504	Crustacea	>=1-mg/L	2
kerosene, (petroleum), hydrodesulfurised	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	LC50	96	Fish	18mg/L	2
	EC50	48	Crustacea	1.4mg/L	2
	EC50	72	Algae or other aquatic plants	3.7mg/L	2
	NOEL	96	Algae or other aquatic plants	0.2mg/L	2
water	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**

Continued...

	Not Available	Not Available	Not Available	Not Available	Not Available

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
kerosene, (petroleum), hydrodesulfurised	LOW (BCF = 159)
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
water	LOW (KOC = 14.3)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate: ▸ Reduction ▸ Reuse ▸ Recycling ▸ Disposal (if all else fails) This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. ▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Where in doubt contact the responsible authority. ▸ Recycle wherever possible. ▸ Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified. ▸ Dispose of by: burial in a land-fill specifically licensed to accept chemical and / or pharmaceutical wastes or incineration in a licensed apparatus (after admixture with suitable combustible material). ▸ Decontaminate empty containers.

SECTION 14 Transport information

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

bitumen emulsions, general is found on the following regulatory lists

Not Applicable

bitumen (petroleum) is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B : Possibly carcinogenic to humans

kerosene, (petroleum), hydrodesulfurised is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

Continued...

water is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

National Inventory Status

National Inventory	Status
Australia - AIIC	Yes
Australia - Non-Industrial Use	No (bitumen (petroleum); kerosene, (petroleum), hydrodesulfurised; water)
Canada - DSL	Yes
Canada - NDSL	No (bitumen (petroleum); kerosene, (petroleum), hydrodesulfurised; water)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (bitumen (petroleum))
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	No (kerosene, (petroleum), hydrodesulfurised)
Vietnam - NCI	Yes
Russia - ARIPS	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 Other information

Revision Date	01/11/2019
Initial Date	30/05/2007

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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TEL (+61 3) 9572 4700.

ECOFLEX 65 - 75
Downer Australia

Chemwatch Hazard Alert Code: **1**

Chemwatch: **6608-21**
Version No: **8.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **01/11/2019**
Print Date: **04/11/2020**
L.GHS.AUS.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	ECOFLEX 65 - 75
Synonyms	Not Available
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Use according to manufacturer's directions.

Details of the supplier of the safety data sheet

Registered company name	**Downer Australia**
Address	Triniti Business Campus, 39 Delhi Road, North Ryde NSW 2113 Australia
Telephone	0294689700
Fax	Not Available
Website	www.downergroup.com
Email	info@downergroup.com

Emergency telephone number

Association / Organisation	**Chemwatch ER**	**CHEMWATCH EMERGENCY RESPONSE**
Emergency telephone numbers	**02 9186 1132**	**+61 2 9186 1132**
Other emergency telephone numbers	**Not Available**	**+61 1800 951 288**

Once connected and if the message is not in your prefered language then please dial 01

SECTION 2 Hazards identification

Classification of the substance or mixture

NON-HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

ChemWatch Hazard Ratings

	Min	Max
Flammability	1	
Toxicity	0	
Body Contact	1	
Reactivity	1	
Chronic	0	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	Not Applicable
Classification [1]	Not Applicable

Label elements

Hazard pictogram(s)	Not Applicable
Signal word	**Not Applicable**

Hazard statement(s)

Not Applicable

Supplementary statement(s)

Page 1 continued...

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	60-80	bitumen emulsions, general
8052-42-4		bitumen (petroleum)
64742-81-0	<10	kerosene, (petroleum), hydrodesulfurised
Not Available	0.1-5	Ingredients determined not to be hazardous
7732-18-5	30-50	water

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation. ▸ Immediately drench burn area in cold running water. ▸ If hot bitumen adheres to the skin, **DO NOT** attempt to remove it (it acts as a sterile dressing). ▸ For burns to the head and neck and trunk, apply cold wet towels to the burn area, and change frequently to maintain cooling. ▸ Cooling should be maintained for no longer than thirty minutes. ▸ When hot bitumen completely encircles a limb, it may have a tourniquet effect and should be split as it cools. ▸ Transport to hospital or doctor.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

The product contains a substantial proportion of water, therefore there are no restrictions on the type of extinguishing media which may be used. Choice of extinguishing media should take into account surrounding areas.
Though the material is non-combustible, evaporation of water from the mixture, caused by the heat of nearby fire, may produce floating layers of combustible substances.
In such an event consider:

▸ foam.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard.

Continued...

	▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Use water delivered as a fine spray to control fire and cool adjacent area.
Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ On combustion, may emit toxic fumes of carbon monoxide (CO). Combustion products include: carbon dioxide (CO_2) sulfur oxides (SOx) other pyrolysis products typical of burning organic material.
HAZCHEM	Not Applicable

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	Moderate hazard. ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps. ▸ **DO NOT** allow clothing wet with material to stay in contact with skin
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ No smoking, naked lights or ignition sources. ▸ Store in a cool, dry, well-ventilated area.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	▸ Avoid reaction with oxidising agents

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	bitumen (petroleum)	Bitumen fumes	5 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
bitumen (petroleum)	Petroleum asphalt; (Bitumen)	30 mg/m3	330 mg/m3	2,000 mg/m3

Ingredient	Original IDLH	Revised IDLH
bitumen emulsions, general	Not Available	Not Available
bitumen (petroleum)	Not Available	Not Available
kerosene, (petroleum), hydrodesulfurised	Not Available	Not Available
water	Not Available	Not Available

Occupational Exposure Banding

Continued...

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
kerosene, (petroleum), hydrodesulfurised	E	≤ 0.1 ppm
Notes:	*Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.*	

MATERIAL DATA

NOTE H: Special requirements exist in relation to classification and labelling of this substance. This note applies to certain coal- and oil -derived substances and to certain entries for groups of substances in Annex VI. European Union (EU) List of harmonised classification and labelling hazardous substances, Table 3.1, Annex VI, Regulation (EC) No 1272/2008 (CLP) - up to the latest ATP

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care. ▸ **DO NOT** use solvent to clean the skin
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. ▸ Skin cleansing cream.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
***"*Forsberg Clothing Performance Index".**
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
ECOFLEX 65 - 75

Material	CPI
BUTYL	A
NEOPRENE	A
VITON	A
NATURAL RUBBER	C
PVA	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	A-AUS P2	-	A-PAPR-AUS / Class 1 P2
up to 50 x ES	-	A-AUS / Class 1 P2	-
up to 100 x ES	-	A-2 P2	A-PAPR-2 P2 ^

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

Continued...

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Black liquid; mixes with water.

Physical state	Liquid	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Not normally a hazard due to non-volatile nature of product
Ingestion	Overexposure is unlikely in this form. Ingestion may result in nausea, abdominal irritation, pain and vomiting
Skin Contact	Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.
Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Chronic exposure to bitumen/ asphalt fumes, over extended periods, may cause central nervous system depression, and liver and kidney changes. Chronic bitumen/ asphalt poisoning may result in a decrease in the number of white and red blood cells. [*ILO Encyclopedia*] Prolonged contact with bitumens may produce irritation, inflammation, dermatitis, acne-like lesions, keratoses, melanosis and photosensitisation. Animal inhalation studies do NOT yield sufficient evidence of bitumen/ asphalt-induced lung cancer.

ECOFLEX 65 - 75	**TOXICITY**	**IRRITATION**
	Not Available	Not Available

Continued...

bitumen emulsions, general	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
bitumen (petroleum)	**TOXICITY**	**IRRITATION**
	Not Available	Eye: no adverse effect observed (not irritating)[1]
		Skin: no adverse effect observed (not irritating)[1]
kerosene, (petroleum), hydrodesulfurised	**TOXICITY**	**IRRITATION**
	Inhalation (rat) LC50: >5.2 mg/l/4H[2]	Eye: no adverse effect observed (not irritating)[1]
	Oral (rat) LD50: >5000 mg/kg[2]	Skin: adverse effect observed (irritating)[1]
water	**TOXICITY**	**IRRITATION**
	Oral (rat) LD50: >90000 mg/kg[2]	Not Available
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

BITUMEN (PETROLEUM)	Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
KEROSENE, (PETROLEUM), HYDRODESULFURISED	Studies indicate that normal, branched and cyclic paraffins are absorbed from the mammalian gastrointestinal tract and that the absorption of n-paraffins is inversely proportional to the carbon chain length,with little absorption above C30. With respect to the carbon chain lengths likely to be present in mineral oil, n-paraffins may be absorbed to a greater extent that iso- or cyclo-paraffins. The major classes of hydrocarbons have been shown to be well absorbed by the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with dietary lipids. The dependence of hydrocarbon absorption on concomitant triglyceride digestion and absorption,is known as the "hydrocarbon continuum hypothesis", and asserts that a series of solubilising phases in the intestinal lumen, created by dietary triglycerides and their digestion products, afford hydrocarbons a route to the lipid phase of the intestinal absorptive cell (enterocyte) membrane. The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. For "kerosenes" **Acute toxicity:** Oral LD50s for three kerosenes (Jet A, CAS No. 8008-20-6 and CAS No. 64742-81-0) ranged from > 2 to >20 g/kg The dermal LD50s of the same three kerosenes were all >2.0 g//kg. Inhalation LC50 values in Sprague-Dawley rats for straight run kerosene (CAS No. 8008-20-6) and hydrodesulfurised kerosene (CAS No. 64742-81-0) were reported to be > 5 and > 5.2 mg/l, respectively. No mortalities in rats were reported in rats when exposed for eight hours to saturated vapor of deodorised kerosene (probably a desulfurised kerosene). Six hour exposures of cats to the same material produced an LC50 of >6.4 mg/l When tested in rabbits for skin irritation, straight run kerosene (CAS No. 8008-20-6) produced “moderate” to “severe” irritation.
BITUMEN EMULSIONS, GENERAL & BITUMEN (PETROLEUM) & WATER	No significant acute toxicological data identified in literature search.

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✗
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

SECTION 12 Ecological information

Toxicity

ECOFLEX 65 - 75	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
bitumen emulsions, general	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
bitumen (petroleum)	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	LC50	96	Fish	>1-mg/L	2
	EC50	72	Algae or other aquatic plants	>1-mg/L	2

Continued...

	NOEL	504	Crustacea	>=1-mg/L	2

kerosene, (petroleum), hydrodesulfurised				
Endpoint	**Test Duration (hr)**	**Species**	**Value**	**Source**
LC50	96	Fish	18mg/L	2
EC50	48	Crustacea	1.4mg/L	2
EC50	72	Algae or other aquatic plants	3.7mg/L	2
NOEL	96	Algae or other aquatic plants	0.2mg/L	2

water				
Endpoint	**Test Duration (hr)**	**Species**	**Value**	**Source**
Not Available	Not Available	Not Available	Not Available	Not Available

Legend:	*Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
kerosene, (petroleum), hydrodesulfurised	LOW (BCF = 159)
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
water	LOW (KOC = 14.3)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate: ▸ Reduction ▸ Reuse ▸ Recycling ▸ Disposal (if all else fails) This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. ▸ **DO NOT** allow wash water from cleaning or process equipment to enter drains. ▸ It may be necessary to collect all wash water for treatment before disposal. ▸ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first. ▸ Where in doubt contact the responsible authority. ▸ Recycle wherever possible or consult manufacturer for recycling options. ▸ Consult State Land Waste Authority for disposal. ▸ Bury or incinerate residue at an approved site. ▸ Recycle containers if possible, or dispose of in an authorised landfill.

SECTION 14 Transport information

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

bitumen emulsions, general is found on the following regulatory lists

Continued...

Not Applicable

bitumen (petroleum) is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B : Possibly carcinogenic to humans

kerosene, (petroleum), hydrodesulfurised is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

water is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

National Inventory Status

National Inventory	Status
Australia - AIIC	Yes
Australia - Non-Industrial Use	No (bitumen (petroleum); kerosene, (petroleum), hydrodesulfurised; water)
Canada - DSL	Yes
Canada - NDSL	No (bitumen (petroleum); kerosene, (petroleum), hydrodesulfurised; water)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (bitumen (petroleum))
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	No (kerosene, (petroleum), hydrodesulfurised)
Vietnam - NCI	Yes
Russia - ARIPS	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 Other information

Revision Date	01/11/2019
Initial Date	07/06/2007

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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TEL (+61 3) 9572 4700.

ECOPRIME
Downer Australia

Chemwatch Hazard Alert Code: **1**

Chemwatch: **6608-23**
Version No: **5.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **01/11/2019**
Print Date: **04/11/2020**
L.GHS.AUS.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	ECOPRIME
Synonyms	Not Available
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Use according to manufacturer's directions.

Details of the supplier of the safety data sheet

Registered company name	**Downer Australia**
Address	Triniti Business Campus, 39 Delhi Road, North Ryde NSW 2113 Australia
Telephone	0294689700
Fax	Not Available
Website	www.downergroup.com
Email	info@downergroup.com

Emergency telephone number

Association / Organisation	**Chemwatch ER**	**CHEMWATCH EMERGENCY RESPONSE**
Emergency telephone numbers	**02 9186 1132**	**+61 2 9186 1132**
Other emergency telephone numbers	**Not Available**	**+61 1800 951 288**

Once connected and if the message is not in your prefered language then please dial 01

SECTION 2 Hazards identification

Classification of the substance or mixture

NON-HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

ChemWatch Hazard Ratings

	Min	Max
Flammability	1	
Toxicity	0	
Body Contact	1	
Reactivity	1	
Chronic	0	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	Not Applicable
Classification [1]	Not Applicable

Label elements

Hazard pictogram(s)	Not Applicable
Signal word	**Not Applicable**

Hazard statement(s)

Not Applicable

Supplementary statement(s)

Page 1 continued...

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	10-40	bitumen emulsions, general
8052-42-4		bitumen (petroleum)
64742-81-0	10-20	kerosene, (petroleum), hydrodesulfurised
Not Available	0.1-5	Ingredients determined not to be hazardous
7732-18-5	60-70	water

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation. ▸ Immediately drench burn area in cold running water. ▸ If hot bitumen adheres to the skin, **DO NOT** attempt to remove it (it acts as a sterile dressing). ▸ For burns to the head and neck and trunk, apply cold wet towels to the burn area, and change frequently to maintain cooling. ▸ Cooling should be maintained for no longer than thirty minutes. ▸ When hot bitumen completely encircles a limb, it may have a tourniquet effect and should be split as it cools. ▸ Transport to hospital or doctor.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

The product contains a substantial proportion of water, therefore there are no restrictions on the type of extinguishing media which may be used. Choice of extinguishing media should take into account surrounding areas.
Though the material is non-combustible, evaporation of water from the mixture, caused by the heat of nearby fire, may produce floating layers of combustible substances.
In such an event consider:

- foam.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard.

Continued...

	▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Use water delivered as a fine spray to control fire and cool adjacent area.
Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ On combustion, may emit toxic fumes of carbon monoxide (CO). Combustion products include: carbon dioxide (CO_2) sulfur oxides (SOx) other pyrolysis products typical of burning organic material.
HAZCHEM	Not Applicable

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	Moderate hazard. ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	▸ **DO NOT** allow clothing wet with material to stay in contact with skin ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ No smoking, naked lights or ignition sources. ▸ Store in a cool, dry, well-ventilated area.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	▸ Avoid reaction with oxidising agents

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	bitumen (petroleum)	Bitumen fumes	5 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
bitumen (petroleum)	Petroleum asphalt; (Bitumen)	30 mg/m3	330 mg/m3	2,000 mg/m3

Ingredient	Original IDLH	Revised IDLH
bitumen emulsions, general	Not Available	Not Available
bitumen (petroleum)	Not Available	Not Available
kerosene, (petroleum), hydrodesulfurised	Not Available	Not Available
water	Not Available	Not Available

Occupational Exposure Banding

Continued...

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
kerosene, (petroleum), hydrodesulfurised	E	≤ 0.1 ppm
Notes:	*Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.*	

MATERIAL DATA

NOTE H: Special requirements exist in relation to classification and labelling of this substance. This note applies to certain coal- and oil -derived substances and to certain entries for groups of substances in Annex VI. European Union (EU) List of harmonised classification and labelling hazardous substances, Table 3.1, Annex VI, Regulation (EC) No 1272/2008 (CLP) - up to the latest ATP

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care.
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. ▸ Skin cleansing cream.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
"Forsberg Clothing Performance Index".
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
ECOPRIME

Material	CPI
BUTYL	A
NEOPRENE	A
VITON	A
NATURAL RUBBER	C
PVA	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	A-AUS P2	-	A-PAPR-AUS / Class 1 P2
up to 50 x ES	-	A-AUS / Class 1 P2	-
up to 100 x ES	-	A-2 P2	A-PAPR-2 P2 ^

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

Continued...

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Liquid; mixes with water.

Physical state	Liquid	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Not normally a hazard due to non-volatile nature of product
Ingestion	Overexposure is unlikely in this form. Ingestion may result in nausea, abdominal irritation, pain and vomiting
Skin Contact	Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.
Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Chronic exposure to bitumen/ asphalt fumes, over extended periods, may cause central nervous system depression, and liver and kidney changes. Chronic bitumen/ asphalt poisoning may result in a decrease in the number of white and red blood cells. [*ILO Encyclopedia*] Prolonged contact with bitumens may produce irritation, inflammation, dermatitis, acne-like lesions, keratoses, melanosis and photosensitisation. Animal inhalation studies do NOT yield sufficient evidence of bitumen/ asphalt-induced lung cancer.

ECOPRIME	**TOXICITY**	**IRRITATION**
	Not Available	Not Available

Continued...

bitumen emulsions, general	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
bitumen (petroleum)	**TOXICITY**	**IRRITATION**
	Not Available	Eye: no adverse effect observed (not irritating)[1]
		Skin: no adverse effect observed (not irritating)[1]
kerosene, (petroleum), hydrodesulfurised	**TOXICITY**	**IRRITATION**
	Inhalation (rat) LC50: >5.2 mg/l/4H[2]	Eye: no adverse effect observed (not irritating)[1]
	Oral (rat) LD50: >5000 mg/kg[2]	Skin: adverse effect observed (irritating)[1]
water	**TOXICITY**	**IRRITATION**
	Oral (rat) LD50: >90000 mg/kg[2]	Not Available
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

BITUMEN (PETROLEUM)	Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
KEROSENE, (PETROLEUM), HYDRODESULFURISED	Studies indicate that normal, branched and cyclic paraffins are absorbed from the mammalian gastrointestinal tract and that the absorption of n-paraffins is inversely proportional to the carbon chain length,with little absorption above C30. With respect to the carbon chain lengths likely to be present in mineral oil, n-paraffins may be absorbed to a greater extent that iso- or cyclo-paraffins. The major classes of hydrocarbons have been shown to be well absorbed by the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with dietary lipids. The dependence of hydrocarbon absorption on concomitant triglyceride digestion and absorption,is known as the "hydrocarbon continuum hypothesis", and asserts that a series of solubilising phases in the intestinal lumen, created by dietary triglycerides and their digestion products, afford hydrocarbons a route to the lipid phase of the intestinal absorptive cell (enterocyte) membrane. The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. For "kerosenes" **Acute toxicity:** Oral LD50s for three kerosenes (Jet A, CAS No. 8008-20-6 and CAS No. 64742-81-0) ranged from > 2 to >20 g/kg The dermal LD50s of the same three kerosenes were all >2.0 g//kg. Inhalation LC50 values in Sprague-Dawley rats for straight run kerosene (CAS No. 8008-20-6) and hydrodesulfurised kerosene (CAS No. 64742-81-0) were reported to be > 5 and > 5.2 mg/l, respectively. No mortalities in rats were reported in rats when exposed for eight hours to saturated vapor of deodorised kerosene (probably a desulfurised kerosene). Six hour exposures of cats to the same material produced an LC50 of >6.4 mg/l When tested in rabbits for skin irritation, straight run kerosene (CAS No. 8008-20-6) produced “moderate” to “severe” irritation.
BITUMEN EMULSIONS, GENERAL & BITUMEN (PETROLEUM) & WATER	No significant acute toxicological data identified in literature search.

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✗
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

SECTION 12 Ecological information

Toxicity

ECOPRIME	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
bitumen emulsions, general	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
bitumen (petroleum)	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	LC50	96	Fish	>1-mg/L	2
	EC50	72	Algae or other aquatic plants	>1-mg/L	2

Continued...

	NOEL	504	Crustacea	>=1-mg/L	2

kerosene, (petroleum), hydrodesulfurised

Endpoint	Test Duration (hr)	Species	Value	Source
LC50	96	Fish	18mg/L	2
EC50	48	Crustacea	1.4mg/L	2
EC50	72	Algae or other aquatic plants	3.7mg/L	2
NOEL	96	Algae or other aquatic plants	0.2mg/L	2

water

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
kerosene, (petroleum), hydrodesulfurised	LOW (BCF = 159)
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
water	LOW (KOC = 14.3)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:
- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use.
- **DO NOT** allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

SECTION 14 Transport information

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

bitumen emulsions, general is found on the following regulatory lists

Continued...

Not Applicable

bitumen (petroleum) is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B : Possibly carcinogenic to humans

kerosene, (petroleum), hydrodesulfurised is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

water is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

National Inventory Status

National Inventory	Status
Australia - AIIC	Yes
Australia - Non-Industrial Use	No (bitumen (petroleum); kerosene, (petroleum), hydrodesulfurised; water)
Canada - DSL	Yes
Canada - NDSL	No (bitumen (petroleum); kerosene, (petroleum), hydrodesulfurised; water)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (bitumen (petroleum))
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	No (kerosene, (petroleum), hydrodesulfurised)
Vietnam - NCI	Yes
Russia - ARIPS	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 Other information

Revision Date	01/11/2019
Initial Date	06/06/2007

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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TEL (+61 3) 9572 4700.

MHB0-6
Downer Australia

Chemwatch Hazard Alert Code: **1**

Chemwatch: **36-2279**
Version No: **4.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **01/11/2019**
Print Date: **04/11/2020**
L.GHS.AUS.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	MHB0-6
Synonyms	Not Available
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Use according to manufacturer's directions.

Details of the supplier of the safety data sheet

Registered company name	**Downer Australia**
Address	Triniti Business Campus, 39 Delhi Road, North Ryde NSW 2113 Australia
Telephone	0294689700
Fax	Not Available
Website	www.downergroup.com
Email	info@downergroup.com

Emergency telephone number

Association / Organisation	**Chemwatch ER**	**CHEMWATCH EMERGENCY RESPONSE**
Emergency telephone numbers	**02 9186 1132**	**+61 2 9186 1132**
Other emergency telephone numbers	**Not Available**	**+61 1800 951 288**

Once connected and if the message is not in your prefered language then please dial 01

SECTION 2 Hazards identification

Classification of the substance or mixture

NON-HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

ChemWatch Hazard Ratings

	Min	Max
Flammability	1	
Toxicity	0	
Body Contact	1	
Reactivity	1	
Chronic	0	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	Not Applicable
Classification [1]	Not Applicable

Label elements

Hazard pictogram(s)	Not Applicable
Signal word	**Not Applicable**

Hazard statement(s)

Not Applicable

Supplementary statement(s)

Page 1 continued...

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	40-70	bitumen emulsions, general
8052-42-4		bitumen (petroleum)
7647-01-0	<5	hydrochloric acid

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation. ▸ Immediately drench burn area in cold running water. ▸ If hot bitumen adheres to the skin, **DO NOT** attempt to remove it (it acts as a sterile dressing). ▸ For burns to the head and neck and trunk, apply cold wet towels to the burn area, and change frequently to maintain cooling. ▸ Cooling should be maintained for no longer than thirty minutes. ▸ When hot bitumen completely encircles a limb, it may have a tourniquet effect and should be split as it cools. ▸ Transport to hospital or doctor.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

The product contains a substantial proportion of water, therefore there are no restrictions on the type of extinguishing media which may be used. Choice of extinguishing media should take into account surrounding areas.
Though the material is non-combustible, evaporation of water from the mixture, caused by the heat of nearby fire, may produce floating layers of combustible substances.
In such an event consider:

▸ foam.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Use water delivered as a fine spray to control fire and cool adjacent area.

Continued...

Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ On combustion, may emit toxic fumes of carbon monoxide (CO). Combustion products include: carbon dioxide (CO2) sulfur oxides (SOx) other pyrolysis products typical of burning organic material. carbon monoxide (CO) May emit poisonous fumes. May emit corrosive fumes.
HAZCHEM	Not Applicable

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment. ▸ Contain and absorb spill with sand, earth, inert material or vermiculite.
Major Spills	Minor hazard. ▸ Clear area of personnel. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Control personal contact with the substance, by using protective equipment as required.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ No smoking, naked lights or ignition sources. ▸ Store in a cool, dry, well-ventilated area.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	▸ Avoid reaction with oxidising agents

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	bitumen (petroleum)	Bitumen fumes	5 mg/m3	Not Available	Not Available	Not Available
Australia Exposure Standards	hydrochloric acid	Hydrogen chloride	Not Available	Not Available	5 ppm / 7.5 mg/m3	Not Available

Emergency Limits

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
bitumen (petroleum)	Petroleum asphalt; (Bitumen)	30 mg/m3	330 mg/m3	2,000 mg/m3
hydrochloric acid	Hydrogen chloride; (Hydrochloric acid)	Not Available	Not Available	Not Available
hydrochloric acid	Deuterochloric acid; (Deuterium chloride)	1.8 ppm	22 ppm	100 ppm

Ingredient	Original IDLH	Revised IDLH
bitumen emulsions, general	Not Available	Not Available
bitumen (petroleum)	Not Available	Not Available
hydrochloric acid	50 ppm	Not Available

MATERIAL DATA

Continued...

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. ▸ Skin cleansing cream.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
***"*Forsberg Clothing Performance Index".**
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
MHB0-6

Material	CPI
BUTYL	A
NEOPRENE	A
VITON	A
NATURAL RUBBER	C
PVA	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type AB-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	AB-AUS P2	-	AB-PAPR-AUS / Class 1 P2
up to 50 x ES	-	AB-AUS / Class 1 P2	-
up to 100 x ES	-	AB-2 P2	AB-PAPR-2 P2 ^

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Black liquid; mixes with water.

Physical state	Non Slump Paste	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	>150	**Taste**	Not Available

Continued...

Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Applicable	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	Miscible	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	Product is considered stable and hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	Limited evidence or practical experience suggests that the material may produce irritation of the respiratory system, in a significant number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system. Not normally a hazard due to non-volatile nature of product
Ingestion	Overexposure is unlikely in this form. Ingestion may result in nausea, abdominal irritation, pain and vomiting
Skin Contact	Limited evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis. Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.
Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Chronic exposure to bitumen/ asphalt fumes, over extended periods, may cause central nervous system depression, and liver and kidney changes. Chronic bitumen/ asphalt poisoning may result in a decrease in the number of white and red blood cells. [*ILO Encyclopedia*] Prolonged contact with bitumens may produce irritation, inflammation, dermatitis, acne-like lesions, keratoses, melanosis and photosensitisation. Animal inhalation studies do NOT yield sufficient evidence of bitumen/ asphalt-induced lung cancer.

MHB0-6	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
bitumen emulsions, general	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
bitumen (petroleum)	**TOXICITY**	**IRRITATION**
	Not Available	Eye: no adverse effect observed (not irritating)[1]
		Skin: no adverse effect observed (not irritating)[1]
hydrochloric acid	**TOXICITY**	**IRRITATION**
	1300 mg/kg[2]	Eye (rabbit): 5mg/30s - mild
	3000 mg/kg[2]	Eye: adverse effect observed (irritating)[1]
	Inhalation (rat) LC50: 780.108879 mg/l/1h[2]	Skin: adverse effect observed (corrosive)[1]
	Oral (rabbit) LD50: 900 mg/kg[2]	Skin: adverse effect observed (irritating)[1]
	Oral (rat) LD50: =700 mg/kg[2]	

Continued...

Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*

BITUMEN (PETROLEUM)	**WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
HYDROCHLORIC ACID	for acid mists, aerosols, vapours Data from assays for genotoxic activity in vitro suggest that eukaryotic cells are susceptible to genetic damage when the pH falls to about 6.5. Cells from the respiratory tract have not been examined in this respect. Mucous secretion may protect the cells of the airways from direct exposure to inhaled acidic mists, just as mucous plays an important role in protecting the gastric epithelium from its auto-secreted hydrochloric acid. In considering whether pH itself induces genotoxic events in vivo in the respiratory system, comparison should be made with the human stomach, in which gastric juice may be at pH 1-2 under fasting or nocturnal conditions, and with the human urinary bladder, in which the pH of urine can range from <5 to > 7 and normally averages 6.2. The material may be irritating to the eye, with prolonged contact causing inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The substance is classified by IARC as Group 3: **NOT** classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing.
BITUMEN EMULSIONS, GENERAL & BITUMEN (PETROLEUM) & HYDROCHLORIC ACID	No significant acute toxicological data identified in literature search.
BITUMEN (PETROLEUM) & HYDROCHLORIC ACID	Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS.

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✗
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

SECTION 12 Ecological information

Toxicity

MHB0-6

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

bitumen emulsions, general

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

bitumen (petroleum)

Endpoint	Test Duration (hr)	Species	Value	Source
LC50	96	Fish	>1-mg/L	2
EC50	72	Algae or other aquatic plants	>1-mg/L	2
NOEL	504	Crustacea	>=1-mg/L	2

hydrochloric acid

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
hydrochloric acid	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
hydrochloric acid	LOW (LogKOW = 0.5392)

Continued...

Mobility in soil

Ingredient	Mobility
hydrochloric acid	LOW (KOC = 14.3)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	▸ Recycle wherever possible or consult manufacturer for recycling options. ▸ Consult State Land Waste Authority for disposal. ▸ Bury or incinerate residue at an approved site. ▸ Recycle containers if possible, or dispose of in an authorised landfill.

SECTION 14 Transport information

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

bitumen emulsions, general is found on the following regulatory lists

Not Applicable

bitumen (petroleum) is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B : Possibly carcinogenic to humans

hydrochloric acid is found on the following regulatory lists

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 5
Australia Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP) - Schedule 6
Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

National Inventory Status

National Inventory	Status
Australia - AIIC	Yes
Australia - Non-Industrial Use	No (bitumen (petroleum); hydrochloric acid)
Canada - DSL	Yes
Canada - NDSL	No (bitumen (petroleum); hydrochloric acid)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (bitumen (petroleum))
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - ARIPS	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 Other information

Revision Date	01/11/2019

Continued...

Initial Date	09/07/2013

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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TEL (+61 3) 9572 4700.

Multibond SS/FB
Downer Australia

Chemwatch Hazard Alert Code: **1**

Chemwatch: **7101931**
Version No: **6.1.1.1**
Safety Data Sheet according to WHS and ADG requirements

Issue Date: **01/11/2019**
Print Date: **04/11/2020**
L.GHS.AUS.EN

SECTION 1 Identification of the substance / mixture and of the company / undertaking

Product Identifier

Product name	Multibond SS/FB
Synonyms	Not Available
Other means of identification	Not Available

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Bitumen emulsion for the binding/stabilisation of haul and unsealed roads. In normal use, product is to be sprayed at ambient temperature with no heat. Use according to manufacturer's directions.

Details of the supplier of the safety data sheet

Registered company name	**Downer Australia**
Address	Triniti Business Campus, 39 Delhi Road North Ryde NSW 2113 Australia
Telephone	+61 2 9468 9700
Fax	+61 2 9813 8915
Website	http://www.downergroup.com/
Email	info@downergroup.com

Emergency telephone number

Association / Organisation	**CHEMWATCH EMERGENCY RESPONSE**
Emergency telephone numbers	**+61 2 9186 1132**
Other emergency telephone numbers	**+61 1800 951 288**

Once connected and if the message is not in your prefered language then please dial 01

SECTION 2 Hazards identification

Classification of the substance or mixture

NON-HAZARDOUS CHEMICAL. NON-DANGEROUS GOODS. According to the WHS Regulations and the ADG Code.

ChemWatch Hazard Ratings

	Min	Max
Flammability	1	
Toxicity	0	
Body Contact	1	
Reactivity	1	
Chronic	0	

0 = Minimum
1 = Low
2 = Moderate
3 = High
4 = Extreme

Poisons Schedule	Not Applicable
Classification [1]	Not Applicable

Label elements

Hazard pictogram(s)	Not Applicable
Signal word	**Not Applicable**

Hazard statement(s)

Not Applicable

Page 1 continued...

Supplementary statement(s)

Not Applicable

Precautionary statement(s) Prevention

Not Applicable

Precautionary statement(s) Response

Not Applicable

Precautionary statement(s) Storage

Not Applicable

Precautionary statement(s) Disposal

Not Applicable

SECTION 3 Composition / information on ingredients

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
Not Available	60-80	bitumen emulsions, general
8052-42-4		bitumen (petroleum)
64742-81-0	<10	kerosene, (petroleum), hydrodesulfurised
Not Available	0.1-5	Ingredients determined not to be hazardous
7732-18-5	30-50	water

SECTION 4 First aid measures

Description of first aid measures

Eye Contact	If this product comes in contact with the eyes: ▸ Wash out immediately with fresh running water. ▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▸ Seek medical attention without delay; if pain persists or recurs seek medical attention. ▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	If skin contact occurs: ▸ Immediately remove all contaminated clothing, including footwear. ▸ Flush skin and hair with running water (and soap if available). ▸ Seek medical attention in event of irritation.
Inhalation	▸ If fumes or combustion products are inhaled remove from contaminated area. ▸ Lay patient down. Keep warm and rested. ▸ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▸ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▸ Transport to hospital, or doctor.
Ingestion	▸ If swallowed do **NOT** induce vomiting. ▸ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. ▸ Observe the patient carefully. ▸ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious. ▸ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink. ▸ Seek medical advice.

Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5 Firefighting measures

Extinguishing media

The product contains a substantial proportion of water, therefore there are no restrictions on the type of extinguishing media which may be used. Choice of extinguishing media should take into account surrounding areas.
Though the material is non-combustible, evaporation of water from the mixture, caused by the heat of nearby fire, may produce floating layers of combustible substances.
In such an event consider:

- foam.

Special hazards arising from the substrate or mixture

Fire Incompatibility	▸ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Fire Fighting	▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves. ▸ Prevent, by any means available, spillage from entering drains or water course. ▸ Use water delivered as a fine spray to control fire and cool adjacent area.

Continued...

Fire/Explosion Hazard	▸ Combustible. ▸ Slight fire hazard when exposed to heat or flame. ▸ Heating may cause expansion or decomposition leading to violent rupture of containers. ▸ On combustion, may emit toxic fumes of carbon monoxide (CO). Combustion products include: carbon dioxide (CO_2) nitrogen oxides (NOx) sulfur oxides (SOx) other pyrolysis products typical of burning organic material.
HAZCHEM	Not Applicable

SECTION 6 Accidental release measures

Personal precautions, protective equipment and emergency procedures

See section 8

Environmental precautions

See section 12

Methods and material for containment and cleaning up

Minor Spills	▸ Remove all ignition sources. ▸ Clean up all spills immediately. ▸ Avoid breathing vapours and contact with skin and eyes. ▸ Control personal contact with the substance, by using protective equipment.
Major Spills	Moderate hazard. ▸ Clear area of personnel and move upwind. ▸ Alert Fire Brigade and tell them location and nature of hazard. ▸ Wear breathing apparatus plus protective gloves.

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

Precautions for safe handling

Safe handling	▸ **DO NOT** allow clothing wet with material to stay in contact with skin ▸ Avoid all personal contact, including inhalation. ▸ Wear protective clothing when risk of exposure occurs. ▸ Use in a well-ventilated area. ▸ Prevent concentration in hollows and sumps.
Other information	▸ Store in original containers. ▸ Keep containers securely sealed. ▸ No smoking, naked lights or ignition sources. ▸ Store in a cool, dry, well-ventilated area.

Conditions for safe storage, including any incompatibilities

Suitable container	▸ Metal can or drum ▸ Packaging as recommended by manufacturer. ▸ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	▸ Avoid reaction with oxidising agents

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
Australia Exposure Standards	bitumen (petroleum)	Bitumen fumes	5 mg/m3	Not Available	Not Available	Not Available

Emergency Limits

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
bitumen (petroleum)	Petroleum asphalt; (Bitumen)	30 mg/m3	330 mg/m3	2,000 mg/m3

Ingredient	Original IDLH	Revised IDLH
bitumen emulsions, general	Not Available	Not Available
bitumen (petroleum)	Not Available	Not Available
kerosene, (petroleum), hydrodesulfurised	Not Available	Not Available
water	Not Available	Not Available

Occupational Exposure Banding

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
kerosene, (petroleum),	E	≤ 0.1 ppm

Continued...

Ingredient	Occupational Exposure Band Rating	Occupational Exposure Band Limit
hydrodesulfurised		
Notes:	*Occupational exposure banding is a process of assigning chemicals into specific categories or bands based on a chemical's potency and the adverse health outcomes associated with exposure. The output of this process is an occupational exposure band (OEB), which corresponds to a range of exposure concentrations that are expected to protect worker health.*	

MATERIAL DATA

NOTE H: Special requirements exist in relation to classification and labelling of this substance. This note applies to certain coal- and oil -derived substances and to certain entries for groups of substances in Annex VI. European Union (EU) List of harmonised classification and labelling hazardous substances, Table 3.1, Annex VI, Regulation (EC) No 1272/2008 (CLP) - up to the latest ATP

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.
Personal protection	
Eye and face protection	▸ Safety glasses with side shields. ▸ Chemical goggles. ▸ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.
Skin protection	See Hand protection below
Hands/feet protection	▸ Wear chemical protective gloves, e.g. PVC. ▸ Wear safety footwear or safety gumboots, e.g. Rubber The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application. The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice. Personal hygiene is a key element of effective hand care.
Body protection	See Other protection below
Other protection	▸ Overalls. ▸ P.V.C apron. ▸ Barrier cream. ▸ Skin cleansing cream.

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
***"*Forsberg Clothing Performance Index".**
The effect(s) of the following substance(s) are taken into account in the ***computer-generated*** selection:
Multibond SS/FB

Material	CPI
BUTYL	A
NEOPRENE	A
VITON	A
NATURAL RUBBER	C
PVA	C

* CPI - Chemwatch Performance Index
A: Best Selection
B: Satisfactory; may degrade after 4 hours continuous immersion
C: Poor to Dangerous Choice for other than short term immersion
NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -
* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	A-AUS P2	-	A-PAPR-AUS / Class 1 P2
up to 50 x ES	-	A-AUS / Class 1 P2	-
up to 100 x ES	-	A-2 P2	A-PAPR-2 P2 ^

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 Physical and chemical properties

Continued...

Information on basic physical and chemical properties

Appearance	Black liquid.

Physical state	Liquid	**Relative density (Water = 1)**	Not Available
Odour	Not Available	**Partition coefficient n-octanol / water**	Not Available
Odour threshold	Not Available	**Auto-ignition temperature (°C)**	Not Available
pH (as supplied)	Not Available	**Decomposition temperature**	Not Available
Melting point / freezing point (°C)	Not Available	**Viscosity (cSt)**	Not Available
Initial boiling point and boiling range (°C)	Not Available	**Molecular weight (g/mol)**	Not Applicable
Flash point (°C)	Not Available	**Taste**	Not Available
Evaporation rate	Not Available	**Explosive properties**	Not Available
Flammability	Not Available	**Oxidising properties**	Not Available
Upper Explosive Limit (%)	Not Available	**Surface Tension (dyn/cm or mN/m)**	Not Available
Lower Explosive Limit (%)	Not Available	**Volatile Component (%vol)**	Not Available
Vapour pressure (kPa)	Not Available	**Gas group**	Not Available
Solubility in water	Not Available	**pH as a solution (1%)**	Not Available
Vapour density (Air = 1)	Not Available	**VOC g/L**	Not Available

SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	▸ Unstable in the presence of incompatible materials. ▸ Product is considered stable. ▸ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 Toxicological information

Information on toxicological effects

Inhaled	Not normally a hazard due to non-volatile nature of product The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
Ingestion	Overexposure is unlikely in this form. The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health).
Skin Contact	Open cuts, abraded or irritated skin should not be exposed to this material Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.
Eye	Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.
Chronic	Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Chronic exposure to bitumen/ asphalt fumes, over extended periods, may cause central nervous system depression, and liver and kidney changes. Chronic bitumen/ asphalt poisoning may result in a decrease in the number of white and red blood cells. [*ILO Encyclopedia*] Prolonged contact with bitumens may produce irritation, inflammation, dermatitis, acne-like lesions, keratoses, melanosis and photosensitisation. Animal inhalation studies do NOT yield sufficient evidence of bitumen/ asphalt-induced lung cancer.

Multibond SS/FB	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
bitumen emulsions, general	**TOXICITY**	**IRRITATION**
	Not Available	Not Available
bitumen (petroleum)	**TOXICITY**	**IRRITATION**
	Not Available	Eye: no adverse effect observed (not irritating)[1]

Continued...

		Skin: no adverse effect observed (not irritating)[1]
kerosene, (petroleum), hydrodesulfurised	**TOXICITY**	**IRRITATION**
	Inhalation (rat) LC50: >5.2 mg/l/4H[2]	Eye: no adverse effect observed (not irritating)[1]
	Oral (rat) LD50: >5000 mg/kg[2]	Skin: adverse effect observed (irritating)[1]
water	**TOXICITY**	**IRRITATION**
	Oral (rat) LD50: >90000 mg/kg[2]	Not Available
Legend:	*1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2.* Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances*	

BITUMEN (PETROLEUM)	Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. **WARNING:** This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.
KEROSENE, (PETROLEUM), HYDRODESULFURISED	Studies indicate that normal, branched and cyclic paraffins are absorbed from the mammalian gastrointestinal tract and that the absorption of n-paraffins is inversely proportional to the carbon chain length,with little absorption above C30. With respect to the carbon chain lengths likely to be present in mineral oil, n-paraffins may be absorbed to a greater extent that iso- or cyclo-paraffins. The major classes of hydrocarbons have been shown to be well absorbed by the gastrointestinal tract in various species. In many cases, the hydrophobic hydrocarbons are ingested in association with dietary lipids. The dependence of hydrocarbon absorption on concomitant triglyceride digestion and absorption,is known as the "hydrocarbon continuum hypothesis", and asserts that a series of solubilising phases in the intestinal lumen, created by dietary triglycerides and their digestion products, afford hydrocarbons a route to the lipid phase of the intestinal absorptive cell (enterocyte) membrane. The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. For "kerosenes" **Acute toxicity:** Oral LD50s for three kerosenes (Jet A, CAS No. 8008-20-6 and CAS No. 64742-81-0) ranged from > 2 to >20 g/kg The dermal LD50s of the same three kerosenes were all >2.0 g//kg. Inhalation LC50 values in Sprague-Dawley rats for straight run kerosene (CAS No. 8008-20-6) and hydrodesulfurised kerosene (CAS No. 64742-81-0) were reported to be > 5 and > 5.2 mg/l, respectively. No mortalities in rats were reported in rats when exposed for eight hours to saturated vapor of deodorised kerosene (probably a desulfurised kerosene). Six hour exposures of cats to the same material produced an LC50 of >6.4 mg/l When tested in rabbits for skin irritation, straight run kerosene (CAS No. 8008-20-6) produced "moderate" to "severe" irritation.
BITUMEN EMULSIONS, GENERAL & BITUMEN (PETROLEUM) & WATER	No significant acute toxicological data identified in literature search.

Acute Toxicity	✗	**Carcinogenicity**	✗
Skin Irritation/Corrosion	✗	**Reproductivity**	✗
Serious Eye Damage/Irritation	✗	**STOT - Single Exposure**	✗
Respiratory or Skin sensitisation	✗	**STOT - Repeated Exposure**	✗
Mutagenicity	✗	**Aspiration Hazard**	✗

Legend: ✗ *– Data either not available or does not fill the criteria for classification*
✔ *– Data available to make classification*

SECTION 12 Ecological information

Toxicity

Multibond SS/FB	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
bitumen emulsions, general	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	Not Available	Not Available	Not Available	Not Available	Not Available
bitumen (petroleum)	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	LC50	96	Fish	>1-mg/L	2
	EC50	72	Algae or other aquatic plants	>1-mg/L	2
	NOEL	504	Crustacea	>=1-mg/L	2
kerosene, (petroleum), hydrodesulfurised	**Endpoint**	**Test Duration (hr)**	**Species**	**Value**	**Source**
	LC50	96	Fish	18mg/L	2
	EC50	48	Crustacea	1.4mg/L	2
	EC50	72	Algae or other aquatic plants	3.7mg/L	2

Continued...

	NOEL	96	Algae or other aquatic plants	0.2mg/L	2

water

Endpoint	Test Duration (hr)	Species	Value	Source
Not Available	Not Available	Not Available	Not Available	Not Available

Legend: *Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data*

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
kerosene, (petroleum), hydrodesulfurised	LOW (BCF = 159)
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
water	LOW (KOC = 14.3)

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:
- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use.
- **DO NOT** allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

SECTION 14 Transport information

Labels Required

Marine Pollutant	NO
HAZCHEM	Not Applicable

Land transport (ADG): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

bitumen emulsions, general is found on the following regulatory lists

Not Applicable

bitumen (petroleum) is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Group 2B : Possibly carcinogenic to humans

kerosene, (petroleum), hydrodesulfurised is found on the following regulatory lists

Continued...

Australia Hazardous Chemical Information System (HCIS) - Hazardous Chemicals
Australian Inventory of Industrial Chemicals (AIIC)

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs

water is found on the following regulatory lists

Australian Inventory of Industrial Chemicals (AIIC)

National Inventory Status

National Inventory	Status
Australia - AIIC	Yes
Australia - Non-Industrial Use	No (bitumen (petroleum); kerosene, (petroleum), hydrodesulfurised; water)
Canada - DSL	Yes
Canada - NDSL	No (bitumen (petroleum); kerosene, (petroleum), hydrodesulfurised; water)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	No (bitumen (petroleum))
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	Yes
Taiwan - TCSI	Yes
Mexico - INSQ	No (kerosene, (petroleum), hydrodesulfurised)
Vietnam - NCI	Yes
Russia - ARIPS	Yes
Legend:	*Yes = All CAS declared ingredients are on the inventory* *No = One or more of the CAS listed ingredients are not on the inventory and are not exempt from listing(see specific ingredients in brackets)*

SECTION 16 Other information

Revision Date	01/11/2019
Initial Date	27/04/2010

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

PC—TWA: Permissible Concentration-Time Weighted Average
PC—STEL: Permissible Concentration-Short Term Exposure Limit
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists
STEL: Short Term Exposure Limit
TEEL: Temporary Emergency Exposure Limit。
IDLH: Immediately Dangerous to Life or Health Concentrations
OSF: Odour Safety Factor
NOAEL :No Observed Adverse Effect Level
LOAEL: Lowest Observed Adverse Effect Level
TLV: Threshold Limit Value
LOD: Limit Of Detection
OTV: Odour Threshold Value
BCF: BioConcentration Factors
BEI: Biological Exposure Index

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TEL (+61 3) 9572 4700.



APPENDIX G

VISUAL AMENITY TECHNICAL RESPONSE

ENVISAGE CONSULTING PTY LTD
0422 956 528
mail@envisageconsulting.com.au

17 November 2020	Attention: Neville Hattingh From: Stacey Brodbeck, Envisage
Ref: 15920 rev01	**Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre – Visual Impact Assessment: Addendum**

1. Purpose of this report

This Addendum provides further information to support the Visual Impact Assessment (VIA, Envisage, 9 September 2020) prepared for the proposal by VE Property Pty Ltd to develop the Central Sydney Industrial Estate within the former Oil Refinery site at Clyde (referred to as the 'project'). The Addendum specifically addresses three comments raised by Parramatta City Council (Council) in their submission on the project, in regard to visual impact.

The Addendum has been prepared for Element Environment Pty Ltd on behalf of the proponent and should be read in conjunction with the VIA. The assessment methodology presented in this Addendum is consistent with the methodology used in the VIA.

2. Council's comments

According to Council's submission, '*Land Use Planning Officers have reviewed the assessment and consider that the impact on the visual amenity of the off-site viewpoints is considered low to moderate*', that is consistent with the conclusions presented in the VIA.

Visual impact comments raised in Council's submission, that require a response, are summarised in TABLE 1, and are addressed in full at Section 4 of this Addendum.

TABLE 1: VISUAL IMPACT COMMENTS RAISED IN COUNCIL'S SUBMISSION

#	Council comment
1.	…more proximate views such as the view from along/across the river (Carnarvon Street) may be significant - if nothing else as a wayfinding and skyline/night- lighting features recreating the industrial aesthetic of the former refinery.
2.	…the EIS has addressed the potential impacts regarding the visibility within Camellia by describing that any visual change associated with the staged subdivision and earthwork would result in a minimal visual impact without having completed any views analysis to demonstrate this
3.	…it is requested that a visual impact assessment be carried out from 181 James Ruse Drive site as a viewpoint from the potential Camellia Town Centre…from the upper levels.

3. Reiterated explanation of 'Theoretical' Visibility mapping

The VIA included FIGURE 1 (APPENDIX A of the VIA) illustrating the visibility of Stage 1 of the project (i.e. the Sustainable Road Resource Centre, with the highest component the RAP elevator at 40.8m). The extent of

visibility shown in FIGURE 1 is 'theoretical' as it maps visibility according to the highest component (e.g. the roof of a building or top of a tree), yet in reality there would usually be no viewers from such a location apart from possibly where access is available to the roof of apartment buildings.

FIGURE 1 has been updated in this Addendum to include new Viewpoint (VP) 6 (181 James Ruse Drive). The updated FIGURE 1 is shown in APPENDIX A (identification number bottom right of figure - 031196_RTS_F1_TVVI_201112_v01).

4. Response to Council Comments

4.1 Comment 1 – Views from Carnarvon Street

The VIA site investigation determined that there would be no views of Stage 1 from Carnarvon Street, Silverwater, or from other ground-level viewpoints in this general area. Additional analysis undertaken for this Addendum (through checking via cross-sectional assessment) has confirmed that views would be prevented by the existing dense trees along both sides of Duck River, combined with a visual separation distance of over 600m (to Carnarvon Street).

4.2 Comment 2 – Views from Rosehill/Camellia industrial area

The VIA did not illustrate viewpoints from within the Rosehill/Camellia industrial area as such viewpoints are not generally considered visually sensitive. Views from sensitive locations, such as public roads, recreational reserves and residential areas, are generally regarded as a higher priority in terms of potential visual impact. Regardless, the VIA provides analysis of the potential for views from within Camellia industrial area (i.e. the surrounding industrial area), including for the staged subdivision and earthworks, and states that (refer VIA, pages 26):

> *As the industrial area does not have through roadways, potential viewers are generally limited to those on private industrial properties that border the project site or those customers or workers using the roadways to access the industrial area.*
>
> *Devon Street is the closest location within the industrial area from where there would be views possible. There would also be some potential views along the north-south orientated streets of Durham Street and Colquhoun Street, and the east-west orientated Unwin Street, yet views would be partially obstructed by existing structures and street trees.*
>
> ***5.2.1 Staged subdivision and earthworks***
>
> *The subdivision and earthworks would result in only minor visual changes due to most works occurring at grade to existing ground level. The new public road proposed within the centre of the Central Sydney Industrial Estate, west of Stage 1, is planned to have street trees which would increase the visual amenity of this part of the industrial area. Rehabilitation works are also planned along Duck River which would improve the visual value of this area.*
>
> *Overall, visual changes associated with the staged subdivision and earthworks would cause minimal visual change and have therefore not been further assessed in any detail. The proposed landscape and rehabilitation works would represent an improvement to the natural and visual environment.*

To clarify further in this Addendum, development of the lots for new industrial uses (in accordance with current zoning), would be the subject of future applications and is not within the scope of the VIA. The visual changes that would occur for the staged subdivision are limited to:

- Earthworks/filling to bench the lots to form a flat pad in the northern half of the site then gradually grading down towards Duck River in the southern half of the site.

- Construction of a new public access road running south from an intersection with Devon Street (in accordance with Parramatta Council specifications).
- Implementation of erosion and sediment controls and necessary municipal services.

In addition, relevant components of the project's Landscape Plan and Vegetation Management Plan (VMP) would be implemented during the staged subdivision and earthworks phase, including:

- Preserving and retaining street trees along Devon Street wherever possible and strengthening visual character of the estate through the use of street trees along the new access road.
- Maintaining a 5m landscape setback along Devon Street and Colquhoun Street (planting design within this setback is subject to a future approval).
- Creating a visual buffer along the western boundary of the Lot 6 Downer site, with a dense mix of native evergreen tree and shrub planting.
- Managing stormwater by planting the swale along Lot 6's eastern boundary, the bioretention basin and the stormwater outlet rip-raps with suitable native grass and other groundcover species.
- Protecting and enhancing the existing ecological character by revegetating areas identified within the riparian management zone. Tree canopy cover to constitute at least 60% of revegetation area and include species that have been listed in the VMP.

It is understood that the site's previous use as a refinery meant that there were no or few native trees within the bulk of the site. The VIA provides photographs illustrating the existing industrial character (which overall has relatively low landscape planting and street trees - refer reproduced FIGURE 4-4 (on left)) and existing views along Devon Street opposite the site showing some trees along that street (refer reproduced FIGURE 5-1 (on right)).



FIGURE 4-4: VARIOUS IMAGES OF NEARBY INDUSTRIAL AREA SHOWING TYPICAL INDUSTRIAL CHARACTER AND SCENIC QUALITY



FIGURE 5-1: SECTION OF DEVON STREET NEAR PROJECT SITE (STAGE 1 SITE ON RIGHT)

With redevelopment, new industrial lots require a minimum of 10% landscaped area to comply with the PCC DCP, in addition to street trees along the proposed new access road and rehabilitation/revegetation along Duck River. The result would mean increased vegetation and improved visual aesthetics of the industrial area over time.

Although photomontages of views from locations within the industrial area were not prepared, the VIA includes four perspectives (FIGURE 2-4 to FIGURE 2-7, pages 9-12, reproduced in APPENDIX B) that show Stage 1, the proposed new road and the landscape and rehabilitation works that form part of the staged subdivision and earthworks.

Those perspectives further clarify the general look of the project in relatively close proximity (such as would be seen from within the industrial area) and that the project is broadly consistent with the visual context of this major industrial landscape.

4.3 Comment 3 – Assessment of views from 181 James Ruse Drive, Rosehill

New viewpoint 6 (VP6) is included in this Addendum to address views from 181 James Ruse Drive, Camellia, as requested by Council.

VP6 represents views from the upper residential levels of the proposed building at 181 James Ruse Drive, Rosehill, as part of the future Camellia town centre. The proposed building is 40 storeys and 126m high. The location of VP6 is identified in FIGURE 1, APPENDIX A (identification number bottom right of figure - 031196_RTS_F1_TVVI_201112_v01).

APPENDIX A also includes a set of simulated images (based on LIDAR data and prepared independently by Cambium Group) to aid the assessment of the viewpoint, with those being:

- Existing view
- An 'historic massing' image – illustrating major elements of the Clyde Refinery demolished between 2015 and 2020
- A combined 'project massing and historic features' image - illustrating a block model of the proposed tallest structures of Stage 1, as well as the major elements of the Clyde Refinery demolished between 2015 and 2020
- A 'project massing model' – showing visual massing and the general outline of the project
- A 'detailed photomontage' - a detailed realistic image of the final project based on 3D modelling of the concept design.

A detailed assessment of VP6 is presented in TABLE 2 and shows the overall predicted impact level to future viewpoints from the upper levels of 181 James Ruse Drive is Low-moderate.

TABLE 2: VISUAL IMPACT ASSESSMENT OF VP6 – 181 JAMES RUSE DRIVE, ROSEHILL

Viewpoint characteristics	This viewpoint represents the view from the upper residential level of the proposed building at 181 James Ruse Drive, Rosehill (40 storeys and 126m high), as part of the future Camellia town centre.
Potential viewers	Potential viewers are future residents of this proposed building, approximately 1.7km away from the site.
Existing visual sensitivity (refer Figure 2, APPENDIX A)	The assessed sensitivity of this viewpoint was determined with regard to: ▪ Stage 1 site is approximately 1.7km away. ▪ Existing views comprise industrial uses in the foreground, including warehouses and open industrial storage areas with shipping containers, and extensive views over Rosehill Racecourse (approximately 400m away) on the right-hand side (i.e. in a south-easterly direction). ▪ In the mid-ground (approximately 5km away) are seen the tall commercial buildings and main stadium of Sydney Olympic Park. ▪ In the far distance (approximately 17km away) can be seen the skyline of the Sydney Central Business District (CBD). ▪ Currently the project site is not distinguishable from the surrounding industrial area.
Magnitude of change (refer images illustrating historic massing and particularly Figure 7 - predicted views from VP6 (upper levels of 161 James Ruse Drive))	The predicted magnitude of visual change is (refer FIGURE 6 and 7, APPENDIX A): ▪ Minor in scale, with Stage 1 evident and appearing to the right-hand side of the view (i.e. south-eastern side) as an element of comparable scale to other structures seen such as buildings with Sydney Olympic Park (seen in the background approximately 5km away). ▪ The tallest components of Stage 1 (i.e. upper parts of RAP elevator (40.8 m), exhaust stack, lime silo, aggregate silos and some associated infrastructure) would be higher than the nearest industrial elements, however, overall Stage 1 would not be particularly visually obvious in the overall scene. The low-lying nature of the site, and extensive industrial area, have a relatively high capacity to absorb such change. ▪ From the upper level of 181 James Ruse Drive the tallest components of Stage 1 would not be seen against the skyline, therefore the structural form would not visually contrast with the sky or obstruct more distant views. ▪ There would be no obstruction of valued views of the distant Sydney CBD skyline (approximately 17km away) from any levels of 181 James Ruse Drive where such city views would be available.
Level of predicted visual impact	**Low-Moderate** - Stage 1 would not been seen against the skyline from the upper levels of 181 James Ruse Drive nor obstruct Sydney CBD views from any levels. Stage 1 would constitute a minor component of the wider view, which might be missed by casual observers and visual awareness of it would not have a marked effect on the overall quality of the scene when seen from 181 James Ruse Drive.

VP6 – Effect on VIA conclusions

The VIA presents a summary of the visual impact to five viewpoints at TABLE 5-6, page 37. The assessment of VP 6 (181 James Ruse Drive) has been added to that table and is shown in TABLE 3 in this Addendum.

TABLE 3: SUMMARY OF PREDICTED VISUAL IMPACT TO REPRESENTATIVE VIEWPOINTS (REVISED TABLE 5-6 FROM VIA)

Representative viewpoint		Assessed visual impact
VP1	Rosehill Racecourse (also representative of Rydges hotel to west and apartments to north of Rydges)	**Low-moderate**
VP2	Residential apartments south of Rydges hotel, James Ruse Drive, Rosehill	**Low-moderate**
VP3	View from residential apartments, River Road/Allambie Street, Ermington	**Low-moderate**
VP4	View from Silverwater Bridge	**Low -moderate**
VP5	View from Patricia Street, Rydalmere	**Low**
VP6	View from 181 James Ruse Drive, Camellia	**Low-moderate**

The conclusion within the VIA summarises the overall predicted impact of the project. The text from that conclusion is reproduced below (VIA, page 40), with additional text in regard to the new VP6 shown in bold text. Overall, there is no change to the overall predicted level of impact as made in the VIA.

> The project would introduce new tall structures within the established industrial area of Rosehill/Camellia – a visual environment of lower scenic quality which includes a number of bulky and tall structures. Yet overall, there would be limited opportunity for publicly available views and no more than a low - moderate impact to such views, with the clearest public views from Silverwater Bridge.
>
> There would also be no more than a low-moderate impact to private views. Views from Rosehill Racecourse ***and from the upper residential levels of the proposed 181 James Ruse Drive, in the future Camellia town centre,*** are predicted to be impacted to a low-moderate level, with valued city views remaining unaffected. Other private viewpoints would have no more than a predicted low-moderate impact.
>
> The project is consistent with the visual environment expected of this major heavy industrial zone which supports (historically and currently) substantial industrial elements visible from outside viewpoints. Although there would be an impact to some viewpoints, the overall visual impact would not be significant considering the site's visual context.

APPENDIX A – VP 6 (181 JAMES RUSE DRIVE): VISUAL ANALYSIS AND SIMULATED PHOTOMONTAGES

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CAMBIUM GROUP
Visual communication science

VISUAL ANALYSIS

Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre

STATE SIGNIFICANT DEVELOPMENT | RESPONSE TO SUBMISSIONS

Prepared for Element Environment
12 November 2020



Contents

Figure 1 Stage 1 theoretical visibility and viewpoint indentification

VIEWPOINT 6
181 James Ruse Drive (part of the future Camellia Town Centre)

Figure 2 VP6 Simulated view - Existing
Figure 3 VP6 Simulated view - Historic massing
Figure 4 VP6 Simulated view - Project massing and historic features
Figure 5 VP6 Simulated view - Project detail and historic features
Figure 6 VP6 Simulated view - Project massing model
Figure 7 VP6 Simulated view - Project detailed model

Figure 1
Stage 1 theoretical visibility and viewpoint identification

Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
STATE SIGNIFICANT DEVELOPMENT | RESPONSE TO SUBMISSIONS



CAMBIUM GROUP | enVisage

Stage 1 site boundary
Stage 1 theoretical visibility based on 40.8m high RAP elevator*

*derived from 7.5cm 3D digital model (LiDAR) including trees and buildings.

0 0.25 0.5 0.75 1km

Viewpoints with no or negligible views

- NV1 Rydalmere Wharf and nearby parkland
- NV2 Eric Primrose Reserve
- NV3 Wilson Park
- NV4 Silverwater Park
- NV5 Asquith Street residential

Viewpoints with limited views

- LV1 Victoria Road
- LV2 M4 Western Motorway
- LV3 Primrose Street / Fallon Street
- LV4 River Road

Representative main viewpoints
(Photomontages provided)

- VP1 Rosehill Racecourse Members Stand
- VP2 Residential apartments, James Ruse Drive, Rosehill. (indicative view from Rosehill Racecourse stable area)
- VP3 Residential apartments (indicative view Allambie Street foreshore, Ermington)
- VP4 Silverwater bridge, Silverwater
- VP5 Patricia Street, Rydalmere
- VP6 181 James Ruse Drive (simulated view* from potential 40 storey residential tower (126m high), as part of the future Camellia Town Centre.

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Source: Nearmap (2020), Downer (2020), Envisage Consulting (2020), Cambium Group (2020).

Figure 2
VP6 181 James Ruse Drive (simulated view) - existing

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Figure 3
VP6 181 James Ruse Drive (Simulated view) – historic massing

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STATE SIGNIFICANT DEVELOPMENT | RESPONSE TO SUBMISSIONS



History of the Clyde Terminal

Viva Energy Australia ceased refining operations at the Clyde Terminal in late 2012. Since that date, crude oil has not been imported to or refined at the Clyde Terminal. The Clyde Terminal currently receives, stores and distributes finished petroleum products only. Demolition of the existing processing units, surplus storage tanks and other redundant infrastructure commenced in 2015 and was completed in 2020. Historical processing units and stacks shown in yellow were significant structures that dominated the Rosehill and Camellia industrial landscape, ranging in height from 60m to 100m.

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Figure 4
VP6 181 James Ruse Drive (Simulated view) – project massing and historic features

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STATE SIGNIFICANT DEVELOPMENT | RESPONSE TO SUBMISSIONS



History of the Clyde Terminal

Viva Energy Australia ceased refining operations at the Clyde Terminal in late 2012. Since that date, crude oil has not been imported to or refined at the Clyde Terminal. The Clyde Terminal currently receives, stores and distributes finished petroleum products only. Demolition of the existing processing units, surplus storage tanks and other redundant infrastructure commenced in 2015 and was completed in 2020. Historical processing units and stacks shown in yellow were significant structures that dominated the Rosehill and Camellia industrial landscape, ranging in height from 60m to 100m.

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Figure 5
VP6 181 James Ruse Drive (Simulated view) – project detail and historic features

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STATE SIGNIFICANT DEVELOPMENT | RESPONSE TO SUBMISSIONS



History of the Clyde Terminal

Viva Energy Australia ceased refining operations at the Clyde Terminal in late 2012. Since that date, crude oil has not been imported to or refined at the Clyde Terminal. The Clyde Terminal currently receives, stores and distributes finished petroleum products only. Demolition of the existing processing units, surplus storage tanks and other redundant infrastructure commenced in 2015 and was completed in 2020. Historical processing units and stacks shown in yellow were significant structures that dominated the Rosehill and Camellia industrial landscape, ranging in height from 60m to 100m.

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Figure 6
VP6 181 James Ruse Drive (Simulated view) – project massing model

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STATE SIGNIFICANT DEVELOPMENT | RESPONSE TO SUBMISSIONS



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Figure 7
VP6 181 James Ruse Drive (Simulated view) – project detailed model

Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
STATE SIGNIFICANT DEVELOPMENT | RESPONSE TO SUBMISSIONS



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APPENDIX B – PERSPECTIVES (FIGURE 2-4 TO FIGURE 2-7, Pages 9-12, reproduced from VIA)

Figure 2-4
Perspective view of stage 1 looking north-east

Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
STATE SIGNIFICANT DEVELOPMENT | ENVIRONMENTAL IMPACT STATEMENT |VISUAL IMPACT ASSESSMENT



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Source: Downer (2020), Geoscapes (2020), Costin Roe (2020), Cambium Group (2020).

Figure 2-5
Perspective view of stage 1 looking south-east

Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
STATE SIGNIFICANT DEVELOPMENT | ENVIRONMENTAL IMPACT STATEMENT |VISUAL IMPACT ASSESSMENT



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Source: Downer (2020), Geoscapes (2020), Costin Roe (2020), Cambium Group (2020).

Figure 2-6
Perspective view of stage 1 looking south-west

Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
STATE SIGNIFICANT DEVELOPMENT | ENVIRONMENTAL IMPACT STATEMENT |VISUAL IMPACT ASSESSMENT



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Source: Downer (2020), Geoscapes (2020), Costin Roe (2020), Cambium Group (2020).

Figure 2-7
Perspective view of stage 1 looking north-west

Central Sydney Industrial Estate incorporating the Sustainable Road Resource Centre
STATE SIGNIFICANT DEVELOPMENT | ENVIRONMENTAL IMPACT STATEMENT |VISUAL IMPACT ASSESSMENT



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Source: Downer (2020), Geoscapes (2020), Costin Roe (2020), Cambium Group (2020).



APPENDIX H

TRAFFIC TECHNICAL RESPONSE

20 November 2020

ptc.

Jeffrey Lord
VE Property Pty Ltd
c/o- DBL Property Pty Ltd
Suite 2, Upper Ground Floor
437 Kent Street
Sydney NSW 2000

Dear Jeffrey

1. VIVA Energy Subdivision – Response to Authorities – Traffic

VE Property Pty Ltd have submitted an SSDA for their site in Clyde. The relevant authorities have reviewed the proposal and have provided comments to be addressed. This letter has been prepared to address the comments regarding traffic and parking.

1.1 Response to Authorities

Our responses are provided in the table below.

Authority	Comment	Response
Parramatta City Council	The subdivision plan provides for a 20m wide road, with future connection to a future bridge crossing connecting to Carnarvon Street. Using a structure plan, this road width should be tested to ensure the proposed minimum width fits in with the broader road hierarchy and is appropriate for the future development and user demands.	The future connection is proposed to be 21m wide which approximately matches the road reserve on Carnarvon Street which is measured at 20m off Sixmaps. Furthermore, the road width will exceed the typical industrial street cross section required in PCC's Public Domain Guidelines of 19.3m. As the development is a typical industrial development the 19.3m cross section would typically apply according to PPC requirements. However, given the potential for the road to link to Silverwater, the cross section has been increased to 21m. Further consideration of the required cross section is set out in Section 1.2 of this letter. A Structure Plan depicting the proposed road and pedestrian connections was included as Figure 5.1 in the original EIS.
Parramatta City Council	A bicycle path at the new road and the riparian corridor be included. Using a structure plan, the bicycle path location and connections at the broader scale should be tested and shown.	We are advised that the Applicant is offering a Right of Way along the Riparian corridor to allow for the construction of a shared path by PCC in the future when required. Further, we understand that the Application has been amended to show a 3m wide shared path on the eastern side of the new access road within the overall estate, as requested by PCC.

		The recommended cross section is shown at Section 1.2 of this letter.
Parramatta City Council	The proposed 27.1m wide driveway for Stage 1 is considered excessive. This can be hazardous for pedestrians as they will have to travel a long distance within an area where there will be reasonable truck movements. Accordingly, the design of the driveway is to be revised so that it does not exceed what is necessary to allow access for a 26m long B Double vehicle.	Swept path analysis indicate the proposed 27.1m wide driveway is necessary for a 26m long B Double vehicle to safely enter and exit the site. Drawings have been revised to include a median refuge island to allow staged pedestrian crossing at the driveway.
Transport for New South Wales	It is noted that an assessment of cumulative impacts with the PLR, in particular the Stabling and Maintenance Facility at 6 Grand Avenue, Rosehill is not included in the development application. It is requested that the applicant: Undertakes an assessment of cumulative traffic impacts, flooding and construction/operational noise and vibration impacts as part of the Response to Submissions;	The proposed development is considered outside of the PLR catchment area. Furthermore, the development won't generate any additional traffic.
Transport for New South Wales	The Traffic Impact Assessment (TIA) prepared to support the development application includes the following: Table 15 of the TIA shows unequal number of employees arriving and departing; Table 16 of the TIA includes some recovered material that are not useable at the site such as organic materials, however it does not account for recovered metal that would also generate some outgoing trips; and Section 3.3.7 of the TIA states that 25 truck parking bays will be provided on site, however based on Section 10.2, a total of 18 truck parking bays will be provided. This discrepancy needs to be clarified. It is not clear from the TIA that adequate parking/queuing area is available for trucks within the site.	Table 15 – The arrival and departure numbers of employees were checked and there was an error in the departure showing only 43 rather than 48. The error was located for the 17:00 departures and has been corrected. This change has not affected the traffic assessment Table 16 – Recovered metals were originally included in the heavy vehicle traffic movements. However, it was erroneously left out of Table 16. Recovered metal has now been included in Table 16 and details of how the heavy vehicle movements were calculated for Reconomy has also been included in section 8.3.2. Section 3.3.7 – Corrected number of truck parking bays noted (18). Adequate parking / queueing area for trucks now addressed in Section 10.2 of the TIA. The updates made to the TIA are provided in Attachment 2.

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1.2 Streetscape Requirements

Parramatta City Council have commented on the width of the proposed road and requested a 3.0m shared path on the eastern side.

Parramatta City Council's Public Domain Guidelines provide typical cross sections of typical industrial streets that would ordinarily apply to the proposal. Figure 1 has been extracted from the Public Domain Guidelines showing the typical street cross section of an industrial street.

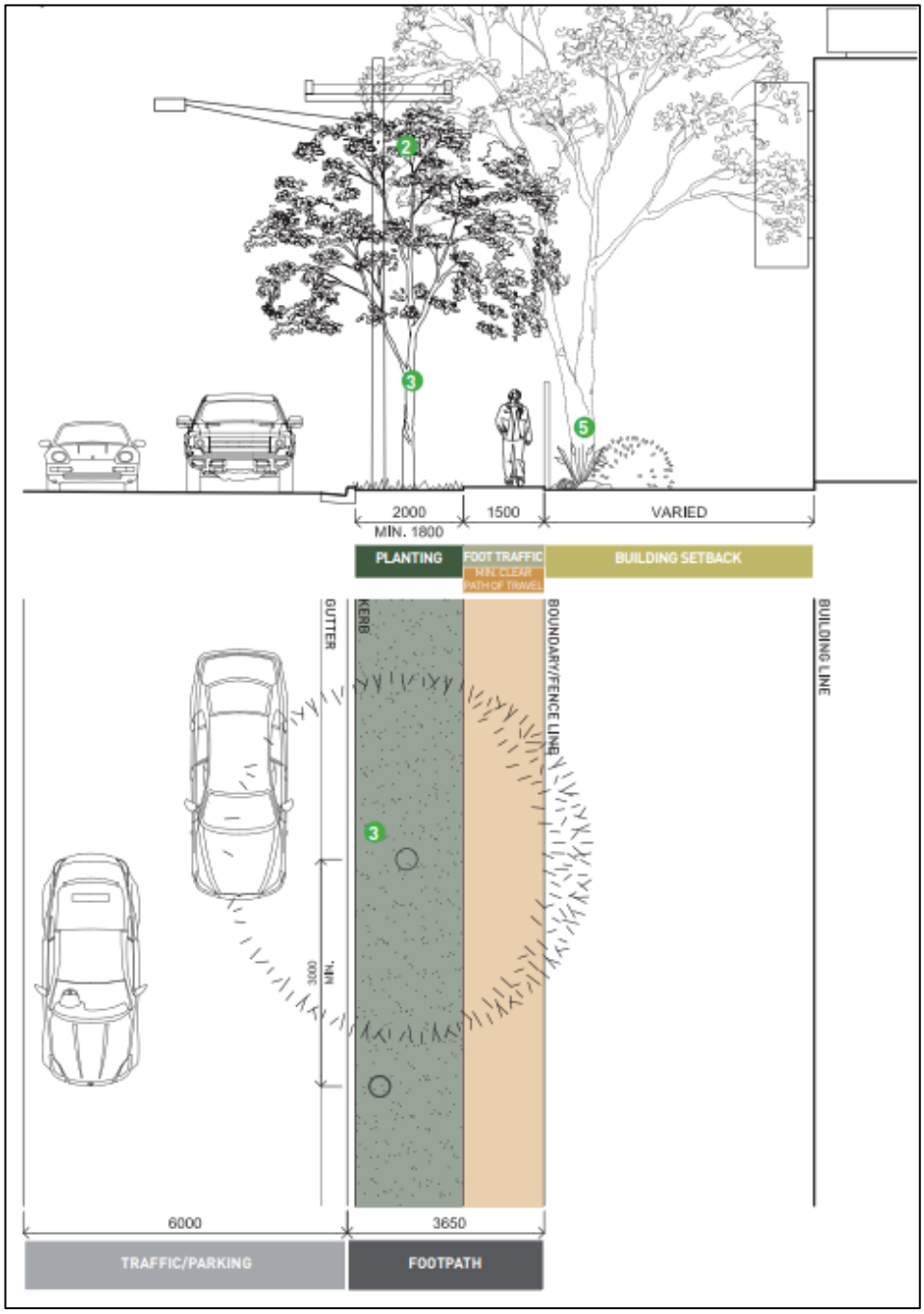


Figure 1 Typical Street Type – Industrial (Source: Public Domain Guidelines, Parramatta City Council)

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It is observed that a typical cross section of an industrial street consists of a trafficable area with parking permitted and a footpath which includes area for planting. From the above, assuming a 6000mm trafficable carriageway width, 150mm kerb, 2000mm planting area and 1500mm pedestrian walkway, the minimum required road reserve will be 19300mm.

ptc. have considered the standard 19.3m cross section in the context of this development acknowledging the future possible role of the new road as a connection through to Silverwater. Bearing in mind the potential need for the link and the existing road cross sections at Carnarvon Street and in Camellia, it was determined that the standard industrial cross section should increase to 21m. To also accommodate a shared path of 3.0m on the eastern verge, the proposed road will have a road reserve of 21000mm. Figure 2 illustrates a satisfactory road cross section at 21m.

The proposed road cross section is therefore shown as follows.

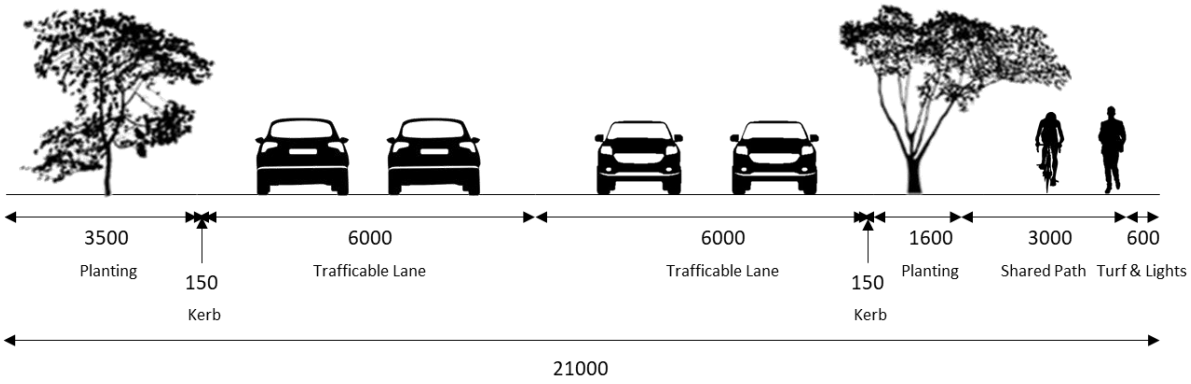


Figure 2 ptc. proposed street layout

1.3 Testing of the revised concept design

The concept design in the EIS and tested in the TIA have been changed. We have updated the swept paths and have provided them in Attachment 1.

Document Control: Prepared by *AP* on *17 November 2020*. Reviewed by *SN* on *17 November 2020*.

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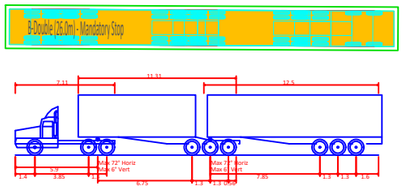
ptc.

Attachment 1 Lot 6 Site Layout Swept Paths

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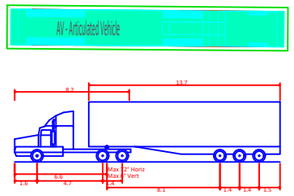
comments

A3



B-Double (26.0m) - Mandatory Stop

Overall Length	26.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



AV - Articulated Vehicle

Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.301m
Min Body Ground Clearance	0.418m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

Please note the following compliance requirements:

Height Clearance: **4.5m** wherever access is required for heavy vehicles (and safety clearance envelope)

Sight Splays: Pedestrian visibility splays in the form of a **2.5m x 2m** right-angled triangle to be provided (AS2890.1). Vehicular sight splays to be in accordance with AS2890.2.

Loading Bays: Ensure that grades within the parking module do not exceed 1:25 (4%) in loading bays.

Grades: Max grade transition of 1:16 (6.25%) required. Grades will be required to be designed in accordance with the requirements of AS2890.2.

Lane widths: Minimum width for circulation aisles (excluding parking aisles) to be a minimum of 3.5m (one-way) or 6.5m (two-way), measured between kerbs.

The turning paths illustrated in this drawing have been prepared using the Autotrack vehicle modelling software in conjunction with AutoCAD. The vehicle model was prepared by Analytico Pty Ltd based upon vehicle data provided by Austroads. While this modelling represents a conservative assessment of the vehicles ability, it is not possible to account for all vehicle types/characteristics or driver ability.

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3	03/07/20	for information	SC	AP
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Subdivision Clyde - SSD

drawing title

High Level Design Review

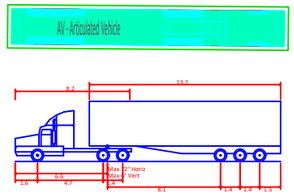
26m B-Double & 19m Semi-Trailer Parking

client	DBL Property Pty Ltd
drawing #	ptc-000
project #	2632A
scale	1 : 1500

rev 7

comments

A3



AV - Articulated Vehicle	
Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.301m
Min Body Ground Clearance	0.418m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

TYPICAL

Please note the following compliance requirements:

Height Clearance: **4.5m** wherever access is required for heavy vehicles (and safety clearance envelope)

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2	02/07/20	For Informatoin	SC	HL
1	30/06/20	For Information	SC/HL	AP

project

Subdivision Clyde - SSD

drawing title

High Level Design Review

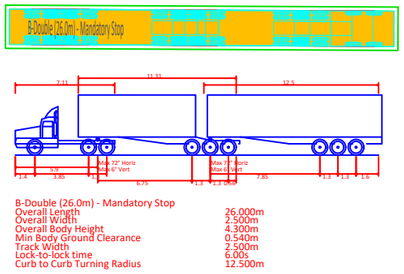
Asphalt Truck Ingress/Egress
19m Semi-Trailer

client	DBL Property Pty Ltd
drawing #	ptc-001
project #	2632A
scale	1 : 1500

rev 7

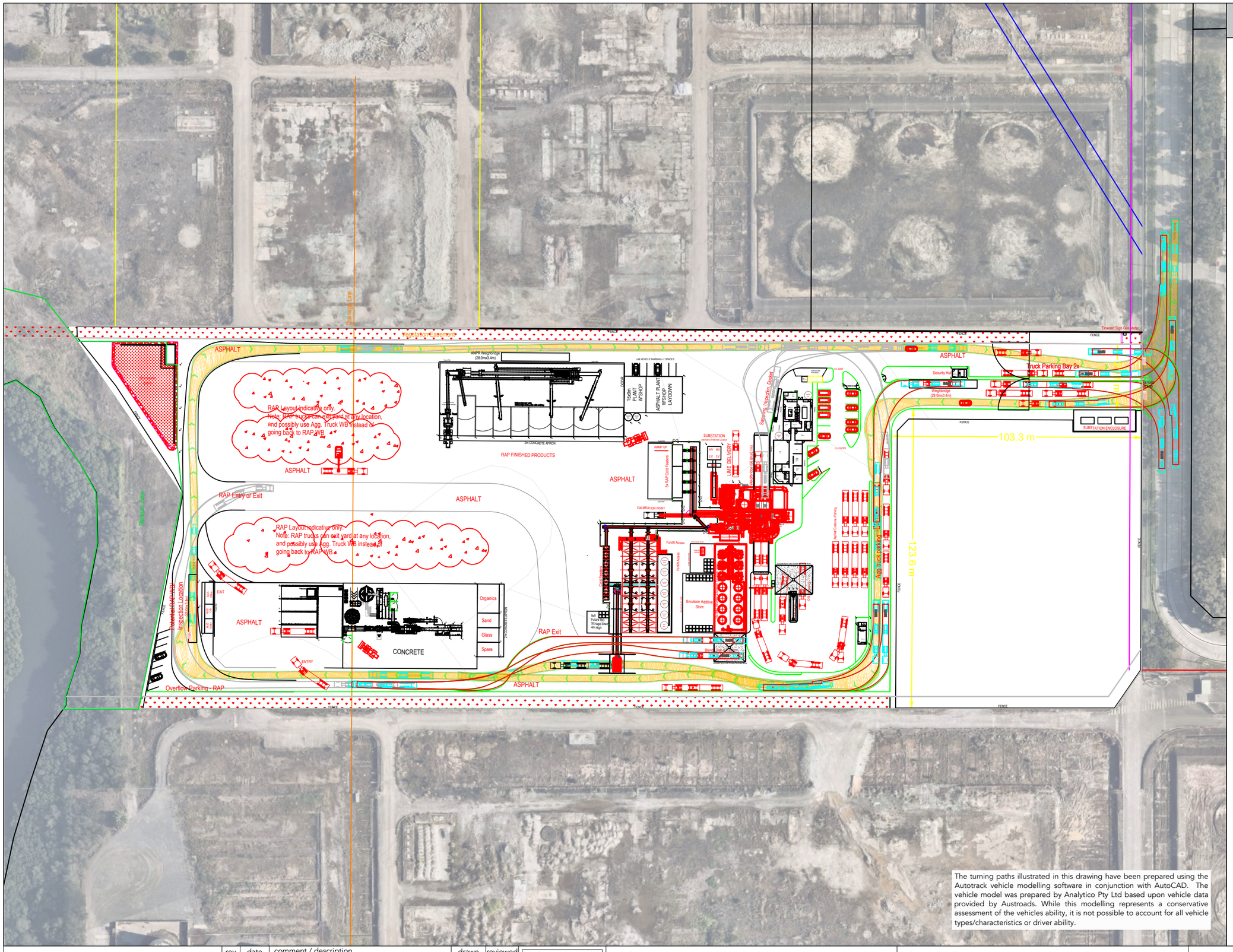
comments

A3



B-Double (26.0m) - Mandatory Stop

Overall Length	26.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



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TYPICAL

Please note the following compliance requirements:

Height Clearance: **4.5m** wherever access is required for heavy vehicles (and safety clearance envelope)

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Grades: Max grade transition of 1:16 (6.25%) required. Grades will be required to be designed in accordance with the requirements of AS2890.2.

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1	30/06/20	For Information	SC/HL	AP

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Subdivision Clyde - SSD

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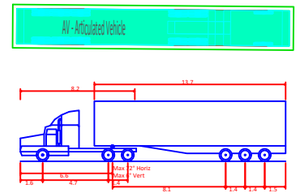
Aggregate Truck Ingress/Egress
26m B-Double

client	DBL Property Pty Ltd
drawing #	ptc-002
project #	2632A
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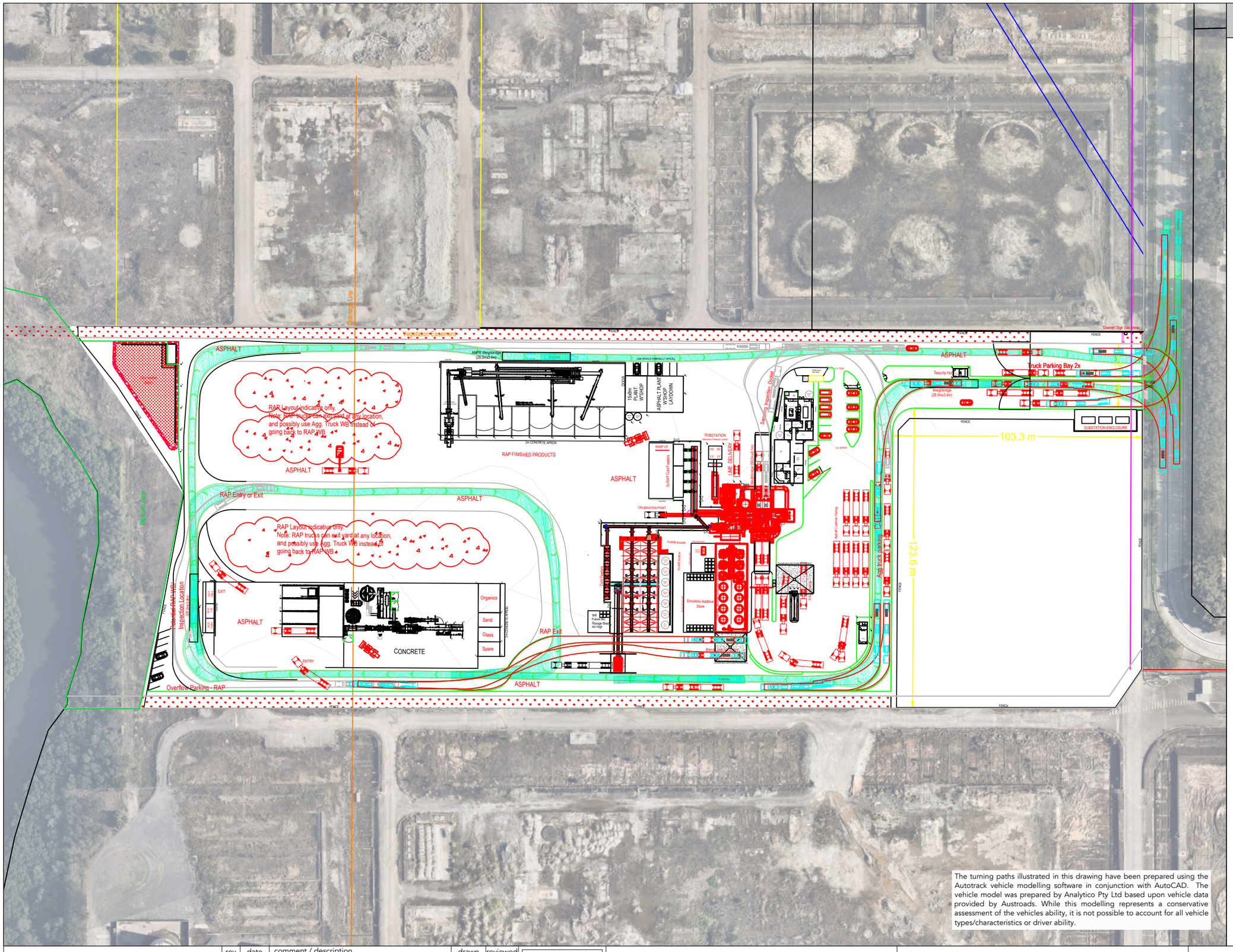
rev 7

comments

A3



AV - Articulated Vehicle	
Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.301m
Min Body Ground Clearance	0.418m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



TYPICAL

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2	02/07/20	For Informatoin	SC	HL
1	30/06/20	For Information	SC/HL	AP

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High Level Design Review

RAP Tip Off Truck Ingress/Egress
19m Semi-Trailer

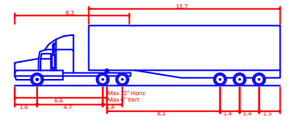
client	DBL Property Pty Ltd
drawing #	ptc-003
project #	2632A
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rev 7

comments

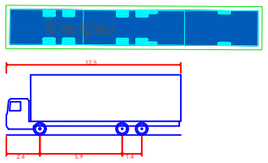
A3





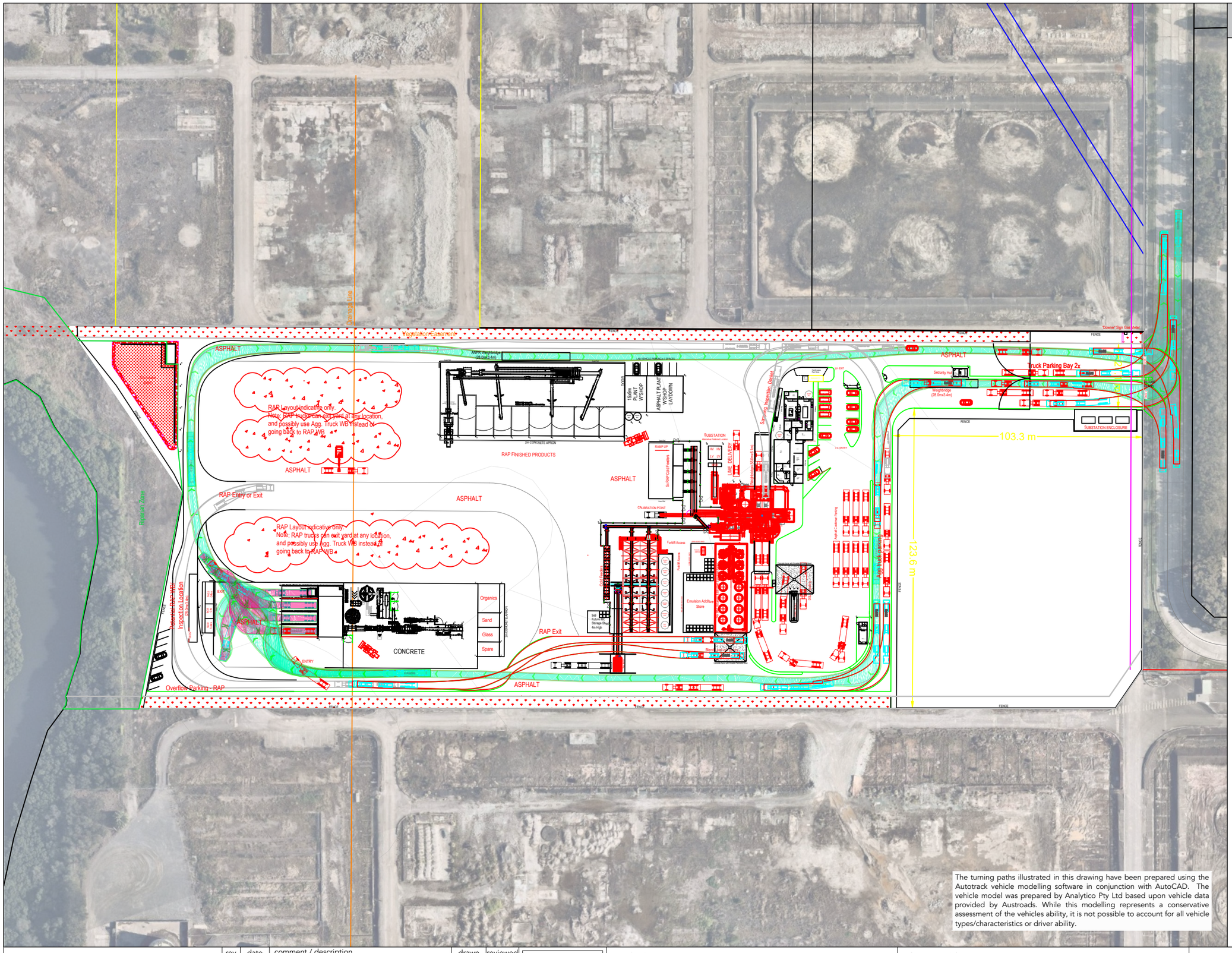
AV - Articulated Vehicle

Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.301m
Min Body Ground Clearance	0.418m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



HRV - Heavy Rigid Vehicle

Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



TYPICAL

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1	30/06/20	For Information	SC/HL	AP

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High Level Design Review

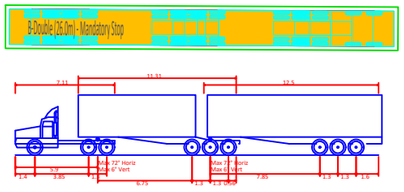
Reconomy Truck Ingress/Egress
19m Semi-Trailer & 12.5m HRV

client	DBL Property Pty Ltd
drawing #	ptc-004
project #	2632A
scale	1 : 1500

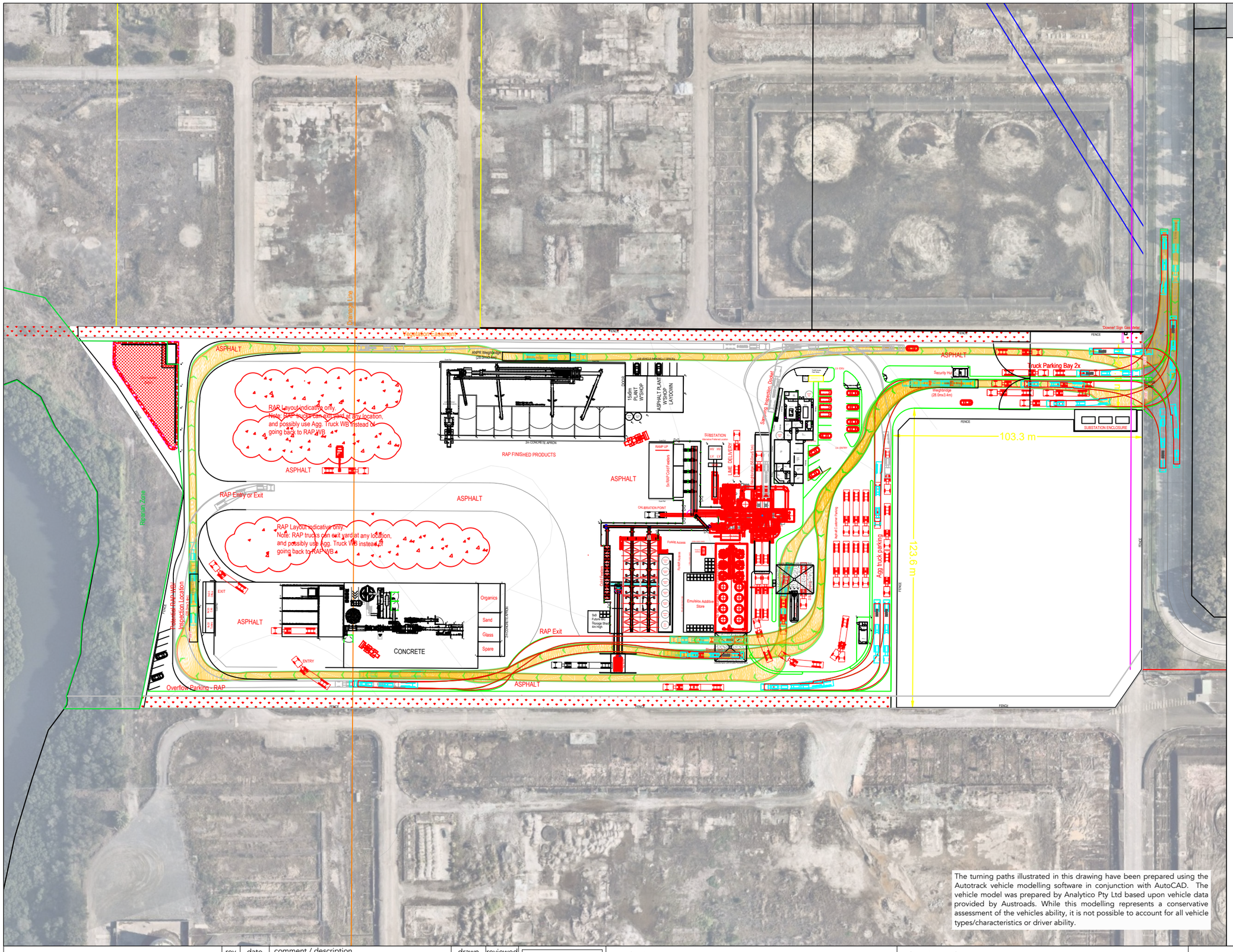
rev 7

comments

A3



B-Double (26.0m) - Mandatory Stop	
Overall Length	26.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



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TYPICAL

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1	30/06/20	For Information	SC/HL	AP

project

Subdivision Clyde - SSD

drawing title

High Level Design Review

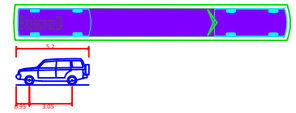
Bitumen Truck Ingress/Egress
26m B-Double

client	DBL Property Pty Ltd
drawing #	ptc-005
project #	2632A
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rev 7

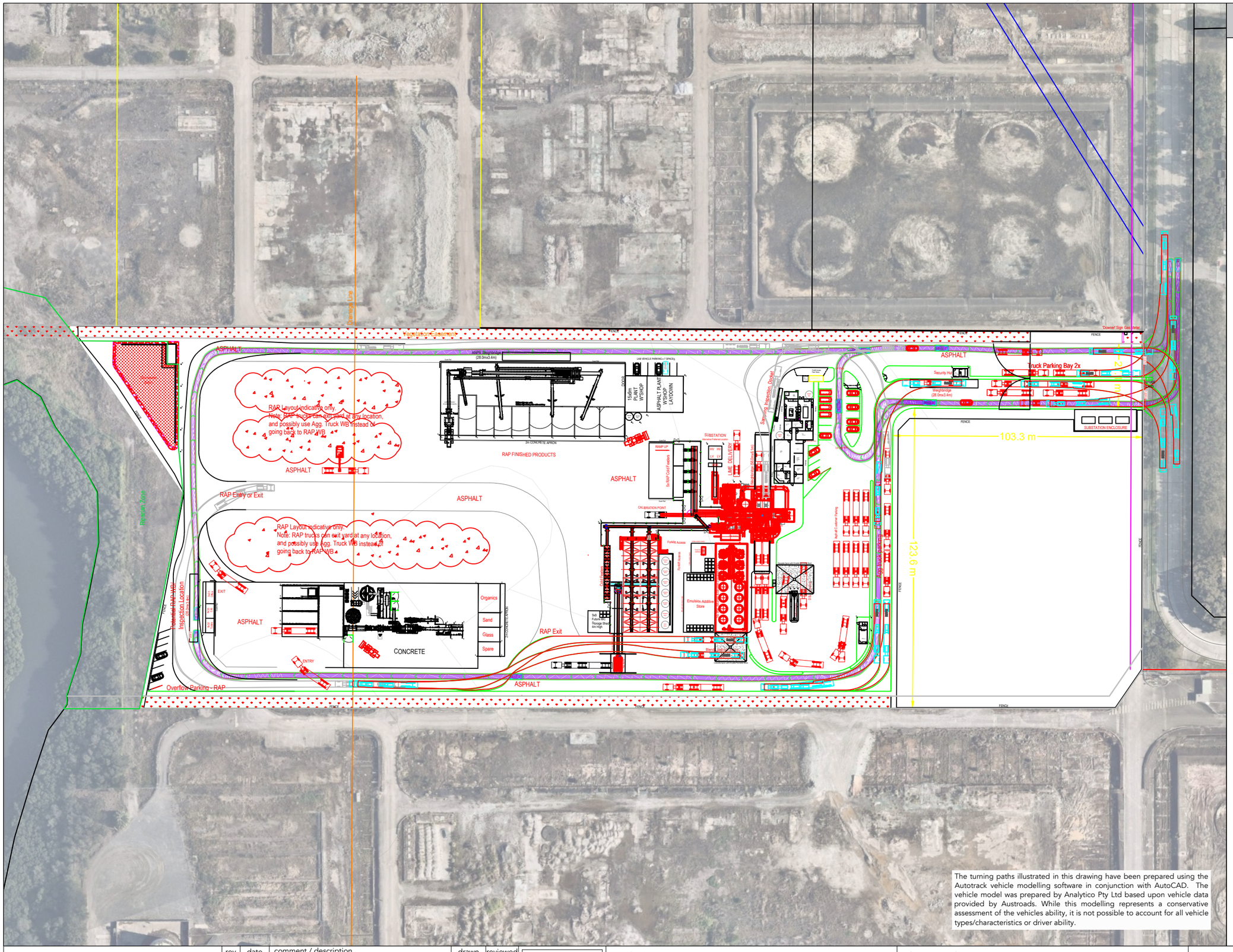
comments

A3



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m



TYPICAL

Please note the following compliance requirements:

Height Clearance: **4.5m** wherever access is required for heavy vehicles (and safety clearance envelope)

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2	02/07/20	For Informatoin	SC	HL
1	30/06/20	For Information	SC/HL	AP

project

Subdivision Clyde - SSD

drawing title

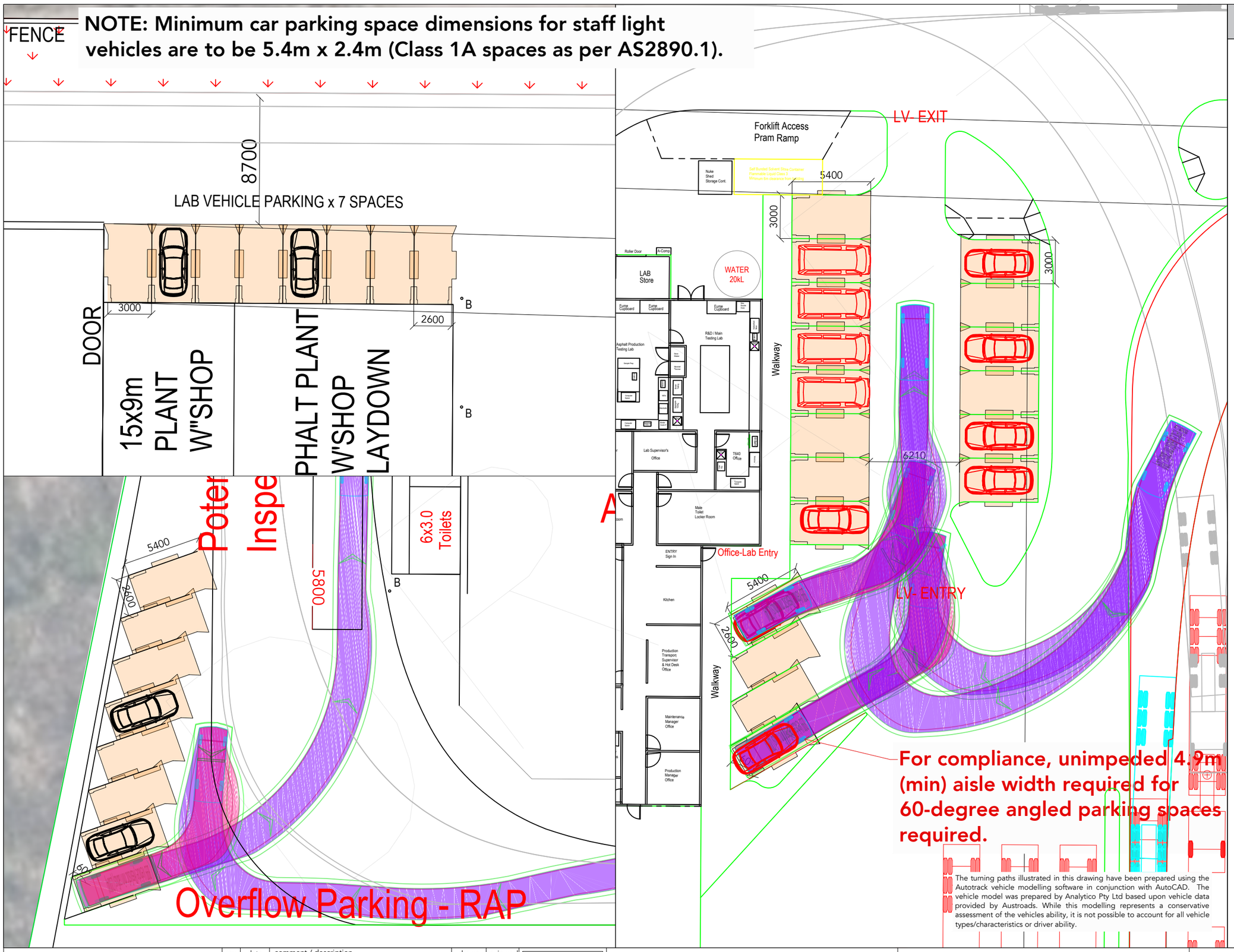
High Level Design Review

Reconomy/RAP Light Vehicle Ingress/Egress B99

client	DBL Property Pty Ltd
drawing #	ptc-006
project #	2632A
scale	1 : 1500

rev 7

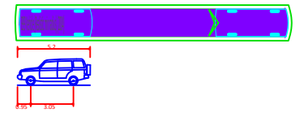
NOTE: Minimum car parking space dimensions for staff light vehicles are to be 5.4m x 2.4m (Class 1A spaces as per AS2890.1).



The turning paths illustrated in this drawing have been prepared using the Autotrack vehicle modelling software in conjunction with AutoCAD. The vehicle model was prepared by Analytico Pty Ltd based upon vehicle data provided by Austroads. While this modelling represents a conservative assessment of the vehicles ability, it is not possible to account for all vehicle types/characteristics or driver ability.

comments

A3



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m

TYPICAL

Please note the following compliance requirements:

Height Clearance: **4.5m** wherever access is required for heavy vehicles (and safety clearance envelope)

Sight Splays: Pedestrian visibility splays in the form of a **2.5m x 2m** right-angled triangle to be provided (AS2890.1). Vehicular sight splays to be in accordance with AS2890.2.

Loading Bays: Ensure that grades within the parking module do not exceed 1:25 (4%) in loading bays.

Grades: Max grade transition of 1:16 (6.25%) required. Grades will be required to be designed in accordance with the requirements of AS2890.2.

Lane widths: Minimum width for circulation aisles (excluding parking aisles) to be a minimum of 3.5m (one-way) or 6.5m (two-way), measured between kerbs.

ptc.

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rev	date	comment / description	drawn	reviewed
7	20/11/20	For Information	AP	AP
6	17/11/20	For Information	AP	AP
5	17/08/20	For Information	SC	AP
4	05/08/20	For Information	SC	AP
3	03/07/20	for information	SC	AP
2	02/07/20	For Informatoin	SC	HL
1	30/06/20	For Information	SC/HL	AP

project

Subdivision Clyde - SSD

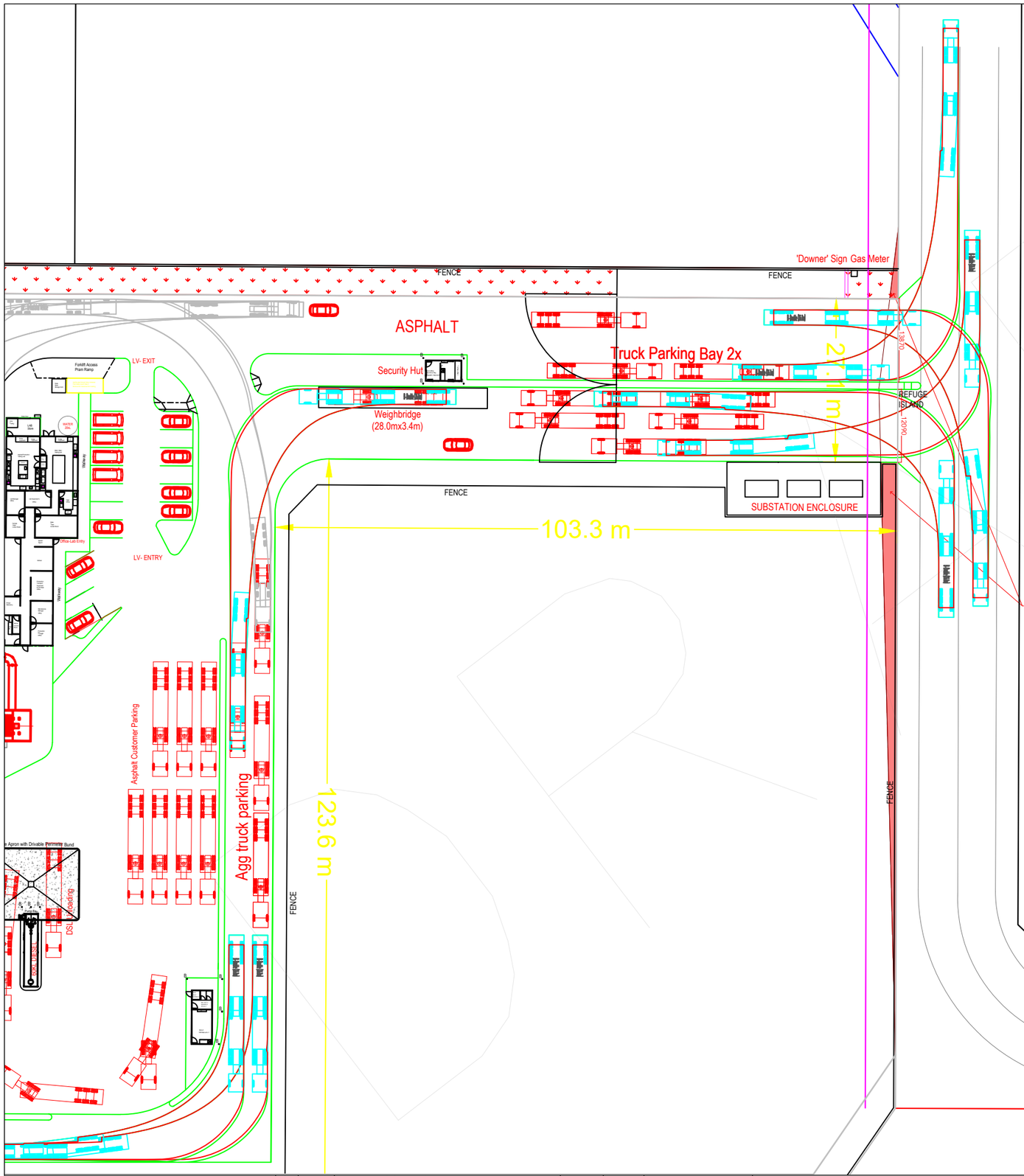
drawing title

High Level Design Review

Parking Assessment
Class 1A (B99)

client	DBL Property Pty Ltd
drawing #	ptc-007
project #	2632A
scale	1 : 250

rev 7



Vehicle sight distance requirements for 50km/h frontage road (AS2890.2:2018).

Indicated area to be clear of any permanent visual obstructions (e.g. walls, dense landscaping, non-permeable fencing, etc.).

The turning paths illustrated in this drawing have been prepared using the Autotrack vehicle modelling software in conjunction with AutoCAD. The vehicle model was prepared by Analytico Pty Ltd based upon vehicle data provided by Austroads. While this modelling represents a conservative assessment of the vehicles ability, it is not possible to account for all vehicle types/characteristics or driver ability.

comments

A3

TYPICAL

Please note the following compliance requirements:

Height Clearance: **4.5m** wherever access is required for heavy vehicles (and safety clearance envelope)

Sight Splays: Pedestrian visibility splays in the form of a **2.5m x 2m** right-angled triangle to be provided (AS2890.1). Vehicular sight splays to be in accordance with AS2890.2.

Loading Bays: Ensure that grades within the parking module do not exceed 1:25 (4%) in loading bays.

Grades: Max grade transition of 1:16 (6.25%) required. Grades will be required to be designed in accordance with the requirements of AS2890.2.

Lane widths: Minimum width for circulation aisles (excluding parking aisles) to be a minimum of 3.5m (one-way) or 6.5m (two-way), measured between kerbs.

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rev	date	comment / description	drawn	reviewed
7	20/11/20	For Information	AP	AP
6	17/11/20	For Information	AP	AP
5	17/08/20	For Information	SC	AP
4	05/08/20	For Information	SC	AP
3	03/07/20	for information	SC	AP
2	02/07/20	For Informatoin	SC	HL
1	30/06/20	For Information	SC/HL	AP

project
Subdivision Clyde - SSD

drawing title
High Level Design Review
Sight Distance Requirements

client	DBL Property Pty Ltd
drawing #	ptc-008
project #	2632A
scale	1 : 750

rev 7

Attachment 2 Updated Sections of TIA

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3.3.7 Ancillary infrastructure, hours of operation and employment

The Sustainable Road Resources Centre will also comprise the following ancillary infrastructure to facilitate the above land uses:

- 34 car parking bays.
- 18 truck parking bays.
- Site offices.
- Laboratory.
- Workshop building.
- Weighbridges.
- Stormwater management infrastructure.
- Services and utilities including an electrical substation.
- Landscaping, fencing and signage.

The Sustainable Road Resources Centre is proposed to operate 24-hours a day, seven days a week, 365 days a year. This reflects the demand for asphalt to be provided at night due to government demands that road works minimize interference with traffic.

Construction and operation of the Sustainable Road Resources Centre will employ the personnel over the shifts summarised in Table 1.

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8.3.1 Light Vehicles

As the land use for Lot 6 is classified as industrial, the typical light vehicle traffic activity during the AM and PM peak hours will only contain staff movements. The traffic generated by employees will be dependent on their shift times (see Table 1 in Section 3).

It should be noted that the existing Rosehill site currently accommodates a number of staff. The operation of Lot 6 will retain some of these employee numbers, however, the number of staff is expected to decrease once the operation is moved to Lot 6 as most of the administrative staff at the existing Rosehill site will not be moving to the new site.

The existing light vehicle traffic generation of the Rosehill site according to *Traffic and Transport Assessment Report for Proposed Resource Recovery Facility No.1A Unwin Street Rosehill* prepared by Transport & Urban Planning, is 26 inbound trips and 22 outbound trips in the AM peak (7:00am to 8:00am) and 2 inbound trips and 24 outbound trips in the PM peak (4:00pm to 5:00pm).

Downer has provided the existing shift details of the Camellia RAP facility. The RAP facility currently operates with three workers and one manager during the day shift (6:00am to 5:00pm) and three workers for the night shift (8:00pm to 5:00am).

Since the AM peaks for the Rosehill and Camellia site do not overlap, the total trips in the AM Peak is 26 inbound trips and 22 outbound trips. The PM peaks for the Rosehill and Camellia site do overlap, the total trips in the PM peak is 2 inbound trips and 27 outbound trips.

Assuming the occupancy of 1 employee per vehicle for each shift, the approximate number of (arriving and departing) project light vehicle trips are summarised in Table 15.

Table 15 Approximate hourly arriving and departing employee trips

Shift start/end time	No. of employees arriving	No of employees departing	Total trips[1]
05:00	1	0	1
06:00	20	17	37
07:00	2	0	2
08:00	5	0	5
14:00	3	3	6
15:00	0	1	1
17:00	0	6	1
18:00	14	17	31
19:00	0	1	1
22:00	3	3	6

As presented in Table 15, the peak number of trips occur at 6am (37 trips) and 6pm (31 trips) for the day and night shift changeover.

[1] Assumes staff arrival and departure times for the same shift start/end time occurs within the same hour

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Though the peak traffic generation time is different between the existing Rosehill and Camellia site and the peak traffic generation shown in Table 15, a conservative like to like comparison can still be made. From the above, the site will decrease the traffic generation in the AM peak by 11 trips and an increase in the PM peak by 2 trips.

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8.3.2 Heavy Vehicles

The anticipated net change in heavy vehicles for the site in comparison to the existing trips are summarised in Table below. It should be noted, the organic waste from reconomy is approximately 20,000t per year, assuming a typical HRV hauls 13.5t per trip over 365 days, an average day would have approximately 4 heavy vehicle trips. Truck movements per day has been taken as 7 to account for the other waste products from reconomy (i.e. water waste, landfill waste and recovered metal).

Table 16 Net change of daily heavy vehicle trips summary

Process	Material / Product	Incoming / Outgoing	Current (trucks/day)	Proposed (trucks/day)
Asphalt	Bitumen	Incoming	13	13
	Lime	Incoming	13	13
	Aggregate	Incoming	13	13
	Asphalt	Outgoing	59	58
Reconomy	Reconomy	Incoming	27	27
	Organics	Outgoing	7	7
	Water waste	Outgoing	0*	0*
	Landfill Waste	Outgoing	0*	0*
	Recovered Metal	Outgoing	0*	0*
RAP	RAP	Incoming	32	34
	RAP going out directly	Outgoing	9	10
	RAP going to Asphalt Production	Outgoing	23	0
Bitumen	Bitumen	Incoming	0	6
	Chemical and Additives	Incoming	0	1**
	Kero and Diesel	Incoming	0	1**
	Bitumen	Outgoing	0	6
Total			188	189

*Accounted for in the organic waste truck movements

**Does not occur daily but rounded up for a conservative estimate

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10.2 Parking Provision

The proposed parking supply of 34 spaces for Lot 6 is summarised in Table 20.

Table 20 Parking provision summary

Sector	Location	Parking Supply[2]
Light Vehicles:		
Office Staff	Office-Lab Car Park	4
Lab Staff	Office-Lab Car Park	14
Lab Vehicles	Asphalt Workshop Laydown	8
RAP WB/Inspection	South-east corner of the site[3]	8
Total		**34**
Heavy Vehicles:		
Semi-Trailer	North-east area of the site	14
B-Doubles	South-east edge of the site	4
Total		**18**

As the peak number of staff on site at any one time is 28, it is considered that 34 parking spaces is sufficient to accommodate a majority of overlapping arrival/departure times during shift changeover. In regards to visitors or service personnel, it is anticipated that they will be on site outside of the shift changeover periods and will therefore be accommodated by the excess car spaces provided.

Downer has informed that the number of heavy vehicles that require parking on site are not anticipated to exceed 18, however, in the unlikely instance where more truck parking is required, the site has the capacity to accommodate additional truck parking spaces.

[2] Subject to change dependent on the final site arrangement

[3] Opportunity for additional non-formalised parking to accommodate overflow (i.e. overlapping arrival/departures during shift changeover)

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APPENDIX I

NOISE TECHNICAL RESPONSE

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11 November 2020

MAC201090-01-07LR1V1

Attention: Neville Hattingh
Element Environment Pty Ltd
PO Box 1563
Warriewood NSW 2102

Dear Neville,

Response to EPA Submissions: Noise and Vibration Impact Assessment Proposed Central Sydney Industrial Estate, Rosehill, NSW.

This letter provides responses to address several comments raised by the Environment Protection Authority (EPA) in relation to the Noise and Vibration Impact Assessment (NVIA) prepared for the development of the Central Sydney Industrial Estate (CSIE) (previously Western Area) incorporating Downer EDI Works Pty Ltd's (Downer) Sustainable Road Resource Centre at Rosehill, NSW (the 'project').

EPA *Comments*

Comment 1:

The EPA does not support the following assertion in the NIA: "Furthermore, in satisfying the relevant criteria, it is anticipated that there would be no cumulative industrial noise impacts at the nearby residential receivers".

Response 1:

Noted, this sentence was based on the project site in isolation achieving the Amenity Criteria and therefore no additional consideration of cumulative noise would be required. Following our meeting with the EPA on 4 November 2020, the criteria approach going forward has changed and this statement is no longer applicable. Cumulative noise emissions have been included in subsequent responses.

Comment 2:

The NIA at S.3.1.1 identifies "typical" construction hours of 6am to 6pm Monday to Friday and 7am to 1pm Saturday, and also notes that "construction outside these hours will be required on both weekdays and weekends including Sundays". The Interim Construction Noise Guidelines (ICNG) (DECC, 2009) outlines standard construction hours (i.e. Monday to Friday – 7am to 6pm and Saturdays 8am to 1pm) and a need to justify construction outside these hours. The Proponent must outline the nature and extent of out of standard hours construction and the justification for it in accordance with the ICNG.

Response 2:

The 1A Unwin Street site on which Downer's existing asphalt plant and Reconomy facility operate is subject to compulsory acquisition by the NSW Government for use by the Sydney Metro West project. Assuming development consent for SSD-10459 is granted at the end of 2020, Downer will have a little over 12 months to construct the entire Sustainable Road Resource Centre, before they are required to vacate their Unwin Street site. This is an extremely demanding construction program and although Downer intend to construct the development within standard construction hours, they require flexibility to undertake construction works outside of standard construction hours in the event of program delays due to inclement weather, COVID related supply chain delays etc. Therefore, the exact nature and extent of out of standard hours construction cannot be determined at this time.

Notwithstanding, noise modelling for the construction of the project which was an absolute worst-case assessment, with multiple plant operating simultaneously identifies that noise emissions would satisfy the relevant noise management levels (NMLs) for any activities completed outside standard construction hours. Furthermore, the proponent has committed to completing a Construction Environmental Management Plan for the works that will guide, manage, quantify and control noise emissions throughout the construction process (see Section 8.1 of the NVIA).

Comment 3:

Both operational and construction noise criteria are in part informed by prevailing background noise levels. The NIA has adopted Rating Background Noise Levels (RBLs) from a previous assessment (i.e. SSD-9302 – Viva Energy Clyde Western Area Remediation). The Proponent must ensure that adopted background noise data are reviewed and a statement provided that the data conforms to the requirements of the Noise Policy for Industry (NPfI) (EPA, 2017).

Response 3:

The historic data has been reviewed and conforms to the requirements of the Noise Policy for Industry (NPI) (EPA, 2017).

Comment 4:

Project Amenity Noise Levels: The NIA notes on page 29 that exceptions to the standard approach to deriving "project amenity noise levels" (i.e. NPfI, Section 2.4) exist. One of the exceptions relates to proposed developments in major industrial clusters. This current proposal will potentially result in the development of eight new industrial noise sources in an area with existing industrial noise sources. Therefore, the approach to developing operational "project amenity noise levels" (PANL) for Lot 6 (and remaining lots) needs to consider the NPfI Section 2.4.2. This approach effectively shares the "project amenity noise level" across the eight lots. For example, based on the night-time derived PANL of LAeq,15minutes 43dB, the level for Lot 6 isolation would be LAeq,15minutes 34dB. This approach is designed to manage cumulative noise impacts which is a SEARs requirement. The assessment must be amended to consider the adjusted PANL applicable in this situation.

Response 4:

Further to our meeting with the EPA on Wednesday 4 November 2020, it is evident that a key component for the project is limiting cumulative changes to offsite amenity noise levels (ie limit background creep), in particular at the nearest catchment of Silverwater. Therefore, this response provides further detail and analysis on the amenity noise levels for the Silverwater catchment taking into account data to develop reasonable criteria based on a contemporary data set.

Current Ambient Noise Levels, Silverwater NSW.

The noise criteria for operation of the project site are based on Amenity Noise Levels (ie the limiting criteria). The unattended noise monitoring location adopted for Silverwater catchment for the noise assessment was 101 Asquith Street, Silverwater, NSW (R2) from 2017 (Wilkinson Murray, 2017). This location has been reviewed and the resultant ambient L_{Aeq} noise metrics are considered slightly conservative as it is shielded by neighbouring industrial buildings to ambient industrial and road noise. To gain a more comprehensive understanding of ambient noise levels in the area (between March and July 2019), data obtained as part of the Sydney Metro West Environmental Impact Statement (2020) (Westmead to The Bays, 2020) for 10 Carnarvon Street Silverwater, NSW (Attachment A) has been reviewed. The 2019 monitoring location has a similar offset to the M4 Motorway compared to the R2 (2017) assessment location, although slightly closer to Silverwater Road which may result in slightly elevated ambient levels compared to Asquith Street (R2).

It is noted that assessment location R2 is geographically situated between the two monitoring locations. Considering the respective measured ambient noise levels and their relevant offset to major noise sources (industry, road) it would seem reasonable to adopt the logarithmic average of the two data sets (Asquith Street & Carnarvon Street) as representative of receivers in the Silverwater catchment. Table 1 provides a comparison of both data sets, along with the logarithmic average to provide context around ambient L_{Aeq} amenity noise levels for the Silverwater area.

Table 1 Comparison of Ambient Noise Levels, Silverwater NSW				
Monitoring Location	Period	Measured RBL, dB $LA_{90(period)}$	Measured Ambient, dB $LA_{eq(period)}$	Measured Ambient, dB $LA_{eq(15min)}$[1]
101 Asquith Street, Silverwater	Day	42	55	58
	Evening	41	51	54
	Night	38	48	51
10 Carnarvon Street, Silverwater	Day	46	60	63
	Evening	44	57	60
	Night	41	55	58
Logarithmic Average (Intermediate Amenity)	**Day**	**N/A**	**58**	**61**
	Evening	**N/A**	**55**	**58**
	Night	**N/A**	**53**	**56**

Note 1: Adjusted from LAeq(period) (ie +3dB)

Consideration of the Cluster Approach

It is understood that limiting cumulative noise emissions from industry within residential communities is a priority. However, applying the (NPI) industry cluster approach based on urban amenity noise levels is not a reasonable approach for this particular project site. There are several justifications for this including:

- The nearest surrounding residential receivers are currently exposed to elevated levels of ambient noise from a combination of sources (eg road noise and industry) that are unlikely to decrease.
- The potentially most affected residential receivers are in the Silverwater catchment. Between these receivers and the project site is approximately 750m of general industrial development.
- The timing for development of future industrial lots in the proposed industrial estate is still uncertain at this time.
- The project in now proposed to be subdivided into 14 lots, with Downer occupying one lot; a cluster approach would restrict lots to a night criteria of 32dB $LA_{eq(15min)}$ per lot which is considered prohibitive for IN3 heavy industrial zoning;
- The type of industry that will be established on the remaining the lots within the industrial estate is unknown at this stage, hence applying an industry cluster based approach may not be reasonable as some lots may be occupied by operations that do not generate significant noise emissions eg storage warehouse/transport logistics depots and will

operate significantly below a night criteria of 32dB $LA_{eq(15min)}$, while other lots may be occupied by operations that are typical heavy industrial uses that won't be able to operate below a night criteria of 32dB $LA_{eq(15min)}$ even when applying reasonable and feasible noise mitigation.

- The project site is zoned IN3 heavy industrial which is in very limited supply in Sydney. Application of an overly restrictive acoustic approach to the land (a very restrictive noise criteria (ie night criteria of 32dB $LA_{eq(15min)}$ per lot) would make the site less attractive and unusable for typical heavy industrial uses, further limiting the availability of usable heavy industrial land in Sydney.
- While typically only applied to existing operational industrial sites, the Urban Industrial Interface approach could be a reasonable application in this instance, as the current ambient environment for residential receivers are already elevated from exposure to existing industrial and road traffic noise that is unlikely to reduce in the future.

The proponent seeks to obtain a noise criteria for the project site that achieves a balance between adopting a reasonable PNTL commensurate to the projects end use (ie IN3 heavy industrial), while minimising off-site cumulative noise increases, particularly during the more sensitive evening and night periods.

The section below provides two options for consideration in deriving criteria for the project site. The first consideration was to adopt a PNTL based on the Urban Industrial Interface approach. The key metric of the analysis was to minimise the overall offsite ambient noise levels as much as possible and avoid background creep from industrial noise sources whilst limiting the overall noise emission from the project site as a whole. Where the Urban Industrial Interface approach is not supported, an alternative approach is proposed which restricts the project criteria to minimise offsite cumulative noise level increases.

Urban Industrial Interface approach - A comparison of measured ambient $LA_{eq(15min)}$ noise levels and a maximum PNTL based on an Urban Industrial Interface is summarised in **Table 2**. The change column shows the overall increase in decibels within the Silverwater catchment based on the project site achieving the maximum allowable PNTL. It is noted that a change in noise level of 2dB would be just perceptible to most humans, notwithstanding, a minimal change in cumulative levels within residential catchments is preferred.

The overall change in offsite noise levels taking the Urban industrial interface approach (refer Table 2), using the (proposed) intermediate Amenity Noise Levels (refer **Table 1**) would result

in a 4.1 dB increase in daytime offsite industrial noise levels (1.2 dB increase in the evening and 0.6 dB increase in the night period) in the Silverwater catchment. Therefore, a more stringent alternative criteria has been considered to minimise residual industrial noise within the community (see Table 3).

Table 2 Cumulative Noise Emission Comparison – Urban Industrial Interface Approach					
Noise Catchment	Period	Existing Ambient dB $LA_{eq(15min)}$	Urban Industrial Interface PNTL dB $LA_{eq(15min)}$	Cumulative (total) Noise (existing + Project) dB $LA_{eq(15min)}$	Change dB
101 Asquith Street, Silverwater	Day	58	63	64	6.2
	Evening	54	53	57	2.5
	Night	51	48	53	1.8
10 Carnarvon Street, Silverwater	Day	63	63	66	3.0
	Evening	60	53	61	0.8
	Night	58	48	58	0.4
Receiver R2[1] (Intermediate Amenity)	Day	**61**	63	65	4.1
	Evening	**58**	53	59	1.2
	Night	**56**	48	57	0.6

Note 1: Intermediate Ambient Level as per Table 1.

Proposed Project PNTLs

Table 3 presents a proposed PNTL to be considered by regulators for this particular project, the proposed PNTL have been selected to minimise changes to offsite industrial noise levels. The approach seeks to achieve a balance between adopting a reasonable PNTL that is commensurate to the projects end use, while minimising off-site cumulative noise increases, particularly during the more sensitive evening and night periods. Adopting this approach would be akin to applying 35dB $LA_{eq(15min)}$ to all 14 lots however would be applied as a cumulative total to all lots in the development. This would allow the flexibility needed to permit a range of types of industries/occupants (some louder and some quieter) operating at the project site.

Table 3 Proposed PNTL and Cumulative Noise Emission Comparison					
Noise Catchment	Period	Existing dB $LA_{eq(15min)}$[1]	Proposed Project PNTL dB $LA_{eq(15min)}$	Cumulative (total) (existing + Project) dB $LA_{eq(15min)}$	Change dB
101 Asquith Street, Silverwater	Day	58	58	61	3.0
	Evening	54	50	55	1.5
	Night	51	46	52	1.2
10 Carnarvon Street, Silverwater	Day	63	58	64	1.2
	Evening	60	50	60	0.4
	Night	58	46	58	0.3
Receiver R2[1] (Intermediate Amenity)	Day	61	58	63	1.8
	Evening	58	50	59	0.6
	Night	56	46	56	0.4

Note 1: Logarithmic average of two datasets per Table 1.

To manage noise emissions from the site, future development of each lot would be subject to a separate approval and would require a noise assessment to be completed to demonstrate cumulative emissions from the project site (ie all 14 lots) do not exceed the PNTL at offsite receivers.

Comment 5:

It is noted that the formula in Section 2.4.2 contains a typographical error and should be read as follows:

Individual project amenity noise level = 10Log (10((ANL – 5 dB)/10)/N).

Note: the 3dB conversion factor between LAeq,period and LAeq,15min applies to this process.

Response 5:

Noted. The correct formula has been used in calculations where required in the NIA and this response.

Comment 6:

The NIA at Table 12, Note 2, identifies application of the 'industrial interface' provisions in the NPfI. While this does not appear to be adopted in the assessment, the EPA advises that it would not support the application of the industrial interface provisions in this case and the Proponent should ensure this is reviewed.

Response 6:

Refer to discussion in Response 4.

Comment 7:

The NPfI requires that prevailing meteorological conditions be considered in noise assessments which include the occurrence of light winds and temperature inversion conditions. The NIA presents an analysis of the occurrence of light winds in Section 6.2.1. The assessment has not undertaken an analysis, or considered the occurrence and effect of temperature inversion conditions. The assessment must be amended to consider the occurrence of temperature inversion conditions in accordance with Fact Sheet D of the NPfI. If temperature inversions are considered to be a feature of the area they must be taken into consideration in the noise modelling scenarios adopted.

Response 7:

Analysis by Todoroski Air Sciences (TAS) who conducted the air quality impact assessment for the project identifies that percentage occurrence of F class stability during winter nights is 9%, and hence temperature inversions are not a feature of the area.

Comment 8:

The NIA has reported use of the ISO9613 noise modelling algorithms implemented through the iNoise modelling package. The NIA, Table 18, presents the meteorological parameters considered in the assessment. Modelling these parameters would require the augmentation of the ISO9613 model. The assessment needs to fully outline the noise modelling approach used and justify its accuracy.

Response 8:

MAC can confirm that DGMR (iNoise, Version 2020.0) (a single calculation method (ISO9613-2) modelling software based on B&K predictor) noise modelling software was used to quantify noise emissions from typical construction activities and operations. iNoise augments meteorological parameters via CONCAWE meteorological algorithms by replacing the C_{met} variable in the ISO9613 calculation as shown in **Figure 1.** These were used in the modelling assessment for the project.

Figure 1

Calculation Formula

Based on ISO 9613 - 1/2, Predictor calculates the noise level as follows:

$$L_{lt,per} = L_{dw} - C_{m,per} - C_{t,per} \quad (1)$$

$$L_{dw} = L_W + D_C - A \quad (2)$$

$L_{lt,per}$	Long-term average octave (or 1/3-octave) SPL during the evaluation period in dB
L_{dw}	Equivalent continuous downwind octave (or 1/3-octave) SPL in dB
$C_{m,per}$	Meteorological correction during the evaluation period in dB
$C_{t,per}$	Correction for the active time of the source during the evaluation period in dB
L_W	Sound power level in dB(A) per octave (or 1/3-octave), re 1 pW
D_c	Directivity correction in dB
A	Attenuation (octave-band) in dB per octave (or 1/3-octave)

The model calculation method used to predict noise levels was in accordance with ISO 9613-1 'Acoustics – Attenuation of sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere' and ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors. Part 2: General method of calculation' including corrections for meteorological conditions using CONCAWE[1]. The ISO 9613 standard from 1996 is the most used noise prediction method worldwide. Many countries refer to ISO 9613 in their noise legislation. However, the ISO 9613 standard does not contain guidelines for quality assured software implementation, which leads to differences between applications in calculated results. In 2015 this changed with the release of ISO/TR 17534-3. This quality standard gives clear recommendations for interpreting the ISO 9613 method. iNoise fully supports these recommendations. The models and results for the 19 test cases are included in the software.

The model incorporated a three-dimensional digital terrain map giving all relevant topographic information used in the modelling process. Additionally, the model uses relevant noise source data, ground type, attenuation from barrier or buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers

Comment 9:

The NIA, Table 20, identifies the expected noise attenuation from noise mitigation measures considered for the asphalt plant. The expected noise reductions are significant and in one case up to 26dB. The NIA must outline whether the stated noise attenuation levels are achievable and the notional design parameters needed to achieve them.

Response 9:

The noise attenuation levels are those specified by the Ammann Group (manufacturers of the RAH100 asphalt plant). Attenuation levels of up to 30dB is not unrealistic for sources that contain broadband or high frequency components (in this case, ventilation fans and stack outlets).

Standard noise mitigation options as provided by the asphalt plant supplier Ammann shall be implemented. The measures and expected noise reductions are summarised in **Table 4**.

[1] Report no. 4/18, "the propagation of noise from petroleum and petrochemical complexes to neighbouring communities", Prepared by C.J. Manning, M.Sc., M.I.O.A. Acoustic Technology Limited (Ref.AT 931), CONCAWE, Den Haag May 1981

Table 4 Noise Mitigation for Asphalt Plant		
Noise Source	Noise Reduction as Indicated by Supplier	Description
Cold Feed System with Drive	3dB	Rubber liners in feeders
Burner Devices	6dB	Frequency drive
Ventilation Fan with Drive	26dB	Sound protection walls plus frequency drive
Stack Outlet	20dB	Silencer
Hot Elevator with Drive	10dB	Insulated head station
Proportioning Machine with Drive	3dB	Rubber liners in feeders
Transfer Chute Drum	3dB	Insulated chute

Comment 10:

The NIA has not considered potentially annoying characteristics of noise in accordance with Fact Sheet C of the NPfI. A detailed assessment in accordance with the provisions of the NPfI is required.

Response 10:

Modifying factors in accordance with Fact Sheet C of the NPI were analysed and are not applicable. Additionally, key tonal sources from the project are associated with reverse alarms. Section 8.1 of the noise assessment report recommends that both a CEMP and OEMP are completed for the project to investigate alternatives to tonal reverse alarms. Downer would apply broadband reversing beepers to all mobile plant on site.

TfNSW Comments

Comment 11:

It is noted that an assessment of cumulative impacts with the PLR, in particular the Stabling and Maintenance Facility at 6 Grand Avenue, Rosehill is not included in the development application. It is requested that the applicant:

- *Undertakes an assessment of cumulative traffic impacts, flooding and construction/operational noise and vibration impacts as part of the Response to Submissions;*
- *Ensures that operational noise as a result of the subject development does not result in PLR operational criteria being exceeded.*

Response 11:

Traffic noise levels are not increasing because of the project, hence there would be no residual increase in offsite traffic noise contributions. MAC note that noise related project emissions are <35dB $LA_{eq(15min)}$ at 6 Grand Avenue Rosehill, NSW. Hence cumulative impacts to residential receivers further to the north and west would be around 10dB lower than ambient levels in these areas and hence would not result in additional cumulative noise impacts.

Summary

We trust this letter report addresses the current outstanding requirements. If you have any questions please contact the undersigned.

Yours sincerely

Oliver Muller
Principal Acoustic Scientist
BSc(REM & HGeog)|MAAS
omuller@mulleracoustic.com

Attachment 1



APPENDIX J

ULTRASLIP SAFETY DATA SHEET

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifier

Trade name : ULTRASLIP

1.2 Relevant identified uses of the substance or mixture and uses advised against

1.3 Details of the supplier of the safety data sheet

Company	:	CHEMETALL AUSTRALASIA PTY LTD 17 TURBO DRIVE 3153 BAYSWATER VIC
Contact person	:	Customer Service
Telephone	:	+61 3 9729 6253 BUSINESS HOURS
Telefax	:	+61 3 9720 1711
Contact person product safety		Technical Manager
Telephone	:	+61 3 9729 6253
E-mail address	:	customer.service.au@basf.com

1.4 Emergency telephone number

Emergency telephone number : +61 3 9720 0370 AFTER HOURS

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Not a hazardous substance or mixture.

GHS label elements

Not a hazardous substance or mixture.

Other hazards which do not result in classification

The information required is contained in this Safety Data Sheet.
As with all chemicals we recommend that you avoid contact with skin and eyes.

Wear gloves and glasses as appropriate.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

No hazardous ingredients

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Take off contaminated clothing and shoes immediately.
First Aid responders should pay attention to self-protection and use the recommended protective clothing

Inhalation	:	Move to fresh air. If symptoms persist, call a physician.
Skin contact	:	Wash off immediately with plenty of water for at least 15 minutes. If symptoms persist, call a physician.
Eye contact	:	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.
Ingestion	:	Clean mouth with water and drink afterwards plenty of water. Call a physician immediately.
Most important symptoms and effects, both acute and delayed	:	No information available.
Notes to physician	:	Treat symptomatically. For specialist advice physicians should contact the Poisons Information Service.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Carbon dioxide (CO2) Dry powder Water spray jet Alcohol-resistant foam
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during fire-fighting	:	Hazardous decomposition products formed under fire conditions. Carbon oxides
Specific extinguishing methods	:	Use water spray to cool unopened containers. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for firefighters	:	Standard procedure for chemical fires.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Wear personal protective equipment. For further information see Section 8 of the safety data sheet. For disposal considerations see section 13.
Environmental precautions	:	Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.
Methods and materials for containment and cleaning up	:	Ensure adequate ventilation. Contain spillage, pick up with an electrically protected vacuum

cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Advice on safe handling	:	Provide sufficient air exchange and/or exhaust in work rooms. Do not breathe vapours or spray mist. Avoid exceeding the given occupational exposure limits (see section 8). Ensure that eye flushing systems and safety showers are located close to the working place. To avoid risks to man and the environment, comply with the instructions for use.
Hygiene measures	:	Take off contaminated clothing and shoes immediately. Avoid contact with skin and eyes. Keep away from food, drink and animal feedingstuffs. Wash hands before breaks and immediately after handling the product.
Conditions for safe storage	:	Store in a place accessible by authorized persons only. Store in original container. Keep container tightly closed in a dry and well-ventilated place. To maintain product quality, do not store in heat or direct sunlight.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Contains no substances with occupational exposure limit values.

Engineering measures	:	Provide sufficient air exchange and/or exhaust in work rooms.

Personal protective equipment

Respiratory protection	:	In case of insufficient ventilation, wear suitable respiratory equipment according to AS/NZS 1715/1716 Recommended Filter type: Type B
Hand protection		
Material	:	Gloves: PVC, Nitrile, Neoprene or natural rubber according to AS/NZS 2161.1
Remarks	:	Protective gloves complying with AS/NZS 2161.1. The exact break through time can be obtained from the protective glove producer and this has to be observed. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough.
Eye protection	:	Tightly fitting safety goggles or safety glasses with side

shields.
Eye protection (AS 1336/1337)

Skin and body protection	:	Chemical resistant protective clothing according to AS3765/2210
Protective measures	:	Handle in accordance with good industrial hygiene and safety practice. Ensure that eye flushing systems and safety showers are located close to the working place.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Orange coloured oil
Density	:	Approx 0.9g/ml
Flash point	:	>300º C
Vapour pressure	:	No data available
Solubility(ies) Water solubility	:	soluble

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No dangerous reaction known under conditions of normal use.
Chemical stability	:	Stable under recommended storage conditions.
Possibility of hazardous reactions	:	None known.
Conditions to avoid	:	Protect from frost. To avoid thermal decomposition, do not overheat.
Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No decomposition if used as directed.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Product:

Acute oral toxicity : Remarks: No data available

Skin corrosion/irritation

Product : No data available

Serious eye damage/eye irritation

Product : No data available

Respiratory or skin sensitisation

Product:
Remarks: No data available

Chronic toxicity

Germ cell mutagenicity
Product : No data available

Carcinogenicity
Product : No data available

Reproductive toxicity
Product : No data available

STOT - single exposure
Product : No data available

STOT - repeated exposure
Product : No data available

Aspiration toxicity

Product : No data available

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
No data available

Persistence and degradability

Product:
Biodegradability : Remarks: No data available

Bioaccumulative potential

Product:
Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Mobility in soil

Product:
Mobility : Remarks: No data available

Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : In accordance with local and national regulations.

Packaging : Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulation

UNRTDG
Not regulated as a dangerous good

IATA-DGR
Not regulated as a dangerous good

IMDG-Code
Not regulated as a dangerous good

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

National Regulations

ADG
Not regulated as a dangerous good

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

The product is classified and labelled in accordance with EC directives or respective national laws.
Regional or national implementations of GHS may not implement all hazard classes and categories.

Standard for the Uniform Scheduling of Medicines and Poisons : No poison schedule number allocated

SECTION 16. OTHER INFORMATION

Full text of other abbreviations

AICS - Australian Inventory of Chemical Substances; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; CPR - Controlled Products Regulations; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk;

IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

Further information

Other information	:	The information provided is based on our current knowledge and experience and apply to the product as delivered. Regarding the product properties, these are not guaranteed. The delivery of this safety datasheet does not free the recipient of the product from his own responsibility to follow the relevant rules and regulations concerning this product.
Date format	:	dd.mm.yyyy

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