



CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

SSD-8586218
Lot 4, Bringelly Road Business Hub

For

ESR Developments (Australia) Pty Ltd



November 2020

The Manager has developed this CEMP specifically for the above project.
The CEMP includes details of the company's overall integrated management system, and critical issues associated with this project with regards to: Health and Safety and the Environment.

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Section 1

Introduction

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SECTION 1 - Introduction

Prime Constructions have been engaged to construct a new temperature-controlled warehouse facility at Lot 4, Skyline Crescent forming part of the Bringelly Road Business Hub (BRBH) Development for ESR Australia (ESR) & DHL Property. This CEMP has been developed in accordance with Development Consent No. SSD-8586218 and will be implemented during the Construction phases of the development.

Whilst the CEMP issue addresses the relevant requirements of the development consent, it is noted due to the dynamic nature of the document it may be further developed and tailored to meet the specific requirements of each phase of the project.

The CEMP outlines:

- The general constraints of the site and an overview of management issues to be addressed.
- Compliance with statutory requirements
- Constructions Methods and Site management issues
- Dust Management Plan
- Traffic Management Plan
- Construction Noise and Vibration Management Plan
- Erosion, Sedimentation Soil and Water Management Control Plan
- Community Consultation and Complaints Handling.
- Waste Management Plan
- Stormwater Management Plan
- Utilities, Services & Easement Restrictions Plan
- Incident Management Plan
- Management Review Plan

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Section 2

Project Plan

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SECTION 2 – Project Plan

2.0 The Site and Proposed Construction Works

The site is identified as the Lot 4 Bringelly Road Business Hub (BRBH) being legally described as Lot 4 of BRBH Lot 11 DP 29104 – Skyline Crescent, Horningsea Park. The site is located on the Northern side of Skyline Crescent and has a direct frontage to Skyline Crescent along the Southern Boundary connecting to the wider road network via Bringelly Road. The site is currently unoccupied, however is surrounded by existing large scale industrial / retail facilities.

The area of the proposed development site is approximately 69,740 m²; the site development works include the following:

- Civil Earthworks & Drainage works
- Retaining Wall Construction
- Construction of One (1) 34,744 m² Temperature Controlled Warehouse
- Construction of One (1) Two-Level Main Office and One (1) Two-Level Ancillary Dock office with a total area of 1,225 m²
- Construction of One (1) Guard House with a total area of 19 m²
- External Hardstand and 231 onsite parking spaces
- Fencing and Landscaping
- Signage

The building site will be managed by Prime Constructions upon handover of the existing site.

Construction Program / Staging / Elements

The detailed Construction Program for the project is attached in Appendix B. The project can generally be broken into the following stages:

Enabling works

- Includes Bulk Earthworks, Drainage Works and Retaining Wall Construction

In-Ground Works

- Footings & In-ground services

Building Structure

- Includes Structural Steel, Precast Panels and concrete frame construction.
- This stage will overlap to an extent with the enabling works and envelope works stages

Building Envelope & Warehouse Services

- Includes Roofing, Metal Wall Cladding and Office Façade Finishes
- Warehouse High Level Services including Mechanical Ventilation
- This stage will overlap to an extent with the building structure and internal services and finishes stage.

Internal Services & Finishes

- Includes installation of all fire, electrical, hydraulic and mechanical services. Includes internal wall and ceiling linings and fix off through to completion.

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- This stage will overlap with the Building envelope and external finishes stages.

External Works

- Includes pavements, landscaping and external metalwork trades.
- Will overlap with the internal finishes stage

The following is a list in order of all major items to be undertaken during construction:

- Civil Earthworks
- Retaining wall
- Stormwater
- Detailed Excavation
- Structural Steel
- Precast Panels
- Suspended Concrete Slabs
- Metal Roofing and Wall Cladding
- Fire, Hydraulic & Electrical Service
- Warehouse Mechanical Services
- Warehouse Slabs
- Aluminium Windows & Louvres
- Office Fitout
- Roller shutters
- Warehouse fitout
- External Slabs
- Landscaping and Fencing Works

As per the SSD Consent No. 8586218 Condition B19, the construction activities associated with the works, including the delivery of materials to and from the site, are to be within the hours of 7:00 am to 6:00 pm from Monday to Fridays, 8:00 am to 1:00pm on Saturdays and no work on Sundays or Public Holiday. All works will occur within these stipulated times.

2.1 Site Accommodation & Temporary Services

Site Accommodation and Site Compound

The site compound will be located along the Southern boundary of the site. Primary access will be via Skyline Crescent. The area will be utilised for site accommodation, storage of construction materials and plant, along with housing of storage containers. The Compound will consist of site office areas, change rooms, lunch rooms & toilet amenities. The entire site will be fenced off at all times with permanent fencing. Pedestrian walkways will be isolated with barricading to ensure personnel safety.

Temporary Services

Power to the site compound will be from use of diesel generators / or temporary builders service pole until such time that a permanent connection can be made.

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- A temporary switchboard will be erected at the site compound and a second generator will be set up to power temporary lighting and DBs within the warehouse and office areas.
- Power for each work area will be taken from the nearest accessible board. A separate temporary distribution board containing ELCB's will be provided at each work area for protection of the workers and the power source.
- Water Service – A water service connection to feed the site compound area will be taken from the permanent water point located on the Southern side of the site.
- Sewer Service – A sewer connection will be made to service the ablution facilities within the site compound areas.

Temporary Toilets

Temporary ablution facilities will be installed within the site compound area to service the construction staff, these facilities will be connected to both water and sewer at main compound and dry saniloos will be provided closer to the main work areas for easy access to the construction staff as required.

Make Good on Completion

All temporary connections will be terminated and made good prior to the completion of the project. Reinstatement will include removal of all temporary pipes, cables, lights, switchboards, buildings, fencing and signage or any other element used during the construction of the site.

2.2 Security

The site will be secured with existing permanent fencing along the boundaries & infill temporary fence panelling where required; any temporary fence panelling system will be replaced during construction with permanent fencing. A double gate will be installed to the temporary vehicle crossover off Skyline Crescent to provide Construction Traffic Access until such time the permanent sliding gates are installed. All gates are to be padlocked when unattended. Visitors to the site are required to report to the site office located at the site entry. All visitors will then be inducted prior to gaining access to the site.

2.3 Environmental Management and Conditions

Scope

This CEMP describes the procedures of Prime Constructions site environmental management plan.

Objectives

- To define the environmental management systems to be followed in this report.
- Develop and implement site specific processes to manage environmental risks and issues.

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- Integrate site specific environmental management systems with company procedures and policies.

Responsibility

The Project Manager is responsible for implementing the procedures outlined in this plan. It is also their duty to ensure compliance with the procedures and updating where required as construction progresses.

The Project Manager may deem it necessary to allocate specific responsibility for procedures in this report based on site resources and practicality. Where necessary, the responsibilities will be appointed verbally and confirmed through email.

References

- ISO 9001 Quality Management
- AS 4801 OHS Management Systems
- ISO 14001 Environmental Management Systems
- Prime Constructions Integrated Management System Manual Revision 001 September 2015.
- Prime Constructions Integrated Management Plan Revision 001.

General

The Project Manager shall be responsible for the preparation and maintenance of this procedure.

The Project Manager shall assign environmental management responsibilities to appropriate project staff i.e. establishing and maintaining environment controls.

The Project Manager is to ensure that the communication of environmental management information to and from internal and external parties is addressed.

Environmental Due Diligence

Due diligence principles will be included in the development of all project documentation as required.

The environmental due diligence principles applied to the development of the Project Management Plan are the:

- Inclusion of environmental management responsibility to all personnel and staff working on the project;
- Application of legal and environmental policy requirements to construction activities;
- Identification and management of environmental issues;
- Emergency response procedures for any incidents that may result in potential impact to the environment; and

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- Development of safe work method statements (incorporating environmental controls), inspection and test plans for all construction activities to protect the environment.
- Integration of Environmental Aspects & Impact Register identifying general activities and processes associated with construction that may have a negative impact on the environment (Refer to below table). Utilisation of the below table will also be implemented when managing unpredicted impacts and their consequences to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible per SSD Consent No. 8586218 Condition C1.

Area	Aspect/s	Potential Impact/s	Control Measures	Legal & Other Requirements
Site Offices, Amenities and General Site Areas	Lighting / IT Equipment	<ul style="list-style-type: none"> • Use of energy • Use of natural resources 	<ul style="list-style-type: none"> • Turn off the lights when not required. • Monitor electricity consumption. • Periodic maintenance. • Use of CFL and low voltage fittings where possible. • Turn all IT equipment to energy saver mode. • Periodic maintenance. 	Nil
	Printing	<ul style="list-style-type: none"> • Use of natural resources/paper • Use of energy • Waste & by-products 	<ul style="list-style-type: none"> • Turn all printers into energy saver mode. • Avoid printing by screen reading. • Encourage/default double sided printing. • Encourage/default grey scale printing. • Recycle waste paper. • Recycle printer cartridges. • Periodic maintenance. • Procure green star rating printers. 	Nil
	HVAC	<ul style="list-style-type: none"> • Emissions to air • Use of energy • Use of natural resources 	<ul style="list-style-type: none"> • Periodic maintenance. • Set temperature to 22°C. • Individual controls for low use areas like meeting rooms. 	Nil
	Appliances	<ul style="list-style-type: none"> • Use of natural resources • Use of energy • Emissions to air 	<ul style="list-style-type: none"> • Periodic maintenance. • Procure at least 4 star rated appliances. • Recycle e-waste. 	Nil
	Emergency	<ul style="list-style-type: none"> • Emissions to air • Emissions to land • Emissions to water 	<ul style="list-style-type: none"> • Periodic maintenance of emergency equipment. • Dispose of any contained spill / leaks as per MSDS. 	Nil
	Water usage	<ul style="list-style-type: none"> • Use of natural resources 	<ul style="list-style-type: none"> • Minimize water usage. • Use water saving taps. 	Nil

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			<ul style="list-style-type: none"> Fix drips and leaks. 	
	Cleaning chemicals	<ul style="list-style-type: none"> Waste and by-products Emissions to land Emissions to water 	<ul style="list-style-type: none"> Minimize usage. Procure eco-friendly chemicals. Disposal of left-over chemicals, contained spill / leaks & empty containers as per MSDS. 	Nil
	Travel	<ul style="list-style-type: none"> Use of natural resources and fossil fuels Emissions to air 	<ul style="list-style-type: none"> Limit travel by use of communication technology. Use of alternate means of transport where possible. Use of small engine size / hybrid hire cars. 	Nil
	Minor site purchases	<ul style="list-style-type: none"> Emissions to air Emissions to land Emissions to water 	<ul style="list-style-type: none"> Procure "green" products where possible. Buy from local suppliers where possible. Buy bulk packaging 	Nil
Construction Activities	Removal of vegetation/s oil disturbance	<ul style="list-style-type: none"> Loss of biodiversity Soil erosion 	<ul style="list-style-type: none"> Implement requirements of Erosion and Sediment Control Plan. Periodic site inspections. Remove vegetation that is utmost necessary for the construction activities. 	Nil
	Excavation - Acid Sulphate Soils and Unsuitable / Contaminated soils	<ul style="list-style-type: none"> Emissions to land Emissions to water Odour Emissions to air Complaints / legal breach 	<ul style="list-style-type: none"> Develop and implement Remediation Works Plan & Air Quality Management Plan when contamination is found. Implement complaints procedure 	POEO Act 1997
	Excavation - General	<ul style="list-style-type: none"> Emissions to air - dust Noise Vibration Complaints / legal breach In-ground utilities and services 	<ul style="list-style-type: none"> Work in accordance with DA conditions. Implement complaints procedure Undertake Dial Before You Dig survey and permit to excavate. 	POEO Act 1997
	Use of construction equipment	<ul style="list-style-type: none"> Emissions to air – dust and carbon emission Noise Vibration Use of natural resources / fossil fuels Spills & leaks 	<ul style="list-style-type: none"> Minimize use Maintain adequate spill kits on site Use of residential class mufflers Avoid idle running Conduct periodic maintenance Implement dust control measures like speed limits, water spray, etc. 	POEO Act 1997

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	Use of construction vehicles	<ul style="list-style-type: none"> Disruption to local traffic Noise Emissions to air – dust and carbon emission Spills & Leaks Dirt transported onto adjoining public roads 	<ul style="list-style-type: none"> Minimize use Implement requirements of Traffic Control Plan The covering of loads and the installation of “shake down” pads will ensure no materials are left on public roads. Use of streetsweeper and watercarts. Maintain adequate spill kits on site. Maintain road worthiness Conduct periodic maintenance Avoid idle running 	POEO Act 1997 Road Transport (General) Act 2005
	Water Usage	<ul style="list-style-type: none"> Use of natural resources Run-off of polluted water into storm water system. 	<ul style="list-style-type: none"> Minimize use Use recycled water for construction activities where possible. Disposal of polluted water in accordance with statutory requirements. 	EPA Act 1979 No. 203
	Use of construction chemicals	<ul style="list-style-type: none"> Spills and leaks Emissions to air Emissions to water Emissions to land 	<ul style="list-style-type: none"> Minimize use Store in bunded containers Follow MSDS requirements Minimize stock 	POEO Act 1997 Environmental Hazardous Chemical Act 1985
	Construction Waste	<ul style="list-style-type: none"> Waste and by-products Emissions to land Emissions to water 	<ul style="list-style-type: none"> Avoid waste by buying bulk packaging and required quantities. Reuse waste where possible. Segregate recyclable and general construction waste. Monitor waste disposal. Monitor construction water quality before discharge/disposal. 	POEO Act 1997 Water Management Act 2000

Project Management Plan

The Project Manager in consultation with the Construction Manager are to assess the Head Contract and all associated documents and reports on environmental requirements and detail these requirements into the following sections of this plan.

The Project Manager in consultation with the Construction Manager is to produce appropriate environmental processes for inclusion in the CEMP where project specific requirements necessitate additional controls.

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The Project Manager and the Site Manager are to identify and manage all environmental records and comply with the CEMP and Prime Construction Integrated Management Plan and Procedures.

Environmental Policy

Apply Prime Constructions Integrated Management Plan to all projects as the project environmental policy. Development conditions and Client environmental objectives will take precedence when the policy documents conflict with site specific requirements.

Environmental Aspects and Impacts

Within the CEMP, the project activities are considered together with the associated environmental aspects and then the potential impacts are identified.

The Project Manager is to review the impacts and identify the significant environmental risks, which could be caused by construction of the project as detailed below:

- List all construction activities under the control of Prime Constructions that have the potential to interact with the environment, such as material selection, purchasing, and all relevant physical construction activities;
- Determine the environmental aspects for each activity, e.g. environmental aspects for a concrete pour include noise, water pollution and solid waste;
- Consider activities beyond the control of the project e.g. flooding, which could have environmental aspects and significant environmental impact;
- Identify the significant environmental impacts that could arise from each environmental aspect of each activity e.g. impacts for a concrete pour include complaints about noise, pollution of a water course from wash down, and burden on a land fill if excess concrete is not recycled; and
- Consider impacts over the lifecycle of the project as some changes may realise longer term benefits (sustainability). Material selection may have an impact on natural resources. Include beneficial as well as adverse impacts.

Review of Activity and Impacts

It is important the activities are relevant for the particular project and that all the activities, consequent aspects and impacts, which may arise over the life of the project, have been identified and reviewed. A review of the site environmental risks due to changes to the work environment, activities, internal and external influences, and change to process or methodology will take place monthly.

Construction work as outlined in the program will have the controls implemented before work commences. As construction work progresses, the control measures implemented will be updated and altered in accordance with the development consent to management or eliminate the environmental risk. For example, an activity such as a concrete pour for slabs contains environmental risks such as noise, water pollution, and solid waste. The environmental impact is any change/effect in the environment as a result from the activity. This can lead to complaints from neighbours about noise, pollution of a local watercourse, and excessive unused concrete not recycled and disposed of in the local landfill. As these risks become apparent/evolve, a review

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of the process will be undertaken as required. I.e. immediately to control the risk and new measures implemented once the review is undertaken.

Legal Requirements

The Project Manager is to identify all legal, contractual requirements, licences, and permits which are applicable to environmental management at commencement and progressively during the construction of the project.

- Determine legislation applicable to the identified potentially significant environmental impacts;
- Identify notifications, licences, and approvals etc. required by applicable legislation; and
- Identify all relevant contractual requirements.

A copy of each approval, licence, permit or other condition imposed by a public authority must be maintained within the HSE folders. This allows for any additional conditions imposed to be identified and included in the follow up approval.

Prime Constructions in conjunction with the client are obligated to meet the requirements of statutory authorities, relevant Legislation, Codes of Practice and guidelines and relevant council authorities. Compliance management for the construction of the project will be managed through an integrated framework of monitoring, inspection, auditing, and reporting, as set out in the CEMP and the Integrated Management Plan.

The relevant legislation to the building works is as follows:

Subject	NSW Legislation
Pollution Control	Protection of the Environment Operations Act 1997
	NSW Water Management Act 2000
	Protection of the Environment Operations (Clean Air) Regulation 2010
Contaminated Land	Contaminated Land Management Act 1997
	State Environmental Planning Policy No. 55
Waste Management	Waste Avoidance and Resource Recovery Act 2001
	Protection and Environment Operations Act (Waste) 2014
	State Environmental Planning Policy No. 33
Conservation and Heritage	Environmental Planning and Assessment Act 1979 (As amended)
	Environmental Planning and Assessment Regulation 2000
	Native Vegetation Conservation Act 1997
	National Parks and Wildlife Act 1974
	Threatened Species Conservation Act 1995
	Heritage Act 1977
	Soil Conservation Act 1938
	Protection of the Environment Operations Act (Noise Regulation 2017) 1997

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	Environmental Protection and Biodiversity Conservation Act 1999
	State Environmental Planning Policy No. 64
	Noxious Weeds Act 1993

The relevant approvals for the building works are as follows:

Development Consent No. SSD-8586218

- Potable Water
 - Tap in approval to be issued by Sydney Water
 - Section 73 to be issued by Sydney Water
- Sewer
 - Section 73 to be issued by Sydney Water
- Electrical
 - Project Number to be issued by Endeavour Energy
 - Designs to be certified by Endeavour Energy
 - Endeavour Energy Notice of Requirements to be provided on completion
- Communications
 - AFR No. to be issued by Telstra
 - Designs to be certified by Telstra
 - Telstra to supply a Design & Construction Compliance Certificate upon completion

Objectives and Targets

The primary aim / objective of the CEMP and the Integrated Management System is to provide a framework of procedures to identify and minimise the impacts of the construction on the project with regard to the environment.

The CEMP identifies environmental objectives and targets which are measureable and consistent with Prime Constructions Environmental Policy and specific project requirements.

The Project Manager may review the project's environmental requirements and revise the CEMP to determine further suitable objectives. They are also encouraged as continuous improvement, to review and revise the objectives and targets on an annual basis if the project timeframe is 12 months or longer.

Environmental Controls

The Project Manager is to establish and maintain adequate environmental controls to ensure that project activities are carried out in accordance with the CEMP and Prime Constructions Integrated Management system.

Section 6 "Soil and Water Management Plan" of the CEMP and Section 3 "Dust Management Plan" of this procedure are to be used as a guideline in setting up the controls.

Risk Assessment

The following risks are to be eliminated and avoided where possible:

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- Pollution;
- Loss of species; and
- Complaints.

In very simple terms, many environmental issues will be managed if we control noise, dust and visual impacts on the surrounding area. A minimum objective is to comply with relevant environmental legislation and regulations, and client's expectations of the above risks onsite.

Environmental Risk Assessment for specific construction activities will be undertaken for all new projects and activities utilising the principle in the CEMP. The Project Manager will be responsible for facilitating Environmental Risk Assessment in consultation with the construction team and specific sub-contractors as required. The Safe Work Method Statement (SWMS) / Environmental Work Method Statement (EWMS) process will be the day-to-day process through which environmental risk will be managed. Prime Constructions considers any risk categorised as high as a significant aspect and requires attention to either be rectified or monitored as required. The risk assessment process is a required procedure to address the evolving construction tasks and their impact on the environment.

Other forums for undertaking environmental risk assessments during construction include:

- Informal site meetings; and
- Toolbox Talks.

Monitoring and Measurement of Environmental Requirements

The Project Manager is responsible for supervising, managing the environmental monitoring, and arranging specialists / consultants to help establish monitoring systems if detailed within the contract documents for the project.

All monitoring is to be conducted in accordance with OEHL approved methods, Australian Standards or, in the absence of an Australian Standard, industry acceptable procedures. The minimum frequency and standard for monitoring is listed in applicable approvals, licences, and regulations. The OEHL "Approved Methods" will be used for all testing required under the Environmental Protection Licence. Where testing is conducted by a non-accredited organisation, proof of appropriate quality control is required.

The Project Manager/appointed team member must conduct a walk around the site each week and record the environmental issues in the integrated management plan. The walk around consists of:

- Any disturbed ground which will generate dust in dry windy conditions;
- Any disturbed ground which is exposed to erosion;
- Construction waste and litter removal; and
- Sediment control devices to be securely erected and in the right place.

The Project Manager may also periodically check that all environmental controls are satisfactory and meet contractual requirements using the Weekly Environmental Checklist Inspection Log or Daily Site Inspection Report as a record document. The HSE Manager is required to conduct environmental audits on projects on a six monthly basis to ensure compliance with project and

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organisational requirements. Site inspections will also be undertaken after all significant rainfall events.

Results outside regulatory standards or project targets will be treated as a non-conformance, rectified, and new procedures will be implemented as appropriate by the Project Manager. All changes, additions and modifications to procedures will be distributed as necessary to ensure non-conformances are corrected.

Waste Management

The Project Team are to endeavour to avoid the use of excess materials and production of waste. Where possible, waste materials (such as offcuts) will be reused on site. Waste will be recycled as appropriate. When deciding how to minimise waste impacts, the Project Manager and Site Manger need to consider whether the construction activity will generate surplus material which can be recycled or disposed off-site.

The OEH NSW Waste Classification Guidelines are the principal reference for waste management in NSW for determining waste classification, transport, and disposal requirements. Refer to appendix I "Site Waste Minimisation & Management Plan" of this CEMP.

Waste Storage and Disposal

The Site Manger must ensure that adequate rubbish receptacles (recyclable and non-recyclable bins, skip bins) are provided. These must be serviced regularly to ensure that the construction site remains tidy.

Littering or dumping of unwanted waste or disposal of surplus construction materials or permitting such activities on any land on or around the site, is illegal unless specifically permitted by a regulatory authority. The disposal of waste will be on a regular basis and disposed of in a waste facility authorised for that waste. This includes using licensed transporters for waste classifications when required.

The Project Manager will maintain records to provide evidence that recycled, reused or disposed of waste meets legislative requirements.

Emergency Response

The Project Manager and Site Manger are to identify, and prevent any adverse environmental impact situations and possible emergency incidents. Refer to Prime Constructions Project QSE Management Plan for emergency procedures.

Subcontractor Management

The Project Team are to manage subcontractor's activities in compliance with Prime Constructions CEMP and HSEMP Plan. The Project Team is to ensure that the subcontractor is aware of their project environmental requirements prior to commencing work.

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Non-Conformance

The Site Manager and Project Manager is to record any environmental non-conformance's raised and rectified as required.

Auditing / Inspections and Evaluating Compliance

The Project Manager must prepare a schedule of regular comprehensive audits or inspections to verify that management controls per the CEMP are effective and that evaluation of legal and other requirements have been assessed. They must arrange for the audits / inspections to be carried out as per the schedule by suitably qualified personnel and compliance with the IMS, CEMP & AS/NZS ISO 14001:2014

The Project Manager must take appropriate action and inform the Construction Manager where a potential problem has been identified and monitor whether the action is effective.

Evaluating compliance with the legal and council requirements that are applicable to Prime's environmental aspects will take the form of:

- Auditing;
- Workplace Surveillance (Internal / External); and
- Project Reviews.

Working Hours

All construction works associated with this development shall be carried out in accordance with the development consent granted by the Department of Planning, SSD Consent No. 8586218 Condition B19.

Construction works that are carried out in accordance with this consent that involve the use of heavy vehicles, heavy machinery and other equipment likely to cause offence to adjoining properties shall be restricted to the following hours in accordance with the NSW Environment Protection Authority Noise Control Guidelines:

Monday to Friday – 7:00am to 6:00pm

Saturdays – 8:00am to 1:00pm

No work is permitted on Sundays and Public Holidays. Demolition work is not permitted on weekends or Public Holidays.

Other construction works carried out inside a building/tenancy and that do not involve the use of equipment that emits noise are not restricted to the construction hours stated above.

The provisions of the Protection of the Environment Operations Act, 1997 in regulating offensive noise also apply to all construction works.

Should work or delivery of goods be required outside the specified hours due to safety or emergency reasons, the relevant authorities may be contacted with the reasoning for the cause and the likely duration of the activity.

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Erosion & Sediment Control

During the construction works, all reasonable measures will be taken to minimise soil erosion and the discharge of sediments and pollutants from the site. All measures will be developed and undertaken in accordance with SSD Consent No. 8586218 Condition B12.

Appendix F shows a detailed plan with respect to the erosion & sediment control measures that will be implemented prior to construction works commencing. The works will be carried out in accordance with the erosion & sediment control plan, Condition B12 the Managing Urban Stormwater: Soils and Construction 2004 guideline.

Dust Management

Generation of dust on site will be reviewed and all best management practices will be undertaken to minimise the causes during construction works. This includes all reasonable and feasible mitigation measures to prevent and minimise dust and odour emissions from the construction and any visible offsite air pollution.

Construction Waste Management

During the construction works, the generation of waste on site will be reviewed and all reasonable measures will be undertaken to minimise the causes.

Development Consent Requirements

All works are to be carried out in accordance with the requirements of Development SSD Consent No. 8586218, noting specifically:

- All items, machinery & equipment associated with the development, including but not limited to concrete pumps, construction cranes will be located wholly on site during all stages of works, unless otherwise approved by council
- Work zone permits for the development will be obtained if councils verge or road is used to stand plant or machinery at any stage of the development
- Damage to footpaths, road any other Council asset (which is found to be as a consequence of the construction activities) will be maintained and repaired when identified and to council requirements during the construction works.

Roles & Responsibilities

Managing Director (Construction)

The Managing Director (Construction) is responsible for supervising the implementation of environmental management on the project. In particular, the Managing Director (Construction) will:

- Identify and allocate suitable human, technical and financial resources to effectively implement the

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- Environmental requirements of the Integrated Management System (IMS) on the project;
- Define responsibilities of project personnel responsible for environmental management;
- Encourage continual improvement to environmental management;

Construction Manager

The Construction Manager is responsible for monitoring the implementation of environmental management on the project. In particular, the Construction Manager will:

- Assist the Managing Director (Construction) in identifying and allocating suitable human, technical and financial resources to effectively implement the Environmental requirements of the Integrated Management System (IMS) on the project;
- Assist the Managing Director (Construction) in defining responsibilities of project personnel responsible for Environmental management;
- Encourage continual improvement to environmental management;
- Review and approve the Health, Safety & Environmental Management Plan (HSEMP) as prepared by the Project Manager;
- Ensure the Health, Safety & Environmental Management Plan (HSEMP) and Integrated Management System (IMS) is implemented and maintained on the project;
- Identify and review environmental risks in construction design and planning and ensure consideration is given to environmental products and methods in the design to achieve best possible outcome;
- Liaise with design consultants to ensure that Environmental considerations are incorporated into the design;
- Review design documentation and carry out a hazard assessment to brief the project team;
- Verify designs for compliance with Acts, Regulations & applicable Standards and Codes of Practice;
- Facilitate the resolution of any environmental complaints;
- Prepare Environmental Reports, which are submitted to the Board of Directors for review and discussion;
- Schedule and allocate education and training courses as necessary to satisfy project requirements;

Project Manager

The Project Manager is empowered and responsible for initiating and implementing environmental management on the project. In particular, the Project Manager will:

- Prepare the Health, Safety & Environmental Management Plan (HSEMP). The project plan will be consistent with the Integrated Management System (IMS);
- Ensure the Health, Safety & Environmental Management Plan (HSEMP) and Integrated Management System (IMS) is implemented and maintained on the project;

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- Ensure all subcontractors are issued with the Health, Safety & Environmental Management Plan (HSEMP) and any subsequent updates;
- Ensure hazard assessment of design is incorporated into the Health, Safety & Environmental Management Plan (HSEMP);
 - Ensure notice boards, site rules and similar information displays are kept up-to-date and interesting;
- Encourage Supervisors and the Site Manager to have regular discussions on environmental impact prevention with the workers under their control particularly whenever an incident or near miss presents a suitable topic;
- Promote interest in the detection of risks and take immediate steps to eliminate, or where the risk cannot be eliminated, provide protection or warning. Co-ordinating emergency responses with the Client;
 - Set a good example in all aspects of incident prevention and insist on correct practices being used by all on site. Where appropriate, take firm disciplinary action required to maintain the standard. This includes stopping works causing unacceptable environmental damage;
 - Foster alertness at all times and promote the development of a sound attitude towards environmental protection practices;
- Implement all relevant education and training:
 - Assessing suppliers' ability to comply with the Environmental requirements for the provision of plant, materials and services;
 - Be aware of all legislation, codes, etc. that apply to the project and ensure that other staff are aware of the provisions and observe them;
 - Determine any requirements peculiar to the project and ensure that necessary steps are taken to educate and / or train the personnel to the necessary standard;
 - Release supervisors, workers, etc. for any necessary incident prevention training;
- Monthly Safety Reporting:
 - The Project Manager shall be responsible for producing and submitting reports as required to the HSE manager, senior management and the client's representatives.
- Review and monitor environmental management requirements:
 - Monitoring overall environmental management performance and compliance;
 - Liaising with Client and relevant Authorities regarding environmental management requirements;
 - Reporting compliance with regulatory and contractual requirements for Client and relevant
- Authorities;
 - Ensuring subcontractor compliance with environmental requirements;
 - Raising non-conformances as necessary, ensuring non-conformances or pollution incidents are investigated and that appropriate corrective actions are implemented and reported to Client;
 - Undertake community liaison (where required);

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- Investigate incidents and initiate corrective (preventative) actions. Report all incidents to the Construction Manager and HSEQ Manager;
 - Assessment of subcontractors' abilities to comply with Environmental requirements. This includes securing and reviewing work method statements;
- Maintaining environmental records;
- Keeping work site environment safe;

Site Manager/General Foreman

The General Foreman is responsible for the wellbeing of the personnel under their charge and the actions of all operatives and visitors to the site as they affect the wellbeing of public. In particular, the General Foreman will:

- Reinforce Environmental awareness in workers and continually influence their attitude to correct working and accident prevention:
 - Set a personal example;
 - Adopt a very firm attitude to Environmental disciplines;
 - Encourage keenness to detect and correct hazards;
 - See that any ideas arising from workers on improvements to incident prevention are recorded in the Site Diary and are drawn to the attention of the Project Manager for action;
 - Issue non-conformance notices as and when conformance to the Integrated Management System (IMS) and Health, Safety & Environmental Management Plan (HSEMP) is in breach;
 - Action immediately any HSE Manager's Inspection Report and sign-off after corrective measures have been taken.
- Be aware fully of the details of the Health, Safety & Environmental Management Plan (HSEMP) and train their workers accordingly:
 - Incorporate Environmental instruction in routine orders and see that they are obeyed;
 - Thoroughly brief workers on the proper and correct way of doing their job and see that they receive any training necessary. Particular attention will be paid to this during the induction period;
 - Thoroughly brief workers on all potential hazards of the site and of any precautions they should take to avoid them;
 - Implement ongoing risk assessment;
- Implement the principles and practices of the Health, Safety & Environmental Management Plan (HSEMP):
- Ensure all subcontractors and workers have received site induction and that records have been kept;
 - Ensure employees follow the Health, Safety & Environmental Management Plan (HSEMP) and restrain them from taking unwarranted and unnecessary risks;
 - Inspect all materials, plant and equipment including material datasheets, logbooks and maintenance records to ensure details are current before the work is commenced;

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- See that workers are provided with the correct tools and equipment and these are used properly and maintained correctly;
- Carry out daily inspections / hazard appraisals of the site and promptly correct any hazardous conditions or practices evident that are not following the site Environmental rules;
- Contribute towards a tidy and orderly work site and ensure that a high standard of housekeeping is maintained at all times;
- Discourage any horseplay and act promptly and firmly to prevent workers behaving in ways that may lead to an incident;
- Arrange for the orderly stacking of materials to ensure correct handling;
- Monitor compliance and ensure subcontractors perform duties as per Work Method
- Statements and that any breaches are rectified;
- Issue corrective notices as required to ensure compliance with Work Method Statements and the Health, Safety & Environmental Management Plan (HSEMP);
- Hold toolbox meetings fortnightly or as required to communicate Environmental issues and concerns of all site workers in regards to their health, safety and welfare;
- Ensure Prime's direct workforce are fully trained and inducted into the correct work procedures of their works through their work method statement, review and amend the Work Method Statement for additional activities that maybe required as an ongoing review;
- Implement and maintain environmental management requirements:
 - Install and maintain environmental controls as directed and as indicated in the Health, Safety & Environmental Management Plan (HSEMP);
 - Ensure subcontractor compliance with environmental requirements;
 - Ensure all imported fill (where applicable) is uncontaminated – clean fill certifications and visual inspections;
 - Reporting non-conformances or pollution incidents to the Project Manager;
 - Undertake inspections of environmental controls on a regular basis and complete the Site Inspection Log each week;
 - Attend to any items from site audits;
 - Encourage the involvement of all personnel in achieving an environmental conscious workplace, by personally being involved with inviting input from people on matters relating to work processes as well as environmental issues;
- Quarantine unsafe work areas, materials, plant and equipment. Ensure the disposal of nonconforming materials is carried out to SafeWork NSW, legislative and manufacturers guidelines;
- Implement the Environmental Policies;
- Communication:
 - Manage the Environmental communication and consultation provisions in accordance with the regulatory requirements;
 - Maintain Site Safety Noticeboards and bulletins as issued to site;

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- Hazardous substance:
 - Prepare, maintain and document hazardous substances where used on site and maintain the register;

Contract & Systems Manager

The Contract and Systems Manager is responsible for ensuring that Prime's Integrated Management System (IMS) is implemented and maintained on the project. In particular, the Contract & Systems Manager will:

- Conduct auditing / inspections of the project team to monitor compliance with Prime's Integrated Management System (IMS) and where necessary provide instructions to take corrective action;

HSEQ Manager

The HSEQ Manager is responsible for the Environmental auditing / inspections of Prime's Integrated Management System (IMS) and Health, Safety & Environmental Management Plan (HSEMP) on the project. In particular, the HSEQ Manager will:

- Conduct auditing / inspections of Prime's Integrated Management System (IMS) and Health, Safety & Environmental Management Plan (HSEMP) to monitor compliance and where necessary provide instructions to take corrective action;
 - Conduct audits of subcontractors site records to monitor compliance with the Health, Safety & Environmental Management Plan (HSEMP) and Work Method Statements;
 - Review Environmental Inspection Logs as prepared by the General Foreman for statistical analysis including regular site audits (generally two per project);
 - Prepare and submit project site safety inspection reports on a regular basis;
 - Maintain a non-conformance register and submit to the Construction Manager on a monthly basis with the Work Health & Safety Report;
 - Submit the reports to the Construction Manager, Project Manager and General Foreman for action;
 - Prepare and submit to the Construction Manager the Collection of statistics from the Project Managers monthly safety reports;
 - Monitor and maintain records of the audit reports being actioned and "signed off";
 - Conduct and or arrange for ongoing and refresher training;
 - Inspections shall be conducted with assistance provided to resolve environmental issues as they arise;
 - Review Environmental Memos, SafeWork NSW Alerts and MBA Environmental alerts as required to encourage environmental consciousness, issue written memos highlighting the issues to the Construction Manager, Project Manager, WHS Inspector and Site Manager/General Foreman;
- Encourage the involvement of all personnel in achieving an environmentally sound workplace;

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- Assist by providing advice when reviewing and solving issues of work practices including refresher training courses to Prime's workers;

WHS Inspector

The Work Health & Safety Officer is responsible for the Work Health & Safety auditing / inspections of Prime's Health, Safety & Environmental Management Plan (HSEMP) on the project. In particular, the WHS Inspector will:

- Conduct Environmental auditing / inspections of Prime's Health, Safety & Environmental Management Plan (HSEMP) to monitor compliance and where necessary provide instructions to take corrective action;
- Conduct auditing of subcontractors site records to monitor compliance with the Health, Safety & Environmental Management Plan (HSEMP) and Work Method Statements;
- Prepare and submit project site environmental inspection reports on a regular basis;
- Environmental inspections shall be conducted with assistance provided to resolve safety issues as they arise;
- Encourage the involvement of all personnel in achieving an environmentally sound workplace;
- Report to HSEQ Manager weekly with all environmental inspection reports;

Project Administrators & Cadets

The Project Administrators, Project Administrators & Cadets are responsible for assisting the Project Manager with implementing of Work Health & Safety, Quality and Environmental management on the project. In particular, the Project Administrator & Project Administrator will:

- Assist the Project Manager in preparing the Health, Safety & Environmental Management Plan (HSEMP) for the project;
- Assist the Project Manager and General Foreman in implementing and maintaining the Health, Safety & Environmental Management Plan (HSEMP) and Integrated Management System (IMS) on the project;

2.4 Traffic Management & Traffic Impacts

Access to the site for construction vehicles will be via Skyline Crescent.

During times of large volumes of construction traffic (ie concrete pours, Layback/Crossover works), traffic control will be provided to assist in the safe navigation of vehicles back onto the public roads and prevent disruption to the normal traffic flow. Traffic management will be developed and implemented in accordance with SSD Consent No. 8586218 Condition B1, B2 & B4 as well as the Construction Traffic Management plan as detailed in Section 4 & Appendix C of this report.

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2.5 WH&S

A detailed Site Specific Safety Plan will be developed as part of the HSEMP Plan in accordance with relative statutory requirements; a copy of this will be available for review on site.

2.6 Community Information

It is expected that the subject development will generate noise impact on the surrounding properties. Extensive community consultation has been undertaken by ESR Australia (ESR) as part of the notification period for the Development Application process.

Refer Appendix N- Consultation Strategy & Outcomes Report

Additionally, contact signage will be provided on the site fencing which will provide contact details if information or concerns regarding the construction works is required.

2.7 Heritage and Archaeology

As the Bulk Earthworks scope is to be completed during Prime Constructions possession, it is unlikely Heritage and Archaeology finds will be encountered; this is substantiated by the Aboriginal Heritage Assessment Report prepared by AHM, dated 20 October 2015 & DPIE's assessment of SSD 6324, "the proposed development is unlikely to have an impact on any items of heritage significance". However, if archaeological deposits, objects and/or state significant relics are to be discovered during construction, in accordance with SSD Consent No. 8586218 Condition B38, B39 and B40 the following methodology is to apply:

Aboriginal Heritage

- All work in the immediate vicinity of the suspected Aboriginal item or object must cease immediately;
- A 10m wide buffer area around the suspected item or object must be cordoned off, and
- Heritage NSW must be contacted immediately
- Recommencement of work in the immediate vicinity of the Aboriginal item or object may only recommence in accordance with the provisions of Part 6 of the National Parks & Wildlife Act 1974.

Historic Heritage

- All work in the immediate vicinity of the Historical heritage item or object must cease immediately;
- Unexpected finds must be evaluated, recorded and if necessary, excavated by suitably qualified and experienced expert and in accordance with the requirements of the EES NSW Heritage Division.

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2.8 Biodiversity

The development site currently does not contain any vegetation or habitat features such as ecological communities containing threatened species, dams or waterbodies. As such, the proposed development site does not involve the removal of existing vegetation or habitat spaces.

Refer to **Appendix O**, for the details of the Biodiversity Development Assessment Report Waiver.

2.9 Key Personnel

Position	Persons Name	Contact Phone
Development Manager (ESR)	David Mollerstrom	9506 1474

Prime Constructions

Position	Persons Name	Contact Phone
Managing Director, Construction	Paul Christopher	9418 7707
Construction Manager	Scott Griffin	9418 7707 0419 699 280
Project Manager	Michael de Gail	9418 7707 0417 675 931
Site Manager	Brian Kelley	0418 244 961
Project Administrator	Jonathan Mu	9418 7707
Project Administrator	Michael Kretzas	9418 7707
First Aid officer	Brian Kelley	0418 244 961
HSEQ Manager	Geoff Hewitt	9418 7707 0427 208 116

2.10 Pre-Commencement Checklist

To be completed by the Project Manager

- YES** – A tick in this box indicates that the activity has been considered and is addressed
- TBC** – **(TO BE COMPLETED)** A tick in this box indicates that the activity has not been considered and must be addressed prior to commencement or prior to that activity starting.

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N/A – A tick in this box indicates that the activity does not apply to this project.

Pre start or Start Up Activities

	Yes	TBC	N/A
Superintendent notified 24 Hr's prior to starting.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Construction & Environment Management Plan completed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Municipal Council notified of start and any inconvenience to the Public.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All necessary permits obtained	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Underground services located. Authorities notified regarding work near their services. Further notification during progress work is required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overhead obstacles identified. Authorities notified regarding work near their services. Further notification during progress work is required.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Survey Lot Pegs or basis for set out in place and set-out can be completed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Planned Compound and Amenities Setup.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensure all construction plans & specifications are certified and marked for construction. All Drawings, Specifications, CEMP, ITP's, SWMSs are ready for construction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensure all updated & revised documentation is provided to site for construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Existing trees and Vegetation protected or permission given to remove if necessary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OH&S and Environmental Hazards Identified: Silt traps arranged / Noise Dust and Vibration controls in place etc	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traffic management plan – reviewed & implemented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Toolbox Meetings to be held on a regular basis during the course of the works when required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2.11 Planning for Emergencies (Accident or Major Incident Requirements)

To be completed by the Project Manager

	Yes	N/A
First aid officer on site: Brian Kelley 0418 244 961		
Prepare a Specific Site Safety Plan and nominate an Evacuation Procedure.	<input type="checkbox"/>	<input type="checkbox"/>
A Mobile Phone and all Emergency Numbers are Available and displayed on site.	<input type="checkbox"/>	<input type="checkbox"/>
Adequate Provision for First Aid on Site.	<input type="checkbox"/>	<input type="checkbox"/>
Prime Constructions management to be notified of any Incident or Injury during the Job immediately.	<input type="checkbox"/>	<input type="checkbox"/>
Injuries and Incidents will be Recorded in Accident Report/Investigation Book	<input type="checkbox"/>	<input type="checkbox"/>
Monthly Reports to be used to review and correct or control all non conformances and identified Hazards	<input type="checkbox"/>	<input type="checkbox"/>

2.12 Restriction of Entry to Site

To be completed by the Project Manager

(Protect Workers, Members of the Public and to Prevent Unauthorised Entry)

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	Yes	N/A
No Entry and/or other Warning Signs will be Placed at the Entrance to Site	<input type="checkbox"/>	<input type="checkbox"/>
Barricades will be used where necessary (open trenches and excavations)	<input type="checkbox"/>	<input type="checkbox"/>
Traffic Management Controls are Planned and Available	<input type="checkbox"/>	<input type="checkbox"/>
Warning devices (reversing beepers & flashing lights are on all motorised mobile equipment)	<input type="checkbox"/>	<input type="checkbox"/>
Public Access Ways will be Controlled (close footpath and divert pedestrians)	<input type="checkbox"/>	<input type="checkbox"/>
Foreman is aware of Signs and Traffic Control	<input type="checkbox"/>	<input type="checkbox"/>

2.13 Protective Equipment Requirements

To be completed by the Project Manager

It is necessary to wear the following Protective Equipment for Particular Work Activities (Discuss in detail at the Toolbox Meeting)

	Yes	N/A
Reflective Safety Vests shall be worn at all times.	<input type="checkbox"/>	<input type="checkbox"/>
Sun Hats & Clothes to protect from sunburn are provided to all Prime Constructions personnel and recommended for all subcontractor staff.	<input type="checkbox"/>	<input type="checkbox"/>
Safety Footwear shall be worn at all times.	<input type="checkbox"/>	<input type="checkbox"/>
Ear Muffs/ or Plugs, Safety Glasses, Face Masks and Gloves are to be worn as per SWMS PPE Directions.	<input type="checkbox"/>	<input type="checkbox"/>
Sun Screen is readily available on site and recommended		
Hard Hats shall be worn.	<input type="checkbox"/>	<input type="checkbox"/>

2.14 Specific Environmental Protection Methods Required for Project

To be completed by the Project Manager

Take these issues to the Job Environmental Analysis for Analysis in this CEMP

	Yes	N/A
Assessment of Specific Hazards associated with:		
Sediment & Erosion Control	<input type="checkbox"/>	<input type="checkbox"/>
Pumping or Dewatering	<input type="checkbox"/>	<input type="checkbox"/>
Protection of Fauna Vegetation or Protection from Noxious Weeds	<input type="checkbox"/>	<input type="checkbox"/>
Local Noise Requirements are known	<input type="checkbox"/>	<input type="checkbox"/>
Litter and Housekeeping on the Site is controlled via waste skip	<input type="checkbox"/>	<input type="checkbox"/>
Waste Minimisation and Disposal	<input type="checkbox"/>	<input type="checkbox"/>

2.15 Hazardous Materials and Dangerous Goods Register

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In accordance with SSD Consent No. 8586218 Condition B25 & NSW EPA requirements, all chemicals, fuels and oils used on site will be documented and compiled within a Material Safety Data Sheet (MSDS) Register and safely stored in accordance with:

- The requirements of all relevant Australian Standards; and
- The NSW EPA's Storing and Handling of Liquids: Environmental Protection - Participants Handbook if the chemicals, fuels and oils are liquids.

To be completed by the Project Manager

	Yes	N/A
A Material Safety Data Sheet MSDS and register shall be available should there be a requirement for use of dangerous goods on the site.	<input type="checkbox"/>	<input type="checkbox"/>
Where new dangerous goods are used, they shall be listed as a Hazard in the Job Safety Analysis of this Construction Management Plan, and assessed in accordance with the Hazard and Risk Analysis Safety Procedure.	<input type="checkbox"/>	<input type="checkbox"/>

2.16 Emergency Contact Numbers

Site Foreman: Brian Kelley 0418 244 961

Project Manager: Michael de Gail 0417 675 931

Head Office: (02) 9418 7707

Emergency Services Safety Environment and Damage to a Service

Police Ambulance and Fire Metro Area		000
Local Hospital	Liverpool Hospital	(02) 8738 3000
Gas	Jemena	131 909
Electricity	Endeavour Energy	131 003
Phone	Telstra	132 203
Water	Sydney Water	132 090
Service Locations	Dial Before you Dig	1100

Other Contact Numbers Appropriate to the Site or Project

Foreman:	Brian Kelley 0418 244 961
HSE Manager	Geoff Hewitt 0427 208 116

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Section 3

Dust Management Plan

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SECTION 3 – Dust Management Plan

Objectives

To minimise the dust and odour emission for the Lot 4 Bringelly Road Business Hub. To implement appropriate controls and best management practice to suppress dust, odour and other suspended particles in accordance with risk management requirements. To minimise any visible off-site air pollution that occurs as a result of the development during its construction.

3.0 Introduction

Key Management Issues

Whilst it is concluded the risk of off-site impacts associated with dust deposition, particulate suspension and exceedances of air quality criteria is low; the generation of dust from the site can be a major nuisance to local activities as well as creating unacceptable working conditions. The key measures to addressing this issue are in accordance with SSD Consent No. 8586218 Condition B15, B16, B17, B18 and is as follows:

- Implement best management practice, including all reasonable and feasible measures to prevent and minimise dust and odour emissions from the construction of the development.
- limit areas of disturbance to the minimum necessary;
- install mitigation devices to reduce the transfer of spoil and dust;

Required Actions

The minimisation of air-borne pollution is a key component for this environment management plan for the site. Construction phase air quality impacts shall be minimised or avoided by incorporation of appropriate air quality control measures including recommendations per the Air Quality Report as prepared by SLR Consulting – Ref No. 610.17734-R12-V1.0 Dated August 2020.

Refer to Appendix M, for the details of the Air Quality Report.

Prior to Construction Works

- Ensure that all equipment used and all facilities erected on site are designed and operated in line with best practice and to control the emission of smoke, dust, fumes and any other air impurity into the atmosphere;
- Spray earthworks, roads and other surfaces as necessary with water;
- Installation of sediment control fencing & shade cloth to Skyline Crescent (south) and the eastern boundary alignment. The neighbouring lot to the least is occupied and fully operational. There will be particular emphasis on dust control along this boundary.

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3.1 Site Location

Refer to Appendix A, for details of the site location.

3.2 Dust Sources

The potential sources of dust from the construction works include:

- Bulk material handling
- Vehicular traffic
- Storage piles
- Bare areas on site
- Earthmoving activities

3.3 Dust Control Criteria

The dust control measures are to provide awareness of the following:

- protection of workers
- protection of general public on and off site
- minimisation of dust into storage facilities
- minimisation of dust generation into the general environment

3.4 Dust & Air Quality Control / Mitigation Measures - Construction Phase

All disturbed areas shall be stabilised as soon as practicable to prevent or minimise wind-blown dust. A range of measures per Appendix 2 of the SSD Consent and in-addition to the recommendations as listed in the SLR Air Quality Report (Appendix M) include:

Communications

- Display of Site Managers name and contact details for air quality and dust issues on the site boundary.
- Display of Head office contact information on the site boundary
- Implementation of Dust Management Plan

Site Management

- Record of all dust and air quality complaints, identification of all cause(s) and appropriate measures to reduce emissions in timely manner, and record of measures taken.
- Availability of Complaints log when requested by local authority.
- Record of any exceptional incidents that cause dust and/or air emissions, either on-or offsite, and the action taken to resolve the situation in the logbook.

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Preparing and Maintaining the Site

- Planning of site layout so that machinery and dust causing activities are located away from receptors, as far as is possible and as reasonably practicable.
- Erection of barriers around dusty activities or the site boundary where reasonably practicable.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period where reasonably practicable.
- Prevent site runoff of water or mud through Sediment Erosion controls.
- Keep site fencing, barriers and scaffolding clean using wet methods
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on site, materials to be covered, seeded or fenced to prevent wind erosion.
- A water application method will be employed daily or more often as conditions require to dampen work areas, exposed soils & stockpiles to prevent the emission of excessive dust from the site;
- Bare areas shall be watered daily or more often as conditions require;
- Land stabilisation works carried out progressively on site to minimise exposed surfaces

Operating Vehicle/Machinery and Sustainable Travel

- Ensure all on-road vehicles comply with relevant vehicle emission standards where applicable.
- Ensure all vehicles switch off engines when stationary – no idling vehicles
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum speed limit of 20 km/h on surfaced finishes and 10 km/h on unsurfaced haul roads and work areas.
- Ensure the use of plant, machinery or materials do not cause or permit the emission of offensive odour as defined in the POEO Act.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on site for effective dust/particulate matter suppression / mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from loading shovels and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available onsite to clean any dry spillages and clean up.
- Spillages as soon as reasonably practicable after the event using wet cleaning methods.

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- Subcontractors to maintain and operate all construction plant / equipment in a proper and efficient condition to ensure exhaust emissions comply with the Protection of the Environment Operations (Clean Air) Regulation issued under the Protection of the Environment Operations Act and in accordance with Development Consent No. SSD-8586218 Condition A16.

Waste Management

- Avoid bonfires and burning of waste materials
- All waste material will be removed from the site in a manner described in the Waste Management Plan

Construction

- Avoid scabbling where possible
- Ensure sand and other aggregates are stored in bunded areas and not allowed to dry out, unless required for a particular process, in which case appropriate additional control measures will be implemented.

Track out

- Water assisted dust sweeper(s) will be utilised on access and local roads to remove, as necessary, any material tracked out from the site.
- Avoidance of dry sweeping to large areas
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport.
- Record of all inspections of haul routes and any subsequent action in site logbook. Implementation of wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Monitor trucks egressing site to prevent tracking of dirt onto the public road network.
- The tailgates of all trucks leaving the premises must be securely fixed prior to loading or immediately after unloading to prevent loss of materials;

3.5 Monitoring and Reporting

Prime Constructions will monitor levels of dust deposition and air quality, the effectiveness of dust emission controls on the construction site and the impacts of any nuisance on adjoining properties or other affected properties. Prime Constructions Site Manager will be responsible for the monitoring of performance using the following methods:

- Performance of daily on-site and off-site inspections where receptors (including roads) are nearby, to monitor dust, record inspection results, and make logs available to local authority when requested. Inspection will include regular dust soiling checks of surfaces including street furniture, cars and window sills within 100 m of site boundary.

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- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to local authority when asked.
- Increase frequency of site inspections by the Site Manager for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Should dust emission exceed acceptable levels, or complaints received with respect to excessive dust from construction activities, written reporting of observations of the dust monitoring will then be recorded in a register and will be available to the clients Project Manager as required. All cases of non-compliance and corrective actions will be brought to the attention of the clients Project Manager immediately and appropriate measures to reduce emissions will be adopted.

3.6 Corrective Actions

Prime Constructions representative will review and analyse the cause of detected non-conformance with the appropriate subcontractor (if applicable) and develop a corrective action to prevent repeat non-conformance. This would include the following actions where appropriate:

- Increase in the frequency of watering down of bare areas
- Increase in the extent of spray grass to bare areas that are not to be paved
- Re-planning of vehicle routes around the site off bare areas when high wind conditions are forecast
- A review of programmed activities in bare areas in times of forecast high wind conditions

A response will be sent to any complainant including the proposed corrective actions to be undertaken where applicable.

The following table indicates the principles and sequencing to be employed for dust management on the site.

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3.7 Summary Chart of Dust Control Measures

Control	Timing	Methodology	Responsibility	Monitoring and Reporting	Performance Measure
Exposed surfaces to be kept moist by spraying with water or dust suppressant	Once per day minimum in dry weather. Further assessments will be made as required by weather conditions (i.e windy conditions will require more monitoring)	-	Contractor (Site Manager) & Subcontractors (Subcontract Foreman)	Daily inspection by foreman / site manager	No visible dust
Exposed surfaces and stockpiles left for prolonged periods to be sealed with dust suppressant, spray grass or sprayed with water	one week from completion of activity where feasible	in accordance with the Air Control Management Plan	Contractor (Site manager) & Subcontractors (Subcontractor foreman)	weekly inspection by foreman	No visible dust
Record and schedule of approved equipment to be kept including type, noise compliance certificate, time and duration of use and noise mitigation measures employed	prior to construction commencement	Within one month of being on the project.	Contractor (Site Manager) & Subcontractors (Subcontract Foreman)	to be included in sub-contractors work method statements. Sub-contractor audit Site manager daily site diary to monitor	Records maintained
Plant and equipment to be fitted with standard pollution control devices	prior to construction commencement	-	Contractor (Site Manager) & Subcontractors (Subcontractor Foreman)	pre-construction inspection, maintenance as required. Monthly inspection by Contractor HSEQ Manager	Copies of compliance certificates held in site offices Plant and equipment meet Protection of the Environment Operations (Clean Air) Regulation 1997 requirements for Plant and Equipment
Excavated material (including stockpiles) to be kept in a damp state	as required where feasible	-	Contractor (Site Manager) & Subcontractors (Subcontractor Foreman)	To be put into Work Method Statements for the sub-contractor. Daily inspection by foreman.	No visible dust

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Control	Timing	Methodology	Responsibility	Monitoring and Reporting	Performance Measure
Trucks transporting loose material to and from the site	ongoing	All trucks to have covered loads when transporting loose material to and from site.	Contractor (Site Manager) & Subcontractors (Subcontract Foreman)	Compulsory inspection at gate prior to entrance into site.	No visible loose material from trucks
Dust generating activities to cease when wind speeds exceed 10m/s, dust emissions from construction are visible and moving towards properties not controlled by Sydney Water	as required	-	Contractor (Site Manager) & Subcontractors (Subcontract Foreman)	daily monitoring by Contractor Site Manager. Contractor Site Manager to review forecast for the following day on a daily basis and plan work activities accordingly.	No visible dust
No incineration or burning on site	at all times	-	Contractor & Subcontractors (all employees)	Continuous monitoring by all Contractor and subcontractor employees	No fires or incineration on site
Contaminated Soil/ Material	As required	Monitor and action in accordance with Unexpected Finds protocol	Contractor, Subcontractors (all employees) and Asbestos Consultant if applicable	Continuous monitoring by all Contractor and subcontractor employees	No visible dust Inspect contaminated material in accordance with referenced documentation

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Section 4

Traffic Management Plan (TMP)

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SECTION 4 – Construction Traffic Management Plan (CTMP)

4.0 Introduction

The purpose of the plan is to provide details of the traffic management during construction. This plan has been developed in accordance with SSD consent No. 8586218 Condition B1 and prepared in consultation with Liverpool City Council (Refer Appendix F- Liverpool City Council – SSD 8586218 CTMP Letter dated 30 November 2020) per Condition B1 (b) and in-conjunction with the following standards and legislation:

The purpose of the plan is to provide details of the traffic management during construction. This plan has NSW Government (Roads and Maritime Services) Documentation

- Work Health and Safety Act, and Regulations
- Protection of the Environment Operations Act 1997
- Prime Constructions Project Health, Safety and Environmental Management Plan
- ISO 9001
- AS/NZS 4801
- ISO 14001
- AS/NZS ISO 31000
- AS/NZS 2436 'Guide to Noise Control on construction, Maintenance and demolition sites'
- Safe work Australia applicable codes of practice, Australian Standards and Guidance Material
- OEH Waste Classification Guidelines
- RMS Specification G10 Traffic Management Edition 5 / Revision 4 – October 2014
- RMS Traffic Control at Work Sites Manual (TCWS)

4.1 Purpose

The CTMP has been developed to safely manage motorists, cyclist and pedestrians travelling along Skyline Crescent as work vehicles enter and exit the project site. The construction traffic management plan outlines safe vehicle paths onsite and rules and regulations that must be adhered by all Prime Employees and Subcontractors.

A driver's code of conduct (refer to appendix D) has been developed in accordance with Prime's HSE system and all relevant legislation as noted in this document. The code of conduct applies to all Prime employees and subcontractors engaged by Prime Constructions to ensure a safe work environment for all workers in and around site.

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4.2 Overall Principles for Construction Traffic Management.

The overall principles for traffic management during the construction phases are;

- Ensure road safety, network efficiency and access during construction;
- Implementation of a driver's code of conduct (refer to appendix D) to minimise the impact from the construction works on the local and regional road;
- Implementation of a driver's code of conduct (refer to appendix D) to minimise conflicts with other road users;
- Implementation of a driver's code of conduct (refer to appendix D) to ensure truck drivers use the specified routes;
- Manage and detail heavy vehicle routes, access and parking onsite (refer to appendix C for route to site and parking);
- Maintain access to adjacent properties at all;
- Notify and detail if necessary any nearby residents of any potential disruption to routes;
- To maintain safe access and circulation within the site;
- Provide a safe environment around the development for and pedestrians and vehicles;
- Minimise effects on pedestrian movements;
- Manage and control vehicular movements to and from the site,
- Maintain maximum practical capacity at intersections and in the vicinity of the site;
- Maintain access for commercial and industrial developments in the vicinity of the site;
- Construction traffic activity, including marshalling of trucks to be provided for on-site;
- Minimise impact on on-street parking in the vicinity of the site during construction;
- Maintain safety for workers;
- Manage and control construction vehicle activity in the vicinity of the site.

4.3 Policies

In addition to this CTMP and CEMP, Prime Constructions will also ensure a copy of their Project HSE Management plan will be available and displayed in a prominent location in the site office. This has been approved by Prime Constructions Executive Management

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Team. The Project HSE management Plan will reflect the relevant conditions of the SSD Consent No. 8586218 and this plan.

4.4 Proposed Development

The project is located within the Liverpool Council LGA with the site forming part of the Bringelly Rd Business Development and will specifically occupy Lot 4 Skyline Crescent, Horningsea Park. The site lies to the South of the M7 Motorway, west of the intersection of Bringelly Road and Cowpasture Road and is located on the North side of Skyline Crescent.

The development consists of One (1) 34,744 m² Temperature Controlled Warehouse comprising One (1) Two-Level Main Office and One (1) Two-Level Ancillary Dock office with a total area of 1,225 m². External Works include carpark, signage, hardstand areas and associated landscaping zones.

4.5 Construction Activity / Scope of Works

Prime will be in control of all Construction vehicles access to and from the site at all times. The site accommodation areas and the site compound will be enclosed by a construction safety fence to ensure there is no ingress into the construction site areas by unauthorised personnel. All construction Activity associated with the construction works will be carried out between the following hours of work per SSD Consent No. 8586218 Condition B19:

- Monday to Friday – 7:00am to 6:00pm
- Saturdays – 8:00am to 1:00pm
- Sundays/Public Holidays – No work permitted

The overall construction process will be controlled by the following means;

- Control of the hours of operation
- Ensure trucks travel to and from the site along designated truck routes
- Ensure loading / unloading of vehicles occurs within the nominated zones via the nominated gates (refer to Appendix C)
- Control and manage the on-site truck marshalling and movement of construction traffic from within the site;
- Careful management of access points by site personnel.

The control of the hours of operation avoids truck movements during the early hours of the morning, before 7.00am and in the evening after 6.00pm. To facilitate an efficient

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construction program, the movement of excavated site materials and the delivery of concrete during major concrete pours will be programmed not to occur concurrently.

Access will be maintained to ensure minimal disruptions to other lots & occupants within the estate.

4.6 Vehicle Routes

Construction traffic will utilise the identified vehicle routes to ensure road safety, network efficiency and access during construction:

- Primary access to the site for construction vehicles will be via Skyline Crescent to the Southern side of the development, see appendix C.
- Access to Skyline Crescent will be via one of the following routes:
 - Approach from M7 Motorway Southbound onto Cowpasture Road, and Bringelly Road then onto Skyline Crescent.
 - Approach from Camden Valley Way from the East into Bringelly Road, then onto Skyline Crescent.
 - Approach from Camden Valley Way from the South, turning onto Bringelly Road then onto Skyline Crescent.
 - Approach from Bringelly Road from the West, then onto Skyline Crescent.

All contractors will be issued with the CTMP as part of their contract documentation ensuring all workers are aware of the access route to site. Trucks moving excavated material will be minimal and all dust control measures will be implemented as outlined in this CEMP for safe dust control. All trucks moving material from site will be loaded to prescribed weight limits and loose material will be covered during transport from the site.

Traffic control requirements will vary depending on the task. Specific control measures will be determined through a traffic risk assessment process that is assessed based on the works required. This includes the engagement of external traffic consultants and controllers as well as the preparation of traffic control plans as required. Utilisation of RMS approved safety aids and personal protective equipment (PPE) including Road Signage, Bollards and the like will be implemented where required.

There will be a requirement for import of filling material during the course of the project. All trucks importing filling material to the site will be loaded to prescribed weight limits and loose material will be covered during transport.

4.7 Planning

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Advanced notification to subcontractors of their required delivery dates will allow planning of the best route to take to the site. Notification should also include when other trades are undertaking deliveries and / or have plant & equipment operating on site which may prevent clear access. This will avoid congestion at site. Proper planning of construction sequencing will also avoid unnecessary congestion at the site.

4.8 Access Points

The site currently will have one personnel entry point (Access Gate 1) located off the Southern Boundary on Skyline Crescent. This entry point will be maintained for employees and contractors to access site by foot and will be utilised for direct access to the Site Office for signing in. This entry point will provide for an isolated personnel access – with barricade devices providing separation to adjacent site vehicular traffic.

A vehicle entry point (Access Gate 2) will be located off the Southern Boundary on Skyline Crescent. This entry point will be maintained as the main vehicle (Heavy & Light Vehicle) entrance & egress point to the site work face and site compound for material drop-off, materials storage, waste bins and designated contractor parking.

Access Gate 2 will also serve as the main access point for emergency services.

Refer to Appendix C – Site Location Plan of this Traffic Management Plan

4.9 Induction

As part of Prime Constructions site induction all site staff & sub-contractors will be advised of site access points and where they are able to park their vehicles each day.

4.10 Number & Frequency of large Vehicles

The number and frequency of truck movements has been detailed below. The highest intensity of truck movement will be during the Civil Earthworks at the commencement of the project, as well as during internal and external concrete pavement pours during the middle and later stage of the project. This will be due to delivery of machinery to undertake the earthwork elements of the project and import of base course material and premixed concrete supply trucks. The remaining construction phase will have a typical number of truck deliveries and would be easily accommodated with the current traffic environment.

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4.11 Parking of Vehicles

It is proposed that there will be sufficient parking onsite for delivery vehicles and workers, considering the size of the site it is not expected that any issues regarding insufficient onsite parking or overflow street parking will be encountered. Allocated Parking Zones are detailed in Appendix C. Deliveries will be granted access to deliver the materials in allocated loading/unloading zones as detailed in Appendix C. There is ample space of site to allow for all trucks to turn around within the site and leave in a forward direction. All persons undertaking works on Lot 4 Bringelly Road Development will be required to complete an induction before commencing works. Part of the induction will outline onsite parking arrangements.

No offsite Parking / On-street parking will be permitted to any party accessing the site work face.

4.12 Loading / Unloading Of Trucks & Delivery Vehicles, Construction Work Zones & Road Occupancy

The loading and unloading of all trucks and delivery vehicles will take place within the boundaries of the site. At no time will trucks be permitted to load or unload on public roads. In the event concrete trucks are queued, the waiting space will also be within the site development area.

Loading will be carried out in designated loading locations adjacent the site compounds accessed from Skyline Crescent. Loading locations will be sign-posted for driver delivery instructions.

Given the layout of the proposed development and its location with respect to surrounding roads and adjoining properties, there are ample staging / laydown opportunities for all deliveries to occur within the site development area. No Construction Zones or Road Closures are therefore anticipated during the project. All vehicles will be loaded and unloaded within the boundaries of the site. Should Work Zones be required at the development frontage, a separate application along with 'Work Zones' signposting Plan will be provided for approval.

Currently it is anticipated all works will occur within the property boundary. Road occupancy or openings are therefore not anticipated, however should this requirement

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change, a request for Road Occupancy / Opening permit will be submitted to Liverpool City Council for approval prior to commencement of works.

4.13 Crane & Concrete Pumps

Mobile cranes and concrete pumps will be used to service the construction of the approved development. Mobile cranes and concrete pumps will be setup within the confines of the site. Mobile cranes will be best positioned for proper and safe access of materials and such that the crane can safely slew around without danger of striking adjacent structures and public areas. Given the use of mobile cranes, no crane permits will be required.

4.14 Notification of Potential disruptions to nearby Residents

Parking will be available onsite for all workers and deliveries. Should any of this change then other arrangements will be made with ESR Australia (ESR) and all other affected estate residents will be notified of the change via direct or ESR Australia (ESR) distributed correspondence.

Per Appendix 2 of the SSD Consent, ongoing engagement measures and distribution tools will be in accordance with Appendix N- Consultation Strategy and Outcomes Report as prepared by Ethos Urban on behalf of ESR Australia (ESR).

Signage detailing Principal contractor details and site manager details will be provided at main access points to enable the community to make contact regarding work activities.

Refer to Appendix N- Consultation Strategy and Outcomes Report.

4.15 Pedestrian Movements

It is anticipated that only a very small number of the construction workers would utilise public transport to access the worksite. It would also be expected that there will be low public pedestrian movement along the front of the site.

The entry gates to the site will have signage that confirms the site rules, site contact details, emergency contact details and the PCA for the project.

Pedestrian movements within the site will be barricaded off with Flagged Walkways / Bollards and risk assessments will be carried out to see if further pedestrian protection measures are required as the construction programme progress.

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4.16 Drivers Code of Conduct

To ensure the construction works have a minimal impact on the local and regional network and other road users, a driver's code of conduct has been developed.

Please refer to Appendix D for the driver's code of conduct.

4.17 Traffic Movements onto and off site

Refer to appendix A & C for vehicle routes onto and off site.

In maintaining Road Safety & Network efficiency per SSD Consent No. 8586218 Condition No. B1 (C), all vehicles accessing & leaving site, must access or leave in a forward direction via the designated access area and ingress / egress routes as shown on the Traffic Management Plan per Appendix C. All vehicles are to be checked for any residual mud, oil or leaks before leaving site, including securing and covering of all materials. Site Speed Limits will also be imposed, with speed limits within site limited at 10km/hr.

Vehicles making deliveries during the day will enter the site in a forward direction via the Access Gate. All vehicles will be unloading within the confines of the site compound before exiting in a forward direction via the Access Gate. An all-weather gravel access crossing will be constructed to provide vehicle access into the site work area as required and provide a turning bay for vehicles to turn and leave site in a forward direction.

Where oversized heavy vehicles are anticipated to arrive on site, spotters will be implemented to supervise the safe movement of heavy vehicles or machinery onto and off site to maintain public safety and to ensure network road efficiency.

Below is a table of projected traffic movements, frequency and route to ensure the acceptable ongoing operations of Skyline Crescent and Bringelly Road. Refer to appendix B for approximate time frame and dates of each stage of construction.

Stage of Construction	Type of Vehicle (size)	Average vehicles per day	Frequency on/off site	Route
Whole Project	Cars/utes/Vans (Light Vehicles)	In: 25 out: 25 (parking onsite)	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	All traffic will enter site via Skyline Crescent Most trades will approach from the M7, down Camden Valley

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				Way then onto Bringelly Road.
Earthworks, Retaining Walls (as per attached program, see appendix B)	Semi trailers to float excavation equipment	In: 2 Out: 2	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	As above
	Dump truck with trailer	In: 20 Out: 20		As above
Footings and Drainage (as per attached program, see appendix B)	Construction Materials Delivery 8-10m Rigid Trucks	In: 5 Out: 5	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	As above
Structural Steel (as per attached program, see appendix B)	30t crane	In: 2 Out: 2	6:30am-10am: High 10am-2pm: High 2pm-6pm: High	As above
	Semi Trailers (Steel Deliveries)	In: 2 per week Out: 2 per week		
Precast Panels (as per attached program, see appendix B)	80t Crane and Franna	In: 2 Out: 2	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	As above
	Semi Trailer (Panel Deliveries)	In: 12 Out: 12		
Roofing & Cladding (as per attached program, see appendix B)	100t Crane	In: 1 per week Out: 1 per week	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	As above
	Semi Trailers (Metal Sheet Deliveries)	In: 3 Out: 3		

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Internal Concrete slabs (as per attached program, see appendix B)	Concrete Agitator Delivery Truck	In: 20 Out: 20	6:30am-10am: High 10am-2pm: Medium 2pm-6pm: High	As above
Building Fitout (as per attached program, see appendix B)	Construction Materials Delivery	In: 6 Out: 6	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	As above
External hardstand Fencing, Landscaping (as per attached program, see appendix B)	Concrete Agitator Delivery Truck	In: 20 Out: 20	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	As above
	Construction Materials Delivery 8-10m Rigid Trucks	In: 5 Out: 5		

4.18 Program Monitoring

Prime carry out the following steps to monitor the effectiveness of the traffic management measures;

- Weekly environmental audits to confirm compliance with HSE Management Plan. This includes a particular focus on the road reserve at Skyline Crescent.
- Monthly audits by senior management.
- Random spot audits / inspection of implemented measures to confirm compliance and effectiveness.

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Section 5

Construction Noise & Vibration Management Plan

PRIME CONSTRUCTIONS recognises its responsibility to minimise the chance of Noise Pollution as a result of construction processes. The company shall also implement sound practices that minimise ENVIRONMENTAL impacts and eliminate health risks and nuisance to residents near the work site as a result of Vibration caused from plant and equipment.

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SECTION 5 - Construction Noise & Vibration Management Plan

5.0 Introduction

This plan is formulated for the new development works for Lot 4 Bringelly Rd Business Hub.

The plan fulfils the following key functions:

- Identifies the standard construction hours for activities onsite;
- Identifies acceptable noise levels of construction works outside standard construction hours;
- Describe in detail what actions and measures would be implemented to ensure that the works comply with the relevant noise and vibration criteria;
- Describe what procedures would be followed to ensure compliance.

The plan is formulated in line with the requirements of SSD Consent No. 8586218 Condition B19, B20, B21, B22 and Appendix 2 of SSD Consent. All construction work associated with the development are to be carried out between 7.00am and 6:00pm Monday to Friday, 8am and 1pm Saturday. Works outside of these hours may only be undertaken in the following circumstances per Condition B20:

- Works that are inaudible at the nearest sensitive receivers;
- For the delivery of materials required outside these hours by the NSW Police Force or other authorities for safety reasons; or
- Where it is required in an emergency to avoid the loss of lives, property or to prevent environmental harm.

Prime Constructions aim to:

- Implement best management practice, including all reasonable and feasible measures to prevent and minimise noise and vibration during construction of Lot 4 Bringelly Rd Business Hub.
- Minimise the noise impacts of Lot 4 Bringelly Rd Business Hub construction during adverse metrological conditions when noise criteria do not apply;
- Maintain the effectiveness of any noise suppression equipment during construction on plant at all times and ensure defective plant is not used operationally until fully repaired; and
- Assess noise monitoring data and relocate, modify and/or stop operations as required.

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5.1 Condition of Consent (Noise & Vibration Criteria) & Construction Acoustic Impact

In accordance with SSD Consent No. 8586218 Condition B21 and Appendix 2 of SSD Consent, Noise levels from the premises shall achieve the construction noise management levels detailed in the Interim Construction Noise Guideline. The relevant noise criteria is provided in the 'Noise Impact Assessment' prepared by SLR Consulting Australia Pty Ltd dated August 2020, reference 610.17734-R10-v1.0. The recommendations provided in the above-mentioned Noise Impact Assessment shall be implemented and incorporated into the design and construction of the development, where applicable.

Scheduling Phase

All construction activities that involve the use of heavy vehicles, heavy machinery and other equipment likely to cause offence to adjoining properties or generate highly noisy intensive works shall be restricted to the following hours in accordance with the NSW Environment Protection Authority Noise Control Guidelines & SSD Consent – Appendix 2 "Construction Acoustic Impact", unless otherwise assessed and justified:

- 7am to 6pm Mondays to Fridays, inclusive; and
- 8am to 1pm Saturdays; and
- At no time on Sundays or public holidays

Where noisy works are approved to be undertaken outside standard hours of construction or during periods where high noise impacts are likely, respite periods will be provided. Community consultation will also be conducted to determine the need and frequency of respite periods, if necessary.

General deliveries and the loading / unloading of materials will only be permitted during the approved Hours of work per Condition B19 of the SSD Consent, unless otherwise assessed and justified. Loading / Unloading of materials or deliveries outside of daytime hours will be avoided.

Site Layout

Site layout will be set-out to ensure site entry, exit points, work compounds, parking areas, equipment, stockpiles and stationary sources of noise (e.g. generators) are located as far as possible from noise sensitive receivers and /or in shielded locations, where practicable. Compound and work areas will be designed to as one-way to minimise the need for vehicles to reverse. Idling of Trucks will not be permitted near residential receivers on Stuart Rd.

Other construction works carried out inside a building that do not involve the use of equipment that emits noise are not restricted to the construction hours stated above.

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Contractor Management

Training will be provided to all project personnel, including relevant sub-contractors, on noise and vibration requirements and the location of sensitive receivers during inductions and toolbox talks. Delivery vehicles will be fitted with straps rather than chains for unloading, wherever possible; and truck drivers will be advised to avoid compression braking as far as practicable. Where night-time works are required and approved, trucks will utilise broadband reversing alarms.

The provisions of the Protection of the Environment Operations Act, 1997 in regulating offensive noise also apply to all construction works.

Vibration

The Noise Impact Assessment (Refer to Appendix J), prepared by SLR dated August 2020, reference 610.17734-R10-v1.0 states that "the distance between the construction works and the nearest sensitive receivers is generally sufficient for most buildings to be outside of the cosmetic damage minimum working distances. The adjacent CFC warehouse is however marginally within the minimum working distance and impacts may occur when vibration intensive works are being completed nearby.

Construction noise levels are predicted to result in moderate impacts at the nearest receivers to the north-east, however, it is noted that works would only be completed during the daytime and not during evening or night-time periods. Noise levels at the other more distant receivers are expected to be below the management levels.

As such it is considered that there is low to minimal concern with regards to vibration emittance from the development site to neighbouring residential zone. There are, however, adjacent industrial developments that have been recently constructed, and as such mitigation measures per Section 6 of the Noise Impact Assessment (Appendix J) will be implemented at critical project stages.

5.2 Noise & Vibration Sources

Noise Sources

Noise during the proposed construction works will vary due to the transient nature and range of plant and equipment. Sources of Noise during the site works and construction periods include the following:

- Site Establishment – Trucks
- Bulk Excavation – Trucks, Backhoes, Excavators
- Detailed Excavation & Filling – Trucks, Backhoes, Excavators, Impact Rollers
- Demolition – Cutting Saws, Jackhammers

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- Slabs – Concrete Trucks, Concrete Pumps, Saws for Reinforcement Cutting, Vibrators
- Structure – Crane, Cutting Saws
- External works – Trucks, Concrete Pumps, Excavators, Rollers

Vibration Sources

The vibration sources during the works will come from four main activities / items of plant:

- The impact roller – used to compact filled ground.
- The excavators – used for bulk and detailed earthworks.
- The roller – Used for civil works.
- Jackhammers – Used for excavation and demolition works.

5. 3 Noise & Vibration Management

Key Management Issues and Mitigation Actions Required

Construction hours as nominated in the development consent are to be strictly maintained.

No construction works shall commence unless the subcontractor has submitted a Work Method Statement which details the schedule of work equipment / excavation equipment and describes the equipment types to be used and any measures required to ensure the noise levels are acceptable (such as screen mufflers etc). It's also preferable that details of noise levels the plant will generate and expected time and duration of use are included in the SWMS.

All subcontractors engaged in rock breaking or rock hammering work are not to exceed 3hrs of continuous work at a time. A minimum break of 1hr to be strictly upheld between continuous rock breaking or rock hammering.

All work under the contract will be carried out using the best available technology. Controls shall be utilised including the use of engine exhaust mufflers, engine noise reduction kits and acoustic enclosures. Jackhammers should be fitted with silencing bags where practicable.

The Construction Manager will identify and report on all work under the contract likely to cause the emission of vibration in excess of the conditions of the consent required by this Plan. Additionally, the Construction Manager shall provide details of the best available technology and best practical means that will be used to control vibration impacts including selection of equipment and scheduling of work under the contract.

There will be periodic inspections from WHS&E management to assess the impacts of noise & vibration at any specific time.

Construction works outside of the standard construction hours identified in Development Consent is prohibited unless approved where required. Best management practice will be implemented to ensure that construction works will not exceed the noise management levels

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specified in the Interim Construction Noise Guideline (Department of Environment and climate change, 2009).

Other mitigation measures include:

- Keep plant and equipment well maintained in a proper and efficient condition; and
- Operate Plant and equipment in an efficient manner in accordance with Condition A16 of SSD Consent.
- Use the minimum sized equipment necessary to complete the work and where possible, use alternative, low-impact construction techniques.
- Power tools should use mains power where possible rather than generators.
- Shut down machinery, including generators, when not in operation.
- Avoid dropping materials from a height and dampen or line metal trays, as necessary.
- Ensure equipment is operated in the correct manner.
- All equipment should be appropriately maintained and fitted with noise control devices, where practicable, including acoustic lining of engine bays and air intake / discharge silencers, etc.
- Where possible, use dampened 'City' bits on jackhammers and rock breakers.
- Hold regular Toolbox meetings to provide training in the best ways to operate machinery in a manner to minimise noise.

5.4 Community Consultation & Performance Measures

Prior to commencement of any noise-generating construction work, appropriate notice will be provided on the Bringelly Road Business Hub website prior to commencement of work. Site signage detailing 24 hr contact number will also be displayed at the site entrance.

Where there are complaints received regarding noise, this will be utilised as Performance Measure on the effectiveness of the existing controls. Received complaints will be reviewed, and where feasible and reasonable, additional control measures will be implemented.

5.5 Environment Noise & Vibration (Monitoring and Reporting)

This Noise and Vibration Management Plan consists of audible observations, a complaints received program and site specific employee and contractor education into acoustic best practice.

Should any valid complaints be received, immediate noise and/or vibration monitoring will be conducted. Daily inspections of noise and vibration will be made by the Site Manager and recorded on the Daily Site Inspection Report when regarded as abnormal or excessive. Further to this, Weekly observations will be made on the Environmental Inspection Log. All contractors are to ensure that where required, their plant and equipment log books are

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completed daily and is maintained as required by the manufacturers specifications / recommendations. Inspections of plant and equipment should include reference to acoustic performance, based on audible tests during operation. Subcontractors are to ensure that plant and machinery utilised are operating within the required acoustic range.

In addition the above, should noise levels for a specific task exceed the levels outlined in Appendix H, additional site specific testing will be conducted in accordance with the Project's Health, Safety and Environmental Management Plan (PHSEMP). This would include the installation of noise receivers to monitor specific tasks.

If noise generated from the construction activities is considered to be above the recommended levels, noise monitoring may be implemented.

Refer to Section 7 of the CEMP for the complaints management procedure.

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Section 6

Erosion, Sedimentation, Soil And Water Management Plan

PRIME CONSTRUCTIONS recognises its responsibility to minimise and if possible eliminate erosion, and the chance of sediment reaching existing drains or waterways, as a result of construction processes.

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SECTION 6 – Erosion, Sedimentation, Soil and Water Management Control Plan

6.0 Objectives

To plan and carry out the work to avoid erosion, contamination and sedimentation as is required under the Consenting Conditions.

In accordance with Development Consent and the relevant requirements in the *Managing Urban Stormwater: Soils and Construction* 2004 Guideline, erosion and sediment control measures will be implemented and maintained onsite during the construction of Lot 4 Bringelly Road Business Hub.

To control the quality of surface water leaving the construction site such that no unacceptable impact occurs to adjoining waterways.

6.1 Key Management Issues

The construction phase works have the potential to impact on:

- water quality of receiving waterways
- soil resources

The following management issues have been identified:

- Site contamination through the potential for an overflow of fuel/chemical storage containers and contamination from the equipment and plant area into the stormwater drainage system.
- Sediment laden water from the construction site may potentially flow into the stormwater inlets and thus nearby water bodies which could be affected and consequently reduce water quality.
- Vehicles leaving the construction site depositing dirt/mud on public roads after rain periods

6.2 Erosion & Sediment Control / Actions

The prevention of soil erosion by water and sediment pollution are key components of the environmental management for the site.

An erosion and sedimentation control plan has been prepared in accordance with the *Managing Urban Stormwater: Soils and Construction* Guideline with controls measures that are to be installed and inspected prior to any site work activity commences. The plan addresses sedimentation controls and general stormwater overflow management. The Erosion and Sediment Control Plan (ESCP) is attached as Appendix F. As per Condition B12 of SSD consent, the erosion and sediment control measures are to be installed prior to the commencement of any construction or other surface disturbance work, and maintained until such time that all disturbed areas have been rehabilitated and stabilised.

Water quality impacts during the construction stage shall be minimised by incorporation of appropriate erosion and sediment control measures as detailed in the ESCP design,

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specification and contract arrangements and with further inspections during construction will ensure all aspects are maintained to the full capacity.

Planning

- Limit land disturbance to the area needed, especially in the vicinity of existing stormwater drainage;
- Site access is to be limited to the minimum number of entry and exit points required;
- Dissipate uncontrolled flow by sediment fencing placed across the line of water flow;
- Direct runoff from disturbed areas through sediment traps or filters;
- Loss of soil from stockpiles is minimised using filter barriers and temporary covering where stockpiles are to be store;
- Stockpiles of sand, soil and other material shall be stored clear of any drainage line or easement, tree protection zone, water bodies, footpath, kerb or road surface and shall have erosion and sediment control measures in place to prevent movement of such materials onto aforementioned areas and adjoining land.

Dispersal Control

- Prevent deposition of sediment on the public road network due to truck / equipment movements to and from the site;
- A purpose built wheel shaker facility will be constructed at the exit gates of the site;

Sediment Fences

Sediment fences will be used in areas where temporary sediment control is required. These relatively simple devices will dissipate stormwater velocity and collect moving solids.

The contractor is to provide sediment fences downstream of stockpiles and disturbed areas. It is important that sediment be collected adjacent to these areas to prevent loss of material.

De-watering

The contractor is to implement management practices that address all sources of pollution on the site in accordance with current practices outlined by the EPA:

The collection of stormwater/ground water on a project can only be discharged to the stormwater system if it meets the acceptable EPA criteria.

These criteria may involve the need to demonstrate that the collected water within the project site boundary, does not exceed the tested parameters and have no evidence of the following substances detected:

- acids from washing;
- building wastes and litter;
- paint and paint wastes; and
- oils, grease and fuel, from equipment operation and maintenance.

Discharge Limits

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In accordance with SSD Consent No. 8586218 condition B13 'Discharge Limits', all liquid discharge are to comply with Section 120 of the POEO Act except as expressly provided for in an EPL. Only clean and unpolluted water is to be discharged into Liverpool Council's stormwater drainage system post rainfall event.

6.3 Monitoring / Compliance

Monitoring of the performance measures shall be undertaken by the Site Manager. During periods of rainfall, this will include periodically inspecting the run-off for sediments. Reports should then be issued to the Project Manager as required.

Written records of any contaminated discharge shall be kept on site and updated on a regular basis. All Erosion and Sediment Control Measures noted in the plan are to be carried out as part of the Contract Works.

6.4 Summary of Erosion & Sediment Control Measures

Control	Timing	Methodology	Responsibility	Monitoring and Reporting	Performance Measure
Silt stop filter fences to be located downhill of disturbed areas	Prior to construction commencement	In accordance with the Stormwater Management Plan	Building Contractor & Subcontractors	Weekly inspection	Silt collected at base of fence No breach of fence line
Truck wheel shake and wash facility to be installed near construction access	Prior to construction commencement	Detailed work method statement to be prepared by contractor	Building Contractor & Subcontractors	Pre-construction checks and 2 weekly maintenance inspections	Pre-construction check
Stormwater inlet sediment traps to be installed	Prior to construction commencement	In accordance with the Stormwater Management Plan	Building Contractor & Subcontractors	Weekly inspection	Sediment collected in traps
All erosion controls to be maintained until potential for erosion and sedimentation passed.	Ongoing	In accordance with the Stormwater Management Plan	Building Contractor & Subcontractors	Weekly inspection	Retaining all controls effective
Site stormwater, which is captured to meet discharge requirements.	Ongoing	In accordance with the Stormwater Management Plan and work method statement to be prepared by sub-contractor	Building Contractor & Subcontractors	Daily inspection	No discharge to exceed controlling Authority criteria.

6.5 Unexpected Finds (Including Contaminated Soils)

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Prime Constructions will be responsible for all bulk earthworks as well as detailed excavation for footings and services installations. There is a possibility that unexpected finds can still be encountered.

All excavated material generated as a result of the development will be re-used, recycled or disposed of in accordance with the DA Site Waste Minimisation and Management Plan as prepared by SLR consulting Australia, Ref: 610.17734.00600-R11, Version No: V2.0 dated August 2020

Waste materials not specified in the approved waste management plan will to be disposed of at a lawful waste management facility. Where the disposal location or type of waste materials have not been identified in the waste management plan, these details will then be provided to the Certifying Authority as part of the waste management documentation accompanying the Construction Certificate application.

All receipts and supporting documentation will be retained in order to verify lawful disposal of materials and records will be kept and made available to Consenting Authorities on request.

Should unknown material or foreign matter be encountered during in-ground excavation, excavation is to be suspended with the immediate work area isolated for further investigation. Soil material identified as contaminated will be disposed off-site, with the disposal location and results of testing submitted to relevant authorities prior to its removal from the site. Should contaminated material be required to be stockpiled prior to off-site removal, excavated material will be stockpiled on plastic sheeting with appropriate environmental controls prior to disposal. Refer to Appendix G for an **Unexpected Finds Protocol**.

All works are to immediately cease and the Office of Environment and Heritage (OEH) is to be contacted to obtain necessary approvals to continue work if any Aboriginal archaeological objects are uncovered.

If substantial intact archaeological deposits and/or State significant relics would be discovered during the construction, the following procedure is to be followed:

- a) Immediately cease all works in the affected area(s) and contact a suitable qualified and experienced archaeologist to assess the find(s);
- b) Works are not to recommence until the Heritage Council has confirmed works may continue within the affected area(s);
- c) Address any request for information made by the Heritage Council, and provide copies of this information to the Client and PCA; and;
- d) Update any relevant plans or strategies where and as required.

6.6 Imported Soil

Any required importation of material for filling purposes will only be sourced where it can be validated / classified with an appropriate EPA Validation Certificate as VENM, ENM or other approved material as required per SSD Consent No. 8586218 condition B11. Prime will also

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need to import base course, slab blinding and pipe bedding material. Prime will only directly source all such materials from reputable suppliers that have all required test data.

No fill material shall be imported to the site until such time as a Validation Certificate (with a copy of any report forming the basis for the validation) for the fill material. Record Keeping of Volume and type of fill will be maintained and will be available for viewing upon application to Planning Secretary.

All imported fill shall also be validated in accordance with Council's Contaminated Land Policy to ensure that it is suitable for the proposed land use from a contamination perspective.

The validation report shall be prepared in accordance with the EPA guidelines, Consultants Reporting on Contaminated Sites, and shall:

- describe and document all works performed;
- include results of validation testing and monitoring;
- include validation results of any fill imported on to the site;
- show how all agreed clean-up criteria and relevant regulations have been complied with; and
- include clear justification as to the suitability of the site for the proposed use and the potential for off-site
- migration of any residual contaminants.

6.7 Salinity

Based on the Salinity Potential in Western Sydney 2002 Map of Department of Infrastructure, Planning and Natural resources, the proposed redevelopment will have a negligible effect on the existing salinity conditions. Further based on the performance of the existing warehouse facility, the report concludes that the site salinity to be low risk for the proposed redevelopment.

6.8 Earthworks

All earthworks shall be undertaken in accordance with AS 3798, Liverpool Council's requirements and Civil Engineering report as prepared by Costin Roe per Appendix K. The level of testing shall be determined by the Geotechnical Testing Authority/Superintendent in consultation with the Principal Certifying Authority.

All excavations and backfilling associated with the erection of a building must be executed safely and in accordance with the appropriate professional standards. All excavations associated with the erection of a building must be properly guarded and protected to prevent them from being dangerous to life or property.

6.9 Ground Water

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In-ground excavation to maximum design depths is not likely to encounter existing ground water. However should any de-watering works be required to be undertaken beyond the designed excavation depths, this will be conducted in accordance with the requirements of NSW Department of Primary Industries

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Section 7

Community Consultation And Complaints Handling

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SECTION 7 – Community Consultation and Complaints handling

7.0 Introduction

The purpose of the plan is to provide details of procedures in place to handle community complaints during construction.

7.1 Objectives

The overall principles for complaints management during the construction phases are;

- Accurately record the details relating to a complaint.
- Ensure that the senior representative of the contractor is notified of the complaint.
- Notification to the clients Project Manager of the complaint.
- Address the nature and the cause of the complaint with the site team, and develop measures to avoid repeat occurrence of the problem.
- Notify the party that instigated the complaint as to the outcome and communicate the remedial measures that will be adopted.

7.2 Complaint Management Procedure

- Record the complaint details on the site log per Appendix L.
- Notify the clients Project Manager of the complaint and the details.
- Review the nature and the cause of the complaint with the contractor's senior representative.
- Address the parties responsible for the activity that caused the complaint.
- Agree procedures that will avoid re occurrences of the same and notify the site management team.
- Contact the complaint originator and advise of the cause and the implemented action procedure.
- Issue a brief written summary of the above items to the local council inspector for their records and future reference.

7.3 Ongoing Monitoring and Controls

Where ongoing or numerous complaints (more than 1) are received for similar issues, the Project Manager will arrange for a meeting with him/herself, the Site Manager, HSEQ Manager and any other stakeholder to discuss the issue and determine the ongoing controls

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required to help satisfy the complainants concerns. The Site Manager will monitor the controls and record this in the Weekly Environmental Inspection Log. The Project Manager and HSEQ Manager will monitor the controls put in place monthly during their Monthly Site Safety Audit. If during this monitoring it is determined that the controls are ineffective then further controls will be determined and implemented.

The corrective actions determined in the above process will be communicated to the complainant. Should any further complaints of the same issue from the same complainant be received, a meeting will be held between all stakeholders and the complainant to attempt to address the issue to the satisfaction of the complainant where it is reasonable to do so.

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Section 8

Waste Management Plan

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SECTION 8 - Waste Management Plan

8.0 Introduction

This Waste Management Plan details the commitment to the development regarding services and capabilities in respect to waste removal, management and recycling of materials removed from this work site. The principal objective of this plan will be to minimise waste generation where practicable and maximise appropriate use of recycled or recyclable materials. All waste generated onsite will be classified in line with the EPA's Waste Classification Guidelines (DECCW, 2009) or any superseding document. All waste generated onsite will be collected by a waste management company and the waste will then be disposed of at facility that may lawfully accept the waste.

An Inspection of the site and a review of the building materials adopted have shown that there will be two basic types of waste generated on site, these being solid and liquid waste.

8.1 Waste Reduction

The focus will be on minimizing waste by implementing the Site Waste Minimisation and Management Plan as prepared by SLR consulting Australia, Ref: 610.17734.00600-R11, Version No: V2.0 dated August 2020 (refer to Appendix I) and in accordance with SSD Consent No. 8586218 Condition B13, B30, B31 & B32 and the sections below.

All excavated material generated as a result of the development will be re-used, recycled or disposed of in accordance with the approved waste management plan.

Waste materials not specified in the approved waste management plan will to be disposed of at a lawful waste management facility. Where the disposal location or type of waste materials have not been identified in the waste management plan, these details will then be provided to the Certifying Authority as part of the waste management documentation accompanying the Construction Certificate application.

All receipts, sampling / waste classification data and supporting documentation will be retained in order to verify lawful disposal of materials; and records will be kept and made available to Consenting Authority or EPA on request.

Any material identified as contaminated will be disposed off-site, with the disposal location and results of testing submitted to relevant authorities prior to its removal from the site.

In accordance with SSD Consent No. 8586218 Condition B31, the contractor will assess and classify all liquid and non-liquid wastes to be taken off site in accordance with the latest version of EPA's Waste Classification Guidelines Part 1: Classifying Waste (EPA, 2014) and dispose of all wastes to a facility that may lawfully accept the waste.

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Reducing Solid Waste

- packaging from site material
- excess material
- soil from excavations
- timber
- gyprock
- metal
- brick and concrete

To reduce the amount of solid waste going to Landfill, the endeavour will be to:

- Recycle materials off site at an authorized waste management facility
- Separate materials on site in designated recycling skips
- Buy materials with minimum packaging
- Stockpile and reuse on site

Reducing Liquid Waste

- Site clean up
- Wash down areas
- Brick cutting waste
- Dust control waste

In accordance with SSD Consent No. 8586218 condition B13 'Discharge Limits', all discharge is to comply with Section 120 of the POEO Act. Only clean and unpolluted water is to be discharged into Liverpool Council's stormwater drainage system post rainfall event. Liquid wastes suitable for discharge to the mains sewerage to be discharged in accordance with Sydney Water requirements.

If mains sewer is not available or if Sydney Water will not allow disposal to the sewer, then a licensed waste contractor is to remove the liquid waste from the premises to an appropriate waste facility.

The waste contractor and waste facility are to hold the relevant licenses issued by the NSW Environment Protection Authority.

Where possible, avoidance of generating any dirty water and when encountered, Prime will attempt to use such water for irrigation or as a means of suppressing dust.

Waste Minimisation

Major subcontractors will be encouraged to submit waste minimisation details including the following:

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- Practical measure associated with their works to prevent waste entering the site
- Waste resulting from their work which can be recycled are to be actively managed as part of their waste reduction plan
- Alternative products containing recycled materials that could be utilised in the works which conform and meet design specification
- Ordering the right quantities of materials and prefabrication of materials where possible
- Minimising site disturbance and to limit unnecessary excavation
- Careful sourcing separation of off-cuts to facilitate re-use, resale or efficient recycling

Construction Stage

In order to reduce waste on site during the construction stage, all construction personnel will be instructed to do the following:

- Order materials to size
- Not to over order
- Order pre-cut or prefabricated materials
- Reduce packaging at source
- Separate reusable or recyclable materials from waste
- Establish a designated concrete wash down system on site for concrete trucks and pumps. The area will be adequately signed and designed so that any excess drainage from area will be contained within the site boundaries
- Bins to be inspected regularly

Bin System

A Separation system will be achieved through the use of separation bins for recyclable materials and non-recyclable waste materials where suitable.

Additional bins will be provided where practical to further separate waste between different materials. Materials collected for recycling may include:

- Food Waste
- Glass
- Concrete and bricks
- Timber
- Aluminium
- Metal
- Plastic
- Paper, cardboard and plasterboard

The subcontractors will be responsible for the daily cleaning of their respective work areas and for placing all their waste in the nominated waste bins.

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If a particular bin is found to be contaminated by waste material from a subcontractor, that particular subcontractor will be liable for the cost associated with tipping or sorting of that bin.

Signs will be located on each bin indicating what type of waste may be placed in that bin.

Packaging

All suppliers of building materials will be encouraged to nominate packaging minimization and reuse initiatives. Bulk handling and reusable transport containers will be encouraged.

Waste Quantities

The quantity of potential waste material is estimated by:

- Quantifying materials for the project
- Apply waste margins allowed in ordering materials
- Copy these amounts of waste into the waste management plan

Conversion to volume of waste materials

- All volume of waste material will be converted from cubic metre to tonnage once the waste has been weighed at a licensed transfer station.

8.2 Waste Management

Waste will be separated and/or stored onsite for re-use and recycling. The proposed waste management contractor will recycle/re-use 80% of demolition and construction waste by weight (so as to reduce contribution to landfill by stated percentage).

In accordance with Appendix 2 of the SSD consent, site operations will ensure minimal waste creation and maximum reuse and recycling by:

- Engagement of Qualified / Certified contractor to remove all contaminated or hazardous materials (e.g. asbestos) and disposal to an appropriately licensed facility.
- Return of all packing waste to suppliers where possible. Standard pallets will be returned to their owners and non-standard / broken pallets will be stockpiled and collected as required by a private waste contractor.
- Incorporating anticipated specifications of waste collection room on Architectural drawings.
- Staff training
- Employment of Waste Management Contractor
- Recycled materials used in construction
- On-going checks by site supervisors
- Separate area or bins set aside for sorted waste
- Clear signage of waste areas

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8.3 Training

Waste Minimisation will be part of the site environmental awareness program that will be incorporated into the site induction program. The responsibility to ensure that waste materials go into the correct bins will be with everyone working on the site.

Measure of Performance / Monitoring

A waste management contractor will be involved in the early stage of the project to ensure effective planning for waste management.

The waste management contractor will be responsible for providing monthly reports to the Site Manager. Records will also be kept on site by the foreman and site manager in the Weekly Environmental Inspection Log. These reports will indicate the volume of waste removed from site, waste type, the amount of waste recycled and bin size.

Reports on percentage of material recycled will be included by the Project Manager in monthly project reports to be presented to senior management. Where waste recycling is not occurring to the standard required by both Prime and the Client, discussions will be held with the waste contractor to determine if there are ways in which recycling levels can be improved.

Visual inspections of waste storage areas will also be undertaken by site personnel to identify and rectify any issues concerning waste management at the site.

Corrective Actions

Where a subcontractor has caused a bin to become contaminated unduly, the Site Manager will be advised, by a non-conformance report. All corrective action taken by the subcontractor shall be monitored and recorded against the non-conformance procedure, all of which shall be at the cost of the offending subcontractor.

Disposal

Disposal of waste to landfill will be as a last resort only. Landfill sites or waste transfer stations will:

- Require correct handling for dusty or hazardous wastes
- Offer discounts for sorted materials

Records of disposal shall be kept. Any disposal of waste that is deemed hazardous shall be disposed of at an EPA approved and licensed facility.

The waste management contractor will insure that we endeavour to better the Waste Minimisation and Management Act 1995, to the amended Waste Avoidance and Resource

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Recovery Act of 2001 which calls for the reduction of demolition and construction waste going directly to land fill sites.

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MATERIALS RECYCLED AT DEPOTS

Pallets	<i>To pallet producers and recyclers</i>
Steel	<i>To scrap metal yard for reprocessing</i>
Aluminium	<i>To scrap metal yard for reprocessing</i>
Copper	<i>To scrap metal yard for reprocessing</i>
Timber	<i>To builders or appropriate tip to be recycled as garden product, alternate fuels or reprocessing abroad.</i>
Cardboard	<i>To cardboard & paper recyclers</i>
Plasterboard	<i>To plasterboard manufactures for reprocessing</i>
Wire	<i>To scrap metal yard for reprocessing</i>
Concrete	<i>To concrete recyclers to be crushed used in road bases, driveways etc</i>
Bricks	<i>To builders or concrete recyclers to be crushed and reused</i>
Rubble	<i>To concrete recyclers to be crushed and reused</i>
Cable drums	<i>Drum recyclers for reuse</i>
Soil / Dirt	<i>Screened into clean filling sand, land remediation or cover etc</i>
Gas Bottles	<i>To bottle distributors and or scrap metal yard</i>
Glass	<i>To Glass recyclers for reprocessing</i>
Green Waste	<i>Processed into garden products, firewood, landscapers etc</i>
Polystyrene	<i>When uncontaminated sent for reuse</i>

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8.4 Waste Management – Construction Works

Type of Material	ON-SITE	OFF-SITE	Nominated recycler
Excavation Material	Reuse as site fill where appropriate	Removed by earthworks contractor to licensed recycling facility	Nil to landfill endeavored
Bricks	Sorted on-site for recycling but no reuse	Removed to recycling facility or reused or recycled for re use by subcontractor	Phillips / Dump-it / Just Skip Bins or similar contractor
Concrete	Sorted on-site for recycling but no reuse	Removed to recycling facility or reused or recycled for re use by subcontractor	Phillips / Dump-it / Just Skip Bins or similar contractor
Timber	Sorted on-site for recycling but no reuse	Removed to recycling facility or reused or recycled for re use by subcontractor	Phillips / Dump-it / Just Skip Bins or similar contractor
Plasterboard	Sorted on-site for recycling but no reuse	Removed to recycling facility or reused or recycled for re use by subcontractor	Phillips / Dump-it / Just Skip Bins or similar contractor
Metals	Sorted on-site for recycling but no reuse	Removed to recycling facility or reused or recycled for re use by subcontractor	Phillips / Dump-it / Just Skip Bins or similar contractor
Other Waste e.g. ceramic tiles, paints, plastics, PVC tubing, cardboard.	Sorted on-site for recycling but no reuse	Removed to recycling facility or reused or recycled for re use by subcontractor	Phillips / Dump-it / Just Skip Bins or similar contractor

The waste management plan will follow the preferred hierarchy of avoidance/reduce, re-use, recycle, treat and dispose. Best Practice should be adopted wherever possible, to achieve waste minimisation and reduction.

In addition, the project will:

- liaise with Subcontractors to identify areas where they can reduce waste and reuse materials in their respective trades;
- meet local, state and federal waste minimisation legislation and environmental standards;
- prevent pollution and damage to the environment;
- protect the safety and health of our employees and the public;

The aim is to whenever possible reduce the generation of landfill waste or to recycle as much waste material as possible. The contractor shall introduce waste minimisation concepts into the Site Environmental Awareness Program and site-specific issues are to be incorporated into the site induction program. The Site Manager is then to continuously monitor sub-contractor's performance against set waste management requirements and guidelines. All Waste will be secured and maintained within designated waste storage areas at all times and shall not leave the site onto neighbouring public or private properties until such time it is directed to a waste management facility or premises lawfully permitted to accept the materials in accordance with SSD Consent No. 8586218 Condition B32.

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An inspection of the site and a review of the existing building materials have shown that the predominant material used are:

- Concrete;
- Brick;
- Glass;
- Steel;
- Metal roof sheeting.

Selected deconstruction will be employed where appropriate to the structures being demolished. The aim with this process is to deconstruct and separate materials for recycling with particular regard to the above mentioned material categories. Clearly labelled bins will facilitate recycling separation techniques. Maximum re-use and recycling, both of off-site and on-site procedures will be employed.

The Site Manager will seek to:

- Re-use excavated materials on-site and disposal of excess material to an approved facility
- Recycle, bricks and concrete off-site or re-use on-site
- Recycle plasterboard recycled off-site
- Recycle timber or re-use on-site
- Recycle windows, doors and joinery off-site
- Recycle metal, plumbing and fittings off-site

Disposal of waste to landfill will be as a last resort only. Landfill sites or waste transfer stations will:

- Require correct handling for dusty or hazardous wastes
- Offer discounts for sorted materials

A process for the verification of disposal of potentially hazardous waste will be developed and maintained to ensure appropriate disposal of the waste material. Copies of all tipping/disposal documentation are to be supplied and filed with site records.

Major subcontractors will be encouraged to submit waste minimization details including the following:

- Practical measure associated with their works to prevent waste entering the site
- Waste resulting from their work which can be recycled are to be actively managed as part of their waste reduction plan
- Alternative products containing recycled materials that could be utilised in the works which conform and meet design specification
- Ordering the right quantities of materials and prefabrication of materials where possible
- Minimising site disturbance and to limit unnecessary excavation
- Careful sourcing separation of off cuts to facilitate re-use, resale or efficient recycling

In order to reduce waste on site during the construction stage, all construction personnel will be instructed to do the following:

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- Order materials to size
- Not to over order
- Order pre- cut or prefabricated materials
- Reduce packaging at source
- Separate reusable or recyclable materials from waste
- Establish a designated concrete wash down system on site for concrete trucks and pumps. The area will be adequately signed and designed so that any excess drainage from area will be contained within the site boundaries
- Bins to be inspected regularly

A Separation system will be achieved through the use of separation bins for recyclable materials and non-recyclable waste materials.

Additional bins will be provided where practical to further separate waste between different materials.

Materials collected for recycling include:

- Food Waste
- Glass
- Concrete, bricks and tiles
- Timber
- Aluminium
- Metal
- Plastic
- Paper, cardboard and plasterboard

The subcontractors will be responsible for the daily cleaning of their respective work areas and for placing all their waste in the nominated waste bins.

Signs will be located on each bin indicating what type of waste may be placed in that bin. Site operations will ensure minimal waste creation and maximum reuse and recycling by:

- Staff Training
- Employment of a Waste Management Contractor
- Recycled materials used in construction
- On- going checks by site supervisors
- Separate area or bins set aside for sorted waste
- Clear signage of waste areas

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Section 9

Stormwater Management Plan

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SECTION 9 – Stormwater Management Plan

9.0 Introduction

This plan is prepared for the Lot 4 Bringelly Road Business Hub Development for management of stormwater during the construction phase and maintenance of the drainage system during the operation phase for compliance with the requirements of SSD Consent No. 8586218 Condition B14. The stormwater management system has been designed in accordance with Liverpool Council's Stormwater Drainage requirements.

9.1 Objectives & Targets

To plan and carry out the work to avoid erosion, contamination and sedimentation. In particular, the prevention of any adjacent waterways due to sedimentation run off. To control the quality of surface water leaving the construction site such that no unacceptable impact occurs to adjoining wetlands and waterways. Only clean and unpolluted water is to be discharged into Liverpool Council's stormwater drainage system. Liquid wastes suitable for discharge to the mains sewerage to be discharged in accordance with Sydney Water requirements. Stormwater discharges to comply with the requirements of the Office of Environment & Heritage (OEH) total suspended solids <50 mg/L, Oil and Grease <10 mg/L, pH 6.5 – 9.0, Schedule 2 Clean Water Regulations.

9.2 Key Management Issues

The construction phase works have the potential to adversely impact:

- Water quality or receiving wetlands and waterways
- Hydrology and flooding
- Soil resources

The following management issues have been identified:

- Site contamination through the potential for an overflow of fuel/chemical storage containers and contamination from the equipment and plant area into the stormwater drainage system.
- Sediment laden water from the construction site may potentially flow into the stormwater inlets and thus nearby water bodies could be affected and consequently reduce water quality.
- Stormwater with excessively high or low pH values could run-off from the selected stockpiles stabilisation area

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- Site cut off drains eroding and increasing site water sediment loads
- Vehicles leaving the construction site depositing dirt/mud on public roads after rain periods
- Removal of bulk material off site escaping from vehicles and polluting roadways

9.3 Contractors Required Actions

The prevention of soil erosion by water and wind and by sediment pollution are key components of the environmental management for the site.

An erosion and sedimentation control plan has been prepared by Costin Roe to address site works. Refer to Appendix F.

Construction stage water quality impacts shall be minimised by incorporation of appropriate erosion and sediment control measures in the detailed design, specification and contract arrangements and quality assurance inspection during construction.

9.3.1 Planning

- Divert up slope runoff around disturbed areas;
- Limit land disturbance to the area needed, especially in the vicinity of wetlands or existing stormwater drainage;
- Site access is to be limited to the minimum number of entry and exit points required;
- All approved access points shall be marked prior to the commencement of construction within that area;
- Dissipate uncontrolled flow by sediment fencing/straw bales placed across the line of water flow;
- Reduce the erosive energy (concentrated flow and velocity) of water using measures such as temporary storage, dissipaters, level spreaders and drain grass planting's;
- Where practicable maintain vegetation in and adjacent to drainage lines to improve the quality of runoff before water body or stormwater inlets and protect the drainage line from erosion;
- Direct runoff from disturbed areas through sediment traps or filters loss of soil from stockpiles is minimised using filter barriers and temporary covering or revegetation with hydro-mulching where stockpiles are to be stored for an appropriate period of time to allow native seeding to occur;
- Direct all surface water flows through grass lined channels and pipelines before discharge

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9.3.2 Dispersal Control

- Prevent deposition of sediment on the public road network due to truck / equipment movements to and from the site;
- A purpose built wheel shaker facility will be constructed at the exit gates of the site;
- Main construction roads on site to be all weather and adequately drained;

9.3.3 Sediment Fences / Straw Bales

Sediment fences and straw bales will be used in areas where temporary sediment control is required. These relatively simple devices will dissipate stormwater velocity and collect moving solids. The contractor is to provide sediment fences downstream of stockpiles and disturbed areas. It is important that sediment is collected adjacent to these areas to prevent loss of material downstream.

9.3.4 Stormwater Management & De-watering

The contractor is to implement management practices that address all sources of pollution on the site in accordance with current practices outlined by the EPA:

The collection of stormwater/ground water on a project can only be discharged to the stormwater system if it meets the acceptable EPA criteria as noted in section 9.3 above.

This criteria may involve the need for the contractor to demonstrate that the collected water within the project site boundary, does not exceed the tested parameters and have no evidence of the following substances detected:

- nutrients, from fertilisers;
- herbicides and pesticides used in landscaping;
- acids from washing;
- building wastes and litter;
- paint and paint wastes; and
- oils, grease and fuel, from equipment operation and maintenance.

As requested by ESR Australia (ESR), Prime Constructions have nominated Michael de Gail as the Environmental representative who will be responsible for ensuring all Sediment and Erosion control works meet the best practice requirements of the Blue Book. ESR Australia (ESR) also require all contractors to maintain a copy of all records of dewatering test results on site.

Refer Appendix K – Civil Stormwater Management Plan

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9.3.5 Surface Water

Due to the flat profile of the site, it is anticipated that there will be minimal surface water runoff from the site. It is expected that the sediment control measures detailed on Costin Roe's Plans as per Appendix F and as detailed herein will sufficiently maintain the required water quality levels.

9.3.5.9 Monitoring and Reporting

If required a consultant will be engaged to periodically monitor water quality during construction. The results will be monitored against EPA guidelines and recorded in line with the required standards. Inspections will be made by the Site Manager of sedimentation control measures to ensure they are well maintained. Inspections are to occur at a minimum of weekly or after heavy rain. These inspections will be noted in the Site Diary and/or Weekly Environmental Inspection Log. Areas of potential runoff are to be checked regularly for any signs of erosion. Should there be 3 or more valid complaints lodged of failure, authority Notice to Comply or site audit notice to improve, a consultant will be engaged to review the design to determine if modifications to the plan are required. This is also the trigger for implementing additional monitoring.

9.4 Stockpiles

If appropriate topsoil is to be stockpiled on site, then the following measures will be put in place. If stockpiling is required, stockpiles shall be stored at least 2 meters clear of drainage lines, natural watercourse and established trees. Stockpiles will have temporary silt fences in place around the stockpiles on the downhill side to create an enclosure and if necessary they will be covered with shade cloth or tarpaulin to retain the materials on the stock pile. The location of stockpiles will be determined on site.

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Section 10

Utilities, Services & Easement Restrictions

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SECTION 10 – Utilities, Services & Easement Restrictions

10.0 Introduction

Whilst the location of Utilities, Services & Easements are generally located outside of the development property boundary or in-ground below max design excavation depths the capacity to damage existing utilities and services infrastructure located within the property boundary and Skyline Crescent is still a potential. Provision of Objectives & Strategies are listed to address and mitigate potential issues.

10.1 Objectives & Targets

To plan and carry out the work to avoid damage to any existing utilities and services. To avoid risk to health and safety of all construction workers within existing Authority Easements including Electrical & Pressure services. To avoid disruption to local community during Construction.

10.2 Strategies & Control Measures

Mitigation measures to be implemented for any in-ground excavation include the following:

- Ensure that Dial-Before-You-Dig (DBYD) is conducted prior to commencement of any ground penetrating works to identify existing registered assets within the work locality.
- Identify any services potentially affected by construction activities in-consultation with relevant authorities and determine requirements for diversion, protection and/or support where deemed necessary
- Overlay key assets onto Design documentation for transparency and ensure documents are available for viewing within the Site office.
- Where design conflicts may occur, consultation with the relevant provider of the utility identified to make arrangements to adjust and/or relocate their services as required.
- Conduct Hazard identification on-site risk assessment when working close or within easement area and / or exclusion zone.
- Avoid unauthorised access into easement area and / or exclusion zone.
- Avoid operation of plant equipment where works encroach into easement zone.
- Provision of Authorised Spotters where applicable

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Section 11

Incident Management

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SECTION 11 – Incident Management

11.0 Reporting Process

An emergency and incident response plan have been prepared for the early works phase of the project and in accordance with SSD Consent No. 8586218 Condition C7, C8, C9, C10 & Appendix 3 of the SSD Consent. The Incident Management Plan includes the procedures to be followed during any incidents that can cause environmental damage.

Any incident likely to cause pollution of the site (such as an oil or chemical spill or accident) must be reported immediately to the Site Manager. If the incident results in a breach of legislative provisions, then the Site Manager must inform the Project Manager and the Health & Safety Representative. The Project Manager will contact relevant authorities including the Planning secretary in writing via the Major Projects website immediately.

The Planning Secretary must be notified of non-compliance incidents causing or threatening material harm to the environment as soon as practicable after a person / organisation becomes aware of the incident. The Project Manager is responsible for notification to the Planning Secretary. Written details of the incident must be notified to the Planning Secretary within 7 days of the date on which the non-compliance occurred. Whilst all reporting will occur via the Project Manager, subcontractors and other personnel are required to assist to the fullest extent possible in the notification and reporting of such incidents.

The Planning Secretary may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided. Prime will provide such further details to the Planning Secretary within the time specified in the request. Relevant personnel involved with the construction activities on site must be made aware of such requests and facilitate the attainment of these requirements.

Emergency scenarios for this project include the following:

- Chemical & Oil spills and leaks
- Fire
- Contamination
- Unexpected find (Addressed in Section 6.5 & Appendix G)

Emergency contact numbers are provided in Section 2.16

Incidents will be recorded in the incident report and investigation and is utilised to assess the root cause of incident to prevent its recurrence through revision of strategies, plans and programs.

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11.1 Written Incident Notification Requirements

A written incident notification addressing the requirements set out below must be submitted to the Planning Secretary via the Major Projects website within seven days after becoming aware of an incident. Notification is required to be given under this condition even if the applicant fails to give the notification required under Condition C7 of the SSD consent or, having given such notification, subsequently forms the view that an incident has not occurred.

Written notification of an incident must:

- Identify the development and application number;
- Provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
- Identify how the incident was detected
- Identify when the applicant became aware of the incident
- Identify any actual or potential non-compliance with conditions of consent;
- Describe what immediate steps were taken in relation to the incident;
- Identify further action(s) that will be taken in relation to the incident; and
- Identify a project contact for further communication regarding the incident.

11.2 Incident Report Requirements

Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Planning Secretary, the Applicant must provide the Planning Secretary and any relevant public authorities (as determined by the Planning Secretary) with a detailed report on the incident addressing all requirements below, and such further reports as may be requested.


The Incident Report must include:

- A summary of the incident
- Outcomes of an incident investigation, including identification of the cause of the incident;
- Details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and
- Details of any communication with other stakeholders regarding the incident

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Section 12

Management Review

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SECTION 12 – Management Review

12.0 Environmental Management Review

The performance and effectiveness of the implementation of this CEMP and related documents is reviewed at the monthly project management team and client meetings in accordance with SSD Consent No. 8586218 Condition C1. Participation from other project staff, specialist consultants, and stakeholders, as appropriate, will be included.

Following meetings are held on site where the performance of CEMP is reviewed:

- Regular Project Team Meetings
- Monthly Project Control Group meetings/report

Records of these meetings are maintained in the form of minutes and the project team is responsible to ensure that actions arising out of these meetings are taken in a timely manner. Prime Constructions senior management also regularly reviews the performance of its Construction Environmental Management System across the company as part of the IMS review. Records of these meetings are maintained in the form of minutes held in the Sydney office.

In accordance with SSD Consent No. 8586218 Condition C5 & C6 and further to the above, if necessary to either improve the environmental performance of the development, cater for a modification or comply with a direction, the strategies, plans and programs required under the current consent will be revised, to the satisfaction of the Planning Secretary. Where revisions are required, the revised document will be submitted to the Planning Secretary for approval within six weeks of the review.

12.1 Continual Improvement

Continual improvement of the CEMP will be achieved by continually evaluating environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement. The continual improvement process for the project has been designed to:

- Identify areas of opportunity for improvement of environmental management which leads to improved environmental performance;
- Determine the root cause or causes of non-conformances and deficiencies;
- Develop and implement a plan of corrective and preventative action to address root causes;

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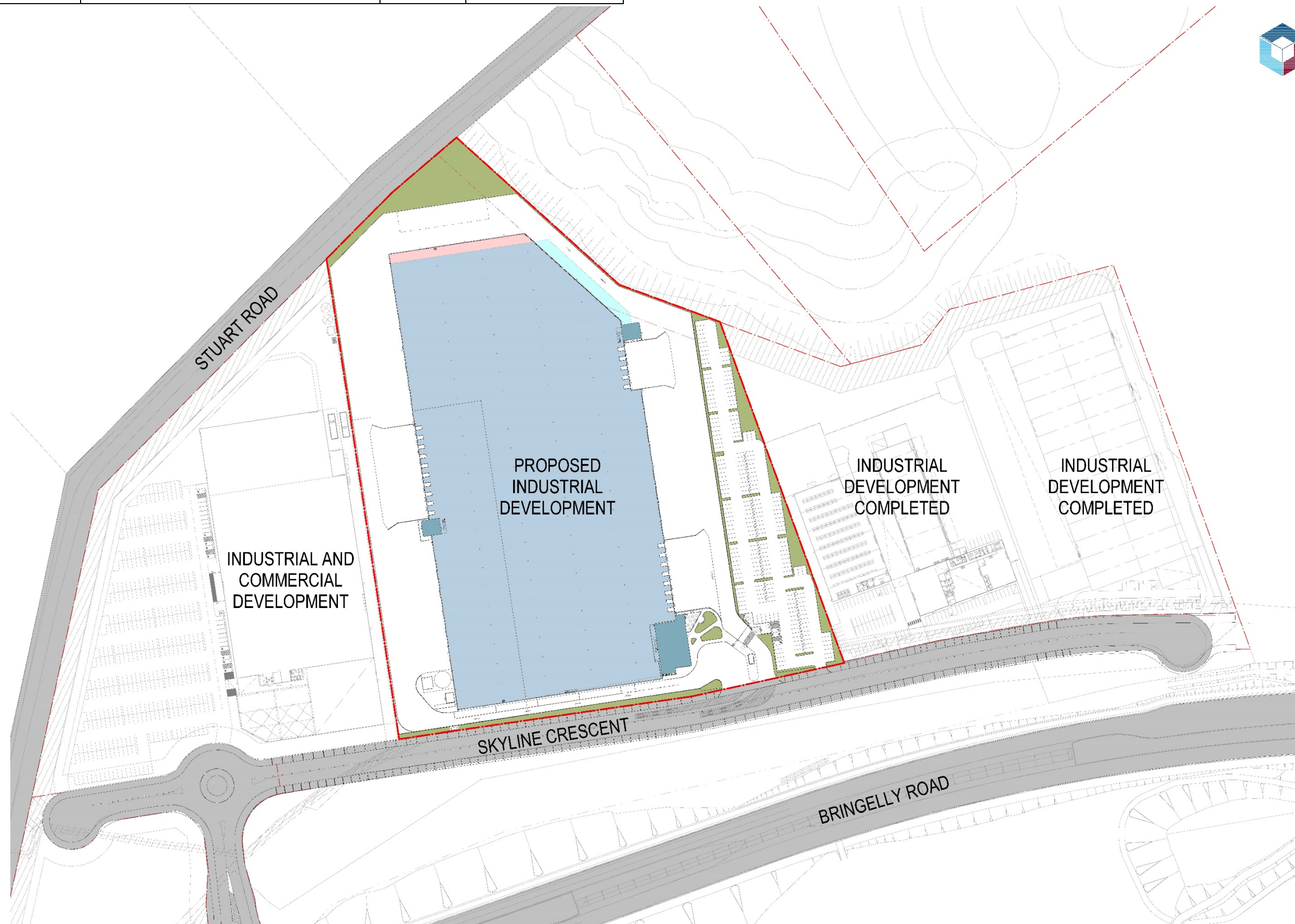
Verify the effectiveness of the corrective and preventative actions;
Document any changes in procedures resulting from process improvement;
Make comparisons with objectives and targets.

Implementation of strategies/techniques to improve the environmental performance of the construction works is the responsibility of the Project Manager. Actions and further opportunities for continual improvement will be discussed at Project Management Team Meetings as required

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Appendix A

Site Location Plan

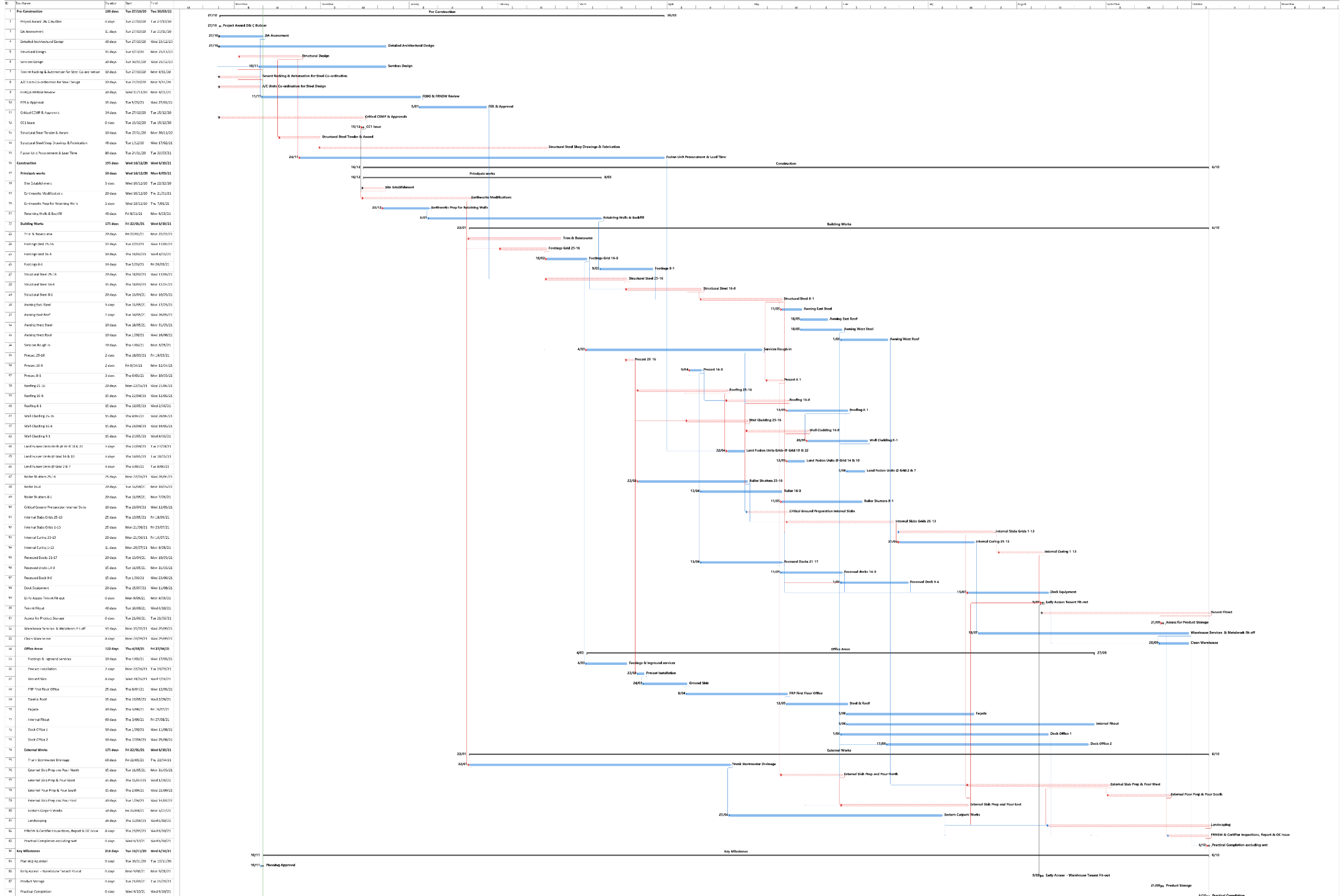



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Appendix B

Construction Program


LOT 4 BRINGELLY ROAD BUSINESS HUB - TENDER PROGRAMME



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Appendix C

Traffic Management

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Construction Traffic Management Plan (CTMP)

1.0 Introduction


The purpose of the plan is to provide details of the traffic management during construction. This plan has been developed in accordance with SSD consent No. 8586218 Condition B1 and prepared in consultation with Liverpool City Council (Refer Appendix E - Liverpool City Council – SSD 8586218 CTMP Letter dated 30 November 2020) per Condition B1 (B) in-conjunction with the following standards and legislation:

- NSW Government (Roads and Maritime Services) Documentation
- Work Health and Safety Act, and Regulations
- Protection of the Environment Operations Act 1997
- Prime Constructions Project Health, Safety and Environmental Management Plan
- ISO 9001
- AS/NZS 4801
- ISO 14001
- AS/NZS ISO 31000
- AS/NZS 2436 'Guide to Noise Control on construction, Maintenance and demolition sites'
- Safe work Australia applicable codes of practice, Australian Standards and Guidance Material
- OEH Waste Classification Guidelines
- RMS Specification G10 Traffic Management Edition 5 / Revision 4 – October 2014
- RMS Traffic Control at Work Sites Manual (TCWS)

1.1 Purpose

The CTMP has been developed to safely manage motorists, cyclist and pedestrians travelling along Skyline Crescent as work vehicles enter and exit the project site. The construction traffic management plan outlines safe vehicle paths onsite and rules and regulations that must be adhered by all Prime Employees and Subcontractors.

A driver's code of conduct (refer to appendix D) has been developed in accordance with Prime's HSE system and all relevant legislation as noted in this document. The code of conduct applies to all Prime employees and subcontractors engaged by Prime Constructions to ensure a safe work environment for all workers in and around site.


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1.2 Overall Principles for Construction Traffic Management.

The overall principles for traffic management during the construction phases are;

- Ensure road safety, network efficiency and access during construction;
- Implementation of a driver's code of conduct (refer to appendix D) to minimise the impact from the construction works on the local and regional road;
- Implementation of a driver's code of conduct (refer to appendix D) to minimise conflicts with other road users;
- Implementation of a driver's code of conduct (refer to appendix D) to ensure truck drivers use the specified routes;
- Manage and detail heavy vehicle routes, access and parking onsite (refer to appendix C for route to site and parking);
- Maintain access to adjacent properties at all;
- Notify and detail if necessary any nearby residents of any potential disruption to routes;
- To maintain safe access and circulation within the site;
- Provide a safe environment around the development for and pedestrians and vehicles;
- Minimise effects on pedestrian movements;
- Manage and control vehicular movements to and from the site,
- Maintain maximum practical capacity at intersections and in the vicinity of the site;
- Maintain access for commercial and industrial developments in the vicinity of the site;
- Construction traffic activity, including marshalling of trucks to be provided for on-site;
- Minimise impact on on-street parking in the vicinity of the site during construction;
- Maintain safety for workers;
- Manage and control construction vehicle activity in the vicinity of the site.

1.3 Policies

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In addition to this CTMP and CEMP, Prime Constructions will also ensure a copy of their Project HSE Management plan will be available and displayed in a prominent location in the site office. This has been approved by Prime Constructions Executive Management Team. The Project HSE management Plan will reflect the relevant conditions of the SSD Consent No. 8586218 and this plan.

1.4 Proposed Development

The project is located within the Liverpool Council LGA with the site forming part of the Bringelly Rd Business Development and will specifically occupy Lot 4 Skyline Crescent, Horningsea Park. The site lies to the South of the M7 Motorway, west of the intersection of Bringelly Road and Cowpasture Road and is located on the North side of Skyline Crescent.

The development consists of One (1) 34,744 m² Temperature Controlled Warehouse comprising One (1) Two-Level Main Office and One (1) Two-Level Ancillary Dock office with a total area of 1,225 m². External Works include carpark, signage, hardstand areas and associated landscaping zones.


1.5 Construction Activity / Scope of Works

Prime will be in control of all Construction vehicles access to and from the site at all times. The site accommodation areas and the site compound will be enclosed by a construction safety fence to ensure there is no ingress into the construction site areas by unauthorised personnel. All construction activity associated with the construction works will be carried out and restricted between the following hours of work per SSD Consent No. 8586218 Condition B19.

- Monday to Friday – 7:00am to 6:00pm
- Saturdays – 8:00am to 1:00pm
- Sundays/Public Holidays – No work permitted

The overall construction process will be controlled by the following means;

- Control of the hours of operation
- Ensure trucks travel to and from the site along designated truck routes
- Ensure loading / unloading of vehicles occurs within the nominated zones via the nominated gates (refer to Appendix C)
- Control and manage the on-site truck marshalling and movement of construction traffic from within the site;

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- Careful management of access points by site personnel.

The control of the hours of operation avoids truck movements during the early hours of the morning, before 7.00am and in the evening after 6.00pm. To facilitate an efficient construction program, the movement of excavated site materials and the delivery of concrete during major concrete pours will be programmed not to occur concurrently.

Access will be maintained to ensure minimal disruptions to other lots & occupants within the estate.


1.6 Vehicle Routes

Construction traffic will utilise the identified vehicle routes to ensure road safety, network efficiency and access during construction:

- Primary access to the site for construction vehicles will be via Skyline Crescent to the Southern side of the development, see appendix C.
- Access to Skyline Crescent will be via one of the following routes:
 - Approach from M7 Motorway Southbound onto Cowpasture Road, and Bringelly Road then onto Skyline Crescent.
 - Approach from Camden Valley Way from the East into Bringelly Road, then onto Skyline Crescent.
 - Approach from Camden Valley Way from the South, turning onto Bringelly Road then onto Skyline Crescent.
 - Approach from Bringelly Road from the West, then onto Skyline Crescent.

All contractors will be issued with the CTMP as part of their contract documentation ensuring all workers are aware of the access route to site. Trucks moving excavated material will be minimal and all dust control measures will be implemented as outlined in this CEMP for safe dust control. All trucks moving material from site will be loaded to prescribed weight limits and loose material will be covered during transport from the site.

Traffic control requirements will vary depending on the task. Specific control measures will be determined through a traffic risk assessment process that is assessed based on the works required. This includes the engagement of external traffic consultants and controllers as well as the preparation of traffic control plans as required. Utilisation of RMS approved safety aids and personal protective equipment (PPE) including Road Signage, Bollards and the like will be implemented where required.

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There will be a requirement for import of filling material during the course of the project. All trucks importing filling material to the site will be loaded to prescribed weight limits and loose material will be covered during transport.

1.7 Planning

Advanced notification to subcontractors of their required delivery dates will allow planning of the best route to take to the site. Notification should also include when other trades are undertaking deliveries and / or have plant & equipment operating on site which may prevent clear access. This will avoid congestion at site. Proper planning of construction sequencing will also avoid unnecessary congestion at the site.

1.8 Access Points

The site currently will have one personnel entry point located off the Southern Boundary on Skyline Crescent. This entry point will be maintained for employees and contractors to access site by foot and will be utilised for direct access to the Site Office for signing in. This entry point will provide for an isolated personnel access – with barricade devices providing separation to adjacent site vehicular traffic.

A vehicle entry point will be located off the Southern Boundary on Skyline Crescent. This entry point will be maintained as the main vehicle (Heavy & Light Vehicle) entrance & egress point to the site work face and site compound for material drop-off, materials storage, waste bins and designated contractor parking.


Access Gate will also serve as the main access point for emergency services.

Refer to Appendix C – Site Location Plan of this Traffic Management Plan

1.9 Induction

As part of Prime Constructions site induction all site staff & sub-contractors will be advised of site access points and where they are able to park their vehicles each day.

1.10 Number & Frequency of large Vehicles

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The number and frequency of truck movements has been detailed below. The highest intensity of truck movement will be during the Civil Earthworks at the commencement of the project, as well as during internal and external concrete pavement pours during the middle and later stage of the project. This will be due to delivery of machinery to undertake the earthwork elements of the project and import of base course material and premixed concrete supply trucks. The remaining construction phase will have a typical number of truck deliveries and would be easily accommodated with the current traffic environment.

1.11 Parking of Vehicles

It is proposed that there will be sufficient parking onsite for delivery vehicles and workers, considering the size of the site it is not expected that any issues regarding insufficient onsite parking or overflow street parking will be encountered. Allocated Parking Zones are detailed in Appendix C. Deliveries will be granted access to deliver the materials in allocated loading/unloading zones as detailed in Appendix C. There is ample space of site to allow for all trucks to turn around within the site and leave in a forward direction. All persons undertaking works on Lot 4 Bringelly Road Development will be required to complete an induction before commencing works. Part of the induction will outline onsite parking arrangements.


No offsite Parking / On-street parking will be permitted to any party accessing the site work face.

1.12 Loading / Unloading Of Trucks & Delivery Vehicles, Construction Work Zones & Road Occupancy

The loading and unloading of all trucks and delivery vehicles will take place within the boundaries of the site. At no time will trucks be permitted to load or unload on public roads. In the event concrete trucks are queued, the waiting space will also be within the site development area.

Loading will be carried out in designated loading locations adjacent the site compounds accessed from Skyline Crescent. Loading locations will be sign-posted for driver delivery instructions.

Given the layout of the proposed development and its location with respect to surrounding roads and adjoining properties, there are ample staging / laydown opportunities for all

	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
	DHL LSHC Building Lot 4, Bringelly Road, Leppington		

deliveries to occur within the site development area. No Construction Zones or Road Closures are therefore anticipated during the project. All vehicles will be loaded and unloaded within the boundaries of the site. Should Work Zones be required at the development frontage, a separate application along with 'Work Zones' signposting Plan will be provided for approval.

Currently it is anticipated all works will occur within the property boundary. Road occupancy or openings are therefore not anticipated, however should this requirement change, a request for Road Occupancy / Opening permit & work specific traffic control plan will be submitted to Liverpool City Council for approval prior to commencement of works.

1.13 Crane & Concrete Pumps


Mobile cranes and concrete pumps will be used to service the construction of the approved development. Mobile cranes and concrete pumps will be setup within the confines of the site. Mobile cranes will be best positioned for proper and safe access of materials and such that the crane can safely slew around without danger of striking adjacent structures and public areas. Given the use of mobile cranes, no crane permits will be required.

1.14 Notification of Potential disruptions to nearby Residents

Parking will be available onsite for all workers and deliveries. Should any of this change then other arrangements will be made with ESR Australia (ESR) and all other affected estate residents will be notified of the change via direct or ESR Australia (ESR) distributed correspondence.

Per Appendix 2 of the SSD Consent, ongoing engagement measures and distribution tools will be in accordance with Appendix N- Consultation Strategy and Outcomes Report as prepared by Ethos Urban on behalf of ESR Australia (ESR).

Signage detailing Principal contractor details and site manager details will be provided at main access points to enable the community to make contact regarding work activities.

	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
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1.15 Pedestrian Movements

It is anticipated that only a very small number of the construction workers would utilise public transport to access the worksite. It would also be expected that there will be low public pedestrian movement along the front of the site.

The entry gates to the site will have signage that confirms the site rules, site contact details, emergency contact details and the PCA for the project.

Pedestrian movements within the site will be barricaded off with Flagged Walkways / Bollards and risk assessments will be carried out to see if further pedestrian protection measures are required as the construction programme progress.

1.16 Drivers Code of Conduct

To ensure the construction works have a minimal impact on the local and regional network and other road users, a driver's code of conduct has been developed.

Please refer to Appendix D for the driver's code of conduct.

1.17 Traffic Movements onto and off site

Refer to appendix A & C for vehicle routes onto and off site.

In maintaining Road Safety & Network efficiency per SSD Consent No. 8586218 Condition No. B1 (C), all vehicles accessing & leaving site, must access or leave in a forward direction via the designated access area and ingress / egress routes as shown on the Traffic Management Plan per Appendix C. All vehicles are to be checked for any residual mud, oil or leaks before leaving site, including securing and covering of all materials. Site Speed Limits will also be imposed, with speed limits within site limited at 10km/hr.

Vehicles making deliveries during the day will enter the site in a forward direction via the Access Gate. All vehicles will be unloading within the confines of the site compound before exiting in a forward direction via the Access Gate. An all-weather gravel access crossing will be constructed to provide vehicle access into the site work area as required and provide a turning bay for vehicles to turn and leave site in a forward direction.

Where oversized heavy vehicles are anticipated to arrive on site, spotters will be implemented to supervise the safe movement of heavy vehicles or machinery onto and off site to maintain public safety and to ensure network road efficiency.

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Below is a table of projected traffic movements, frequency and route to ensure the acceptable ongoing operations of Skyline Crescent and Bringelly Road. Refer to appendix B for approximate time frame and dates of each stage of construction.

Stage of Construction	Type of Vehicle (size)	Average vehicles per day	Frequency on/off site	Route
Whole Project	Cars/utes/Vans (Light Vehicles)	In: 25 out: 25 (parking onsite)	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	All traffic will enter site via Skyline Crescent Most trades will approach from the M7, down Camden Valley Way then onto Bringelly Road.
Earthworks, Retaining Walls (as per attached program, see appendix B)	Semi trailers to float excavation equipment	In: 2 Out: 2	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	As above
	Dump truck with trailer	In: 20 Out: 20		As above
Footings and Drainage (as per attached program, see appendix B)	Construction Materials Delivery 8-10m Rigid Trucks	In: 5 Out: 5	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	As above
Structural Steel (as per attached program, see appendix B)	30t crane	In: 2 Out: 2	6:30am-10am: High 10am-2pm: High 2pm-6pm: High	As above
	Semi Trailers (Steel Deliveries)	In: 2 per week Out: 2 per week		
Precast Panels (as per attached program, see appendix B)	80t Crane and Franna	In: 2 Out: 2	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	As above


	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN			
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	Semi Trailer (Panel Deliveries)	In: 12 Out: 12		
Roofing & Cladding (as per attached program, see appendix B)	100t Crane	In: 1 per week Out: 1 per week	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	As above
	Semi Trailers (Metal Sheet Deliveries)	In: 3 Out: 3		
Internal Concrete slabs (as per attached program, see appendix B)	Concrete Agitator Delivery Truck	In: 20 Out: 20	6:30am-10am: High 10am-2pm: Medium 2pm-6pm: High	As above
Building Fitout (as per attached program, see appendix B)	Construction Materials Delivery	In: 6 Out: 6	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	As above
External hardstand Fencing, Landscaping (as per attached program, see appendix B)	Concrete Agitator Delivery Truck	In: 20 Out: 20	6:30am-10am: High 10am-2pm: Low 2pm-6pm: High	As above
	Construction Materials Delivery 8-10m Rigid Trucks	In: 5 Out: 5		

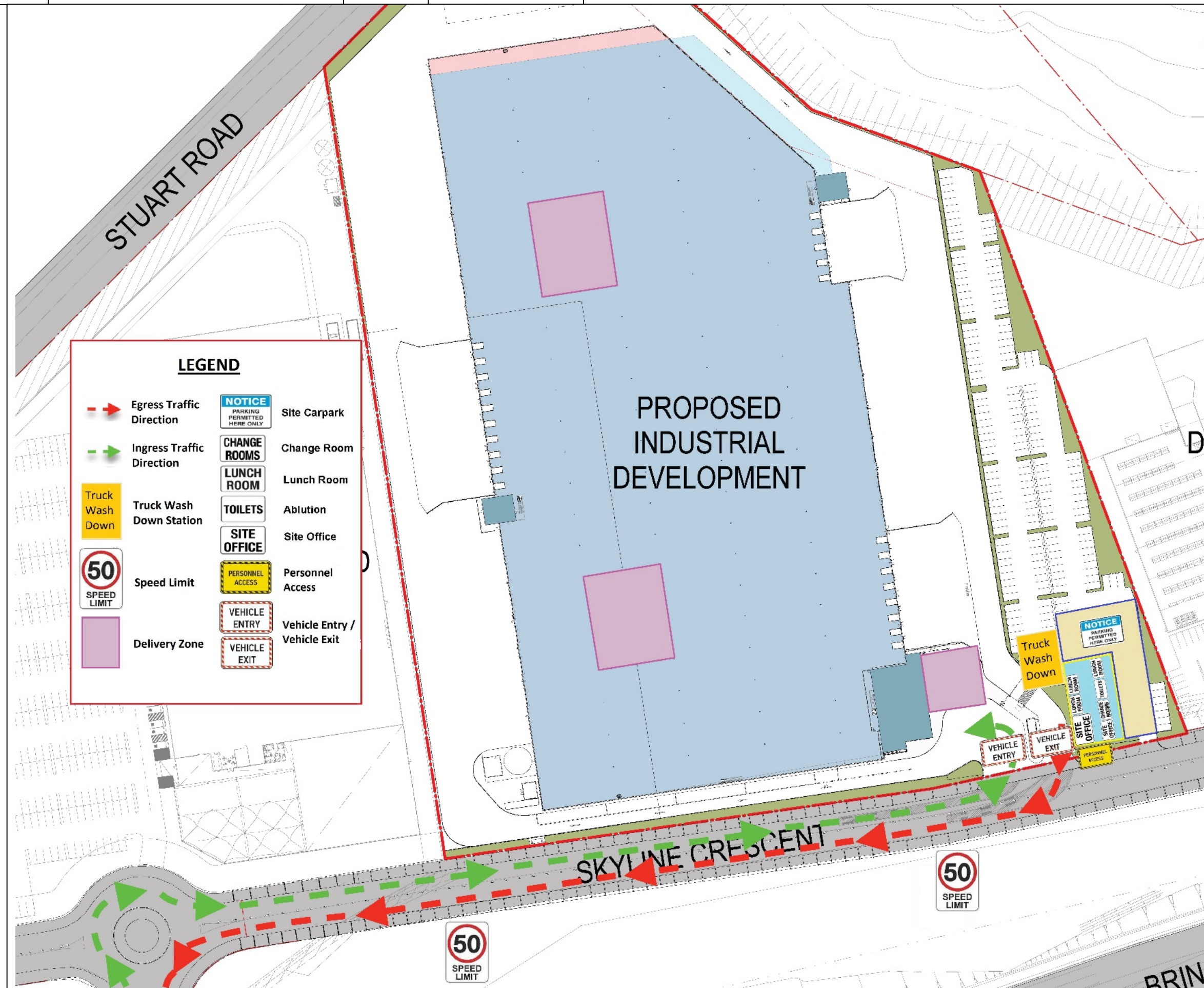
1.18 Program Monitoring


Prime carry out the following steps to monitor the effectiveness of the traffic management measures;

- Weekly environmental audits to confirm compliance with HSE Management Plan. This includes a particular focus on the road reserve at Skyline Crescent.

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- Monthly audits by senior management.
- Random spot audits / inspection of implemented measures to confirm compliance and effectiveness.



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Appendix D

Drivers Code of Conduct

	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
	DHL LSHC Building Lot 4, Bringelly Road, Leppington		

1.0 Drivers Code of Conduct

Safe Driving Policy for Lot 4, Bringelly Road Business Hub

Date: 18th November 2020

1.1 Objectives of the policy

Compliance with SSD Consent No. 8586218 Condition B1 & B22 and the following:

- Ensure road safety, network efficiency and access during construction;
- Minimise the impact from the construction works on the local and regional road network;
- Minimise conflicts with other road users;
- Minimise Road Traffic noise;
- Ensure truck drivers use the specified routes.

1.2 Code of Conduct


The code of conduct for Lot 4, Bringelly Road Business Hub

requires that: While driving any vehicle for work purposes, drivers must comply with all of the following:

- Traffic and road legislation;
- Site signage and instructions;
- Demonstrate safe driving and road safety habits.
- Drivers must only enter and exit the site via the allocated temporary access point.
- All traffic on site is to obey a speed limit of 10km/hr.

The following actions in any vehicle while at work will be viewed as a serious breach of conduct and removal from site or dismissal may be a consequence:

- Drinking or being under the influence of drugs while driving;
- Driving while disqualified or not correctly licensed;
- Reckless or dangerous driving causing death or injury;
- Failing to stop after a crash;
- Acquiring demerit points leading to suspension of licence;
- Any actions that warrant the suspension of a licence;
- Exceeding the 20km/hr speed limit.

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1.3 Responsibilities as a driver

Every driver on site will:


- Ensure they hold a current driver licence for the class of vehicle they are driving and this licence is carried when driving a company vehicle.
- Immediately notify their supervisor or manager if their drivers licence has been suspended or cancelled, or has had limitation placed upon it.
- Be responsible and accountable for their actions when operating a company vehicle or driving for the purposes of work.
- Display the highest level of professional conduct when driving a vehicle at work.
- Regularly check the oil, tyre pressures, radiator and battery levels of company vehicles they regularly used.
- Comply with all NSW traffic and road legislation when driving.
- Assess hazards while driving and anticipate 'what if' scenarios.
- Drive within the legal speed limits, including driving to the conditions.
- Wear a safety seat belt at all times.
- Never drive under the influence of alcohol or drugs, including prescription and over the counter medication if they cause drowsiness – to do so will merit disciplinary measures.
- Avoid distraction when driving – the driver will adjust car stereos/mirrors etc. before setting off, or pull over safely in order to do so.
- Report any near-hits, crashes and scrapes to their manager, including those that do not result in injury, and follow the crash procedures outlined in this policy.
- Report infringements to a manager at the earliest opportunity.
- Report vehicle defects to a manager before the next vehicle use.
- Follow the designated traffic routes, authorised Site Access Route and Site Egress Route as shown in Appendix C of the CEMP and in minimising impact on local / regional road network.
- Enter and leave the site in a forward direction.
- Obey Speed limits as imposed on site and within the estate.

1.4 Responsibilities as a Project Manager

The Project Manager will take all steps to ensure company vehicles are as safe as possible and will not require staff to drive under conditions that are unsafe and/or likely to create an unsafe environment, physical distress, fatigue, etc.

The project manager will do this by undertaking the following tasks:


- Ensuring all vehicles are well maintained and that the equipment promotes driver, operator and passenger safety by:

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- Enforce the requirement of daily prestart inspections for all plant and equipment on site.
- Carry out pre-commencement check of all new plant arriving onsite.
- Ensure all construction plant are fitted with a flashing light, fire extinguisher and reverse alarms.
- Ensure all operators onsite have a current verification of competency of current driver's licence of the appropriate class.
- Ensure maintenance requirements are being met.
- Identify driver training needs and arranging appropriate training or re-training, including providing:
 - Operator assessment as part of all staff inductions.
 - Regular Toolbox discussions on safety features, fatigue, driver responsibility, drink-driving and fuel-efficient driving.
- Encouraging Safe Driving behaviour by:
 - Not paying staff speeding or other infringement fine;
 - Legal use of mobile phones in vehicles while driving;
 - Ensuring the employer is informed if existing staff become unlicensed.
- Encouraging better fuel efficiency by:
 - Providing training on, and circulating information about, travel planning and efficient driving habits.
 - Encouraging the use of other transport and/or remote conferencing whenever practical.
- Promote road safety and NSW Road Rules.
- Random testing for Alcohol or prohibited drugs.

1.5 Post Incident or Crash Procedure

- Immediately stop your vehicle at the scene or as close to it as possible, making sure you are not obstructing traffic. Ensure your own safety first. Help any injured people and call for assistance immediately if needed.
- Gather the following information:
 - Details of the other vehicle(s) and registration number(s)
 - Name(s) and address(es) of the other vehicle owner(s) and driver(s)
 - Name(s) and address(es) if any witness(es)
 - Name(s) of insurer(s)
- Give the following information:
 - Name, address and company details
- If the damaged vehicle is unattended, leave a note with your contact details.
- Contact the police in the following circumstances:

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- If there are injuries.
- If there is a disagreement over the cause of the crash.
- If you damage property other than your own.
- If damage to the vehicle appears to be worth more than \$2500.
- Report all details gathered to your manager as soon as reasonably practical.

	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
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Appendix E

Liverpool City Council – CTMP Review Letter Ref: SSD 8586218

Michael de Gail
Prime Constructions Pty Ltd
Level 2, 407 Pacific Highway
ARTARMON NSW 2064

Email: mdegail@primeconstruct.com.au

Dear Michael,

**Re: Construction Traffic Management Plan for proposed development at Lot 4,
Bringelly Road Business Hub, SSD No. 8586218**

I refer to the submitted Construction Traffic Management Plan (CTMP) for the approved industrial development at Lot 4, Skyline Crescent, Horningsea Park.

Council notes that the plan has been submitted to comply with SSD consent No. 8586218. Council has reviewed the CTMP and the following comments are to be incorporated to finalise the plan. The updated plan is to be implemented during construction.

- Heavy vehicles access route indicated in the CTMP is to be used at all times.
- Driver Code of Conduct should include:
 - I. Enter and leave the site in forward direction.
 - II. Promote road safety and obey all NSW Road Rules
 - III. Drivers randomly be tested of alcohol and drugs.
- The working hours should be restricted to the approved times, in accordance with the development consent. If required, contact Council's Traffic and Transport Section for approval of alternative working times within public road reserves.
- Should a 'Works Zone' be required at the development frontage, a separate application along with 'Works Zone' signposting plan is to be provided for approval. The approval may take up to six weeks. Approved Works Zone should only be used for deliveries.
- Road occupancy approval is required for works within the public road reserve, including placing construction plants such as concrete pumps, mobile crane etc. on the public road reserve.
- Road opening approval is also required for connecting existing services within the public road reserve.
- Work specific traffic control plans are to be submitted with each road occupancy or road opening applications. Application forms for road occupancy and road opening permits as well as works zone are available on Council website.


- Parking for all construction workers should be accommodated within the development site. Alternatively, a map indicating locations of existing public parking spaces for construction workers are to be included in the CTMP.
- Work vehicles parked on street should be in accordance with the signposted parking restrictions and NSW Road Rules.
- A notice with contact phone number and email details for community to make contacts regarding work activities are to be installed at the site.

The updated CTMP will comply with the consent conditions. Should you require further clarification, please contact Council's Traffic Engineer, Mr Mahavir Arya on 8711 7592, or via email on aryam@liverpool.nsw.gov.au.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Charles Wiafe'.

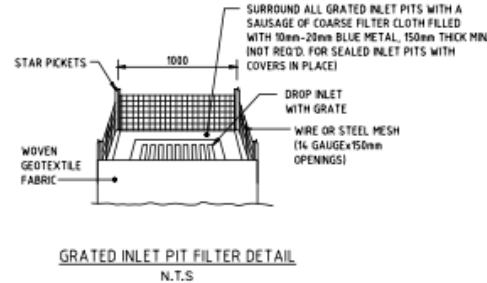
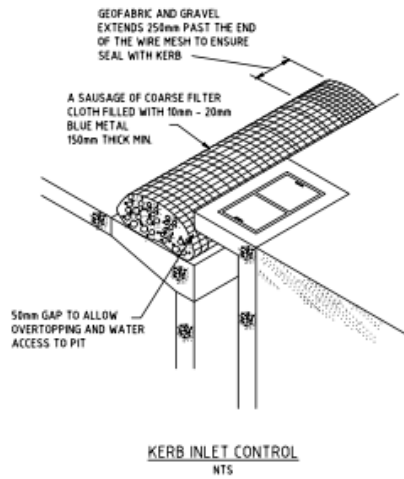
Charles Wiafe
Acting Manager Planning and Transport Strategy

	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
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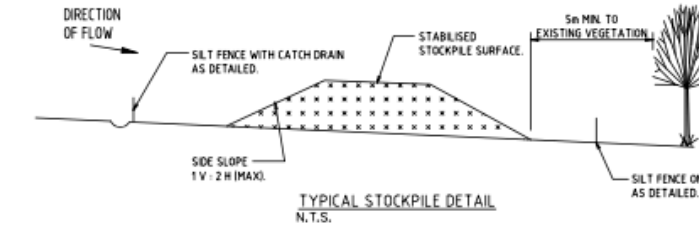
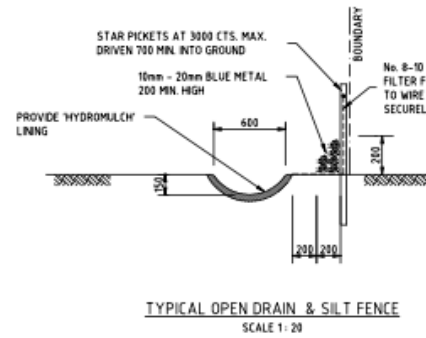
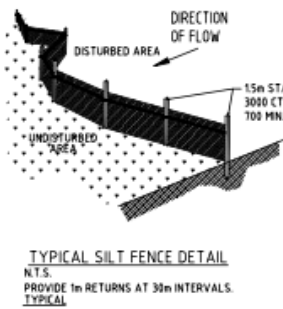
Appendix F

Erosion & Sediment Control Plan

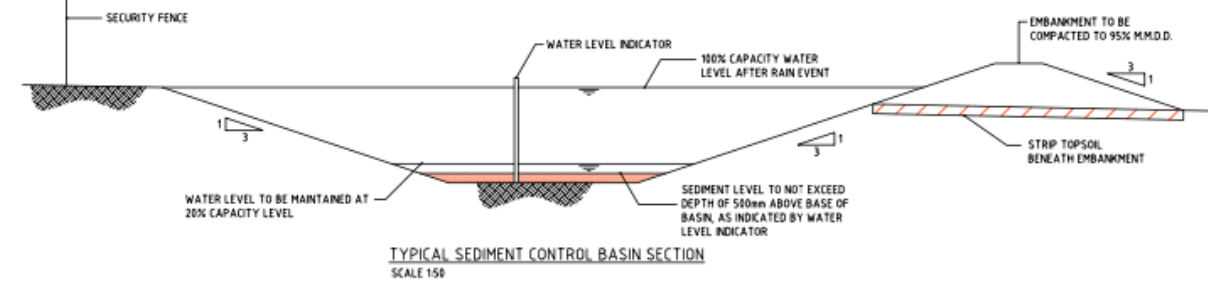
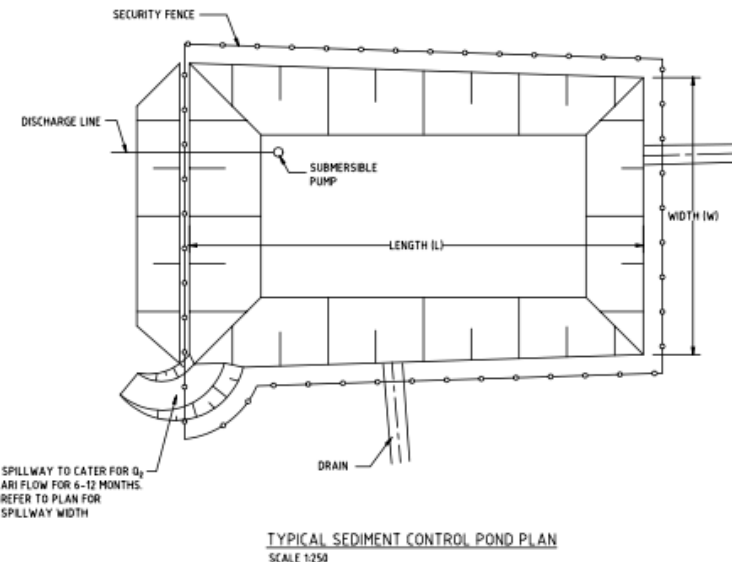
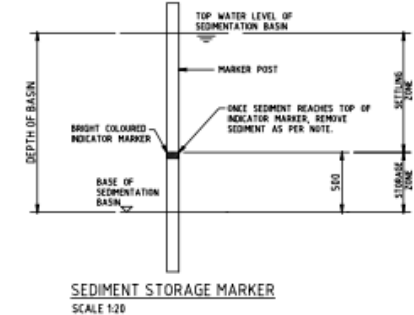
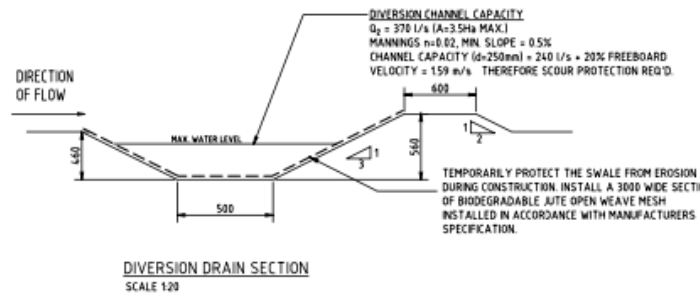
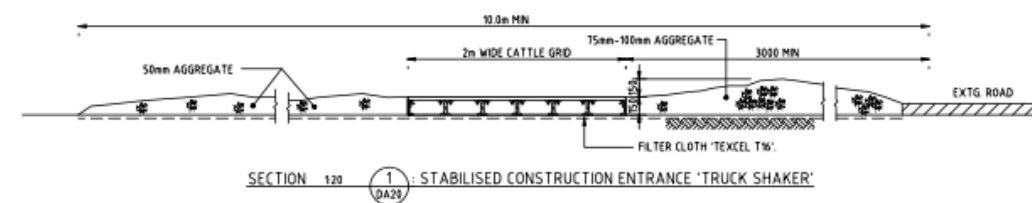




NOTE: ADOPT ABOVE DETAILS AROUND ALL PITS WITHIN AREA ENCOMPASSED BY SILT FENCE & TO PITS ON THE ROAD ADJACENT TO SITE BOUNDARY.



- 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.



NOTES:

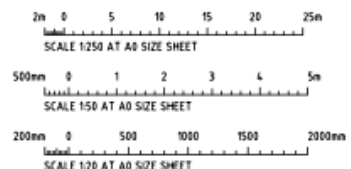
ALL EROSION & SEDIMENT CONTROL MEASURES TO BE INSPECTED & MAINTAINED DAILY BY SITE MANAGER.

MINIMISE DISTURBED AREAS.

ROADS & FOOTPATHS TO BE SWEEPED DAILY.

12m TURF TO BE PLACED BEHIND KERBS.

DUST MINIMISATION CONTROL BY WATERING TO BE IMPLEMENTED BY SITE MANAGER AS REQUIRED OR AS DIRECTED BY THE EPA.




FOR APPROVAL

	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
	DHL LSHC Building Lot 4, Bringelly Road, Leppington		

Appendix G

Unexpected Finds Protocol

	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
	DHL LSHC Building Lot 4, Bringelly Road, Leppington		


**QUALITY, SAFETY & ENVIRONMENT
UNEXPECTED FINDS PROTOCOL
FORM 5.3**



In the event that an unexpected find of hazardous material occurs the following process is to be followed;

- Immediately cease work in the affected areas.
- Notify the Project Manager, who is then to notify the HSEQ Manager
- Ensure the area is bunted off and warning signage installed. Ensure the correct PPE is worn when working near a contaminated area
- If required, hold a toolbox meeting with all persons on site to inform them of the areas of concern and processes being undertaken.
- Project Manager to notify the Client or their representative.
- Engage a hygienist to inspect & report on the contaminated materials.
- In the event the material is found to be hazardous then;
- Arrange for the materials to be removed from site to an approved waste station using a suitably licensed sub-contractor (tipping dockets to be obtained from licensed sub-contractor).
- Obtain a clearance certificate from the hygienist

Once the above has been completed the area can be re-opened and works re-commence

	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
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Appendix H

Typical Plant and Equipment Max Noise Level

	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
	DHL LSHC Building Lot 4, Bringelly Road, Leppington		

Appendix H

Item	Typical Plant or Equipment	Max Noise Level (at 7 metres)
Bulldozer	Caterpillar D7, D9	88
Bulldozer	Caterpillar D10	93
Front End Loader	Wheeled	90
Jack Hammers	With silenced bags	85
Air Track Drill	800CFM compressor	96
Scraper	Caterpillar 631	89
Scraper	Caterpillar 651	85
Grader	Caterpillar 16	85
Compactor	Caterpillar 825	85
Compactor	Vibrating Plate	92
Vibratory Roller	10-12 Tonne	89
Water Cart		88
Dump Trucks	35 Tonne	96
Excavator	Kato 750	86
Rock Breaker	Hydraulic on Kato 750 (if required)	97
Truck		80
Crane	Truck Mounted	85
Compressor	600CFM	75
Compressor	1500CFM	80
Backhoe		88
Spreader	Asphalt, concrete	70
Asphalt Truck		92
Asphalt Paver		89
Tip Truck		83
Generator	Diesel	79
Spraying machine		75
Mechanical Broom		83
Piling hammer	For piles and casing	93
Concrete truck		83
Concrete pump		84
Concrete vibrators		80
Drill	Air	85
Drill	Pneumatic	85
Welders		85
Concrete Saw		93
Concrete Leveller		90
Cherry Picker	On Truck	80

	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
	DHL LSHC Building Lot 4, Bringelly Road, Leppington		

Appendix I

Site Waste Minimisation & Management Plan

BRINGELLY ROAD BUSINESS HUB

Waste Management Plan

Prepared for:

ESR Australia
Level 29, 20 Bond St
Sydney 2000 NSW

SLR Ref: 610.17734.00600-R11
Version No: -v2.0
August 2020



EXECUTIVE SUMMARY

PREPARED BY

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with ESR Australia (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.17734.00600-R11-v2.0	17 August 2020	Emerson Helmi Patch	Andrew Quinn	Andrew Quinn
610.17734.00600-R11-v1.1	17 August 2020	Emerson Helmi Patch	Andrew Quinn	Andrew Quinn
610.17734.00600-R11-v1.0	24 July 2020	Emerson Helmi Patch	Andrew Quinn	Andrew Quinn

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APPENDICES

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1 Introduction

1.1 Overview

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by ESR (Aust) Pty Ltd (the Client) to prepare a waste management plan (WMP) in support of the State Significant Development Application (SSDA) for a proposed warehouse at Lot 4 within the Bringelly Road Business Hub on Bringelly Road in Leppington. This WMP reflects the Secretary's Environmental Assessment Requirements (SEARs) relevant to this project. This WMP is for the construction and operational activities of the development.

This WMP applies to the waste generated from the construction and operational stages of the Project and has been prepared using architectural drawings supplied by the Client and attached in **Appendix A**.

1.2 Objectives

The principal objective of this WMP is to identify all potential wastes likely to be generated at the Project site during construction and operational phases, including a description of how waste would be handled, processed and disposed of, or re-used or recycled, in accordance with Liverpool City Council's (Council) requirements.

The objectives of this WMP are as follows:

- Identify potential waste types likely to be generated during the construction and operational phases of the Project
- Provide advice on how identified wastes should be handled, identified, processed, disposed of, reused or recycled in accordance with Council requirements, relevant Australian codes and standards and better practice waste minimisation principles
- Encourage waste avoidance and minimisation through advice on design, ordering and planning, and
- Help implement safe and practical options for waste collection from the Project by Council or private waste servicing contractors.

1.3 Review of WMP

This WMP is not a static document. It is a working document that requires review and updating to ensure ongoing suitability for the proposed on-going operations at the site.

This WMP will be reviewed and updated:

- To remain consistent with waste and landfill regulations and guidelines
- If changes are made to site waste and recycling management, or
- To take advantage of new technologies, innovations and methodologies for waste or recycling management.

Copies of the original WMP and its future versions should be retained by the building manager. Changes made to the WMP, as well as the reasons for the changes made, should be documented by the building manager as part of the review process.

2 Project Description

2.1 Overview of Proposed Development

The Bringelly Road Business Hub is a master plan-approved business park located in the South West Growth Corridor between Moorebank Intermodal Terminal and Western Sydney Airport, which is under-construction. The project is a 35,000 m² warehouse in the Bringelly Road Business Hub. The site will comprise one warehouse with attached offices, and will include car parking spaces, hardstands and a guard house.

The Client intends to seek approval for the proposed warehouse via an SSDA.

2.2 Overview of Proposed Construction Work

The Project works will include construction activities.

The site plan for development of the site can be seen in **Appendix A**. The anticipated construction works for this development include:

- One warehouse building
- Three two-storey ancillary office buildings
- A guardhouse, and
- Truck, car parking areas and associated site hardstand areas.

2.3 Overview of Proposed Operations

Based on communication with the Client, SLR understands the Project area will function as a light industrial warehouse facility for storage and distribution of materials, including the following:

- Bulk delivery and storage of materials;
- Dispatch and distribution; and
- Ancillary office administration.

3 Better Practice Waste Management and Recycling

3.1 Waste Management Hierarchy

This WMP has been prepared in line with the waste management hierarchy shown in **Table 2**, which summarises the objectives of the *Waste Avoidance and Resource Recovery Act 2001*.

The waste management hierarchy comprises the following principles, from most to least preferable:

- Waste **avoidance**, prevention or reduction of waste generation. Achievable through better design and purchasing choices.
- Waste **reuse**, reuse without substantially changing the form of the waste.
- Waste **recycling**, treatment of waste that is no longer usable in its current form to produce new products.
- Energy **recovery**, processing of residual waste materials to recover energy.
- Waste **treatment**, reduce potential environmental, health and safety risks.
- Waste **disposal**, in a manner that causes the least harm to the natural environment.

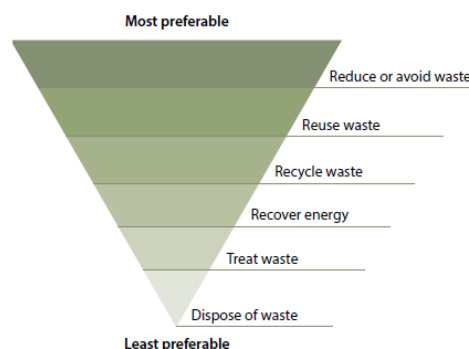


Image from NSW EPA (2014) NSW Waste Avoidance and Resource Recovery Strategy 2014-21.

Figure 1 Waste management hierarchy

3.2 Benefits of Adopting Better Practice

Adopting better practice principles in waste minimisation offers significant benefits for organisations, stakeholders and the wider community. Benefits from better practice waste minimisation include:

- Improved reputation of an organisation due to social and environmental responsibility.
- Lowered consumption of non-renewable resources.
- Reduced environmental impact, for example, pollution, from materials manufacturing and waste treatment.
- Reduced expenses from lower waste disposal.
- Providing opportunities for additional revenue streams through beneficial reuse.

4 Waste Legislation and Guidance

The legislation and guidance outlined in **Table 1** below should be referred to during the demolition, construction and operational phases of the Project.

Table 1 Legislation and guidance

Legislation and Guidance	Objectives
Council legislation and guidelines	
Secretary Environmental Assessment Requirements (SEARs)	SEARs provide the additional requirements that must be completed when a critical state significant infrastructure project is submitted in a DA in NSW. The objective of SEARs submissions is to achieve better environmental outcomes by focusing on environmentally sensitive areas and areas of the greatest community concern. The provisions of the SEARs must be met for DA approval including the provision of a construction and operational waste management plan.
Liverpool Local Environmental Plan 2008 (LEP)	Liverpool Local Environmental Plan (LEP) 2008 applies to all land in Liverpool except for areas where other planning instruments have overridden the plan. Some new growth centre areas no longer use the Liverpool Local Environmental Plan 2008 and have now been overridden by State Environmental Planning Policies.
Liverpool Development Control Plan 2008 (DCP)	The Liverpool DCP came into effect in 2008 and provides greater planning detail for developments, supplementing the zoning and development standards contained within the LEP 2013. The DCP helps promote better development throughout the city, protecting the community's lifestyle and enjoyment of town centres and neighbourhoods. This WMP specifically addresses Part 1 - General Controls for all development and Part 7 - Development in Industrial Areas
State and National legislation and guidelines	
Building Code of Australia (BCA) and relevant Australian Standards	The BCA has the aim of achieving nationally consistent, minimum necessary standards of relevant health and safety, amenity and sustainability objectives efficiently.
Council of Australian Governments National Construction Code 2016	The National Construction Code 2016 sets the minimum requirements for the design, construction and performance of buildings throughout Australia.
NSW EPA's Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012	These better practice guidelines present information on waste minimisation and resource recovery as well as information on commonly used waste management provisions. The guidelines also provide benchmarks for assessing waste production rates in Australia.
NSW EPA (2014) NSW Waste Avoidance and Resource Recovery Strategy 2014-21	The <i>NSW Waste Avoidance and Resource Recovery Strategy 2014-21</i> is aimed at ultimately "improving environment and community well-being by reducing the environmental impact of waste and using resources more efficiently" by presenting a framework intended to avoid and reduce waste generation, increase recycling, divert more waste from landfill, manage problem wastes better, reduce litter and reduce illegal dumping.
NSW EPA Resource Recovery Orders and Resource Recovery Exemptions	<p>The NSW EPA has issued a number of resource recovery orders and resource recovery exemptions under the POEO (Waste) Regulation 2014 for a range of wastes that may be recovered for beneficial re-use. These wastes typically include those from demolition and construction works, as well as operational wastes such as food waste.</p> <ul style="list-style-type: none"> Resource recovery orders present conditions which generators and processors of waste must meet to supply the waste material for beneficial re-use. Resource recovery exemptions contain the conditions which consumers must meet to use waste for beneficial re-use.

Legislation and Guidance	Objectives
NSW EPA's Waste Classification Guidelines 2014	The NSW EPA <i>Waste Classification Guidelines</i> assists waste generators to effectively manage, treat and dispose of waste to ensure the environmental and human health risks associated with waste are managed appropriately and in accordance with the <i>POEO Act 1997</i> and is associated regulations.
<i>Protection of the Environment Operations Act (POEO) 1997 and Amendment Act 2011</i>	The <i>POEO Act 1997</i> and <i>POEO Amendment Act 2011</i> are administered by the NSW Environment Protection Authority (NSW EPA) to enable the NSW Government to establish instruments for setting environmental standards, goals, protocols and guidelines. They outline the regulatory requirements for lawful disposal of wastes generated during the demolition, construction and operational phases of a development, as well as the system for licencing waste transport and disposal.
The Work Health and Safety Regulation 2011	The Work Health and Safety Regulation 2011 provide detailed actions and guidance associated with the topics discussed in <i>The Work Health and Safety Act 2011</i> . The primary aim of the regulation is to protect the health and safety of workers and ensure that risks are minimised in work environments. Workplaces are to ensure that they are compliant with the requirements specified in the regulations. The regulations discuss items such as actions that are prohibited or obligated in work environments, the requirements for obtaining licences and registrations, and the roles and responsibilities of staff in workplaces.
<i>Waste Avoidance and Resource Recovery Act 2001</i>	<p>The <i>Waste Avoidance and Resource Recovery Act 2001</i> aims to promote waste avoidance and resource recovery and repeals the <i>Waste Minimisation and Management Act 1995</i>. Specific objectives of the <i>Waste Avoidance and Resource Recovery Act 2001</i> include:</p> <ul style="list-style-type: none"> • Encouraging efficient use of resources • Minimising the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste • Ensuring industry and the community share responsibility in reducing/dealing with waste, and • Efficiently funding of waste/resource management planning, programs and service delivery. <p>As of 2016, the addition to the Act of Part 5 defines the legislative framework for the "Return and Earn Container Deposit Scheme" whereby selected beverage containers can be returned to State Government authorities for a monetary refund.</p>

5 Construction Waste and Recycling Management

5.1 Targets for Resource Recovery

The performance of each new development should contribute to the following target from the NSW EPA (2014) *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*:

- 75 % of total construction and demolition waste recycled, increasing to 80 % by 2021.

It is anticipated that the waste minimisation measures in the following sections will assist the Project to meet this target. Waste reporting and audits can be used to determine the actual percentage of wastes that have been recycled during the construction stage of the Project.

5.2 Waste Streams and Classifications

The construction stage of the Project is likely to generate the following broad waste streams:

-
- Construction wastes,
 - Plant maintenance waste
 - Packaging wastes, and
 - Work compound waste from on-site employees.

A summary of likely waste types generated from construction activities, along with their waste classifications and proposed management methods, is provided in **Table 2**.

For further information on how to classify a waste type refer to the NSW EPA (2014) *Waste Classification Guidelines*¹. Further information on managing construction wastes is available from the NSW EPA website² and Council's DCP.

¹ Available online from <https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines>

² <http://www.epa.nsw.gov.au/your-environment/waste/industrial-waste/construction-demolition>

Table 2 Potential waste types and their management methods

Waste Types	NSW EPA Waste Classification	Proposed Management Method
Construction		
Sediment fencing, geotextile materials	General solid waste (non-putrescible)	Reuse at other sites where possible or disposal to landfill
Concrete	General solid waste (non-putrescible)	Off-site recycling for filling, levelling or road base
Bricks and pavers	General solid waste (non-putrescible)	Cleaned for reuse as footings, broken bricks for internal walls, crushed for landscaping or driveway use, off-site recycling
Gyprock or plasterboard	General solid waste (non-putrescible)	Off-site recycling or returned to supplier
Sand or soil	General solid waste (non-putrescible)	Off-site recycling
Metals such as fittings, appliances and bulk electrical cabling, including copper and aluminium	General solid waste (non-putrescible)	Off-site recycling at metal recycling compounds and remainder to landfill
Conduits and pipes	General solid waste (non-putrescible)	Off-site recycling
Timber	General solid waste (non-putrescible)	Off-site recycling, Chip for landscaping, Sell for firewood <i>Treated</i> : reused for formwork, bridging, blocking, propping or second-hand supplier <i>Untreated</i> : reused for floorboards, fencing, furniture, mulched second hand supplier Remainder to landscape supplies.
Doors, Windows, Fittings	General solid waste (non-putrescible)	Off-site recycling at second hand building supplier
Insulation material	General solid waste (non-putrescible)	Off-site disposal
Glass	General solid waste (non-putrescible)	Off-site recycling, glazing or aggregate for concrete production
Asbestos	Hazardous waste	Off-site disposal at a licenced landfill facility.
Fluorescent light fittings and bulbs	Hazardous waste	Off-site recycling or disposal; contact <i>FluoroCycle</i> for more information ³
Paint	Hazardous waste	Off-site recycling, Paintback collection ⁴ or disposal
Synthetic rubber or carpet underlay	General solid waste (non-putrescible)	Off-site recycling; reprocessed and used in safety devices and speed humps

³ Available online from <http://www.fluorocycle.org.au/> or <http://www.environment.gov.au/settlements/waste/lamp-mercury.html>

⁴ Available online from <https://www.paintback.com.au/>

Waste Types	NSW EPA Waste Classification	Proposed Management Method
Ceramics including tiles	General solid waste (non-putrescible)	Off-site recycling at a crushing and recycling company
Carpet	General solid waste (non-putrescible)	Off-site recycling or disposal; reused for landscaping, insulation or equestrian uses
Plant Maintenance		
Empty oil and other drums or containers, such as fuel, chemicals, paints, spill clean ups	Hazardous waste: Containers were previously used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and residues have not been removed by washing or vacuuming. General solid waste (non-putrescible): Containers have been cleaned by washing or vacuuming.	Transport to comply with the transport of Dangerous Goods Code applies in preparation for off-site recycling or disposal at licensed facility
Air filters and rags	General solid waste (non-putrescible)	Off-site disposal
Oil filters	Hazardous waste	Off-site recycling
Batteries	Hazardous waste	Off-site recycling, contact the Australian Battery Recycling Initiative ⁵ for more information
Packaging		
Packaging materials, including wood, plastic, including stretch wrap or LLPE, cardboard and metals	General solid waste (non-putrescible)	Off-site recycling
Wooden or plastic crates and pallets	General solid waste (non-putrescible)	Reused for similar projects, returned to suppliers, or off-site recycling. Contact <i>Business Recycling</i> for more information ⁶
Work Compound and Associated Offices		
Food Waste	General solid (putrescible) waste	Dispose to landfill with general garbage
Recyclable beverage containers including glass and plastic bottles, aluminium cans and steel cans	General solid waste (non-putrescible)	Co-mingled recycling at off-site licensed facility or deliver to local NSW container deposit scheme 'Return and Earn' facility ⁷
Clean paper and cardboard	General solid waste (non-putrescible)	Paper and cardboard recycling at off-site licensed facility
General domestic waste generated by workers such as soiled paper and cardboard and polystyrene	General solid waste (non-putrescible) mixed with putrescible waste	Disposal at landfill

⁵ <http://www.batteryrecycling.org.au/home>

⁶ Available online from <http://businessrecycling.com.au/search/>

⁷ Available online from <http://returnandearn.org.au/>

5.3 Construction Waste Types and Quantities

The construction site manager will need to specify the types and quantities of wastes produced during construction and on this basis, the numbers and capacity of skip bins can be determined.

In the absence of readily available construction waste generation rates from Council, SLR has adopted the waste generation rates from Appendix A of The Hills Development Control Plan (DCP) 2012 for estimating the type and quantities of waste generated from construction of the Project. The waste generation rates listed in the Hills DCP include '2 Bedroom', '3 Bedroom', 'Block of Flats', 'Factory' and 'Office'. SLR has adopted the 'Factory' and 'Office' rates to measure waste expected from the Project, as the construction of a factory and office is the most relevant in representing the construction of the industrial warehouse and office precinct.

In the absence of readily available published information for 'Carpark', construction waste generation rates, SLR has developed 'Carpark' construction rates based on the 'Office' rates by:

- Removing timber, bricks and gyprock as these materials are unlikely to be present in significant quantities in a modern carpark structure, and
- Increasing the rates for concrete, sand or soil, metal and 'other', in proportion, to maintain the total assumed tonnage per 1000 m² of construction.

The waste generation rates are shown in **Table 3**.

Table 3 Average waste generation rates for the construction of the project

Rate Type	Floor Area (m ²)	Waste types and quantities (m ³)						
		Timber	Concrete	Bricks	Gyprock	Sand or Soil	Metal	Other
Factory	1,000	0.25	2.10	1.65	0.45	4.80	0.60	0.50
Office	1,000	5.1	18.8	8.5	8.6	8.8	2.75	5
Carpark	1,000	--	30.6	--	--	14.3	4.5	8.1

These waste generation rates are used to estimate the waste generated from the construction of the Project. The anticipated construction waste quantities for are shown in **Section 5.3.1** below.

The waste generation rates for 'Factory' are applied to calculate the waste quantities from the construction of each level of the warehouses and the mezzanines. The 'Office' waste generation rates are applied to calculate the waste quantities from all office administration areas, the guard house and dock office 1. The 'Carpark' waste generation rates are applied to calculate the waste quantities from the construction of all external hard surface areas including carparks, light duty pavement and heavy-duty pavement. The areas are based on area information provided by ESR site plans.

Actual waste quantities and composition will vary; however, this estimate is provided so that the construction site manager can make provision for on-site or off-site re-use and recycling opportunities.

5.3.1 Construction waste quantities

The construction waste quantities anticipated are provided in **Table 4**. The areas are based on area information provided by ESR site plans in **Appendix A** with the exception of carpark areas which have been estimated from the site plans by SLR.

Table 4 Estimated types and quantities of construction waste from Project

Project area		Area (m ²)	Waste types and quantities (m ³)						
			Timber	Concrete	Brick	Gyprock	Sand and Soil	Metal	Other
Project site	Warehouse	34,744	10	75	60	20	170	25	20
	Office (2 levels)	1,024	10	20	10	10	10	5	10
	Warehouse Dock offices	201	5	5	5	5	5	5	5
	Guard House	19	5	5	5	5	5	5	5
	Light Duty Carpark	5,933	-	185	-	-	85	30	50
	Heavy Duty Driveway	22,704	-	695	-	-	325	105	185
Totals		64,625	30	985	80	40	600	175	275

Waste quantity estimates have been rounded up to the nearest 5 m³.

At the time of preparing this plan, architectural drawings with storage details for construction waste were not available. This is to be updated by the site manager once waste streams, estimated quantities, and final disposal locations and recycling services have been identified.

5.4 Waste Avoidance

In accordance with best practice waste management, the building contractor, building designer and/or equivalent roles should:

- Develop a purchasing policy based on the approximate volumes of materials to be used so that the correct quantities are purchased.
- Arrange for delivery of materials on an 'as needed' basis to avoid material degradation through weathering and moisture damage.
- Communicate strategies to handle and store waste to minimise environmental, health and amenity impacts.
- Select materials with a low environmental impact over the lifecycle of the building.
- Choose timber from certified plantations and avoid unsustainable timber imports including western red cedar, oregon, meranti, luan or merbau.
- Use leased equipment rather than purchase and disposal.
- Minimise site disturbance and unnecessary excavation.

- Incorporate existing trees and shrubs into the landscape plan.
- Grouping wet areas together to minimise the amount of pipe work required.
- Design the Project to require standard material sizes or make arrangements with manufacturing groups for the supply of non-standard material sizes.
- Design works for de-construction.
- Reduce packaging waste by:
 - Returning packaging to suppliers where practicable to reduce waste further along the supply chain
 - Purchasing in bulk
 - Requesting cardboard or metal drums rather than plastics
 - Requesting metal straps rather than shrink wrap, and
 - Using returnable packaging such as pallets and reels.
- Use prefabricated materials.
- Select materials for Project works with low embodied energy properties or materials that have been salvaged or recycled for the construction of the Project including concrete that utilises slag and fly ash content, structural and reinforced steel that uses recycled steel content or bulk insulation products that contain recycled content, such as recycled glass in glass-wool.
- Preferentially use paints, floor coverings and adhesives with low VOC (volatile organic compound) content.
- Reduce the use of polyvinyl chloride products.
- Implement measures to prevent the occurrence of windblown litter, dust and stormwater pollution.
- Ensure subcontractors are informed of and implement site waste minimisation and management procedures.

5.5 Reuse, Recycling and Disposal

Effective management of construction materials and construction and demolition waste, including options for reuse and recycling where applicable and practicable, will be conducted. Only wastes that cannot be cost effectively reused or recycled are to be sent to landfill or appropriate disposal facilities.

Refer to **Table 2** for an outline of the proposed reuse, recycling and disposal methods for potential construction waste streams generated by the Project.

In accordance with best practice waste management, the following specific procedures should be implemented:

- Ensure the site's project management of the site includes minimising waste generation, requiring the appropriate storage and timely collection of waste materials, and maximising re-use or recycling of materials.
- Store wastes on site appropriately to prevent cross-contamination and guarantee the highest possible re-use value.
- Consider the potential of any new materials to be re-used and recycled at the end of the Project's life.

- Determine opportunities for the use of prefabricated components and recycled materials.
- Re-use formwork where appropriate.
- Retain roofing material cut-offs for re-use or recycling.
- Retain used crates for storage purposes unless damaged.
- Recycle cardboard, glass and metal wastes.
- Recycle or dispose of solid waste timber, brick, concrete, asphalt and rock, where such waste cannot be re-used on site, to an appropriately licenced construction and demolition waste recycling facility or an appropriately licenced landfill.
- Dispose of all asbestos and/or hazardous wastes in accordance with SafeWork NSW and NSW EPA requirements.
- Deliver batteries and florescent lights to drop off-site recycling facility.
- Return excess materials and packaging to the supplier or manufacturer.
- Dispose of all garbage via a council approved system.

5.6 Waste Storage and Servicing

5.6.1 Waste Segregation and Storage

Waste materials produced from construction activities should be separated at the source and stored separately on-site. It is anticipated that the Project will provide enough space on-site for separate storage, for example, separate skip bins or appropriately managed stockpiles, of the following waste types:

- Bricks, concrete and scrap metal
- Metal and steel, in a condition suitable for recycling at metal recycling facilities
- Timber
- Glass
- Hardstand rubble
- Uncontaminated excavation spoil, if present
- Contaminated excavation spoil, if present
- Hazardous waste, if present
- Paper and cardboard
- General co-mingled recycling waste, and
- Non-recyclable general waste.

If there is insufficient space on-site for full segregation of waste types, the Site Manager, or equivalent role, should consult with the waste and recycling collection contractor to confirm which waste types may be co-mingled prior to removal from the site.

5.6.2 Waste Storage Area

Waste storage areas should be accessible and allow enough space for storage and servicing requirements. The storage areas should also be flexible in order to cater for change of use throughout the Project construction. Where space is restricted, dedicated stockpile areas are to be delineated on the site, with regular transfers to dedicated skip bins for sorting.

All waste placed in skips or bins for disposal or recycling will be adequately contained to ensure that the waste does not fall, blow, wash or otherwise escape from the site. Waste containers and storage areas are to be kept clean and in a good state of repair.

In accordance with better practice waste management, areas designated for waste storage should:

- Be designed so that the floors and walls can be washed on a regular basis
- Include separation facilities for waste to be divided into separate waste streams in order to recycle materials;
- Be located away from residential dwellings; and
- Be located so as to not cause any negative impacts, in terms of visual appearance, noise or smell, to adjoining properties, or to the street.

5.6.3 Waste Servicing and Record Keeping

The site manager or equivalent role is to:

- Arrange for suitable waste collection contractors to remove any construction waste from site
- Ensure waste bins are not filled beyond recommended filling levels
- Ensure that all bins and loads of waste materials leaving site are covered
- Maintain waste disposal documentation detailing, at a minimum:
 - Descriptions and estimated amounts of all waste materials removed from site
 - Details of the waste and recycling collection contractors and facilities receiving the waste and recyclables
 - Records of waste and recycling collection vehicle movements, for example, date and time of loads removed, licence plate of collection vehicles, tip dockets from receiving facility, and
 - Waste classification documentation for materials disposed to off-site recycling or landfill facilities.
- Ensure lawful waste disposal records are readily accessible for inspection by regulatory authorities such as Council, SafeWork NSW or NSW EPA, and
- Remove waste during hours approved by Council.

If skips and bins are reaching capacity, removal and replacement should be organised as soon as possible. All site generated building waste collected in the skips and bins will leave the site and be deposited in the approved site lawfully able to accept them.

5.6.4 Contaminated or Hazardous Waste Management

During the construction phase, SLR recommends that a qualified and certified contractor is engaged to remove all contaminated or hazardous materials, for example, asbestos, and dispose of all contaminated or hazardous waste at an appropriately licenced facility.

All asbestos and other hazardous waste must be handled according to appropriate legislation and regulation including the Work Health and Safety Regulation 2011.

Hazardous waste management at the project site could require a licence from the EPA and approval from Council. If hazardous waste is identified for removal, Council and NSW EPA are to be consulted prior to undertaking any hazardous waste removal.

5.7 Site Inductions

All staff, including sub-contractors and labourers, employed during the construction phase of the Project must undergo induction training regarding waste management for the site.

Induction training is to cover, as a minimum, an outline of the WMP including:

- Legal obligations and targets
- Emergency response procedures on-site
- Waste priorities and opportunities for reduction, reuse and recycling
- Waste storage locations and separation of waste
- Procedures for suspected contaminated and hazardous wastes
- Waste related signage
- The implications of poor waste management practices, and
- Responsibilities and reporting, including identification of personnel responsible for waste management and individual responsibilities.

It is the responsibility of the site manager or building contractor to notify Council of the appointment of waste removal, transport or disposal contractors.

5.8 Signage

Standard signage is to be posted in all waste storage and collection areas. All waste containers should be labelled correctly and clearly to identify stored materials.

Signs approved by the NSW EPA for labelling of waste materials are available online⁸ and should be used where applicable. A selection of signs prepared by NSW EPA is provided in **Figure 3**.



Figure 2 Examples of NSW EPA labels for waste skips and bins

5.9 Monitoring and Reporting

The following monitoring practices are to be undertaken to improve construction waste management and to obtain accurate waste generation figures:

- Conduct waste audits of current projects where feasible.
- Note waste generated and disposal methods.
- Look at past waste disposal receipts.
- Record this information to track waste avoidance, reuse and recycling performance and to help in waste estimations for future waste management plans.

As required by Council's DCP, all demolition and construction waste dockets must be kept which show which facility received the material for recycling or disposal. Audits may be conducted by Council to verify that dockets have been kept and waste recycled and disposed of as described within the WMP. Dockets will need to show the company's Australian Business Number. This can include dockets or receipts verifying recycling and disposal in accordance with this WMP. This evidence should also be presented to regulatory bodies when required.

Daily visual inspections of waste storage areas will be undertaken by site personnel and inspection checklists and logs recorded for reporting to the site manager on a weekly basis or as required. These inspections will be used to identify and rectify any resource and waste management issues.

Waste audits are to be carried out by the building contractor to gauge the effectiveness and efficiency of waste segregation procedures and recycling and reuse initiatives. Where audits show that the above procedures are not carried out effectively, additional staff training will be undertaken and signage re-examined.

⁸ NSW EPA approved waste materials signage <https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/business-government-recycling/standard-recycling-signs>

5.10 Roles and Responsibilities

All personnel have a responsibility for their own environmental performance and compliance with all legislation. It will be the responsibility of the building contractor to implement the WMP, and an employee and subcontractor responsibility to ensure that they always comply with the WMP.

Where possible, an environmental management representative should be appointed for the Project. Suggested roles and responsibilities are provided in **Table 5**.

Table 5 Suggested roles and responsibilities for construction waste management

Responsible Person	General Tasks
Construction Site Manager	Ensuring plant and equipment are well maintained.
	Ordering only the required amount of materials.
	Keeping materials segregated to maximise reuse and recycling.
	Ultimately responsible for routinely checking waste sorting and storage areas for cleanliness, hygiene and safety issues, contaminated waste materials, and also ensuring that all monitoring and audit results are well documented and carried out as specified in the WMP.
Construction Environmental Manager or equivalent	Approaching and establishing the local commercial reuse of materials where reuse on-site is not practical.
	Establishing separate skips and recycling bins for effective waste segregation and recycling purposes.
	Ensuring staff and contractors are aware of site requirements.
	Provision of training of the requirements of the WMP and specific waste management strategies adopted for the Project.
	Contaminated waste management and approval of off-site waste transport, disposal locations and checking licensing requirements.
	Approval of off-site waste disposal locations and checking licensing requirements.
	Assessment of suspicious potentially contaminated materials, hazardous materials and liquid wastes.
	Monitoring, inspection and reporting requirements.

Daily visual inspections of waste storage areas may be delegated to other on-site staff. All subcontractors will be responsible for ensuring that their work complies with the WMP through the project induction and contract engagement process.

6 Operational Waste Management

6.1 Targets for Resource Recovery

The waste management performance of each new development should contribute to the overall NSW State targets for recycling outlined in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*. The targets include increasing waste diverted from landfill to 75% and recycling 70% of commercial, industrial and municipal solid waste⁹. Each commercial and industrial development can contribute to this NSW State target through an effective waste management plan.

It is anticipated that the waste minimisation measures in the following sections will assist the Project to meet the state's targets. Waste reporting and audits can be used to determine the actual percentage of waste that are being, or have been, recycled during operation.

6.2 Waste Streams and Classifications

The operation of the Project is anticipated to generate the following broad waste streams:

- Domestic waste generated by employees, including food waste
- Bulk packaging waste, including polystyrene, plastic wrapping and cardboard boxes
- Office waste
- Garden organic waste from landscaped areas
- Bulky waste items such as furniture and e-waste, and
- Stores, plant and general maintenance waste.

Potential ongoing waste types, their associated waste classifications, and management methods are provided in **Table 6**. For further information on how to determine a waste's classification, refer to the NSW EPA (2014) Waste Classification Guidelines. Suggestions for recycling drop off locations and contacts can be found on <https://businessrecycling.com.au/> for each waste type.

Table 6 Potential waste types, classifications and management methods for operational waste

Waste Types	NSW EPA Classification	Proposed Management Method
General Operations		
Clean office paper	General solid (non-putrescible) waste	Paper recycling at off-site licensed facility
Cardboard including bulky cardboard boxes	General solid (non-putrescible) waste	Cardboard recycling at off-site licensed facility
Recyclable beverage containers, glass and plastic bottles, aluminium cans, steel cans	General solid (non-putrescible) waste	NSW container deposit scheme 'Return and Earn', container recycling at off-site licensed facility

⁹ <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/wastestrategy/140876-warr-strategy-14-21.pdf?la=en&hash=EC6685E6624995242B0538B18C2E80C0CA2E51B3>

Waste Types	NSW EPA Classification	Proposed Management Method
Food waste	General solid (putrescible) waste	Compost on or off-site or dispose to landfill with general garbage
Batteries	Hazardous waste	Off-site recycling, alternatively contact the Australian Battery Recycling Initiative for more information
Mobile Phones	Hazardous waste	Off-site recycling; can be taken to the Mobile Muster program. Contact Mobile Muster for more information
Bulky polystyrene	General solid (non-putrescible) waste	Off-site recycling or disposal at landfill
Furniture	General solid (non-putrescible) waste	Off-site reuse or disposal to landfill
E-waste	Hazardous waste	Off-site recycling
Printer toners and ink cartridges	Hazardous waste	Off-site recycling, free disposal box or bags and pickup service exists for printer toners and ink cartridges
General garbage, including non-recyclable plastics	General solid (putrescible and non-putrescible) waste	Disposal at landfill
Maintenance		
Spent smoke detectors ¹⁰	General solid (non-putrescible) waste, or Hazardous waste (some commercial varieties)	Disposal to landfill, or off-site disposal at licensed facility
Glass, other than containers	General solid (non-putrescible) waste	Off-site recycling
Light bulbs and fluorescent tubes	Hazardous waste	Off-site recycling or disposal, contact FluoroCycle ¹¹ or Lamp Recyclers ¹² for more information
Cleaning chemicals, solvents, area wash downs, empty oil or paint drums, chemical containers	Hazardous waste if containers used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and residues have not been removed by washing or vacuuming. General solid (non-putrescible) waste if containers cleaned by washing or vacuuming.	Transport to comply with the transport of Dangerous Goods Code applies in preparation for off-site recycling or disposal at licensed facility.
Garden organics - lawn mowing, tree branches, hedge cuttings, leaves	General solid (non-putrescible) waste	Reuse on-site or contractor removal for recycling at licenced facility

¹⁰ The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) require that when more than 10 smoke alarms (particularly americium-241 sources) are collected for bulk disposal they must be treated as radioactive waste and the requirements of the National Health and Medical Research Council's Code of practice for the near-surface disposal of radioactive waste in Australia (1992) must be met.

¹¹ <https://www.fluorocycle.org.au/>

¹² <https://www.lamprecyclers.com.au/>

6.3 Estimated Quantities of Operational Waste

In the absence of waste generation rates from Liverpool City Council, SLR has adopted the waste generation rates for 'Offices' and 'Warehouse' from the Penrith City Council DCP 2014 section 3.3.4¹³ for estimating the type and quantities of waste generated for from the operational activities of the Project. The operational waste generation rates used are shown below in **Table 7**.

Table 7 Waste generation rates applied to the operations of the Project

Type of Premises	General Waste Generation (L/100 m ² /day)	Recycling Generation (L/100 m ² /day)
Warehouse	10	10
Offices	10	10

Using the waste generation rates in **Table 7** above, the approximate weekly waste quantities for the Project have been calculated and are presented in **Section 6.3.1**. The operational waste quantities were additionally calculated based on the below assumptions:

- GFAs as presented on the architectural drawings shown in **Appendix A**
- A week comprising seven days of operation, and
- General recycling consisting of approximately 60% paper and cardboard, and 40% other recycling¹⁴.

Based on the Project's activities, SLR estimates that large quantities of the recycling stream will include pallets and plastic and cardboard packaging waste. To minimise packaging waste generated in the recyclables stream, it is recommended that packing waste is returned to the suppliers where possible. Standard pallets are recommended to be returned to their owners and non-standard and broken pallets are to be stockpiled and collected as required by a private waste contractor.

If additional collection services are required, such as secured document destruction, these can be organised with a private waste contractor who can provide additional bins and take collected waste to an off-site licenced facility.

6.3.1 Estimated quantities of operational waste

The estimated quantities of operational waste generated by the Project are shown in **Table 8**. The naming conventions used in **Table 8** are as per the plans provided by the Client.

Based on communication with the Client, the anticipated operations of the Project are primarily anticipated to be packaging waste consisting of paper and recycling. Comingled recycling is anticipated to be minimal and primarily be generated from the office areas. Hence the recycling breakdown of 60% paper and cardboard, and 40% other recycling has only been considered for the office spaces, where comingled recycling will be generated.

¹³ <https://www.penrithcity.nsw.gov.au/building-development/planning-zoning/planning-controls/development-control-plans>

¹⁴ <https://www.epa.nsw.gov.au/~media/EPA/Corporate%20Site/resources/warrlocal/140442-audits-2011.ashx>

Table 8 Estimated quantities of operational general waste and recycling

Complex	Location	Area (m ²)	General Waste (L/week)	Recycling Paper and Cardboard (L/week)	Recycling Other (L/week)
Warehouse	Warehouse	34,744	24,325	14,595	9,730
	Office (2 levels)	1,000	700	420	280
	Warehouse Dock offices	201	175	105	70
	Guard House	19	35	35	35
	Total	35,964	25,235	15,155	10,115

Waste quantity estimates have been rounded up to the nearest 5 L.

'Other Recycling': comingled recycling excluding paper and cardboard.

The Project is anticipated to produce minimal quantities of garden organics, less than 100 L per week. This waste will be taken by a landscaping contractor who will dispose of it at an off-site licenced facility.

6.4 Waste Storage Area Size

The waste storage area must be large enough to adequately store all quantities of operational waste and recycling between collections. In accordance with Council requirements, the storage area size must:

- Have sufficient housing for the agreed number of bins
- Have sufficient space for user access, bins, and manoeuvring of bins
- Ensure that storage and collection of waste and recyclables is easily and safely accessible for tenanted users, cleaners and collection contractors

In the absence of bin dimensions from Council, SLR has adopted the bin dimensions from the Penrith City Council DCP 2014 section 3, as outlined in **Table 9**.

Table 9 Dimensions and approximate footprint of bins

Dimension	Height (mm)	Depth (mm)	Width (mm)	Footprint (m ²)
1,100 L	1,330	1,240	1,090	1.35
1.5 m ³	1,190	1,080	2,070	2.24
3 m ³	1,540	1,520	2,060	3.13

To allow for ready movement of bins into and out of the bin storage area, the bin storage area is to provide a floor area of at least 150% of the total minimum bin GFA. This can also act as a contingency in the event of spikes in waste generation. This has been considered in the calculation of the waste storage area for each of the buildings in the Project. The waste storage area sizes are shown in **Section 6.4.1**.

The recommended storage area does not include consideration for the storage of bulky and hazardous waste. For the additional storage space for bulky and hazardous waste, refer to **Section 6.52**.

6.4.1 Waste storage area size

The estimated number of bins required for weekly storage of operational waste and recycling generated by the project are in **Table 11** and are based on:

- The estimated quantities of operational waste and recycling as shown in **Table 8**
- Bin dimensions from as shown in **Table 9**
- Garbage and recycling collection frequency as shown in **Table 10** below

Table 10 Collection frequency

Collections Per Week		
Garbage	Recycling P&C	Recycling other
3	3	3

The waste storage area calculations in **Table 11** are recommendations, based on preliminary master planning information, and should be updated for each building once detailed drawings are available.

Table 11 Recommended number of bins and storage area for weekly operations

Location	Bins Required			Total Number of Bins	Recommended Storage Area (m ²)
	General Waste	Paper and Cardboard Recycling	Comingled Recycling		
Warehouse	3 x 3 m ³	2 x 3 m ³	3 x 1.5 m ³	8	25

In accordance with waste management best practice, the architectural drawings, attached in **Appendix A**, show a waste area size in line with the recommendations provided by this report.

6.5 Bulky and Hazardous Waste Management

Sufficient space will be provided in the Project for the storage of large and/or bulky items and hazardous wastes that cannot be disposed of in the general waste or recyclable streams. This would include broken pallets, furniture, shelving, monitors, batteries and fluorescent tubes.

Building management may consider organising a separate casual collection service for as required, to remove bulky waste items, or engaging a contractor to collect and transport these items for reuse, recycling or disposal.

6.6 Waste Storage Room Location

In accordance with better practice waste management and recommendations from Council's DCP, the waste storage area should be located so that:

- Collection is on a level area less than 5% (1V:20H) gradient, and away from ramps and steps
- Collection servicing vehicles can efficiently and effectively service the development without reversing
- There is compatibility with collection servicing vehicle dimensions, such as height, width and turning radius

- A distance between bin collection and storage is less than 15 metres
- It is away from principal street frontages
- It is screened from view
- It does not cause any negative impacts, in terms of visual appearance, noise or smell, to adjoining properties, or to the street
- It avoids pedestrian or vehicular traffic hazards likely to be caused by waste collection and storage,

SLR recommends the architectural plans for this Project are updated to show the waste storage area recommended in **Section 6.4**. Following the revision of the architectural plans, SLR recommends that this WMP is updated.

6.7 Waste Storage Area Features

In accordance with best practice waste management and Council's DCP, the Project's waste storage area should have the following features:

- Have a distance between bin collection and storage of less than 15 metres
- Be located to minimise noise impacts during use and collection, away from principal street frontages and screened from view. Any waste management equipment must not be visible from the street.
- Be well ventilated
- Be constructed using materials compatible with the proposed and adjoining development(s)
- Have adequate lighting for safe use after dark
- Have a hose cock and a sewer drainage point in or adjacent to the storage area. The hose cock should not impede or protrude into bin storage space
- Fine grade drain cover sufficient to prevent coarse pollutants from entering the sewer
- Signage should:
 - Be in English and all other applicable languages
 - Include illustrative graphics for at least half of the sign
 - Be posted in all waste management areas
 - Clearly identify the purpose and content of all bins, specifically what can be recycled
 - Signal for the area to be maintained, tidy and clean
 - Display a telephone number to arrange for bulky waste disposal.
- Be designed so that the floors and walls can be washed on a regular basis
- Adequate vermin prevention measures
- Reduce potential noise and odour impacts

6.8 Waste Servicing

The following general waste servicing access requirements should be implemented:

- Waste will be removed regularly.
- Arrangements should be in place so that the waste and recycling storage rooms are not accessible to the general public.

In accordance with best practice waste management, the following is recommended for the access provisions for of waste collection vehicles:

- Collection vehicles should be able to enter and exit the collection area in a forward direction
- Drawings should show the site's entry point, vehicle's route of travel and manoeuvring
- Swept path models should illustrate how a standard waste collection vehicle will enter, service and exit the site
- Unobstructed access, adequate driveways and ramps of sufficient strength to support waste collection

Hazardous waste produced at the site will be collected by appropriately licensed specialised services.

Once a private waste contractor is engaged, a valid waste and recycling collection contract is recommended to demonstrate disposal at a waste facility lawfully able to accept it. Written evidence of the valid contract should be kept on-site.

6.9 Waste Avoidance, Reuse and Recycling Measures

6.9.1 Waste Avoidance

Waste avoidance measures include:

- Participating in take-back services to suppliers to reduce waste further along the supply chain
- Avoiding printing where possible
- Review of packaging design to reduce waste but maintain 'fit for purpose'
- Providing ceramic cups, mugs, crockery and cutlery rather than disposable items
- Purchasing consumables in bulk to avoid unnecessary packaging
- Presenting all waste reduction initiatives to staff as part of their induction program, and
- Investigating leased office equipment and machinery rather than purchase and disposal.

6.9.2 Re-use

Possible re-use opportunities include establishing systems with in-house and supply chain stakeholders to transport products in re-useable packaging where possible.

6.9.3 Recycling

Recycling opportunities include:

- Collecting and recycling e-wastes
- Flatten or bale cardboard to reduce number of bins required
- Paper recycling trays provided in office areas for scrap paper collection and recycling
- Collecting printer toners and ink cartridges in allocated bins for appropriate contractor recycling, and
- Development of 'buy recycled' purchasing policy.

6.10 Communication Strategies

Waste management initiatives and management measures should be clearly communicated to building managers, owners, employees, customers and cleaners. Benefits of providing this communication include:

- Improved satisfaction with services
- Increased ability and willingness to participate in recycling
- Improved amenity and safety
- Improved knowledge and awareness through standardisation of services
- Increased awareness or achievement of environmental goals and targets
- Reduced contamination of recyclables stream
- Increased recovery of recyclables and organics material, if implemented, and
- Greater contribution to targets for waste reduction and resource recovery, the environment and heritage conservation.

To realise the above benefits, the following communication strategies should be considered:

- Use consistent signage and colour coding throughout the Project
- Ensure all staff are trained in correct waste separation and management procedures
- Provide directional signage to show location of and routes to waste storage area
- General waste and co-mingled recycling bins should be clearly labelled and colour-coded to ensure no cross contamination, where applicable
- Employees and cleaners should adhere to the WMP for compliance, in consultation with management, and
- Repair signs and labels promptly to avoid breakdown of communications.

6.11 Signage

In accordance with best practice waste management, the waste storage and collection areas should be provided with appropriate signage. These signs should clearly identify waste management procedures and provisions to contractors, tenants and visitors should be distributed around the Project.

Signs which clearly identify waste management procedures and provisions to staff and visitors should be distributed around the Project. Key signage considerations are:

- Clear and correct labelling on all waste and recycling bins, indicating the correct type or types of waste that can be placed into a given bin, as shown in **Figure 4**
- Signposts and directions to location of waste storage area
- Clear signage in all waste storage areas to instruct users how to correctly separate waste and recycling
- Maintaining a consistent style colour scheme and system for signs throughout the Project, and
- Emergency contact information for reporting issues associated with waste or recycling management.

Colour-coded and labelled bin lids are necessary for identifying bins. All signage should conform to the relevant Australian Standard and use labels approved by the NSW EPA¹⁵. The design and use of safety signs for waste rooms and enclosures should comply with Australian Standard AS 1319 Safety Signs for the Occupational Environment and clearly describes the types of materials designated for each bin.



Figure 3 Example of bin labels for operational waste

6.12 Monitoring and Reporting

Monitoring is recommended to ensure waste and recycling management arrangements and provisions for the Project are functional, practical and are maintained to the standard outlined in this plan, at a minimum.

Visual assessments of bins and bin storage areas should be conducted by the building manager, at minimum:

- Weekly, in the first two months of operation to ensure the waste management system is sufficient for the operation, and
- Every six months, to ensure waste is being managed to the standards outlined in this document.

In addition, audits are to be conducted on a half-yearly basis to ensure WMP provisions are maintained.

¹⁵ NSW EPA waste signage and label designs <http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm>

Quantities of waste and recycling associated with disposal of waste and recycling, including dockets, receipts and other physical records should be recorded by the Building Manager. This is to allow reviews of the waste management arrangements and provisions at the site over time. Records of waste disposal should also be available to regulatory authorities such as the NSW Environmental Protection Authority and SafeWork NSW, upon request.

Any deficiencies identified in the waste management system, including, but not limited to, unexpected waste quantities, is to be rectified by the Building Manager as soon as it is practical. Where audits show that recycling is not carried out effectively, management should carry out additional staff training, signage re-examination and reviews of the waste management system where the audit or other reviewing body has deemed necessary. If this waste management plan no longer sufficiently meets the needs of the Project, review and updates to maintain suitability must be undertaken.

6.13 Roles and Responsibilities

It is the responsibility of the Building Manager, or equivalent role, to implement this WMP and a responsibility of all warehouse tenants and staff to follow the waste management procedures set out by the WMP. SLR recommends that all subcontractors enlisted by the Client are to have roles and responsibilities identified and the Project's waste management system clearly explained. A summary of recommended roles and responsibilities are provided in **Table 12**.

Table 12 Operational waste management responsibility allocation

Responsible Person	General Tasks
Management	Ensure the WMP is implemented throughout the life of the operation.
	Update the WMP regularly, for example each year, to ensure the Plan remains applicable.
	Undertake liaison and management of contracted waste collections.
	Organise internal waste audits on a regular basis.
	Manage any complaints and non-compliances reported through waste audits etc.
	Perform inspections of all waste storage areas and waste management equipment on a regular basis.
	Organise cleaning and maintenance requirements for waste management equipment.
	Monitor bins to ensure no overfilling occurs.
	Ensure effective signage, communication and education is provided to alert visitors, employees and cleaners about the provisions of this WMP and waste management equipment use requirements.
	Monitor and maintain signage to ensure it remains clean, clear and applicable.
	Ensure waste and recycling storage rooms are kept tidy.
	Ensure that regular cleaning and daily transfer of bins is being undertaken by the cleaners
	Ultimately responsible for the management of all waste management equipment, cleaning requirements, waste transfer and collection arrangements.

Responsible Person	General Tasks
Cleaners and Staff	Removal of general waste, recyclables, cardboard waste and hazardous waste from floor areas for transfer to centralised waste and recycling collection rooms daily or as required.
	Cleaning of all bins and waste and recycling rooms weekly or as required.
	Compliance with the provisions of this WMP.
Gardening Contractor, as applicable	Removal of all garden organics waste generated during gardening maintenance activities for recycling at an off-site location or reuse as organic mulch on landscaped areas.

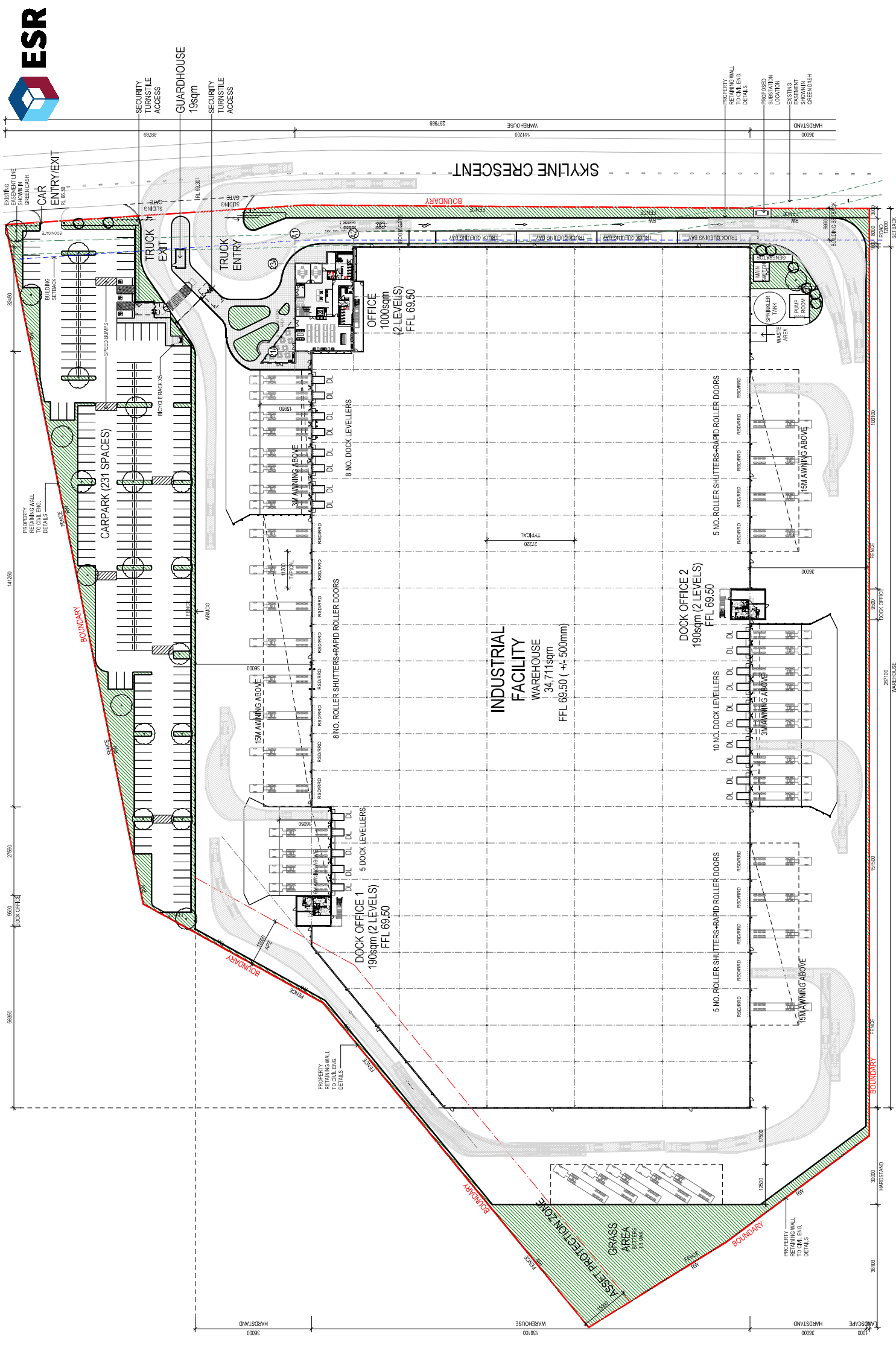
APPENDIX A

Site plans



PROPOSED INDUSTRIAL DEVELOPMENT

LOT 4, BRINGELLY ROAD, LEPPINGTON, SYDNEY



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	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
	DHL LSHC Building Lot 4, Bringelly Road, Leppington		

Appendix J

Noise Impact Assessment

LOT 4 - BRINGELLY ROAD BUSINESS HUB

Noise Impact Assessment

Prepared for:

ESR Australia
Level 29, 20 Bond Street
Sydney 2000
Australia

SLR Ref: 610.17734-R10
Version No: -v1.0
August 2020



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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with ESR Australia (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.17734-R10-v0.1	12 August 2020	Jason Rasquinha	Antony Williams	Antony Williams

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Appendix A Acoustic Terminology

Appendix B Noise Monitoring Graphs

1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been engaged by ESR Australia to undertake a noise impact assessment of a proposed warehouse facility at Lot 4 of Bringelly Business Hub. This assessment has been completed to accompany the Development Application for the proposal.

This report summarises the results of ambient noise measurements undertaken at the site and assesses the potential noise impacts on the surrounding receivers from predicted noise emissions from the proposal.

The following report uses specialist acoustic terminology. An explanation of common terms is provided in **Appendix A**.

1.1 Proposal Description

The proposed facility would generally involve the delivery and storage of products along with office and support facilities.

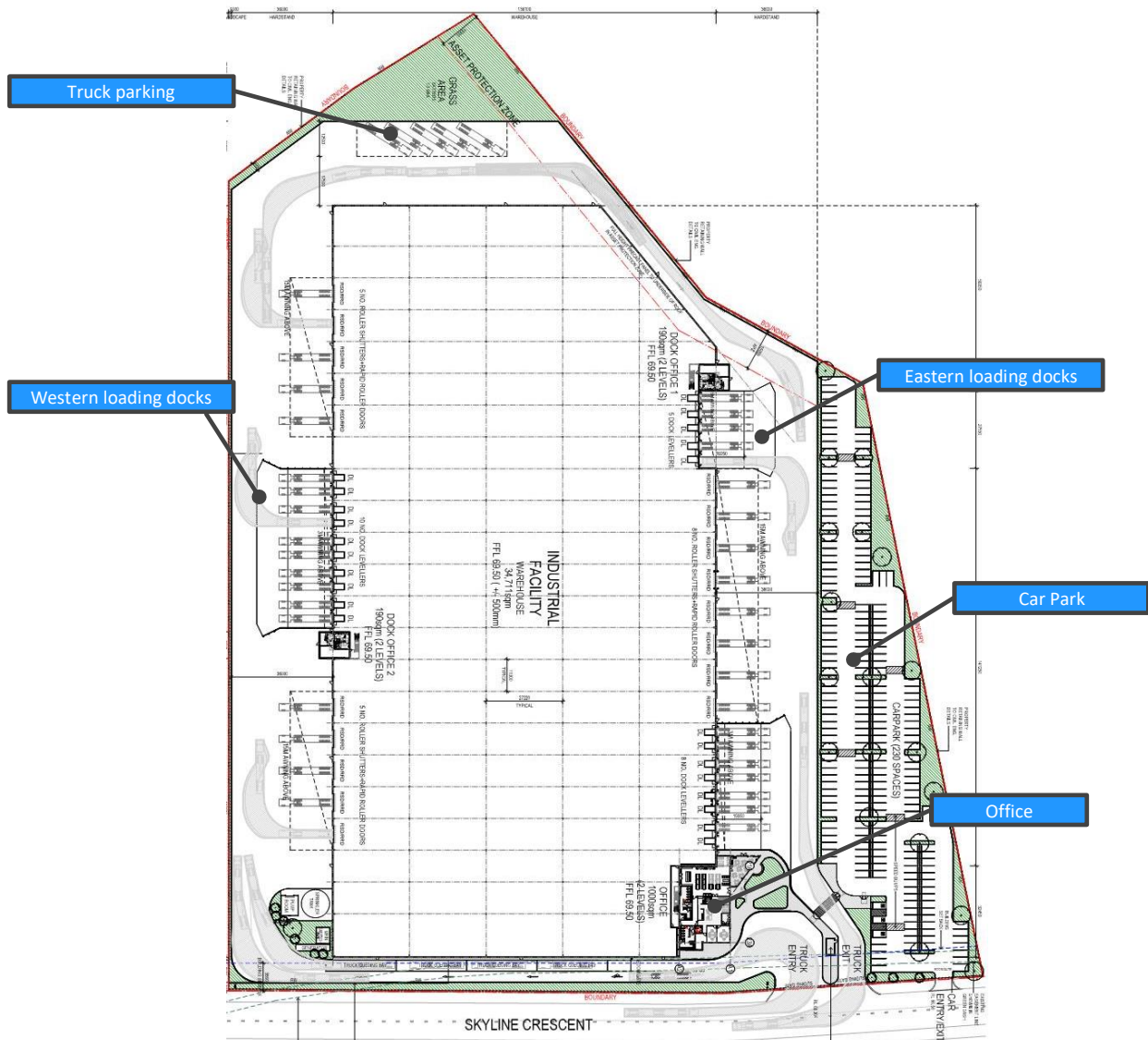
The proposal forms part of the 19 hectare Bringelly Business Hub which was granted development consent in January 2016 and allows for predominantly light industrial and retail development. The two lots to the east of Lot 4 are approved and operational, with the adjacent lot to the west being recently approved for Bunnings.

The site location is shown in **Figure 1** and proposed layout of the facility is shown in **Figure 2**.

Figure 1 Site Location, Surrounding Receivers and Noise Monitoring Locations



Figure 2 Proposed Layout



Warehouse operating hours would be 24 hours per day, seven days a week. The identified sources of noise from the facility include:

- Truck and light vehicle movements on internal access roads and in parking areas
- Loading of trucks in the various loading docks
- Truck parking
- Roof mounted mechanical plant.

A 230 space car park is situated to the east of the facility and a truck access route runs along the boundary of the site.

1.2 Nearest Receivers

The nearest sensitive receivers are residential dwellings to the north-east on Stuart Road. The closest of these is around 200 m away. Additional residential receivers are also located to the west and east, although these are more distant and are generally shielded by the buildings on the adjoining lots.

The nearest receivers are shown in **Figure 1**, with details of the nearest potentially affected sensitive receivers in **Table 1**.

Table 1 Surrounding Sensitive Receivers

ID	Address	Type	Distance (m)	Direction
R01	12 Bringelly Road, Horningsea Park (abandoned condition)	Residential	80 m	East
R02	12 Bringelly Road, Horningsea Park	Residential	85 m	East
R03	Properties across Cowpasture Road	Residential	420 m	East
R04	Residential properties on Stuart Road	Residential	200 m	North-east
R05	Properties on Stuart Road	Residential	250 m	West
R06	MindChamps Early Learning Centre	Childcare Centre	250 m	North-east
R07	CEA Office Building	Commercial	70 m	East
R08 ¹	Proposed Bunnings Warehouse Building	Commercial	35 m	West

Note 1: The Bunnings warehouse is not constructed yet and only operational noise impacts have been assessed to it.

1.3 Secretary's Environmental Assessment Requirements

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) for the development. The SEARs relevant to this assessment are outlined in **Table 2**.

Table 2 SEARs Relevant to Noise and Vibration

Requirement	Comments
6. Noise and Vibration – including: <ul style="list-style-type: none"> a description of all potential noise and vibration sources during the construction and operational phases of the development, including on and off-site traffic noise a cumulative noise impact assessment of all potential noise sources in accordance with relevant Environment Protection Authority guidelines details of noise mitigation, management and monitoring measures 	Section 4 and 5 Section 5.2.2 Section 6

2 Existing Noise Environment

The acoustical environment surrounding the site is generally controlled by road traffic noise from the surrounding road network, with the nearest major roads being Cowpasture Road to the east and Bringelly Road and Camden Valley Way to the south. The South West Rail Link is also located around 250 m to the south of the site.

2.1 Unattended Ambient Noise Monitoring

Unattended noise monitoring was completed at the site in August 2018 to measure the existing ambient noise environment of the area.

The noise monitoring locations were selected with consideration of other noise sources which may influence the measurements, security of noise monitoring equipment and gaining permission for access from residents and landowners.

Calibration of the equipment was checked prior to and following measurements, and drift in calibration did not exceed acceptable tolerances. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

The measured data was processed with reference to the NSW EPA's *Noise Policy for Industry* (NPfI) and the data was filtered to remove periods affected by adverse weather conditions, based on Bureau of Meteorology weather station data. A summary of the background noise monitoring locations and results are provided in **Table 3** and **Table 4**, and are shown in **Appendix B**.

Table 3 Ambient Noise Monitoring Locations

ID	Location Address	Location Details	Representative Receiver Area
L01	18 Stuart Road, West Hoxton	Noise logger deployed in adjacent vacant land	Residences to the north in West Hoxton
L02	12 Bringelly Road, Horningsea Park	Noise logger deployed in adjacent vacant land	Residences to the east in Horningsea Park
L03	Intersection of Stuart Road and Twenty Sixth Avenue, Horningsea Park	Noise logger deployed in adjacent vacant land	Residences to the west in Horningsea Park

Table 4 Summary of Ambient Noise Levels

ID	Location	Measured Noise Levels (dBA)					
		RBL ¹			LAeq(period) ²		
		Daytime	Evening	Night-time	Daytime	Evening	Night-time
L01	18 Stuart Road, West Hoxton	39	36	31	53	51	48
L02	12 Bringelly Road, Horningsea Park	46	45	37	55	53	52
L03	Intersection of Stuart Road and Twenty Sixth Avenue, Horningsea Park	44	43	39	51	54	49

Note 1: The Rating Background Levels (RBLs) and LAeq noise levels have been obtained from the measured data using the calculation procedures outlined in the NPfI.

Note 2: NPfI time periods – Day: 7:00 am to 6:00 pm Monday to Saturday, 8:00 am to 6:00 pm Sundays and public holidays; Evening: 6:00 pm to 10:00 pm; Night: the remaining periods.

Daily graphs representing the measured noise levels are contained in **Appendix B**. The graphs represent each 24 hour period during the survey and show the LA1, LA10, LAeq and LA90 noise levels in 15 minute periods.

3 Assessment Criteria

3.1 Interim Construction Noise Guideline

The NSW *Interim Construction Noise Guideline* (ICNG) is used to assess and manage impacts from construction noise on residences and other sensitive land uses in NSW.

The ICNG requires project specific Noise Management Levels (NMLs) to be established for sensitive receivers based on the existing background noise in the area.

The NMLs are not mandatory limits, however where construction noise levels are predicted or measured to be above the NMLs, feasible and reasonable work practices to minimise noise emissions are to be investigated.

3.1.1 Residential Receivers

The ICNG approach for determining NMLs at residential receivers is shown in **Table 5**.

Table 5 Determination of NMLs for Residential Receivers

Time of Day	NML LAeq(15minute)	How to Apply
Standard hours Monday to Friday 7:00 am to 6:00 pm Saturday 8:00 am to 1:00 pm No work on Sundays or public holidays	RBL + 10 dB	<ul style="list-style-type: none"> The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq(15minute) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practises to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly Noise Affected 75 dBA	<ul style="list-style-type: none"> The Highly Noise Affected (HNA) level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restructuring the hours that the very noisy activities can occur, taking into account: <ul style="list-style-type: none"> Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools or mid-morning or mid-afternoon for works near residences. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	RBL + 5 dB	<ul style="list-style-type: none"> A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practises have been applied and noise is more than 5 dB above the noise affected level, the proponent should negotiate with the community.

Note 1: The RBL is the Rating Background Level and the methodology for calculating it is described in the NSW *Noise Policy for Industry*.

Sleep Disturbance

Where construction works are planned to extend over more than two consecutive nights, the ICNG recommends that an assessment of sleep disturbance impacts should be completed.

A method for assessing sleep disturbance is contained in the EPA's *Noise Policy for Industry* (NPfI). Although the NPfI sleep disturbance criteria relates to industrial noise, it is also considered relevant for reviewing potential impacts from construction noise as a screening criteria to identify the need for further assessment.

The NPfI notes that a detailed maximum noise level assessment should be undertaken where a project results in night-time noise levels which exceed:

- 52 dBA LA_{Fmax} or the prevailing background level plus 15 dB, whichever is the greater.

3.1.2 Other Sensitive Land Uses

The ICNG provides criteria for a number of non-residential 'other sensitive' land uses, such as educational institutes, hospitals, medical facilities and outdoor recreational areas. The ICNG references AS 2107 for criteria for other sensitive receivers which are not listed in the guideline.

The AS2107 NMLs for other sensitive receivers are shown in **Table 6**.

Table 6 NMLs for Project Specific Other Sensitive Receivers

Land Use	NML LAeq(15minute)		NML Derived From
	Internal	External	
Childcare Centre	60 dBA play areas	70 dBA ¹ play areas	ICNG outdoor passive recreation
	40 dBA sleeping area	50 dBA ¹ sleeping area	AS2107 for residential sleeping areas near to major roads

Note 1: A conservative 10 dB outside-to-inside facade performance is assumed at this receiver for an open window.

3.1.3 Summary of NMLs

The NMLs for the project are determined using the background noise monitoring and are shown in **Table 7**.

Table 7 Construction Noise Management Levels

Receiver ID	Representative Background Monitoring Location	Noise Management Level (LAeq(15minute) – dBA)				Sleep Disturbance Screening Criteria (RBL +15 dB)
		Standard Construction (RBL +10 dB)	Out of Hours (RBL +5 dB)			
		Daytime	Daytime ¹	Evening	Night-time	
R01	L.02	56	n/a	n/a	n/a	n/a
R02	L.02	56	n/a	n/a	n/a	n/a
R03	L.02	56	n/a	n/a	n/a	n/a
R04	L.01	49	n/a	n/a	n/a	n/a
R05	L.03	54	n/a	n/a	n/a	n/a
R06	-	70 (play areas)	n/a	n/a	n/a	n/a
		50 (sleeping areas)	n/a	n/a	n/a	n/a
R07	-	70	n/a	n/a	n/a	n/a

Note 1: This refers to the period on Saturday between 7am – 8am and 1pm – 6pm, on Sunday and public holidays between 8am – 6pm.

3.1.4 Construction Road Traffic Noise

The potential impacts from construction traffic on public roads are assessed under the NSW EPA *Road Noise Policy* (RNP)).

An initial screening test is first applied to evaluate if noise levels due to construction traffic are expected to increase by more than 2 dB. Where this is considered likely further assessment is required using the RNP base criteria shown in **Table 8**.

Table 8 RNP Criteria for Assessing Construction Traffic on Public Roads

Road Category	Type of Project/Land Use	Assessment Criteria (dBA)	
		Daytime (7 am - 10 pm)	Night-time (10 pm - 7 am)
Freeway/arterial/sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	LAeq(15hour) 60 (external)	LAeq(9hour) 55 (external)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	LAeq(1hour) 55 (external)	LAeq(1hour) 50 (external)

3.2 Construction Vibration

Minimum working distances for typical vibration intensive construction equipment are provided in **Table 9**.

The minimum working distances are quoted for both cosmetic damage (see *BS 7385 Part 2-1993 Evaluation and measurement for vibration in buildings Part 2*, BSI, 1993) and human comfort (see the NSW DEC *Assessing Vibration: A Technical Guideline*, 2006) and are based on empirical data which suggests that where works are further from receivers than the quoted minimum distances then impacts are not considered likely.

Table 9 CNVG Recommended Minimum Working Distances from Vibration Intensive Equipment

Plant Item	Rating/Description	Minimum Distance	
		Cosmetic Damage (BS 7385)	Human Response (NSW EPA Guideline)
Vibratory Roller	1-2 tonne	5 m	15 m to 20 m
	2-4 tonne	6 m	20 m
	4-6 tonne	12 m	40 m
	7-13 tonne	15 m	100 m
	13-18 tonne	20 m	100 m
	>18 tonne	25 m	100 m
Small Hydraulic Hammer	300 kg (5 to 12 t excavator)	2 m	7 m
Medium Hydraulic Hammer	900 kg (12 to 18 t excavator)	7 m	23 m
Large Hydraulic Hammer	1,600 kg (18 to 34 t excavator)	22 m	73 m
Piling Rig – Bored	≤ 800 mm	2 m (nominal)	4 m
Jackhammer	Hand held	1 m (nominal)	2 m

Note 1: Taken from the Roads and Maritime *Construction Noise and Vibration Guideline*.

Note 2: More stringent conditions may apply to heritage or other sensitive structures.

The minimum working distances are indicative and would vary depending on the particular item of equipment and local geotechnical conditions. The distances apply to cosmetic damage of typical buildings under typical geotechnical conditions.

3.3 Noise Policy for Industry

The *Noise Policy for Industry* (NPfI) was released in 2017 and sets out the NSW EPA's requirements for the assessment and management of noise from industry in NSW.

3.3.1 Trigger Levels

The NPfI describes 'trigger levels' which indicate the noise level at which feasible and reasonable noise management measures should be considered. Two forms of noise criteria are provided – one to account for 'intrusive' noise impacts and one to protect the 'amenity' of particular land uses.

- The **intrusiveness** of an industrial noise source is generally considered acceptable if the L_{Aeq} noise level of the source, measured over a period of 15 minutes, does not exceed the background noise level by more than 5 dB. Intrusive noise levels are only applied to residential receivers. For other receiver types, only the amenity levels apply.
- To limit continual increases in noise levels from the use of the intrusiveness level alone, the ambient noise level within an area from all industrial sources should remain below the recommended **amenity** levels specified in the NPfI for that particular land use.

For this assessment, the area surrounding the proposal is considered to be 'suburban'.

3.3.2 Project Specific Criteria

The noise emission trigger levels for industrial noise generated by the facility are provided in **Table 10**. The Project Specific Noise Trigger Level is the lowest value of the intrusiveness or amenity noise level for each period and these are shown in the table in bold.

Table 10 Project Specific Noise Trigger Levels

Receivers	Period	Recommended Amenity Noise Level LAeq (dBA)	Measured Noise Level (dBA)		Project Noise Trigger Levels LAeq(15minute) (dBA)	
			RBL ¹	LAeq(period)	Intrusiveness	Amenity ^{2,3}
Residential to the north (R04)	Daytime	55	39	53	44	53
	Evening	45	36	51	41	43
	Night-time	40	31	48	36	38
Residential to the east (R01 – R03)	Daytime	55	46	55	51	53
	Evening	45	45	53	50	43
	Night-time	40	37	52	42	40⁴
Residential to the west (R05)	Daytime	55	44	51	49	53
	Evening	45	43	54	48	43
	Night-time	40	39	49	44	38
Childcare centres ⁵ (R06)	When in use	50	n/a	n/a	n/a	48
Commercial receivers (R07 & R08)	When in use	65	n/a	n/a	n/a	63

Note 1: RBL = Rating Background Level.

Note 2: The recommended amenity noise levels have been reduced by 5 dB, where appropriate, to give the project amenity noise levels due to other sources of industrial noise being in the area. It is noted that the NPfI defines a process in Section 2.4.2 for determining amenity noise levels where receivers are potentially affected by proposed 'clusters of industry'. However, given receivers surrounding the site would not be impacted by more than four individual sources of industrial noise, the recommended amenity noise level minus 5 dB approach is appropriate and adequately covers cumulative noise impacts from the Bringelly Road Business Hub.

Note 3: The project amenity noise levels have been converted to a 15-minute level by adding 3 dB.

Note 4: The measured LAeq noise level was dominated by road traffic noise and exceeds the recommended amenity noise level by 10 dB or more, therefore the 'high traffic project amenity noise level' is the existing LAeq(traffic) noise level minus 15 dB.

Note 5: The NPfI and AS2107 do not provide specific guideline noise levels for childcare centres, as such an internal criterion of 40 dBA has been used with a 10 dB external to internal, which is generally considered representative of windows being partially open for ventilation

3.3.3 Modifying Factors

Sources of industrial noise can cause greater annoyance where they contain certain characteristics, such as tonality, impulsiveness, intermittency, irregularity or dominant low-frequency content. The NPfI provides the following modifying factors, shown in **Table 11**, which are to be applied to the predicted receiver noise levels.

Table 11 NPfl Modifying Factors

Factor	Assessment/Measurement	When to Apply	Correction ¹
Tonal noise	One-third octave or narrow band analysis	Level of one-third octave band exceeds the level of the adjacent bands on both sides by levels defined in the NPfl.	5 dB ²
Low-frequency noise	Measurement of source contribution C-weighted and A-weighted level and one-third octave measurements	Measure/assess source contribution C and A weighted Leq,t levels over same time period. Correction to be applied where the C minus A level is 15 dB or more and the level to which thresholds defined in the NPfl are exceeded.	2 or 5 dB ²
Intermittent noise	Subjectively assessed but should be assisted with measurement to gauge the extent of change in noise level	The source noise heard at the receiver varies by more than 5 dB and the intermittent nature of the noise is clearly audible.	5 dB

Note 1: Corrections to be added to the measured or predicted levels.

Note 2: Where a source emits tonal and low-frequency noise, only one 5 dB correction should be applied if the tone is in the low-frequency range, that is, at or below 160 Hz.

Sleep Disturbance

In accordance with the NPfl, a detailed maximum noise level assessment should be undertaken where a development results in night-time noise levels which exceed:

- LAeq(15minute) 40 dBA or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- LAFmax 52 dBA or the prevailing RBL plus 15 dB, whichever is the greater.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the RBL and the number of times this happens during the night-time.

The NPfl refers to the *Road Noise Policy* (RNP) for additional information regarding sleep disturbance. From the research to date, the RNP concludes that:

- Maximum internal noise levels below 50 dBA to 55 dBA are unlikely to awaken people from sleep
- One or two events per night, with maximum internal noise levels of 65 dBA to 70 dBA, are not likely to affect health and wellbeing significantly.

4 Construction Noise and Vibration Assessment

4.1 Construction Activities

The activities likely to be required to build the project involve conventional construction equipment such as ground excavation equipment, mobile cranes, delivery trucks and trade equipment.

The representative construction scenarios developed to assess potential impacts during construction are detailed in **Table 12**.

Table 12 Construction Activities

Works ID	Scenario	Working Hours			
		Standard Daytime	Day OOH ¹	Evening	Night-time
W.001	Site Establishment	✓	-	-	-
W.002	Ground Works	✓	-	-	-
W.003	Structural Works	✓	-	-	-
W.004	Service Installation	✓	-	-	-
W.005	Finishing Trades	✓	-	-	-

Note 1: OOH = Out of hours. During the daytime this refers to the period on Saturday between 7am – 8am and 1pm – 6pm, on Sunday and public holidays between 8am – 6pm.

4.1.1 Working Hours

The works would be undertaken during the standard construction hours of:

- 7.00 am to 6.00 pm Monday to Friday
- 8.00 am to 1.00 pm on Saturdays
- No work on Public Holidays or Sundays.

It is not expected that there would be any requirement for works during evening or night-time periods.

4.1.2 Construction Activity Source Noise Levels

The assessment uses ‘realistic worst-case’ scenarios to determine the impacts from the noisiest 15-minute period that is likely to occur for each work scenario, as required by the ICNG. Sound power levels for the construction equipment used in the modelling are listed in **Table 13**.

Table 13 Construction Works and Sound Power Levels for Construction Equipment

Works ID	Scenario	Sound Power Level (Leq dBA)											
		Concrete Mixer Truck	Concrete Pump	22 T Excavator	Generator	Grader	4" Grinder	Hammer Drill	Hand Tools	Mobile Crane Franna	Mobile Crane 100 T	Roller – Vibratory	Truck
		103	106	99	102	108	98	100	94	98	100	107	107
W.001	Site Establishment				X								X
W.002	Ground Works			X	X	X						X	X
W.003	Structural Works	X	X	X	X			X	X		X		
W.004	Service Installation			X	X		X	X			X		
W.005	Finishing Trades			X	X		X		X	X			

Note 1: The ICNG requires that activities identified as particularly annoying (such as jackhammering, rock breaking and power saw operation) have a 5 dB 'penalty' added to predicted noise levels when using the quantitative method.

Note 2: Sound Power Levels have been taken from DEFRA, RMS *Construction Noise and Vibration Guideline* and TfNSW *Construction Noise and Vibration Strategy*.

4.2 Construction Noise Assessment

Noise predictions from the construction works have been predicted to the nearest receivers during the daytime and are summarised in **Table 14**.

The results represent the worst-case noise levels where all equipment in each scenario is working concurrently. For most construction activities, it is expected that the construction noise levels would frequently be lower than predicted.

Table 14 Predicted Daytime Construction Noise Levels

Construction Scenario	Receiver / NCA	Noise Level LAeq(15minute) (dBA)		
		Daytime NML	Predicted Level	Exceedance
W.001 Site Establishment	R01 (12 Bringelly Road – Abandoned Condition) ¹	56	36	-
	R02 (12 Bringelly Road)		52	-
	R03 (Properties along Cowpasture Road)		53	-
	R04 (Properties along Stuart Road)	49	57	8
	R05 (Properties to West of development)	54	54	-
	R06 (MindChamps Early Learning Centre)	70 (play areas)	59	
		50 (sleeping)	59	9
	R07 (CEA Office building)	70	70	-
W.002 Ground Works	R01 (12 Bringelly Road – Abandoned Condition) ¹	56	36	-
	R02 (12 Bringelly Road)		52	-
	R03 (Properties along Cowpasture Road)		53	-
	R04 (Properties along Stuart Road)	49	57	8
	R05 (West of development)	54	54	-
	R06 (MindChamps Early Learning Centre)	70 (play areas)	59	
		50 (sleeping)	59	9
	R07 (CEA Office building)	70	70	-
W.003 Structural Works	R01 (12 Bringelly Road – Abandoned Condition) ¹	56	32	-
	R02 (12 Bringelly Road)		46	-
	R03 (Properties along Cowpasture Road)		48	-
	R04 (Properties along Stuart Road)	49	54	5
	R05 (West of development)	54	50	-
	R06 (MindChamps Early Learning Centre)	70 (play areas)	55	-
		50 (sleeping)	55	5
	R07 (CEA Office building)	70	57	-
W.004 Service Installation	R01 (12 Bringelly Road – Abandoned Condition) ¹	56	30	-
	R02 (12 Bringelly Road)		44	-
	R03 (Properties along Cowpasture Road)		46	-
	R04 (Properties along Stuart Road)	49	52	3
	R05 (West of development)	54	48	-
	R06 (Clever Cookies Child Care)	70 (play areas)	53	-
		50 (sleeping)	53	3
	R07 (CEA Office building)	70	55	-

Construction Scenario	Receiver / NCA	Noise Level LAeq(15minute) (dBA)		
		Daytime NML	Predicted Level	Exceedance
W.005 Finishing Trades	R01 (12 Bringelly Road – Abandoned Condition) ¹	56	<30	-
	R02 (12 Bringelly Road)		40	-
	R03 (Properties along Cowpasture Road)		42	-
	R04 (Properties along Stuart Road)	49	48	-
	R05 (West of development)	54	44	-
	R06 (Clever Cookies Child Care)	70 (play areas)	49	-
		50 (sleeping)	49	-
	R07 (CEA Office building)	70	51	-

Note 1: Receiver not considered noise sensitive.

The above shows the following:

- The noise levels from construction of the project are generally predicted to comply with the criteria at most receivers. Moderate worst-case exceedances of up to 9 dB are however predicted at the nearest receivers to the north when noisier work activities are being completed. This is due to the proximity of the receivers to the northern boundary of the site and the relatively low existing background levels in this area.
- It is likely that exceedances would only occur when work is being carried out at the northern end of the site. Noise levels are expected to comply when works move to the southern end of the site.
- It is noted that works would only occur during Standard Daytime Construction Hours.

4.3 Construction Vibration Assessment

The major potential sources of vibration from the proposed construction activities would likely be during earthworks when vibratory rollers are being used.

Vibration offset distances have been determined from the CNVG minimum working distances for cosmetic damage and human response in **Table 9** and the assessment is summarised in **Figure 3**. Buildings within the minimum working distances are shown on the figure.

Figure 3 Construction Vibration – Vibratory Roller used as part of Earthworks



Cosmetic Damage Assessment

The above figure shows that the distance between the construction works and the nearest sensitive receivers is generally sufficient for most buildings to be outside of the cosmetic damage minimum working distances. The adjacent CFC warehouse is however marginally within the minimum working distance and impacts may occur when vibration intensive works are being completed nearby.

Human Comfort Vibration Assessment

The CFC warehouse and office building are also within the human comfort minimum working distance and occupants of these buildings may be able to perceive vibration impacts at times when vibration intensive equipment is in use. Where impacts are perceptible, they would likely only be apparent for relatively short durations when vibration intensive equipment is in use.

Construction mitigation and management measures are discussed further in **Section 6**.

4.4 Construction Traffic

The requirements for construction traffic accessing the site would be minimal and would not be expected to result in any additional noise impacts at the nearest receivers due to the roads in the area being major routes with high existing volumes of traffic.

5 Operational Noise Assessment

5.1 Operational Noise Sources

A summary of the potential noise sources associated with the operation of the facility is provided below.

5.1.1 On-Site Traffic

The modelling of on-site vehicles has been based on the provided traffic data presented in **Table 15**. The volumes are assumed to be representative of the worst-case 15-minute period for the daytime, evening and night-time.

Table 15 Vehicle Volumes – Worst-case 15 Minute Period

Vehicle Type	Number of Vehicles (per Worst-case 15 Minute)		
	Daytime	Evening	Night-time
Trucks	6	1	1
Light Vehicle Traffic	13	1	2

On-site vehicles have been modelled as line sources based on the sound power levels and assumed speeds presented in **Table 16**.

Table 16 Vehicle Speeds & Sound Power Levels

Noise Source	Sound Power Level (dBA)	Vehicle Speed	Location
Trucks	105	20 km/h	Site perimeter truck route
Light Vehicle Traffic	95	20 km/h	Car park

The following typical noise sources associated with trucks loading are presented in **Table 17**. Loading and unloading activities have been modelled in the northern most loading bays which represents a worst-case situation for the nearest receivers to the north. A truck has also been modelled in the northern truck parking area.

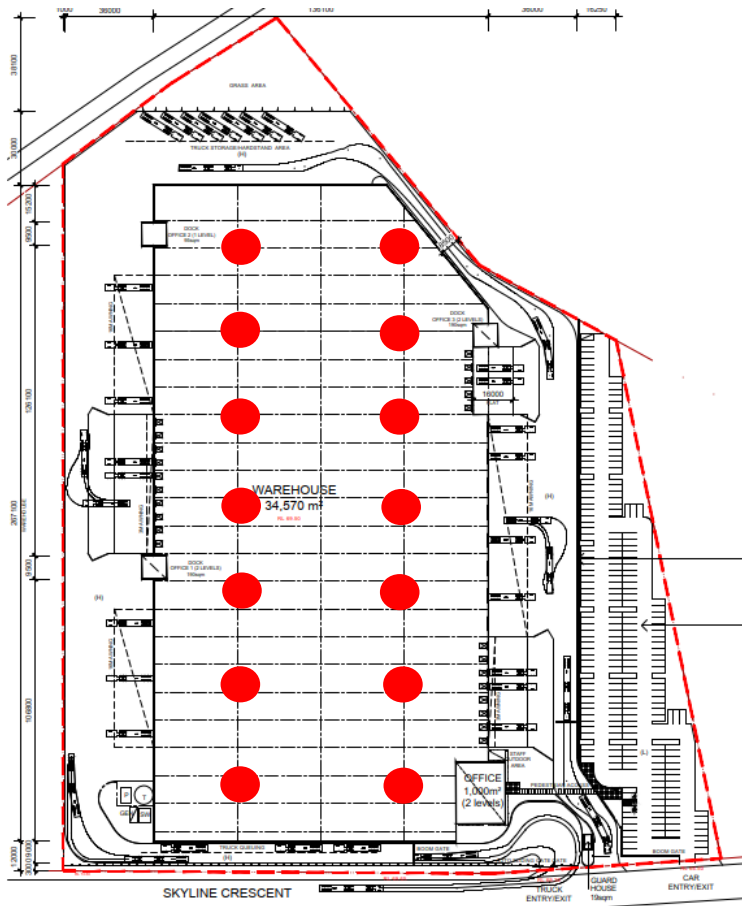
Table 17 Typical Truck Parking Noise Levels and Duration of Operation

Noise Source	Sound Power Level (dBA)	Typical Duration of Operation	Source Height
Reversing Alarm ¹	110	10 seconds	1.5 m
Air brakes	120	1 second	1.5 m
Roller door	94	60 seconds	4 m
Forklift	93	900 seconds	0.5 m

Note 1 It is noted that the operation of this plant is typically intermittent in nature. A +5 dB modifying correction factor is therefore applied to the noise level to account for its potential to cause annoyance, in accordance with the NPfl.

The mechanical plant at the site would likely be limited to rooftop air-conditioning equipment and supply/extraction fans. A total of 14 180 kW Fusion Modular (FPA180) units will be placed on the roof in two rows.

Figure 4 Indicative Rooftop Mechanical Plant Location



The assumed sound power level for mechanical plant is shown in **Table 18** based on equipment with a similar capacity.

Table 18 Assumed Mechanical Plant Details

Noise Source	Sound Power Level (dBA)	Typical Duration of Operation	Source Height ¹
180 kW Fusion Modular	90 ²	24 hours	0.5 m

Note 1: Height above roof.

Note 2: The mechanical plant would be shielded by a small parapet around each unit. The modelled sound power level has therefore been reduced by 5 dB to account for shielding that would be provided.

5.1.2 Warehouse Internal Activities

The internal noise generating activities are expected to be minimal and would not significantly contribute to external noise emissions.

5.1.3 Noise Sources with Potential for Sleep Disturbance

As the facility operates 24 hours per day, noise emissions during the night-time require an assessment for potential sleep disturbance at the nearest noise sensitive receivers. A summary of the L_{Amax} sound power levels of typical activities that may occur at the facility with the potential to cause sleep disturbance is presented in **Table 19**.

Table 19 Sleep Disturbance – L_{Amax} Sound Power Levels

Noise Source	L_{Amax} SWL (dBA)	Source height
Truck Movements	108	1 m
Airbrake	120	1 m
Reversing Alarm	110	1 m
Roller Door	94	4 m

These sources have been assumed to be in the north-eastern most loading dock, which is the location which would most affect the nearest receivers to the north-east.

5.2 Noise Level Predictions

5.2.1 Lot 4 Predicted Levels

SoundPLAN V8 has been used for modelling the noise emissions from the proposal using the ISO 9613-2 industrial noise algorithm. The model includes ground topography, buildings and representative noise sources as discussed in **Section 5.1**.

The predicted noise levels at the nearest receivers from industrial noise emissions are presented in **Table 20**.

Table 20 Industrial Noise Assessment

Scenario	Receiver Location	Period	LAeq(15 minutes) Noise Level (dBA)			Compliance?
			Project Noise Trigger Level	Predicted	Exceedance	
Lot 4 Industrial Noise Sources	R01 – 12 Bringelly Road, Horningsea Park (abandoned property)	Daytime	51	<30	-	Yes
		Evening	43	<30	-	Yes
		Night-time	40	<30	-	Yes
	R02 – 12 Bringelly Road, Horningsea Park	Daytime	51	36	-	Yes
		Evening	43	30	-	Yes
		Night-time	40	<30	-	Yes
	R03 – Cowpasture Road Receivers	Daytime	51	40	-	Yes
		Evening	43	35	-	Yes
		Night-time	40	33	-	Yes
	R04 – Receivers to the north	Daytime	44	46	2	No
		Evening	41	40	-	Yes
		Night-time	36	38	2	No
	R05 – Receivers to the west	Daytime	49	38	-	Yes
		Evening	43	33	-	Yes
		Night-time	38	33	-	Yes
	R06 - Clever Cookies Child Care	When in use	48	47	-	Yes
	R07 - CEA Office building	When in use	63	46	-	Yes
	R08 – Proposed Bunnings Warehouse building	When in use	63	63	-	Yes

The above assessment indicates that noise levels are generally predicted to comply with the Project Noise Trigger Level at most receivers. A relatively minor exceedance of 2 dB during the daytime and night-time is, however, predicted at the nearest residential receiver to the north-east (at receiver R04).

The predicted exceedances are caused by truck movements around the site boundary near the truck parking area. Noise from all other activities is predicted to comply with the goals during all periods.

With regard to the exceedances, it is noted that the existing noise environment of the area is controlled by existing road traffic noise from on surrounding road network. Reference to the noise monitoring data shows that existing LAeq noise levels near the Stuart Road receivers are higher than the predicted noise from the proposal. When considering this, together with the relatively low number of trucks that would access the site, particularly during the more sensitive night-time period, the predicted 2 dB exceedances are consider minor. Additionally, the NPfl notes that where exceedances of ≤2 dB are apparent the significance of the residual noise levels is generally considered negligible.

5.2.2 Cumulative Noise from all Developments

Cumulative operational noise levels from Lot 4, Steelforce (assessed in SLR report 610.17734-R03-v1.0), CFC (assessed in SLR report 610.17734-R02-v1.3) and Bunnings (assessed in Wilkinson Murray report 19268 Version A) have been assessed at the surrounding residential receivers and the results are shown in **Table 21**.

Table 21 Cumulative Noise Levels – Lot 4, Steelforce, CFC and Bunnings

Receiver Location	Period	LAeq(15 minutes) Noise Level (dBA)							Compliance?
		Noise Trigger Level ¹	Steelforce	CFC	Bunnings	Lot 4	Cumulative Level	Exceedance	
R01 – 12 Bringelly Road, Horningsea Park (abandoned property)	Daytime	58	51	34	-	<30	51	-	Yes
	Evening	48	51	33	-	<30	51	3	No
	Night-time	43	42	33	-	<30	43	-	Yes
R02 – 12 Bringelly Road, Horningsea Park	Daytime	58	42	45	-	36	47	-	Yes
	Evening	48	42	34	-	30	43	-	Yes
	Night-time	43	33	34	-	<30	37	-	Yes
R03 – Cowpasture Road Receivers	Daytime	58	35	34	-	40	42	-	Yes
	Evening	48	35	32	-	35	39	-	Yes
	Night-time	43	30	32	-	33	37	-	Yes
R04 – Receivers to the north	Daytime	58	36	43	35	46	48	-	Yes
	Evening	48	36	35	35	40	43	-	Yes
	Night-time	43	30	35	n/a	38	40	-	Yes
R05 – Receivers to the west	Daytime	58	-	38	44	38	46	-	Yes
	Evening	48	-	30	44	33	44	-	Yes
	Night-time	43	-	30	n/a	33	35	-	Yes

Note 1: The cumulative noise criteria is taken to be the amenity level plus 3 dB (to convert it to a 15-minute assessment level), as per the NPfI.

Note 2: Noise from Steelforce is not expected to significantly impact R05.

Note 3: Noise from Bunnings is not expected to significantly impact R01, R02 and R03.

The above shows that cumulative noise levels are expected to comply with the goals at all residential receivers except R01 during the evening. This receiver is to the immediate east of the approved and currently operational Steelforce site and noise levels at this receiver are controlled by emissions from Steelforce alone (ie the cumulative noise level is the same as the noise level from Steelforce alone).

Cumulative noise levels are therefore not expected to introduce any additional adverse effects at any receivers surrounding the site.

5.2.3 Sleep Disturbance

The predicted night-time L_{Amax} noise levels at the nearest habitable receivers to the development are presented in **Table 22**.

Table 22 Summary of Predicted Sleep Disturbance Noise Levels (dBA)

Receiver Location	Source	LAF _{max} Noise Level (dBA)			Compliance?
		Criteria	Predicted	Exceedance	
R02 – 12 Bringelly Road, Horningsea Park	Airbrake	52	45	-	Yes
	Reversing Alarm		36	-	Yes
	Roller Door		<30	-	Yes
	Truck Movements		45	-	Yes
R03 – Cowpasture Road Receivers	Airbrake	52	56	4	No
	Reversing Alarm		46	-	Yes
	Roller Door		30	-	Yes
	Truck Movements		44	-	Yes
R04 – Receivers to the north	Airbrake	52	60	8	No
	Reversing Alarm		50	-	Yes
	Roller Door		<30	-	Yes
	Truck Movements		52	-	Yes
R05 – Receivers to the west	Airbrake	54	35	-	Yes
	Reversing Alarm		<30	-	Yes
	Roller Door		<30	-	Yes
	Truck Movements		47	-	No

The above shows that noise from truck air brakes is predicted to exceed the night-time sleep disturbance goal at the residences to the north and east. The use of truck airbrakes is however expected to be an infrequent event (during loading of trucks only) and the impacts from this are considered relatively minor given existing noise levels in the area are controlled by road traffic movements on the surrounding road network.

5.3 Traffic Increases on the Surrounding Road Network

Light and heavy vehicles associated with the facility would access the site directly from Bringelly Road. Given the high existing volumes on this route, the potential noise impacts from additional traffic generated by the development is considered negligible.

6 Mitigation

6.1 Construction Noise

Noise impacts may be apparent at the nearest receivers during construction of the project. The project should apply all feasible and reasonable mitigation measures to minimise the impacts, particularly during noise intensive works.

The following example measures shown in **Table 23** should be implemented to minimise the potential impacts from the works.

Table 23 Standard Recommended Mitigation Measures

Project stage	Measure
Scheduling	Wherever possible, highly noisy intensive works should only be undertaken during the following hours, unless otherwise assessed and justified: <ul style="list-style-type: none"> - 7 am to 6 pm Mondays to Fridays, inclusive; and - 8 am to 1 pm Saturdays; and - at no time on Sundays or public holidays.
	Provide respite periods when noisy works are undertaken outside standard hours of construction or during periods where high noise impacts are likely.
	Carry out community consultation to determine the need and frequency of respite periods, if necessary.
	Avoid loading and unloading of materials / deliveries outside of daytime hours.
Site Layout	Site entry and exit points should be located as far as possible from sensitive receivers.
	Compounds and work areas should be designed to as one-way to minimise the need for vehicles to reverse.
	Work compounds, parking areas, equipment and stockpiles should be positioned away from noise-sensitive locations and/or in shielded locations.
	Trucks should not idle near to residential receivers.
	Stationary sources of noise, such as generators, should be located away from sensitive receivers.
Contractor management	Training should be provided to project personnel, including relevant sub-contractors, on noise and vibration requirements and the location of sensitive receivers during inductions and toolbox talks.
	Delivery vehicles should be fitted with straps rather than chains for unloading, wherever possible.
	Truck drivers should avoid compression braking as far as practicable.
	Where night-time works are required, trucks should use broadband reversing alarms.

Project stage	Measure
Noise source mitigation	Use the minimum sized equipment necessary to complete the work and where possible, use alternative, low-impact construction techniques.
	Power tools should use mains power where possible rather than generators.
	Shut down machinery, including generators, when not in operation.
	Avoid dropping materials from a height and dampen or line metal trays, as necessary.
	Ensure equipment is operated in the correct manner.
	All equipment should be appropriately maintained and fitted with noise control devices, where practicable, including acoustic lining of engine bays and air intake / discharge silencers, etc.
	Where possible, use dampened 'city' bits on jackhammers and rockbreakers.
Community consultation	Provide appropriate notice on the Bringelly Road Business Hub website prior to starting works.
	Provide signage with a 24 hour contact number.
	Where there are complaints regarding noise, review and implement additional control measures, where feasible and reasonable.
Monitoring	Conduct noise and/or vibration monitoring in response to any valid complaints received.

6.2 Operational Noise

Operational noise emissions from the proposal are predicted to be compliant at most of the surrounding receivers with the exception of minor exceedances at the nearest receivers to the north-east, due to truck movements.

The significance of this exceedance is however considered low and does not warrant any specific mitigation measures. Notwithstanding, it is recommended that operational procedure for the site should recognise that there is potential for impacts to receivers to the north-east, particularly during the night-time, and should aim to minimise noise emissions from trucks (and the site) as far as practicable.

7 Conclusion

Construction and operational noise emissions associated with the proposed facility at Lot 4 of the Bringelly Business Hub have been assessed against the appropriate *Noise Policy for Industry* trigger levels and *Interim Construction Noise Guideline* Noise Management Levels.

Construction noise levels are predicted to result in moderate worst-case impacts at the nearest receivers to the north-east, however, it is noted that works would only be completed during the daytime and not during evening or night-time periods. Noise levels at the other more distant receivers are expected to be below the management levels.

Operational noise level are generally expected to be comply with the trigger levels except for minor exceedances at the nearest residences to the north-east, which is due to truck movements on the site access road. The significance of this exceedance is however considered low and does there not warrant any specific mitigation measures.

APPENDIX A

Acoustic Terminology

1. Sound Level or Noise Level

The terms 'sound' and 'noise' are almost interchangeable, except that 'noise' often refers to unwanted sound.

Sound (or noise) consists of minute fluctuations in atmospheric pressure. The human ear responds to changes in sound pressure over a very wide range with the loudest sound pressure to which the human ear can respond being ten million times greater than the softest. The decibel (abbreviated as dB) scale reduces this ratio to a more manageable size by the use of logarithms.

The symbols SPL, L or LP are commonly used to represent Sound Pressure Level. The symbol LA represents A-weighted Sound Pressure Level. The standard reference unit for Sound Pressure Levels expressed in decibels is 2×10^{-5} Pa.

2. 'A' Weighted Sound Pressure Level

The overall level of a sound is usually expressed in terms of dBA, which is measured using a sound level meter with an 'A-weighting' filter. This is an electronic filter having a frequency response corresponding approximately to that of human hearing.

People's hearing is most sensitive to sounds at mid frequencies (500 Hz to 4,000 Hz), and less sensitive at lower and higher frequencies. Different sources having the same dBA level generally sound about equally loud.

A change of 1 dB or 2 dB in the level of a sound is difficult for most people to detect, whilst a 3 dB to 5 dB change corresponds to a small but noticeable change in loudness. A 10 dB change corresponds to an approximate doubling or halving in loudness. The table below lists examples of typical noise levels.

Sound Pressure Level (dBA)	Typical Source	Subjective Evaluation
130	Threshold of pain	Intolerable
120	Heavy rock concert	Extremely noisy
110	Grinding on steel	
100	Loud car horn at 3 m	Very noisy
90	Construction site with pneumatic hammering	Loud
80	Kerbside of busy street	
70	Loud radio or television	
60	Department store	Moderate to quiet
50	General Office	
40	Inside private office	Quiet to very quiet
30	Inside bedroom	
20	Recording studio	Almost silent

Other weightings (eg B, C and D) are less commonly used than A-weighting. Sound Levels measured without any weighting are referred to as 'linear', and the units are expressed as dB(lin) or dB.

3. Sound Power Level

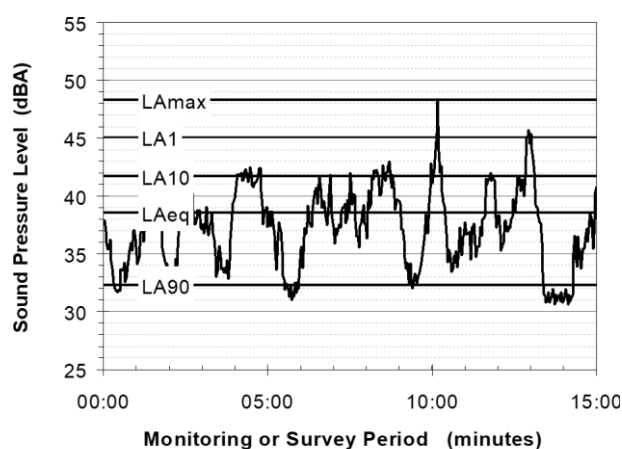
The Sound Power of a source is the rate at which it emits acoustic energy. As with Sound Pressure Levels, Sound Power Levels are expressed in decibel units (dB or dBA), but may be identified by the symbols SWL or LW, or by the reference unit 10^{-12} W.

The relationship between Sound Power and Sound Pressure is similar to the effect of an electric radiator, which is characterised by a power rating but has an effect on the surrounding environment that can be measured in terms of a different parameter, temperature.

4. Statistical Noise Levels

Sounds that vary in level over time, such as road traffic noise and most community noise, are commonly described in terms of the statistical exceedance levels LAN, where LAN is the A-weighted sound pressure level exceeded for N% of a given measurement period. For example, the LA1 is the noise level exceeded for 1% of the time, LA10 the noise exceeded for 10% of the time, and so on.

The following figure presents a hypothetical 15 minute noise survey, illustrating various common statistical indices of interest.



Of particular relevance, are:

LA1 The noise level exceeded for 1% of the 15 minute interval.

LA10 The noise level exceeded for 10% of the 15 minute interval. This is commonly referred to as the average maximum noise level.

LA90 The noise level exceeded for 90% of the sample period. This noise level is described as the average minimum background sound level (in the absence of the source under consideration), or simply the background level.

LAeq The A-weighted equivalent noise level (basically, the average noise level). It is defined as the steady sound level that contains the same amount of acoustical energy as the corresponding time-varying sound.

5. Frequency Analysis

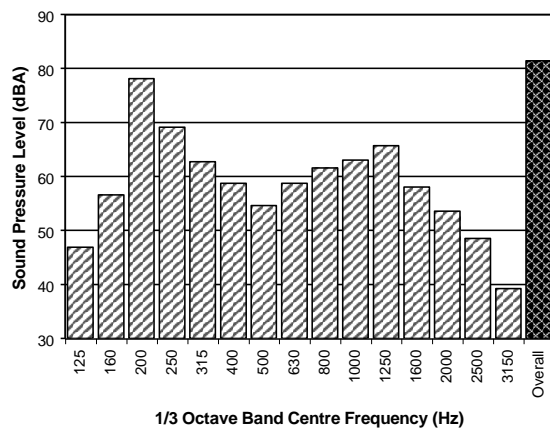
Frequency analysis is the process used to examine the tones (or frequency components) which make up the overall noise or vibration signal.

The units for frequency are Hertz (Hz), which represent the number of cycles per second.

Frequency analysis can be in:

- Octave bands (where the centre frequency and width of each band is double the previous band)
- 1/3 octave bands (three bands in each octave band)
- Narrow band (where the spectrum is divided into 400 or more bands of equal width)

The following figure shows a 1/3 octave band frequency analysis where the noise is dominated by the 200 Hz band. Note that the indicated level of each individual band is less than the overall level, which is the logarithmic sum of the bands.



6. Annoying Noise (Special Audible Characteristics)

A louder noise will generally be more annoying to nearby receivers than a quieter one. However, noise is often also found to be more annoying and result in larger impacts where the following characteristics are apparent:

- **Tonality** - tonal noise contains one or more prominent tones (ie differences in distinct frequency components between adjoining octave or 1/3 octave bands), and is normally regarded as more annoying than 'broad band' noise.
- **Impulsiveness** - an impulsive noise is characterised by one or more short sharp peaks in the time domain, such as occurs during hammering.
- **Intermittency** - intermittent noise varies in level with the change in level being clearly audible. An example would include mechanical plant cycling on and off.
- **Low Frequency Noise** - low frequency noise contains significant energy in the lower frequency bands, which are typically taken to be in the 10 to 160 Hz region.

7. Vibration

Vibration may be defined as cyclic or transient motion. This motion can be measured in terms of its displacement, velocity or acceleration. Most assessments of human response to vibration or the risk of damage to buildings use measurements of vibration velocity. These may be expressed in terms of 'peak' velocity or 'rms' velocity.

The former is the maximum instantaneous velocity, without any averaging, and is sometimes referred to as 'peak particle velocity', or PPV. The latter incorporates 'root mean squared' averaging over some defined time period.

Vibration measurements may be carried out in a single axis or alternatively as triaxial measurements (ie vertical, longitudinal and transverse).

The common units for velocity are millimetres per second (mm/s). As with noise, decibel units can also be used, in which case the reference level should always be stated. A vibration level V , expressed in mm/s can be converted to decibels by the formula $20 \log (V/V_0)$, where V_0 is the reference level (10^{-9} m/s). Care is required in this regard, as other reference levels may be used.

8. Human Perception of Vibration

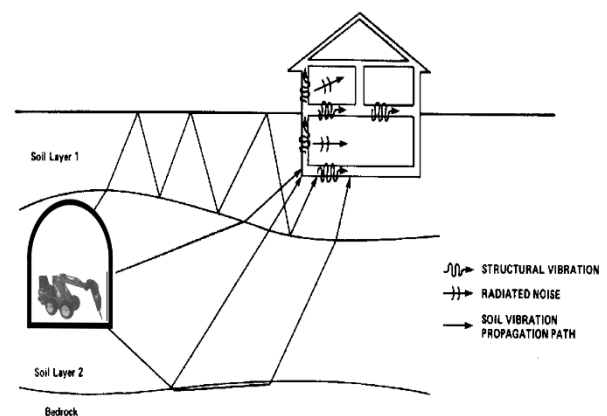
People are able to 'feel' vibration at levels lower than those required to cause even superficial damage to the most susceptible classes of building (even though they may not be disturbed by the motion). An individual's perception of motion or response to vibration depends very strongly on previous experience and expectations, and on other connotations associated with the perceived source of the vibration. For example, the vibration that a person responds to as 'normal' in a car, bus or train is considerably higher than what is perceived as 'normal' in a shop, office or dwelling.

9. Ground-borne Noise, Structure-borne Noise and Regenerated Noise

Noise that propagates through a structure as vibration and is radiated by vibrating wall and floor surfaces is termed 'structure-borne noise', 'ground-borne noise' or 'regenerated noise'. This noise originates as vibration and propagates between the source and receiver through the ground and/or building structural elements, rather than through the air.

Typical sources of ground-borne or structure-borne noise include tunnelling works, underground railways, excavation plant (eg rockbreakers), and building services plant (eg fans, compressors and generators).

The following figure presents an example of the various paths by which vibration and ground-borne noise may be transmitted between a source and receiver for construction activities occurring within a tunnel.



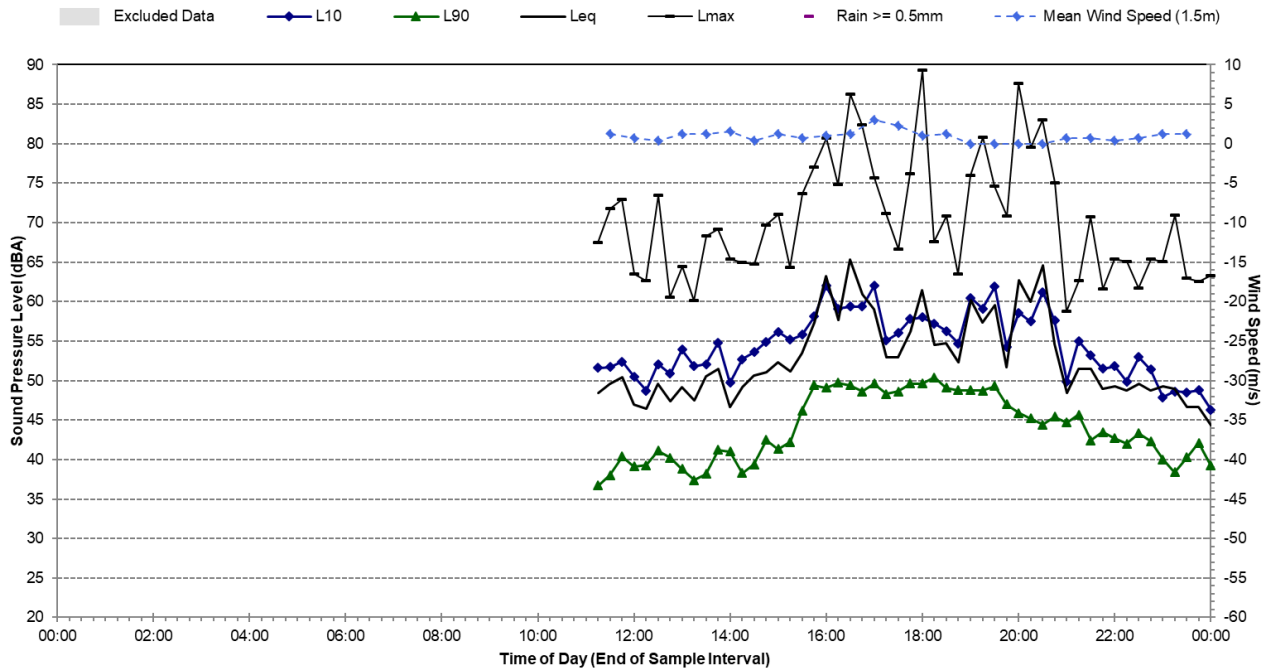
The term 'regenerated noise' is also used in other instances where energy is converted to noise away from the primary source. One example would be a fan blowing air through a discharge grill. The fan is the energy source and primary noise source. Additional noise may be created by the aerodynamic effect of the discharge grill in the airstream. This secondary noise is referred to as regenerated noise.

APPENDIX B

Noise Monitoring Graphs

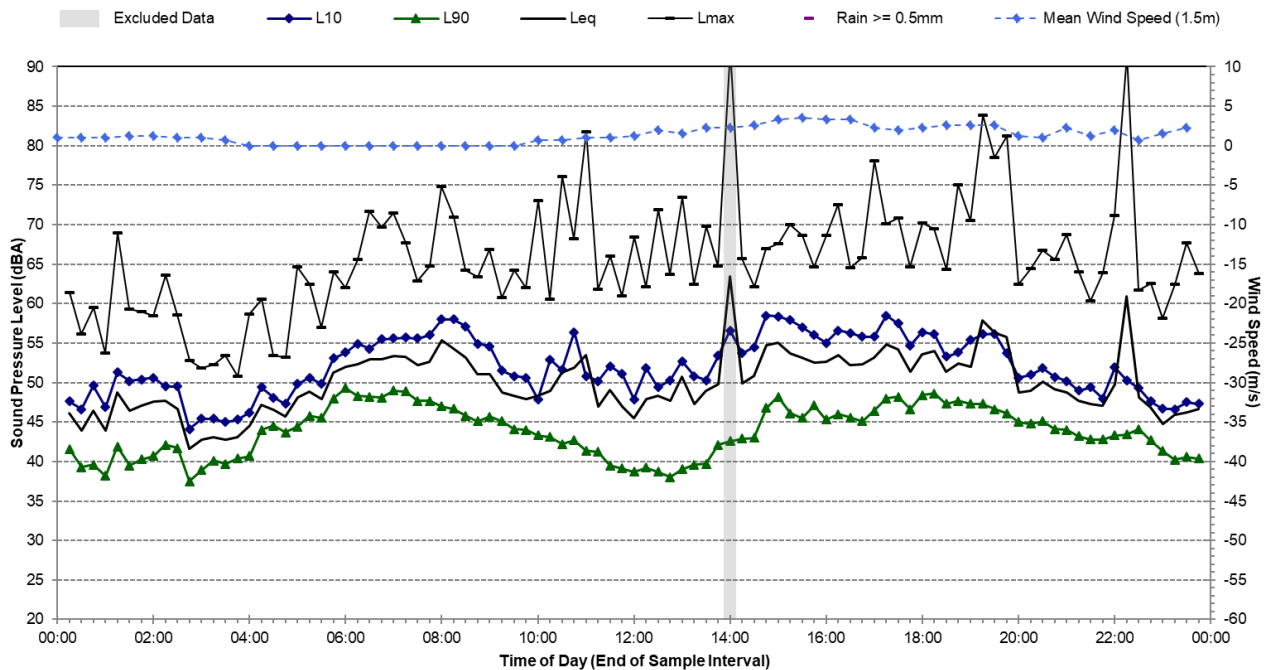
Statistical Ambient Noise Levels

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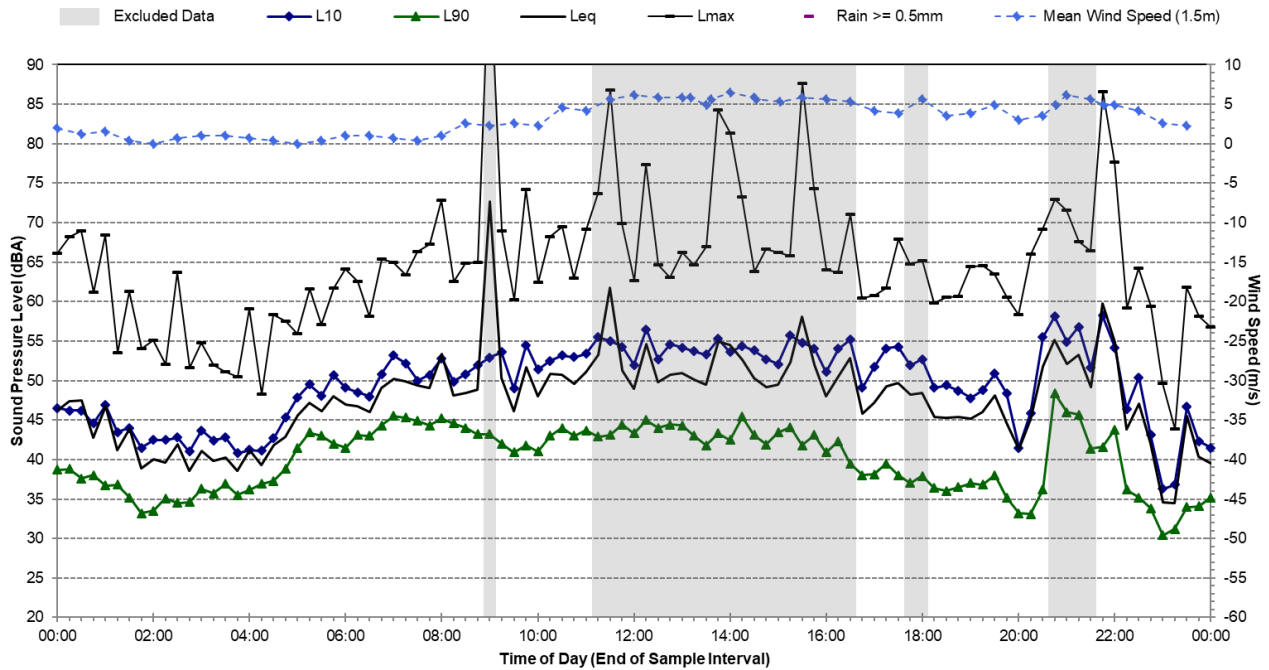
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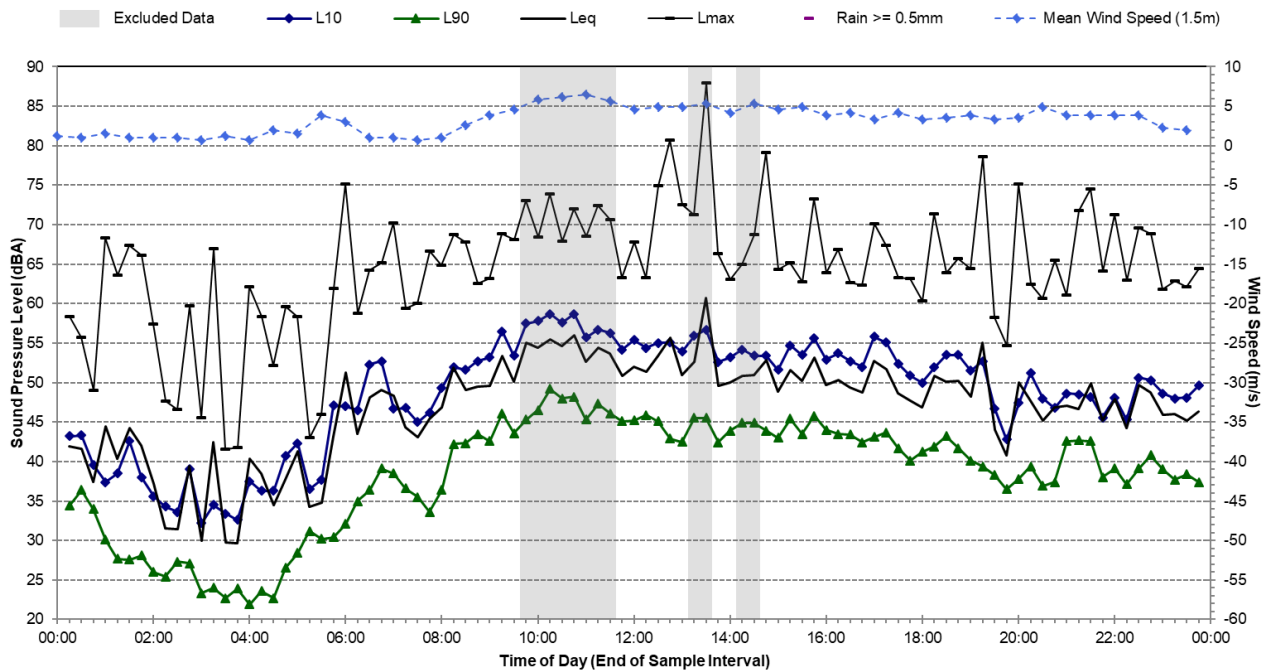
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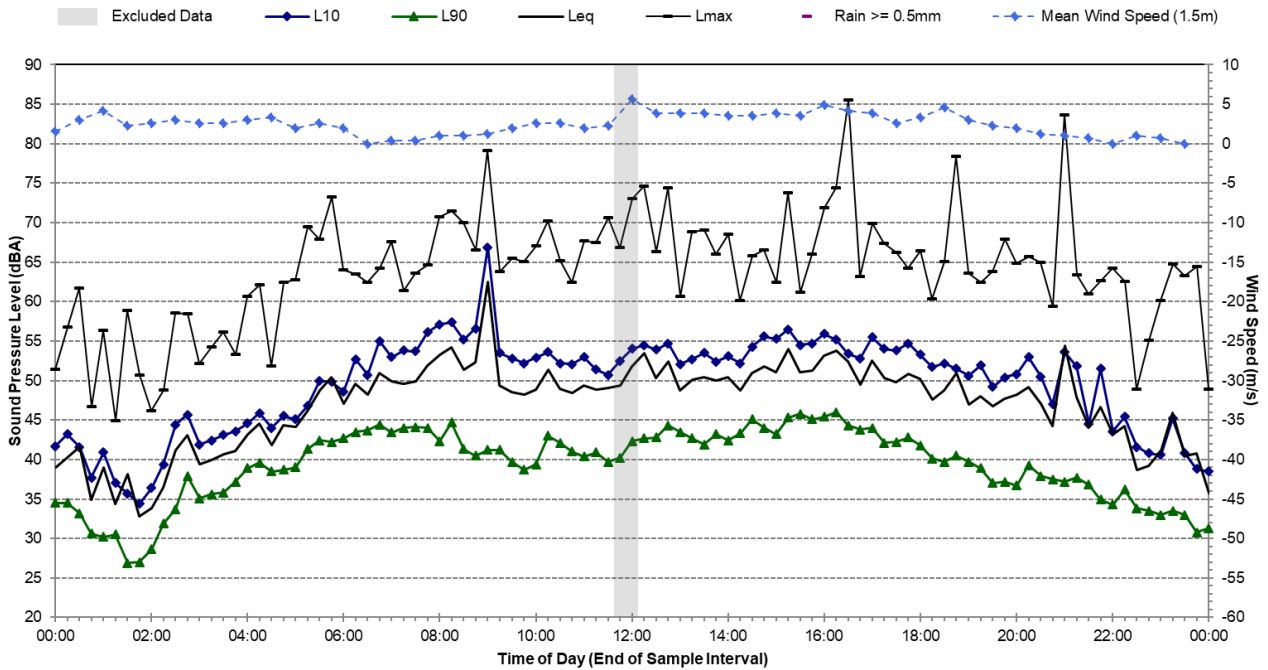
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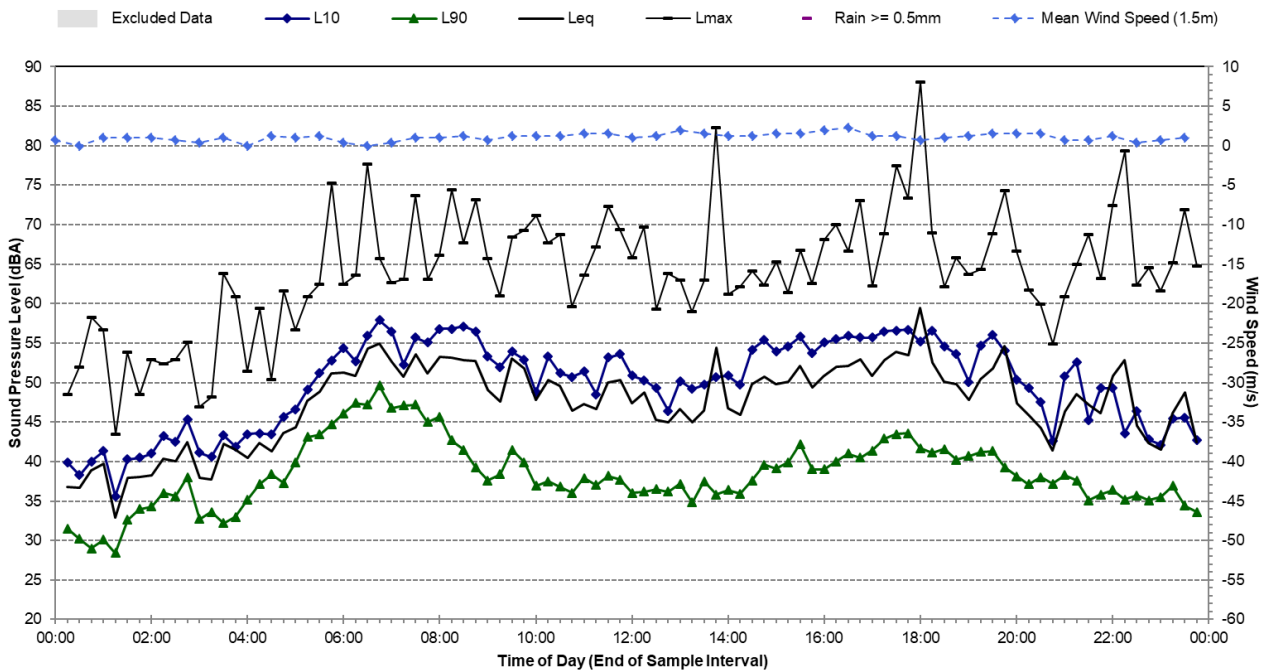
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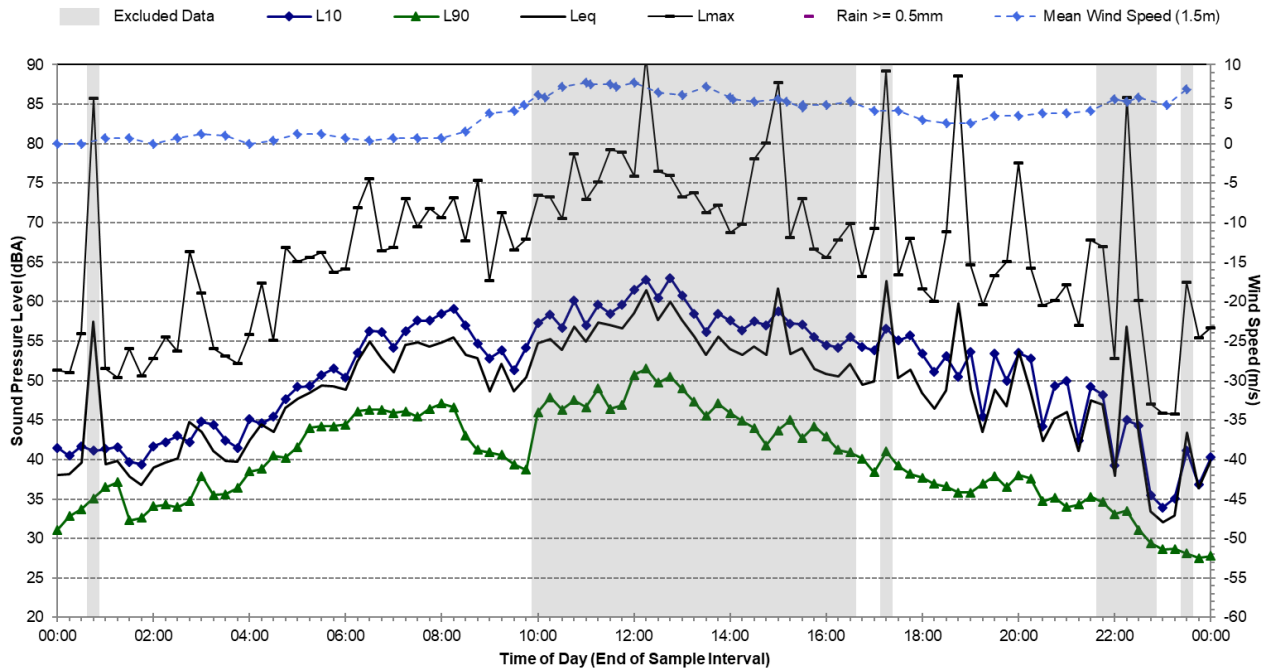
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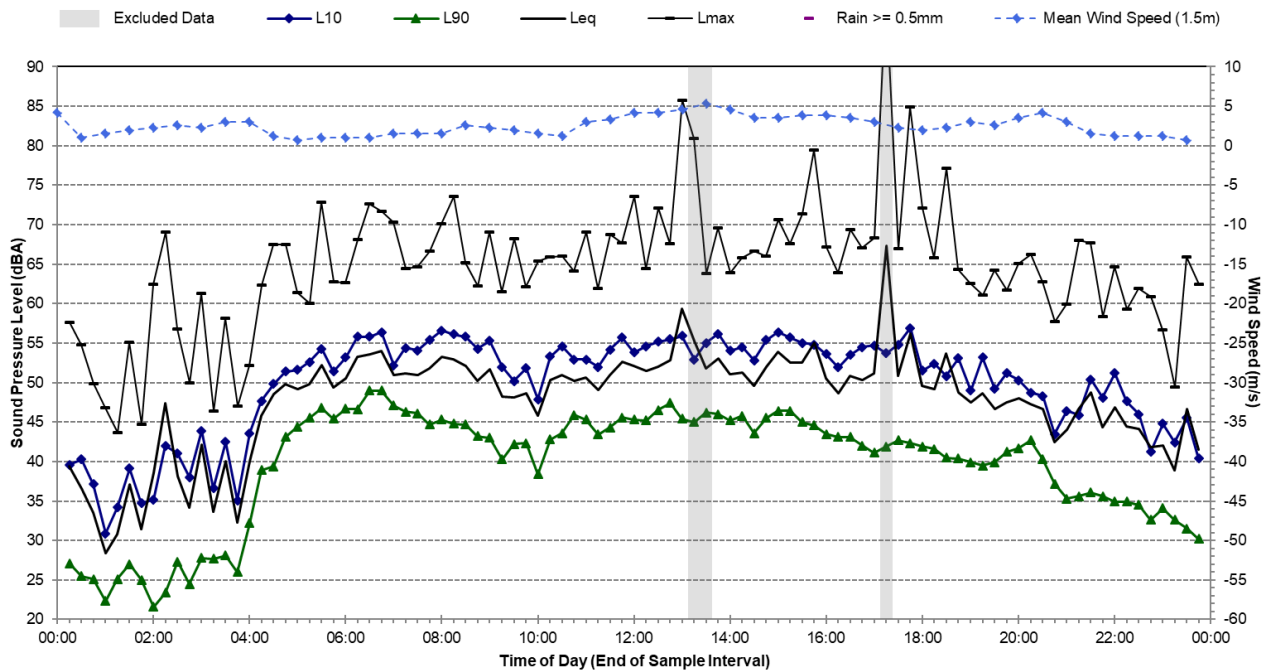
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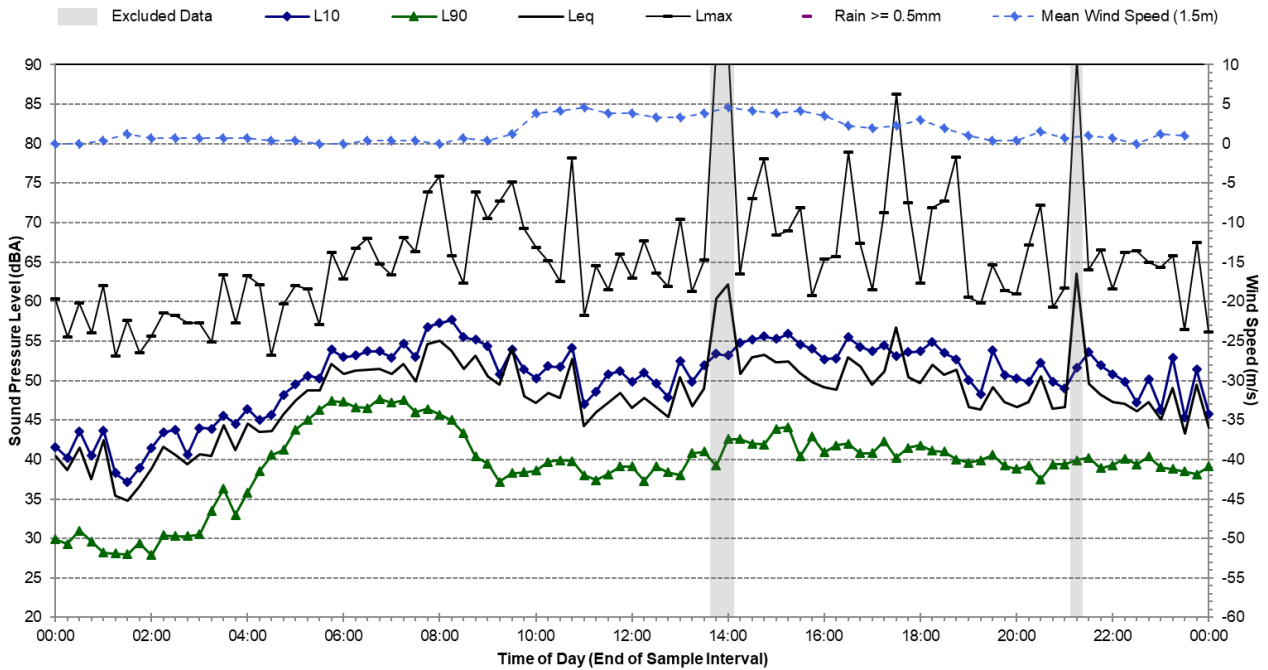
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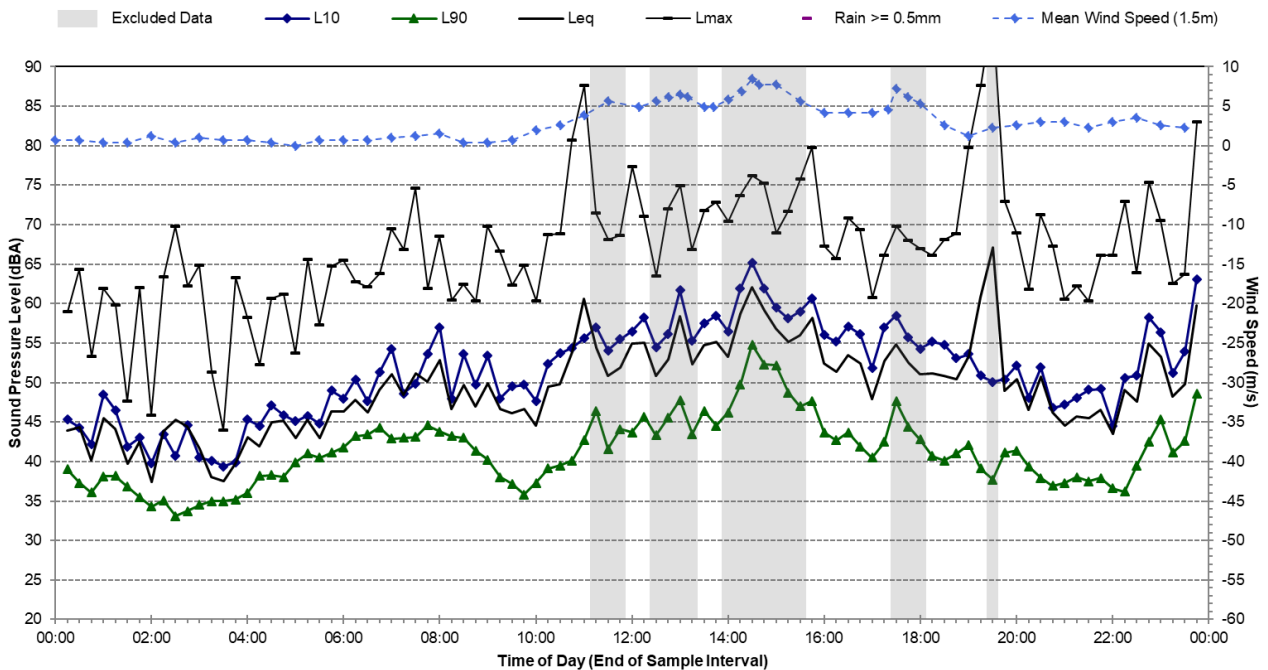
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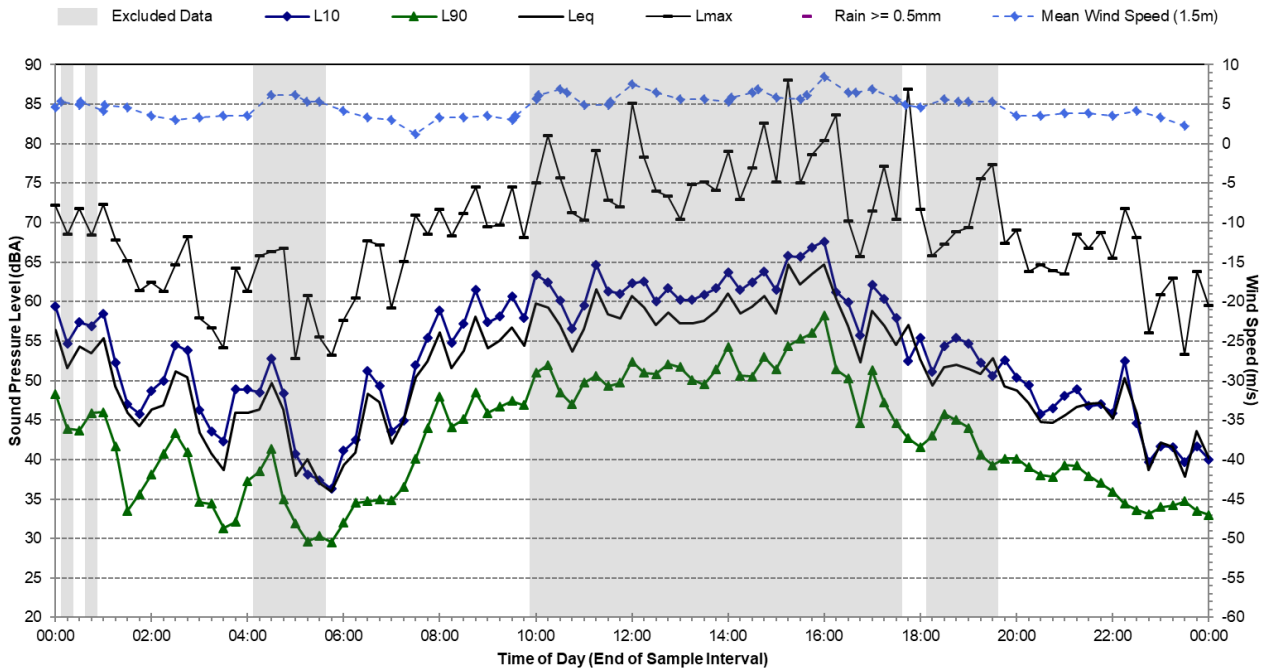
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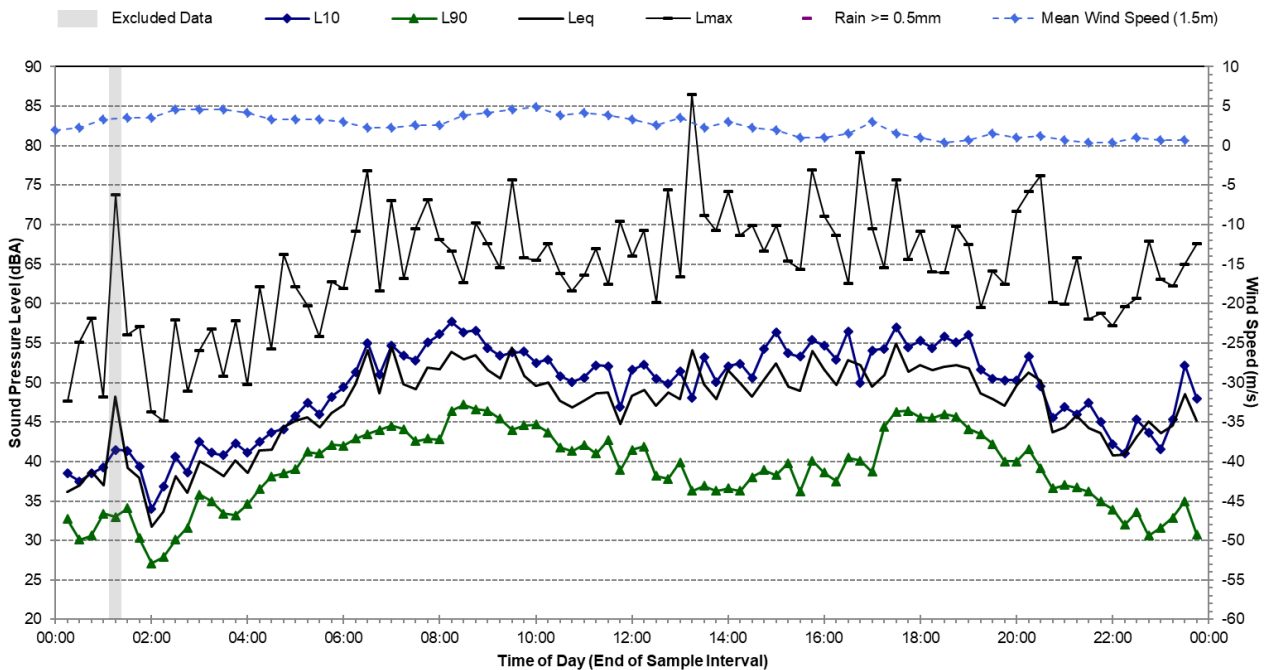
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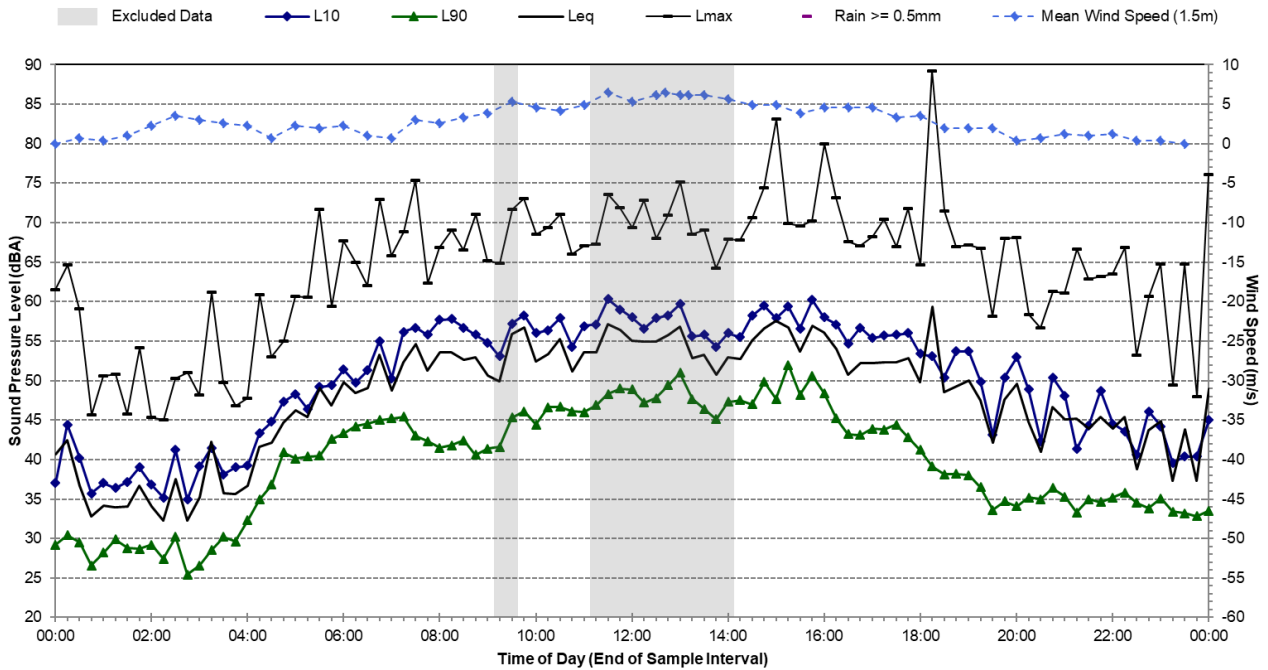
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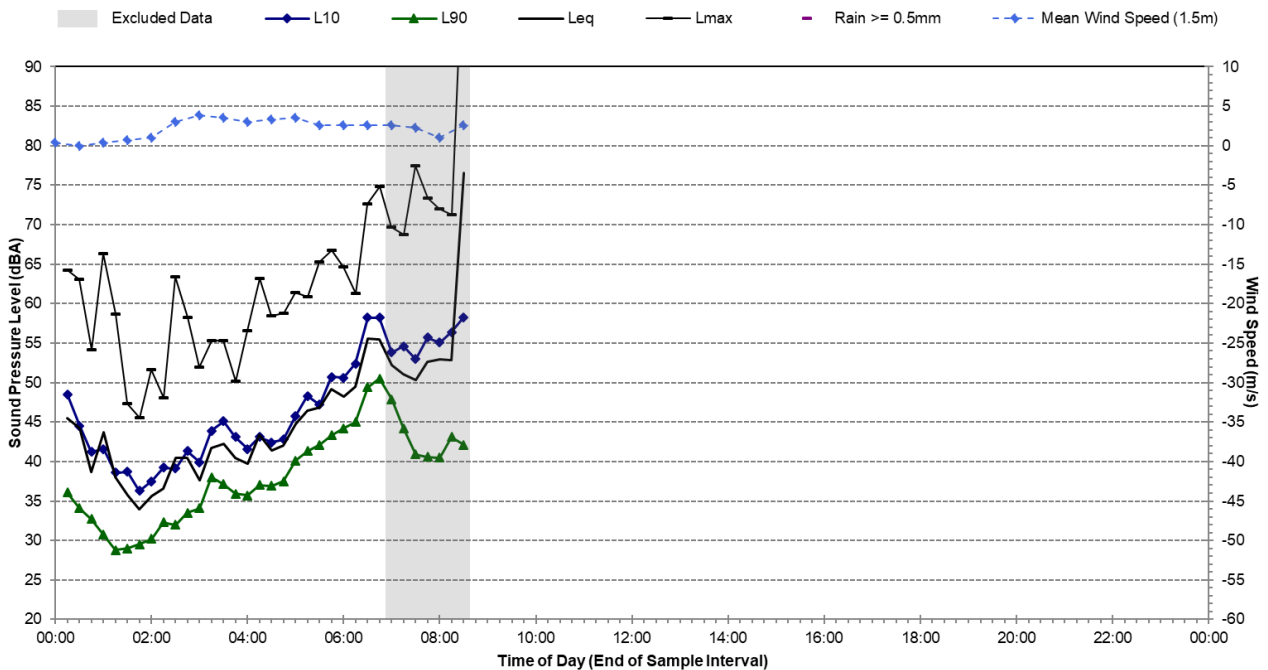
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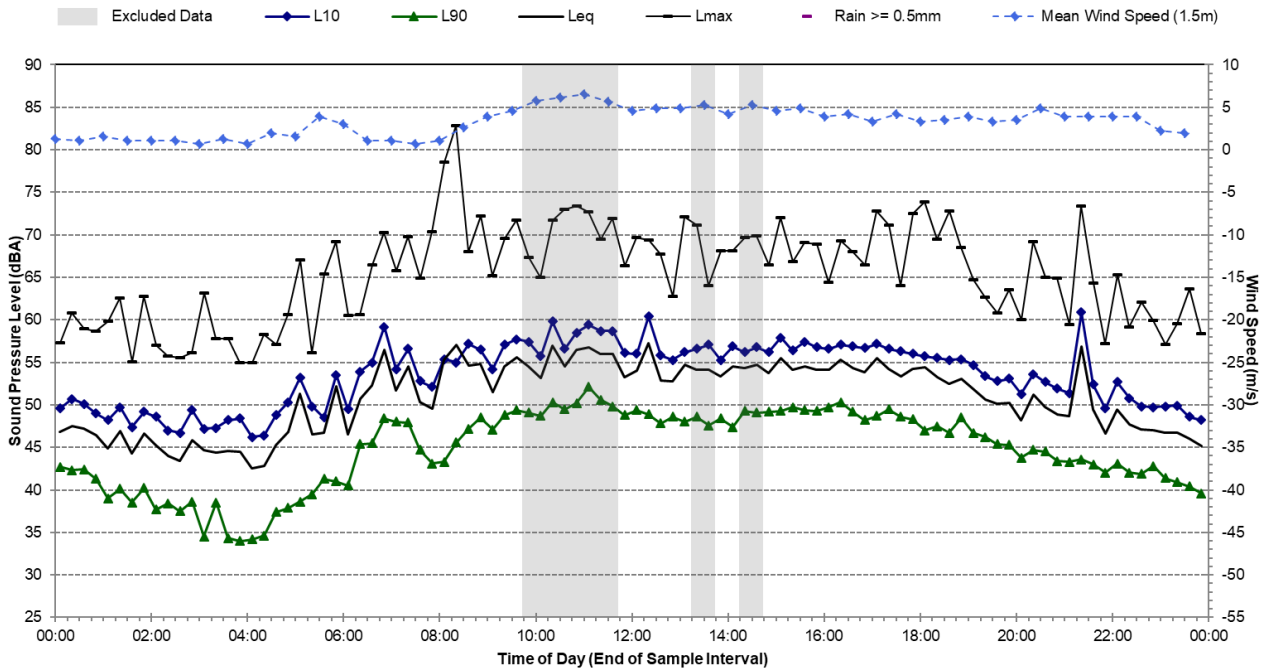
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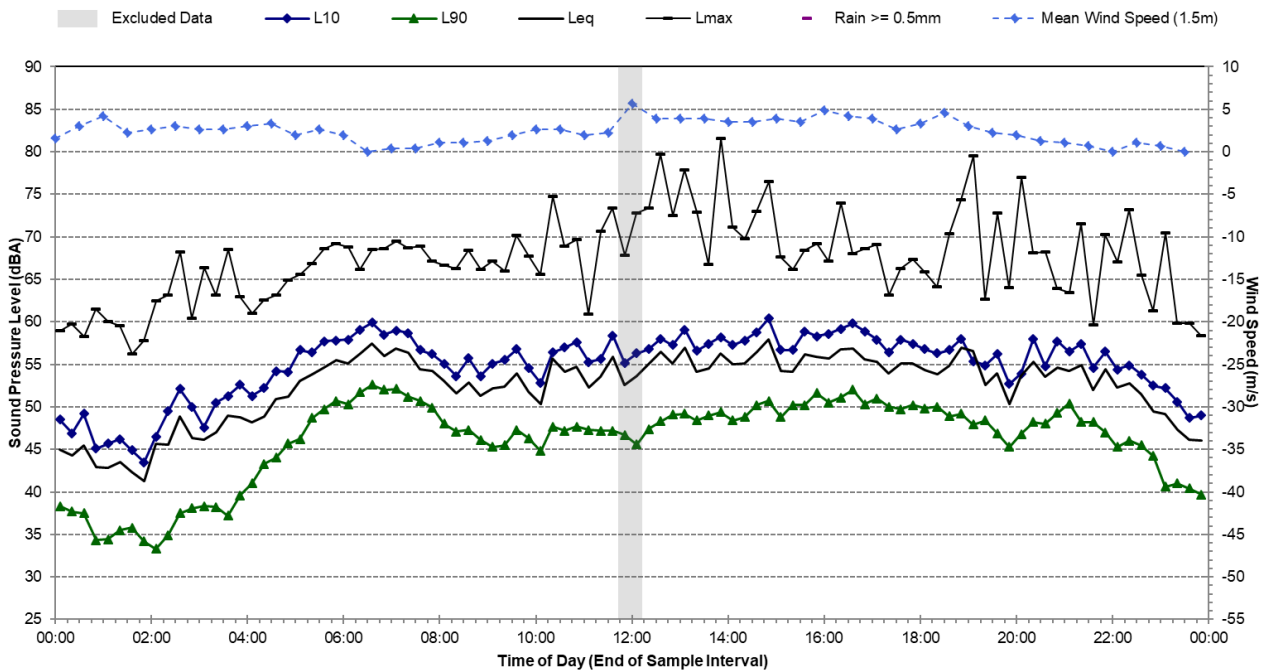
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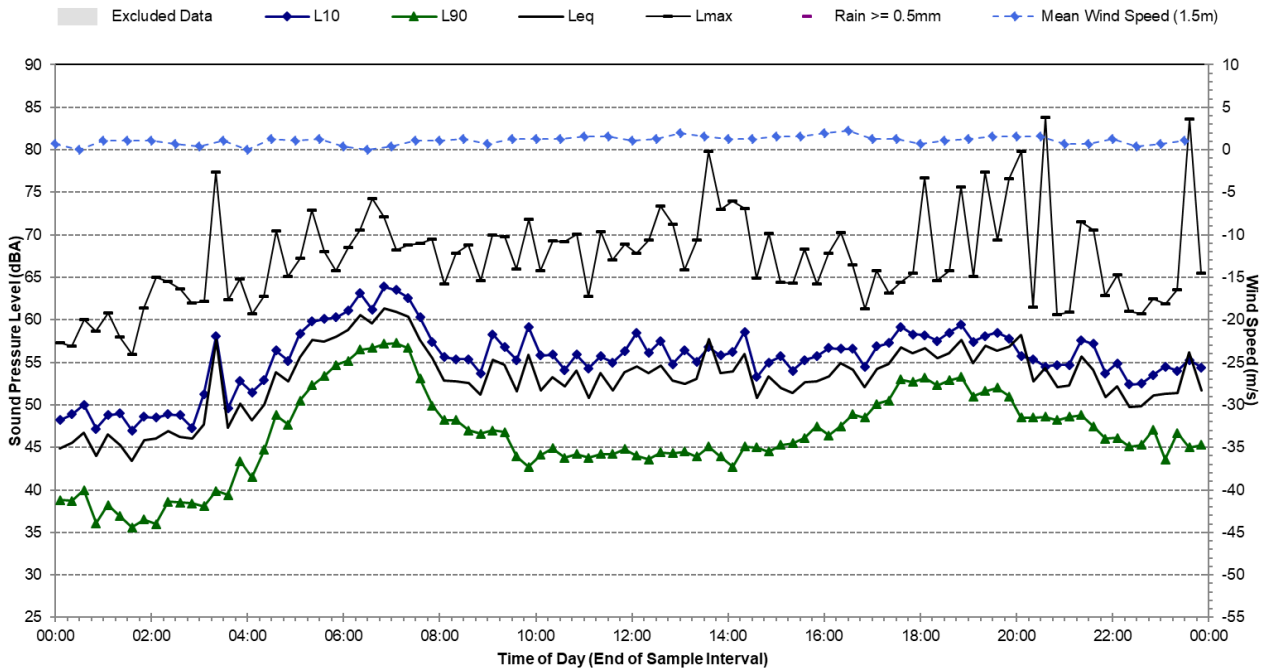
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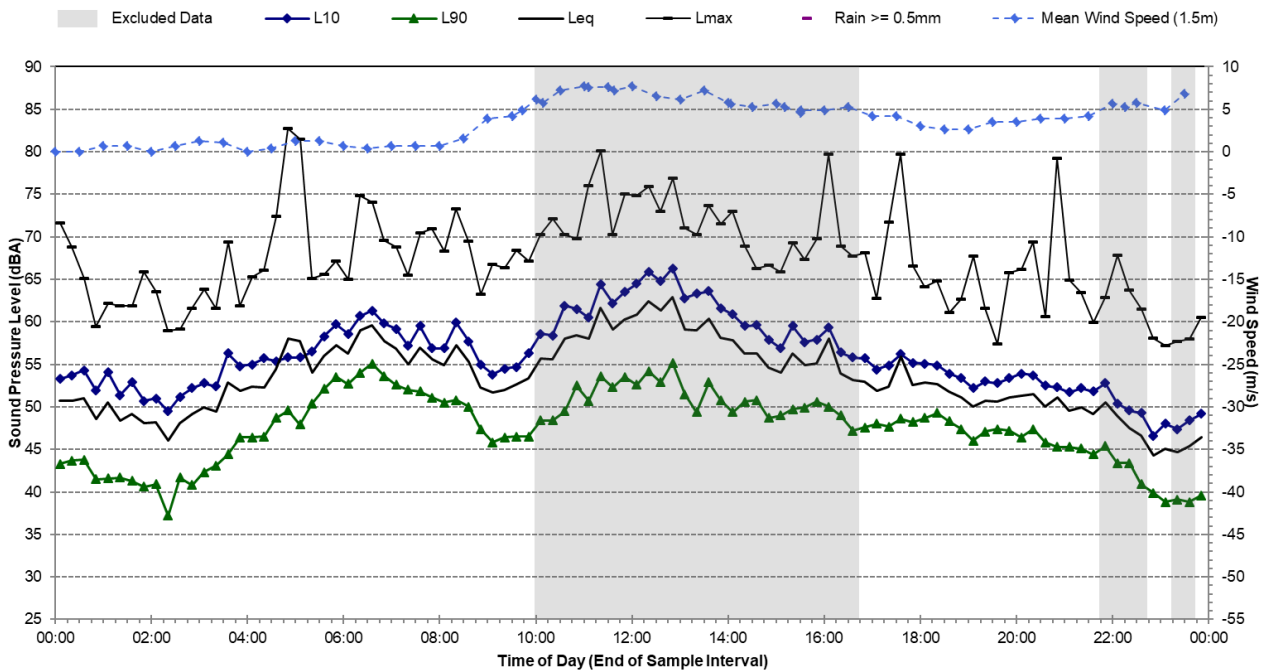
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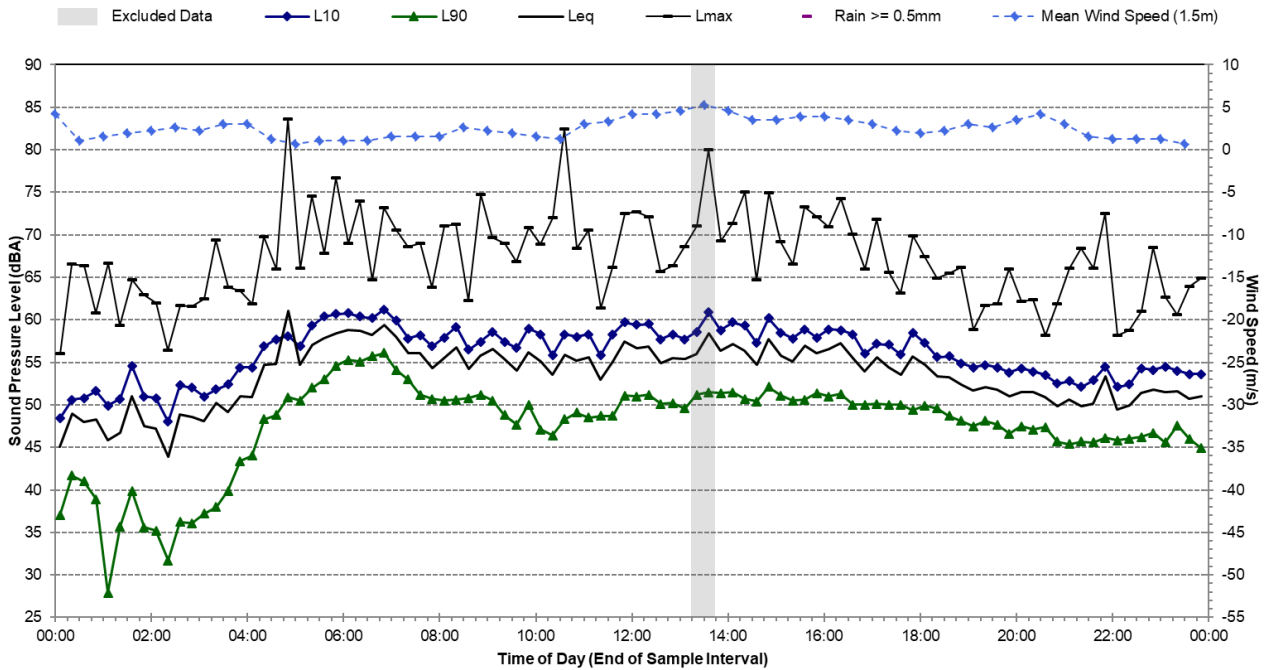
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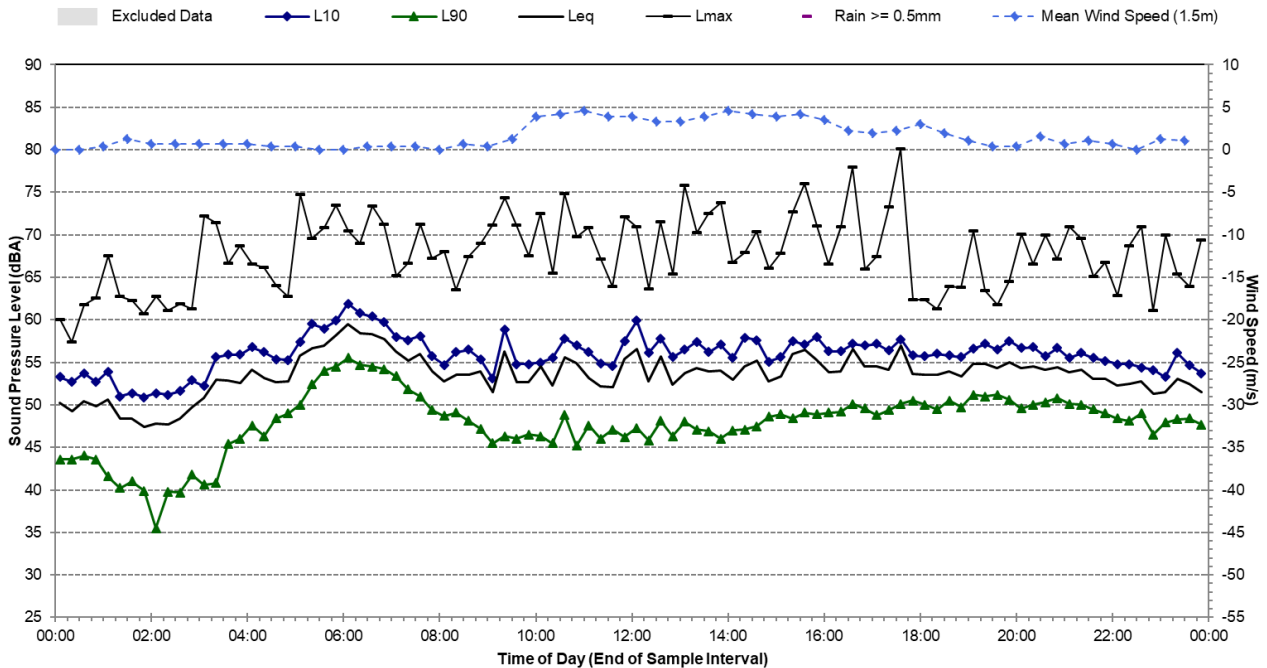
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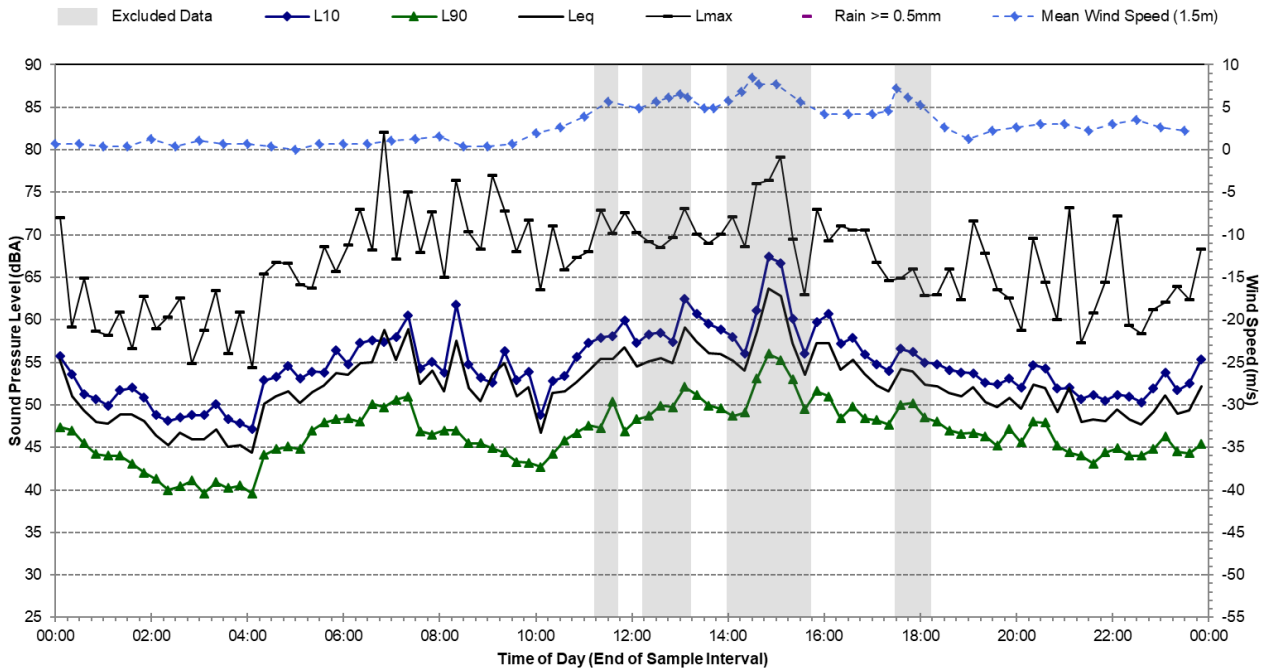
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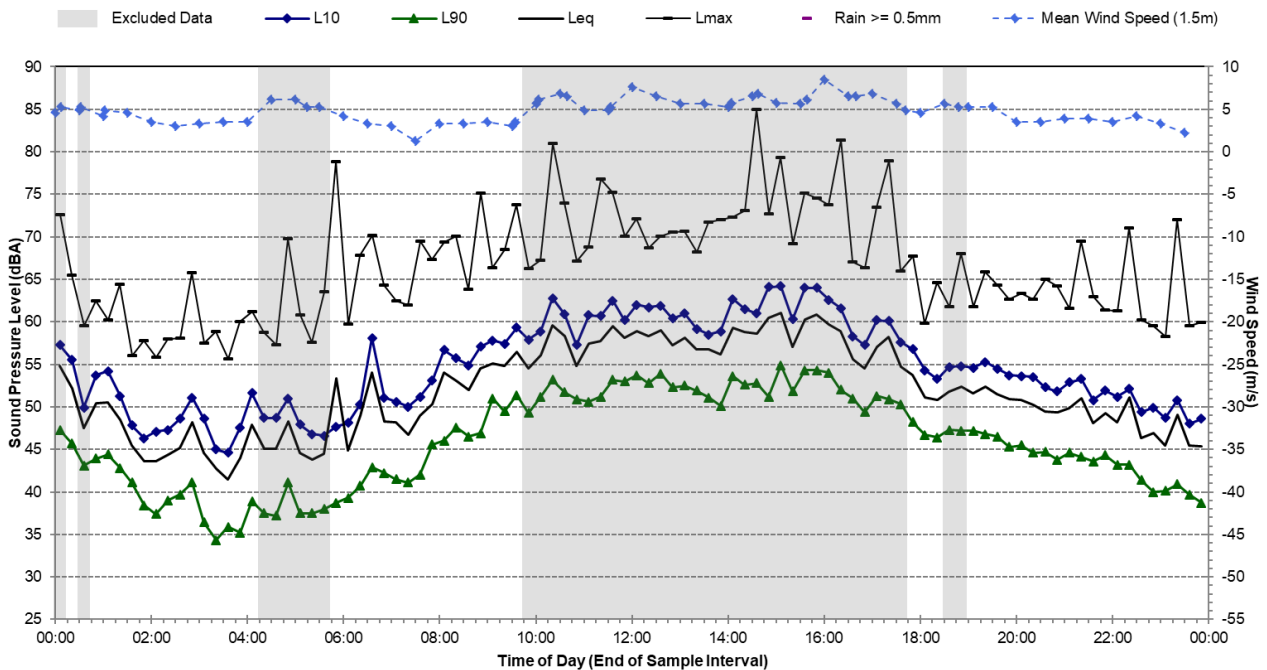
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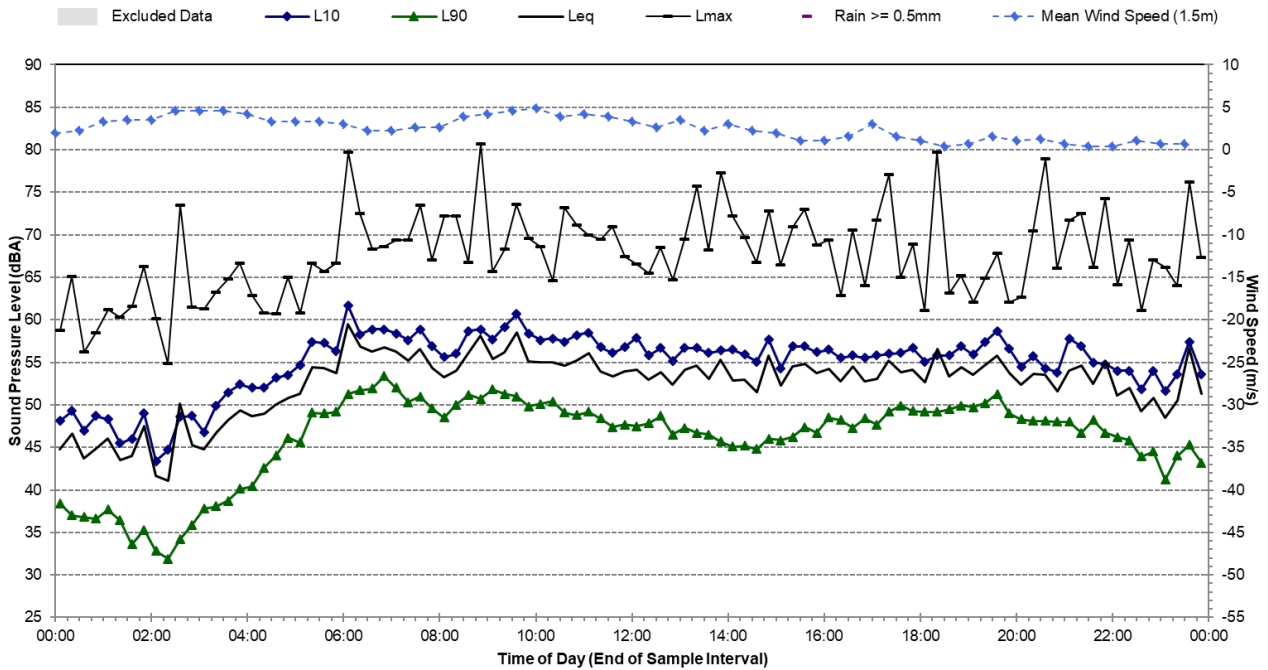
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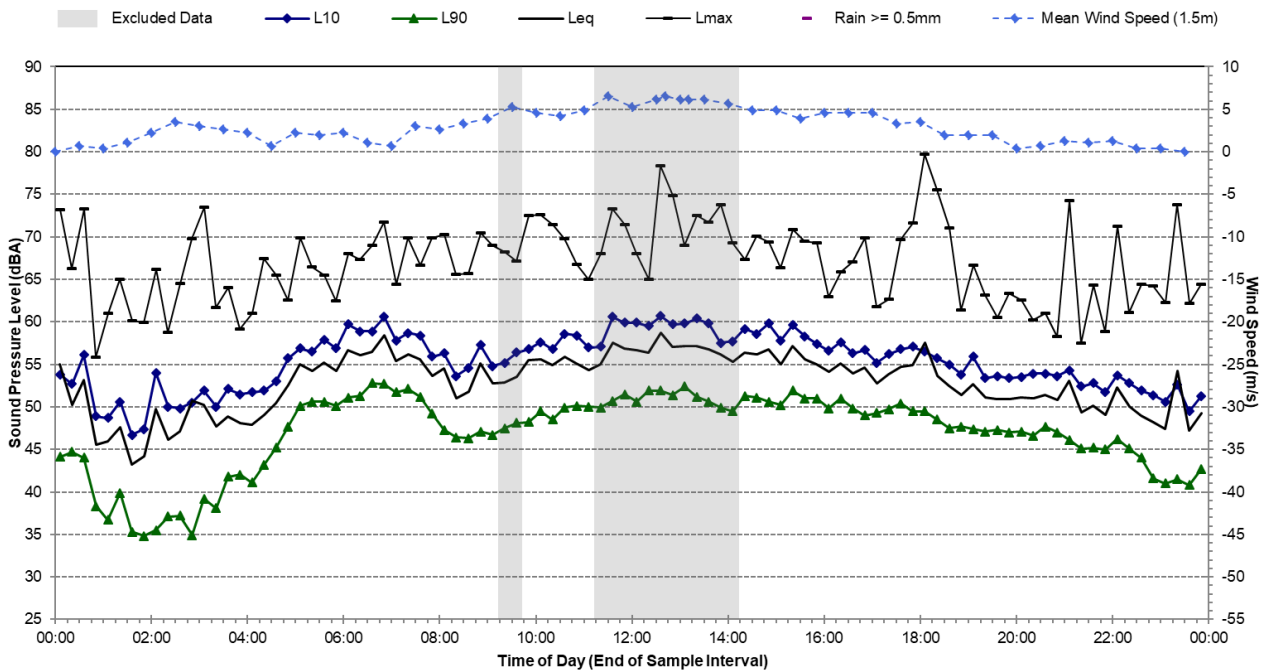
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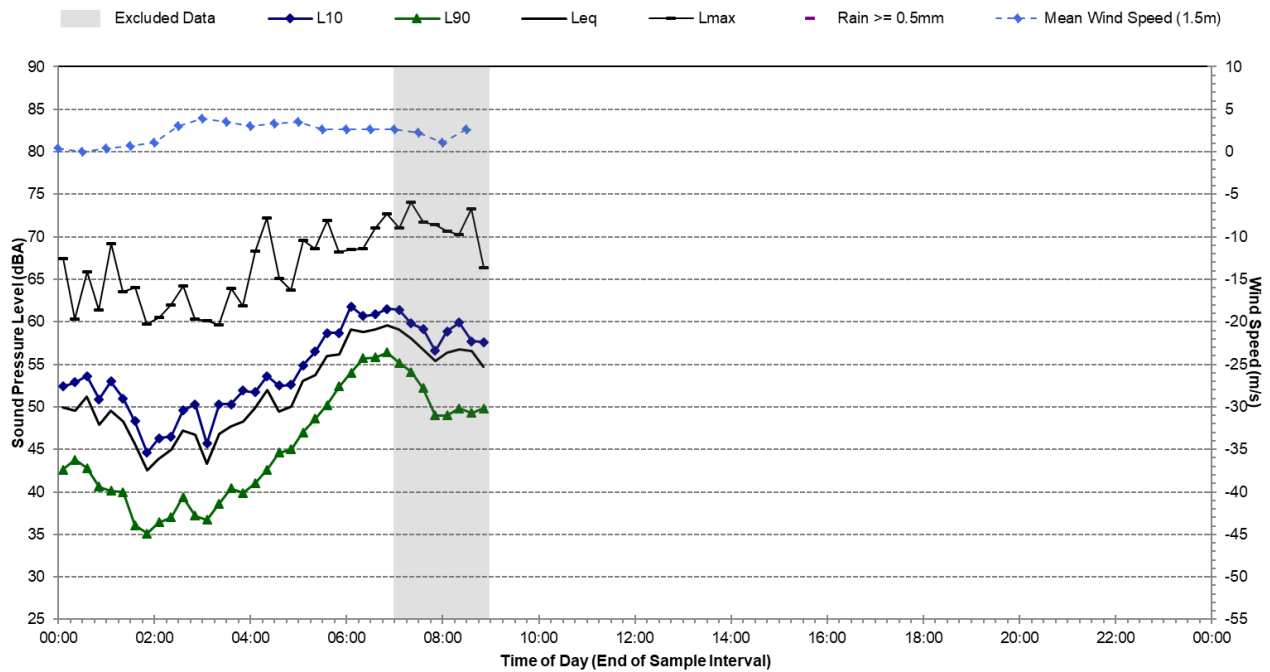
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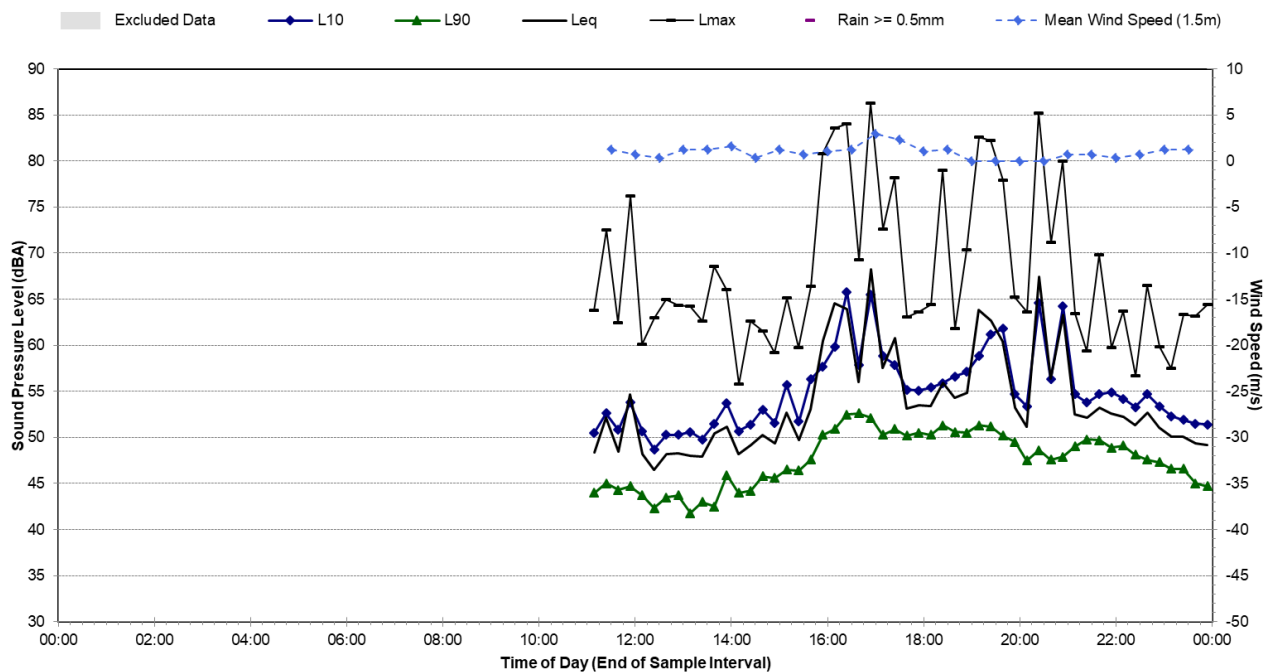
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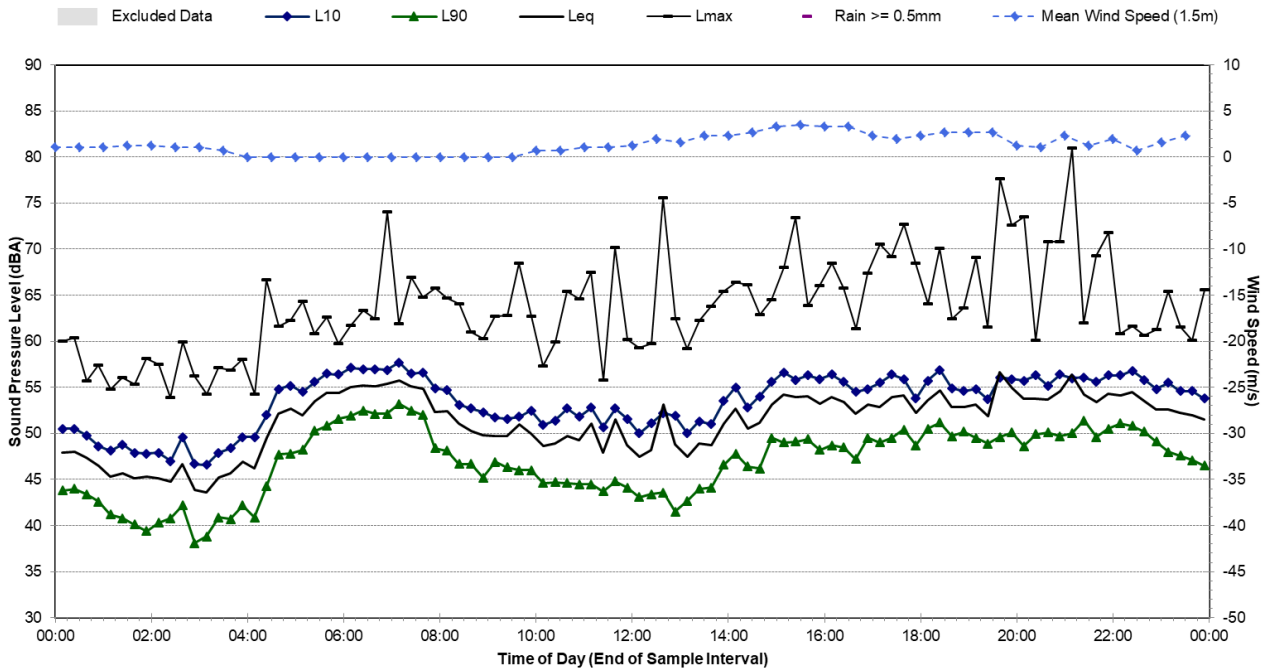
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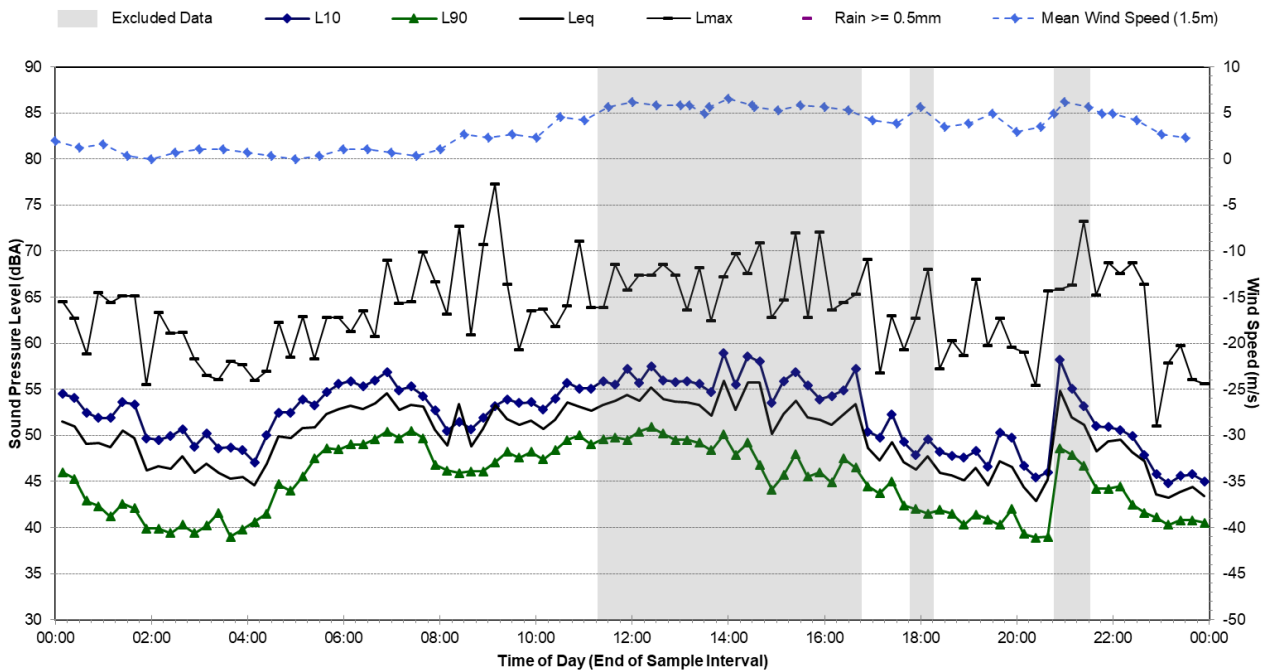
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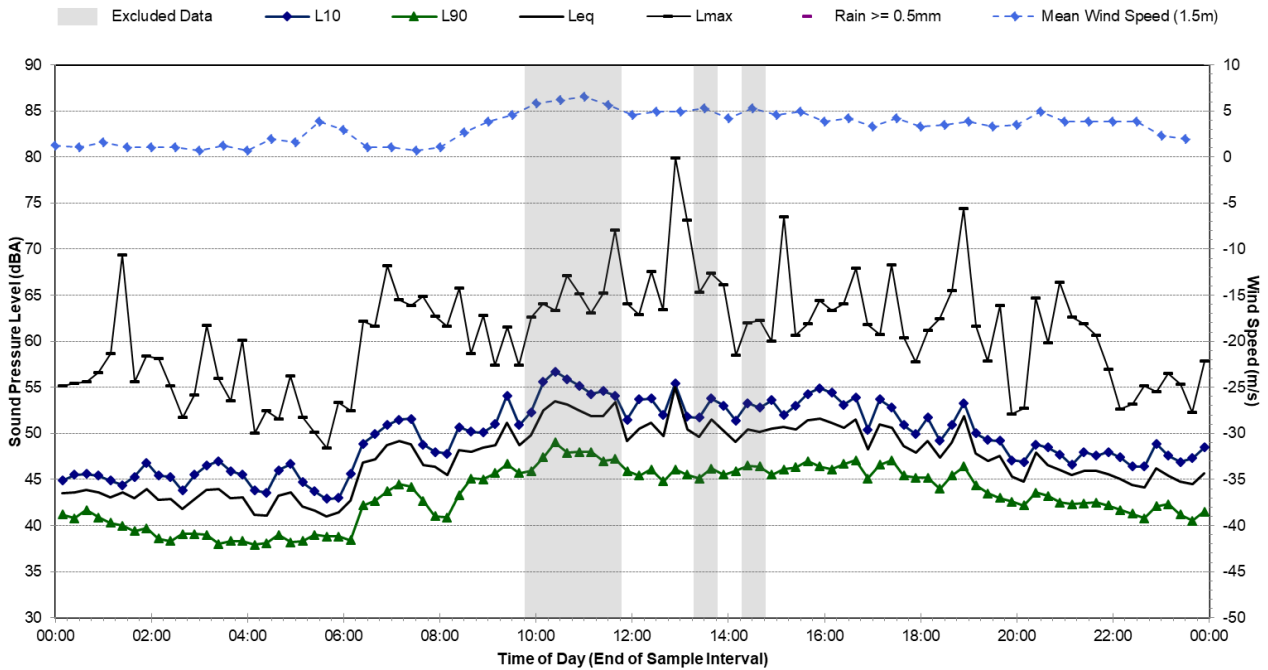
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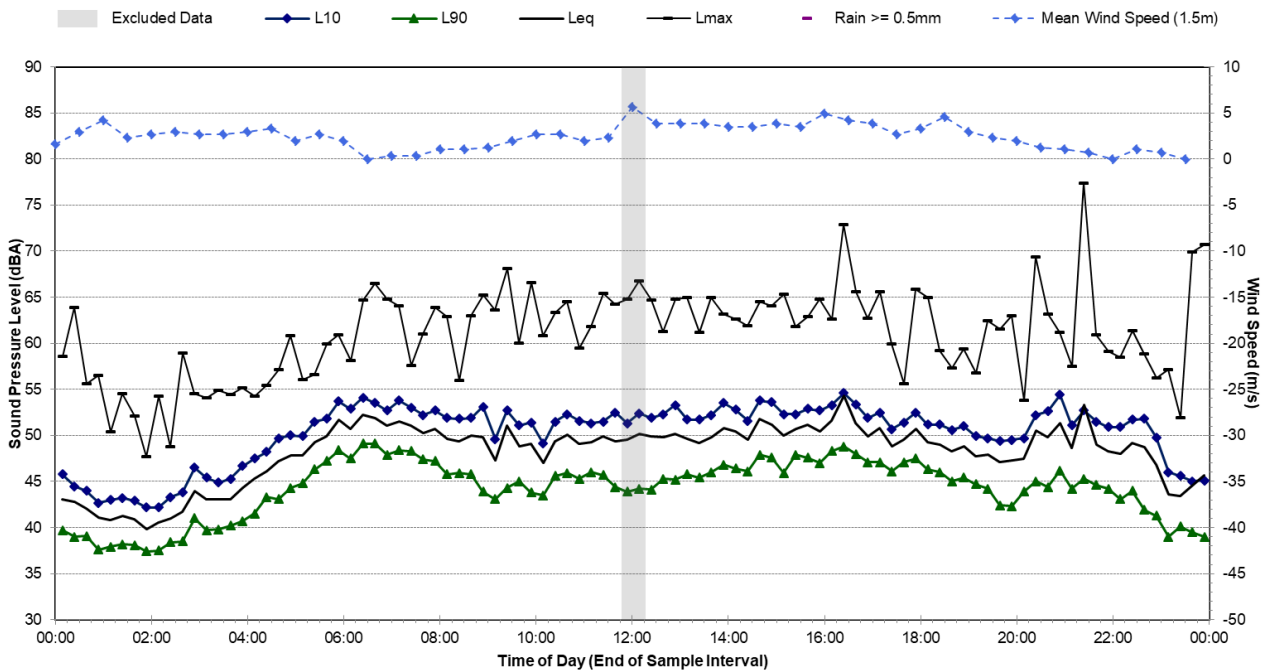
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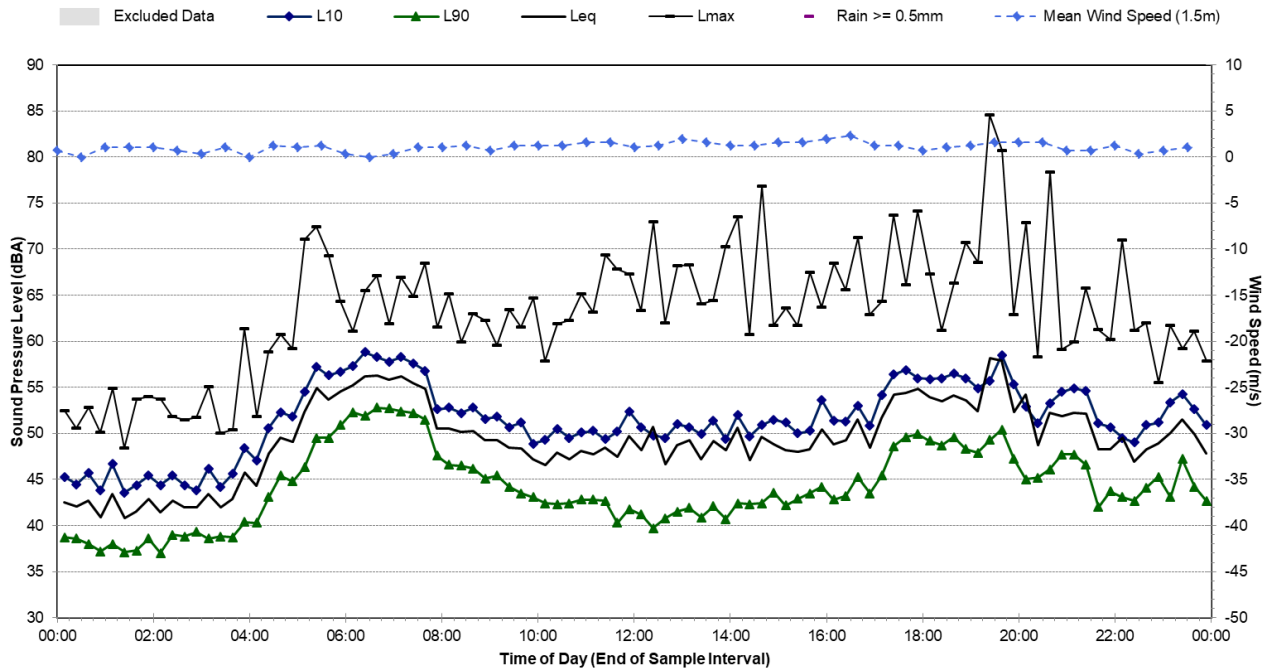
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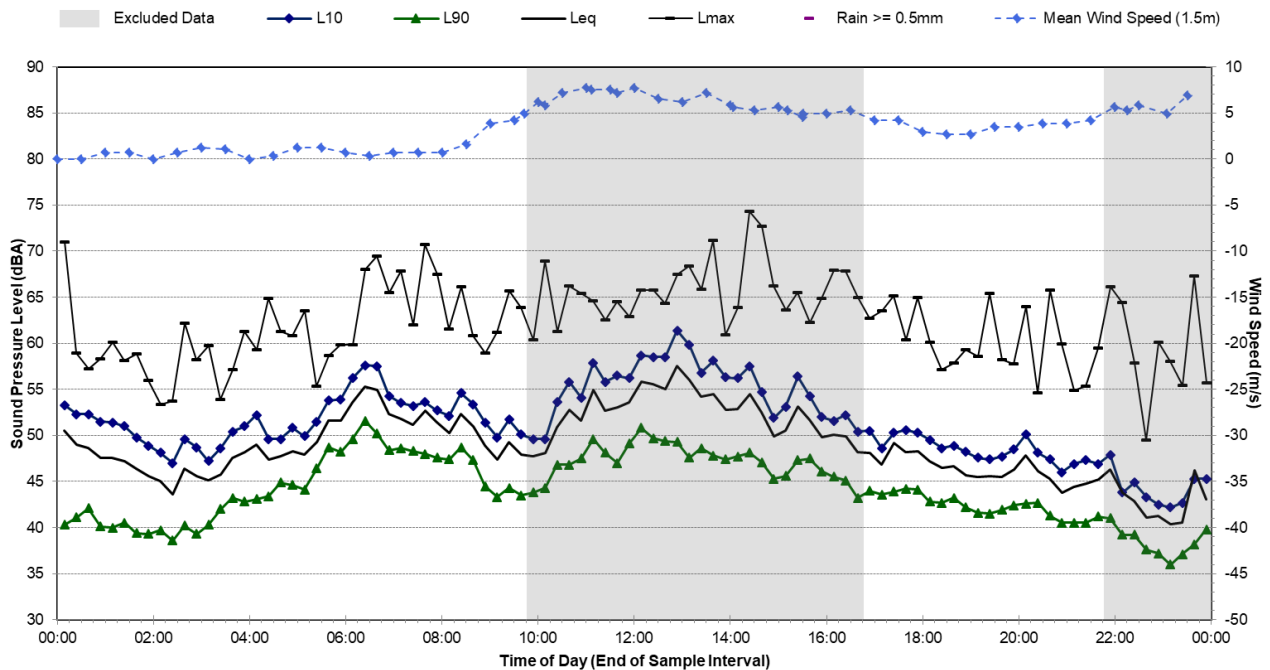
Statistical Ambient Noise Levels

L03 - Stuart Road, Horningsea Park - Tuesday, 14 August 2018



Statistical Ambient Noise Levels

L03 - Stuart Road, Horningsea Park - Wednesday, 15 August 2018



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	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
	DHL LSHC Building Lot 4, Bringelly Road, Leppington		

Appendix K

Civil Stormwater Management Plan

CIVIL ENGINEERING REPORT DEVELOPMENT APPLICATION SSD_8586218

PROPOSED FACILITY LOT 4, BRINGELLY ROAD HORNINGSEA PARK

Prepared For:

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Rev: A

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	Name	Signature
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1 INTRODUCTION

1.1 Introduction

ESR proposes to develop a warehouse facility for a speculative tenant over Lot 4 Bringelly Road, Horningsea Park, NSW.

The proposed development over the site is for a single-level warehouse building, office space, truck loading and circulation areas and passenger vehicle parking.

1.2 Scope

Costin Roe Consulting Pty Ltd has been commissioned by ESR to prepare this Engineering Report in support of the proposed Development Application for the site.

This report provides a summary of the design principles and planning objectives for the following civil engineering components of the project:

- Earthworks
- Stormwater Management; and
- Erosion & Sediment Controls.

The engineering objectives for the development are to provide an appropriate and economical stormwater management system, based on the proposed architectural layout, which incorporates best practice in water sensitive urban design and is consistent with the requirements of council's water quality objectives.

This report also specifically addresses Condition B15 of SSD_6324 (dated 13 January 2016) which states "*Future development applications for construction of buildings shall include a Stormwater Management Plan in accordance with the Civil and Engineering report prepared by Northrop, dated November 2014 and Councils Development Control Plan 2008 and Liverpool City Council Growth Centre Precincts Development Control Plan*". Further the report and design has been completed with consideration to the NSW Department of Planning & Environment SEARS SSD_8586218 dated 11 August 2020.

It should be noted that drawings developed for this report are conceptual only, and not a detailed design. Details provided are subject to adjustment as the design is developed to completion.

1.3 Authority Jurisdiction

The development, being part of the Bringelly Road Business Hub, as approved under SSD_6324, will be assessed by the NSW Department of Planning and Environment. The department issued SEARS specific to this development under SSD_8586218 (dated 11 August 2020) (Refer **Appendix C**) and this document considers the requirements of the SEARS and agency responses.

It is noted that as the site is located within the bounds of Liverpool City Council local government area that the requirements of the Liverpool City Council *Development Design Specification D1 through D9* will be considered in the design of facility.

2 DEVELOPMENT SITE

2.1 Location

The proposed development is located in the suburb of Horningsea Park within the proposed Bringelly Road Business Hub at Lot 4, Bringelly Road as shown in Figure 2.1.

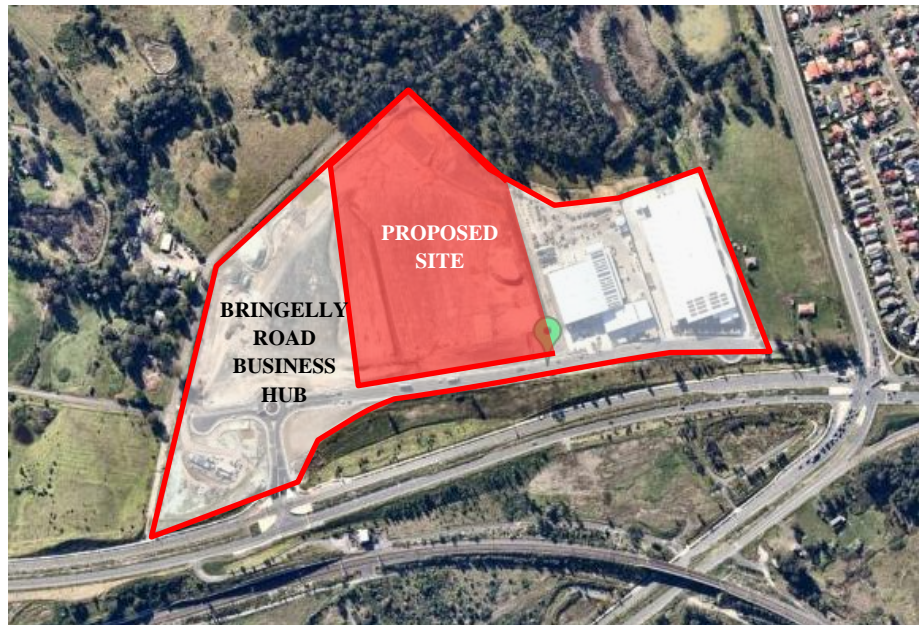


Figure 2.1. Locality Map (Source: Nearmap 2020)

2.2 Existing Site Description

The proposed industrial facility occupies a land area of 6.97 Ha located on Lot 4 of the Bringelly Road Business Hub Estate. The site is bounded by Stuart Road and an existing waterway to the north, Lot 3 of the proposed Bringelly Road Business Hub to the west, the existing CEA facility to the east, Skyline Crescent to the south.

The site drains to the waterway to the north of the site at grades of 1-2%.

Access to the site will be available from the recently completed Skyline Crescent.

2.3 Proposed Development

The proposed development is for the construction of a single level warehouse for a speculative tenant. The indicative layout for the development produced by ESR has been included in **Figure 2.2**.

The proposed warehouse comprises a large single level warehouse building situated centrally on the site. Ancillary office space has been provided on the south-eastern corner of the warehouse. Truck loading areas and circulation hardstand is located around the perimeter of the building as well as fire access. Parking is to the east of the building.

Civil works will include bulk earthworks, stormwater drainage and pavements.

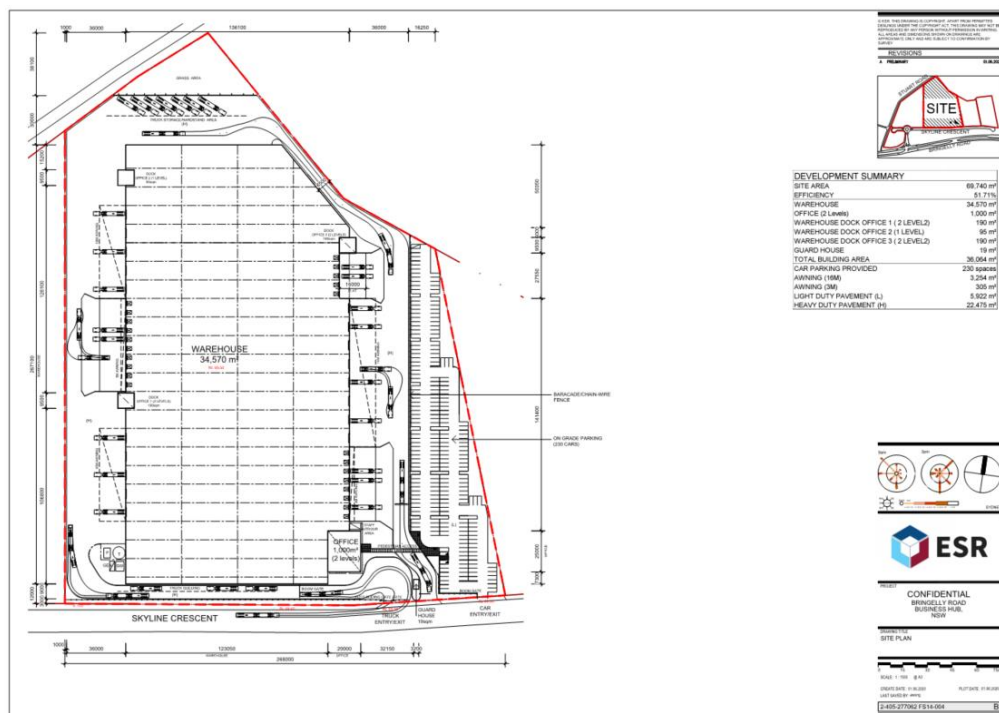


Figure 2.2. Proposed Development Layout

2.4 SEARS Items

The design considers the requirements of NSW Planning Industry & Environment SSD_8586218 SEARS dated 11 August 2020 (refer **Appendix C**). In particular this document covers requirements of *Soil & Water* as included in the *Key Issues* section of the SEARS document. We further provide the following response and direction to the relevant sections of the report for each of the *Soil and Water* items. Refer **Table 2.1** below.

<i>Item No.</i>	<i>Item & Response</i>
<i>SEARS Soil and Water</i>	
<i>Item 1</i>	<p><i>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.</i></p> <p><u>Response</u></p> <p>Refer to Section 6 of this report in relation to proposed water quality measures, provided in accordance with approved SSD_6324 estate strategy.</p>
<i>Item 2</i>	<p><i>A detailed site water balance including a description of the water demands and breakdown of water supplies, and any water licensing requirements.</i></p> <p><u>Response</u></p> <p>The project does require any water licensing.</p> <p>Refer Section 4.5 to Section 4.8 for site water balance analysis.</p>
<i>Item 3</i>	<p><i>Description of the measures to minimise water use.</i></p> <p><u>Response</u></p> <p>Refer Section 6.3 for discussion on rainwater reuse, external and not-potable uses and harvesting.</p>
<i>Item 4</i>	<p><i>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.</i></p> <p><u>Response</u></p> <p>Refer Sections 4, 5 and 6 of this report and associated drawings CO11994.10-DA41, DA42, DA45 and DA46 for detailed information of the proposed drainage layout and management systems.</p> <p>The stormwater management strategy (including stormwater detention, water quality and rainwater reuse requirements) has been completed in accordance with the overall estate strategy as defined and approved under SSD_6324 and condition B15 of SSD_6324.</p>
<i>Item 5</i>	<p><i>Detailed flooding assessment.</i></p> <p><u>Response</u></p> <p>The site achieves suitable flood immunity and the proposed development does not impact existing flooding to the north of the</p>

	site. Refer Section 4.4 of this report, and approved Northrop consulting Engineering Report under SSD_6324.
<i>Item 6</i>	<p><i>Description of the proposed erosion and sediment controls during construction.</i></p> <p><u>Response</u></p> <p>Refer Section 7 of this report and associated drawings CO11994.10-DA20 and DA25 for details of Erosion and Sediment Controls.</p>
<i>Item 7</i>	<p><i>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).</i></p> <p><u>Response</u></p> <p>Refer to Section 6 of this report in relation to proposed water quality measures, provided in accordance with approved SSD_6324 estate strategy.</p>
<i>Item 8</i>	<p><i>Characterisation of the nature and extent of any contamination on the site and surrounding area.</i></p> <p><u>Response</u></p> <p>Refer to EIS.</p>

Table 2.1 SEARS Response Items

3 SITE WORKS

3.1 Bulk Earthworks

Bulk earthworks will be required over the site to facilitate the construction of the new warehouse building. The objective for the site will be to provide large flat building pad, facilitate site access and to drain the stormwater system via gravity

These works will involve cut to fill earthworks, and the construction of retaining walls. An import of fill is expected to achieve the final engineered level.

The final levels over the site will be subject to detailed earthworks modelling and volume assessments allowing for access, drainage, cut to fill and retaining wall considerations. The levels shown on the engineering drawings appended to this report could be considered to be within +/-500mm of the final adopted level.

Soil Erosion and Sediment Control measures including sedimentation basins are to be placed in accordance with submitted drawings and the Soil and Water Management Plan in **Section 7** of this report.

Refer to drawing **CO11994.10-DA30, 35 & 36** for bulk earthworks plan and sections.

3.2 Embankment Stability

To assist in maintaining embankment stability, slopes of permanent batters will be no steeper than 3 horizontal to 1 vertical while temporary batters will be no steeper than 2 horizontal to 1 vertical.

Permanent batters will also be adequately vegetated or turfed which will assist in maintaining embankment stability.

Stability of batters and reinstatement of vegetation shall be in accordance with the submitted drawings and the Soil and Water Management Plan in **Section 7**.

3.3 Supervision of Earthworks

All geotechnical testing and inspections performed during the earthworks operations will be undertaken to Level 1 geotechnical control, in accordance with AS3798-2007.

3.4 Retaining Walls

The civil engineering objective is to minimise retaining walls within the constraints of the architectural layout and allowable grading (as per AS2890.1 and AS2890.2) through paved areas and batters in landscaped areas.

Given the existing natural falls and proposed industrial layout, retaining walls will be required. Where possible, landscaped batters are proposed to limit and reduce retaining wall construction. Retaining will be provided as part of the works as shown indicatively on drawing **CO11994.10-DA51 & DA52**.

4 STORMWATER MANAGEMENT

4.1 Hydrology

4.1.1 General Design Principles

The design of the stormwater system for this site will be based on relevant national design guidelines, Australian Standard Codes of Practice, Liverpool City Council Development Control Plan 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” (1987 Edition), Volumes 1 and 2 (AR&R).

4.1.2 Minor/ Major System Design

The piped stormwater drainage (minor) system has been designed to accommodate the 20-year ARI storm event (Q20). Overland flow paths (major) which will convey all stormwater runoff up to and including the Q100 event (to the provided OSD tank) have also been provided which will limit major property damage and any risk to the public in the event of a piped system failure.

4.1.3 Rainfall Data

Rainfall Intensity Frequency Duration (IFD) data used as a basis for DRAINS modelling for the 5 to 100 year ARI events, was taken from The Bureau of Meteorology Online IFD Tool.

4.1.4 Runoff Models

The calculation of the runoff from storms of the design ARI will be calculated with the catchment modelling software DRAINS using council nominated IFD data.

The design parameters for the DRAINS model are to be based on typical parameters for the area and are as follows:

Model	Model for Design and analysis run	Rational method	
	Rational Method Procedure	ARR87	
	Soil Type-Normal	3.0	
	Paved (Impervious) Area Depression Storage	1	mm
	Supplementary Area Depression Storage	1	mm
	Grassed (Pervious) Area Depression Storage	5	mm
AMC	Antecedent Moisture Condition (ARI=1-5 years)	2.5	
AMC	Antecedent Moisture Condition (ARI=10-20 years)	3.0	
AMC	Antecedent Moisture Condition (ARI=50-100 years)	3.5	
	Sag Pit Blocking Factor (Minor Systems)	0	
	On Grade Pit Blocking Factor (Minor Systems)	0	
	Sag Pit Blocking Factor (Major Systems)	0.5	
	On Grade Pit Blocking Factor (Major Systems)	0.2	
	Inlet Pit Capacity		

Table 4.1: DRAINS Parameters

4.2 Hydraulics

4.2.1 General Requirements

Hydraulic calculations will be carried out utilising DRAINS modelling software during the detail design stage to ensure that all surface and subsurface drainage systems perform to or exceed the required standard.

4.2.2 Freeboard

The calculated water surface level in open junctions of the piped stormwater system will not exceed a freeboard level of 150mm below the finished ground level, for the peak runoff from the Major System runoff. Where the pipes and junctions are sealed, this freeboard would not be required.

The calculated water surface for the peak runoff from the Major System runoff will not exceed a freeboard level of 300mm below the finished floor level of the building.

4.2.3 Public Safety

For all areas subject to pedestrian traffic, the product (dV) of the depth of flow d (in metres) and the velocity of flow V (in metres per second) will be limited to 0.4, for all storms up to the 100-year ARI.

For other areas, the dV product will be limited to 0.6 for stability of vehicular traffic (whether parked or in motion) for all storms up to the 100-year ARI.

4.2.4 Inlet Pit Spacing

The spacing of inlets throughout the site will be such that the depth of flow, for the Major System design storm runoff, will not exceed the top of the kerb (150mm above gutter invert).

4.2.5 Overland Flow

The piped system has been designed to convey all storms up to and including the 20-year ARI. Dedicated flow paths have been shown which will convey stormwater from the site to OSD system and in the event of full system blockage to the existing waterway to the north.

4.3 **Site Drainage**

4.3.1 Existing Site Drainage

The property is currently undeveloped with no formal in-ground drainage located on site.

The 6.97 Ha catchment is drained to a Bringelly Road Business Hub Estate sediment basin located on the north eastern side of the property. Discharge from the site is made to the existing natural waterway also toward the north of the site.

4.3.2 Proposed Site Drainage

As per general engineering practice and the guidelines of LCC, the proposed stormwater drainage system for the development will comprise a minor and major system to safely and efficiently convey collected stormwater run-off from the development to the legal point of discharge.

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 results in the piped system being able to convey all stormwater runoff up to and including the Q20 event. This meets the requirements of LCC and is the minimum recommended capacity for an industrial development.

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, such as roads and open channels, 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, Australia Standard Codes of Practice, the standard of LCC 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 Institute of Engineers, Australia

publication “Australian Rainfall and Runoff” (1988 Edition), Volumes 1 and 2 (ARR).

Stormwater Management is required to be provided for water quantity and quality in accordance with the requirements of LCC DCP. Further discussion on the Stormwater Management Strategy is provided in **Section 5** and **6** of this report. Reference to drawings **CO11994.10-DA41 & DA42** shows the proposed drainage layout. The stormwater management strategy has been completed with consideration to the estate management strategy as defined by Northrop Consulting Engineers as part of SSD_6324.

4.3.3 Proposed Site Discharge

Discharge from the site is proposed at on the north of the property, via an existing stormwater pit, as per estate management strategy as defined by Northrop Consulting Engineers as part of SSD_6324.

4.4 **Flooding**

Liverpool City Council’s ePlanning portal demonstrates that the Bedwell Park Wetlands area has no risk of flooding as seen in **Figure 4.1** below.

Flood requirements for the estate have been assessed and approved as part of the SSD_6324 approval. As described in *Section 5.3* of the approved engineering report by Northrop Consulting (November 2014), with the proposed works are clear of any flood affected areas and with the provision of on-site detention measures, the proposed development will not affect flows or flooding within Bedwell Park Wetland. A short summary of the findings of the approved report and figures is included for reference.

Bewsher Consulting had carried out flooding assessment and prepared a flood management plan for Council in 2011. The Bedwell Park Wetland, downstream of the development site (refer to **Figure 4.2** for location) is discussed in this plan as follows:

- Pond A contains permanent water storage and flows through to Pond B downstream via two (2) 825mm diameter pipes and overflows at RL53.1m AHD
- Pond B discharges to an open channel downstream via a piped drainage system and has a spillway level at RL51.2m AHD
- Flood modelling results indicate that water levels in Ponds A and B increase to RL53.20m AHD and RL51.58m AHD respectively in the 1% AEP flood.

The Probable Maximum Flood (PMF) is conservatively estimated to be at RL53.50m AHD, 300mm above the top water level at RL53.20m. Taking into account the effects of climate change and applying a conservative increase of 500mm in flood levels and adopting 500mm of freeboard to the PMF, building pads and buildings would need to be set at a minimum level at RL54.50m.

The proposed building level is 69.50m. This has a clearance of more than 10m to the predicted PMF flood levels, hence flood immunity is provided to the building.

Local overland flows from pavement runoff etc have been accounted for within the building design as described in other sections of the report.

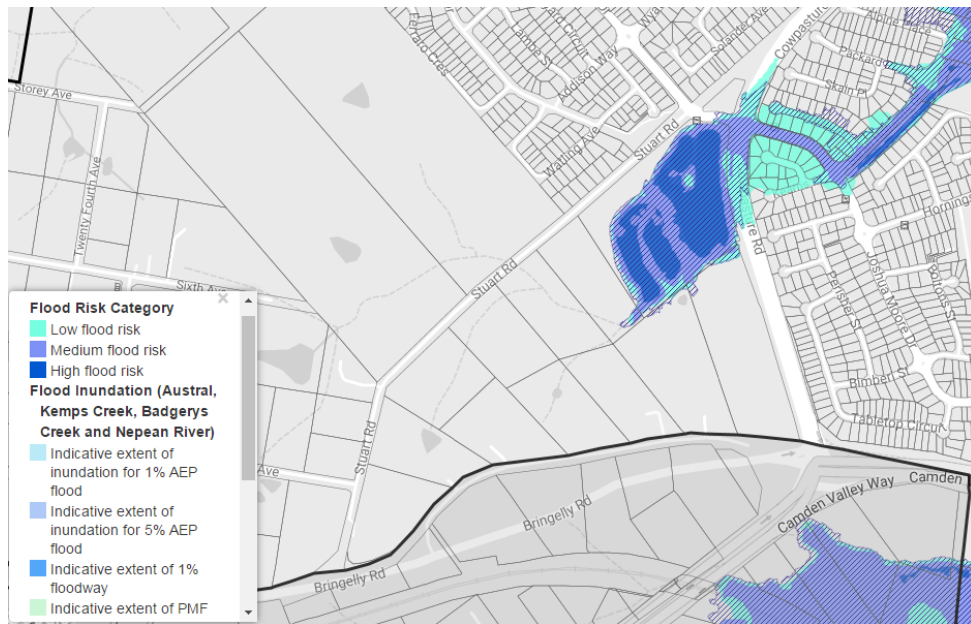


Figure 4.1 Flood risk (Source: Liverpool City Council, ePlanning Portal)



Figure 4.2 Bedwell Park Wetland (Source: Nearmap 2017)

4.5 Site Water Balance Objectives

A daily site 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.

4.6 Water Use Management Features

4.6.1 Existing

Existing water use features comprise Sydney Water Mains supply.

There will be no existing rainwater harvesting systems, or water extractions as the proposed site is currently vacant.

There are no current irrigated landscaped areas.

4.6.2 Proposed

Proposed management measures for water use are as follows:

- Existing Sydney Water mains supply is proposed to be maintained throughout the duration of the proposed site operation;
- Stormwater harvesting throughout rainwater reuse to reduce demand on non-potable water uses;
- Sprinkler water storage via Sydney Water mains.

A concept diagram for the proposed re-use scheme on site is shown in **Figure 4.3** below.

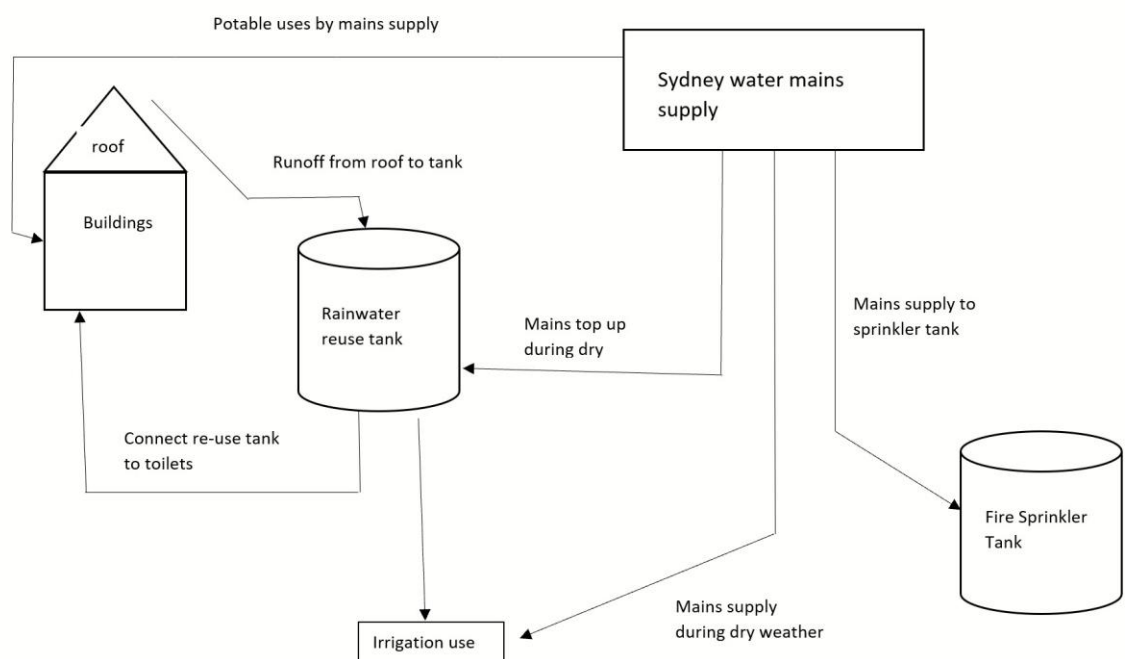


Figure 4.3. Water Cycle Management Schematic

A short description of the expected stormwater harvesting for the development is described below.

Stormwater Harvesting

Stormwater harvesting refers to the collection of stormwater from the development's 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.

In general terms the rainwater harvesting system will be comprised 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 to 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.

4.7 Water Balance Assessment

4.7.1 Internal Base Water Demand

The proposed development is expected to generate 240 operational jobs. The site is expected to operate with a two-shift roster, thus it is expected that there will be 120 employees on site per operational day.

Potable water demand is based on each employee using 25 litres per day for showering and inside tap use.

These rates give the following internal non-potable demand:

Potable Water	120 People	3.0 kL/day
---------------	------------	------------

Indoor non-potable water demand has been based on each employee using 15 litres of potable water per day for toilet flushing which is typical of an office environment which uses energy efficient flushing devices.

These rates give the following internal non-potable demand:

Toilet Flushing	120 People	1.8 kL/day
-----------------	------------	------------

4.7.2 Fire Services Base Demand

The proposed sprinkler tank for fire services requires a storage of 600 kL. These are expected to be serviced twice yearly, hence total yearly demand of 1200 kL has been allowed.

Fire Services	3.29 kL/day
---------------	-------------

4.7.3 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/m² (i.e. 10 mm/m²). For the purposes of our analysis the average of this application rate has been used, in conjunction with the application regime shown in **Table 4.2**, to determine the monthly and total yearly demand.

Table 4.2. 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:

Proposed Development	Area=2200m ²	2244 kL/year
		6.15 kL/day

4.7.4 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 were designed using the MUSIC water quality modelling software, based on calculated base water demands and proposed roof catchment areas. Allowances in the calculation were made for efficiency of collection, absorption/ evaporation losses. Refer **Appendix D** for the MUSIC model.

Table 4.3. Rainwater Reuse Requirements

Roof Catchment to Rainwater Tank (m ²)	Tank Size (kL)	Predicted Non-Potable Demand Reduction (%)
7210	40	50

The water balance assessment predicts 50% reduction in non-potable will be met for the developments with the provision of rainwater tanks as specified in **Table 4.3** above.

We note that the final configuration and sizing of the rainwater tanks is subject to detail design considerations and optimum site utilisation.

4.7.5 Overall Water Cycle Management

The following **Table 4.4** shows overall water cycle and each water source.

Table 4.4. Overall Water Cycle

Area	Daily Demand (kL/ Day)	
	Via Harvesting/ Reuse	Via Mains
Internal	0.90	3.90
External	3.08	3.08
Fire	-	3.29
Total	3.98	10.27

4.8 Operational Impact Assessment

Rainwater harvesting is proposed to reduce demand on non-potable applications.

An existing and reliable water supply is available during operations.

Impact on environment from water use is considered to be acceptable.

5 STORMWATER QUANTITY MANAGEMENT

Liverpool City Council requires water quantity management, or stormwater detention, to be provided to limit the runoff discharged from private property into the underground piped drainage system to pre-developed flow and to assist in mitigating the increased stormwater runoff generated by development.

Attenuation of stormwater runoff from the catchment on the development is proposed to be managed via an on-site detention tank provided in the north of the site. As set out in the estate management strategy as defined by Northrop Consulting Engineers as part of SSD_6324, the objective for stormwater discharge is to attenuate stormwater flow from the development to pre-developed flows, consistent with Liverpool City Council policy and engineering practice.

Sizing of the basin system has been completed using DRAINS modelling software in accordance with the Liverpool City Council Policy for the 1 in 5 year ARI to 1 in 100 year ARI storms for various durations.

Table 5.1 provides details for the pre and post development flows and storage for the total detention system. The critical storm duration for the 1 in 5 year, 1 in 20 year and for the 1 in 100 year ARI storms are 2 hours. Flows and storage information are provided for these storms.

ARI	Pre-developed Flow (m ³ /s)	Post-developed Flow (m ³ /s)	
		Un-attenuated	Attenuated
5	1.31	2.02	1.05
20	1.78	2.37	1.27
100	2.24	2.88	1.64

Table 5.1. Site and Detention Hydrology

The indicative location of the detention tank can be found on Drawing **Co11994.10-DA41**.

Indicative hydrological and storage arrangements are shown below, **Table 5.2**.

ARI	Post Developed Flow (m³/s)					Storage (m³)
	Un-attenuated	Attenuated				
		Low Flow	High Flow	Bypass	Total	
5	2.02	1.00	0	0.15	1.05	790
20	2.37	1.20	0	0.22	1.27	1160
100	2.88	1.64	0.21	0.26	1.74	1560

Table 5.2. OSD Tank Storage and Flow Arrangement

The modelling has shown that, with the provision of a total storage volume of 1560m³ contained in the modelled system, stormwater flows from the development will be attenuated to pre-development flows. Detention storage will be fully active and will be provided as an OSD tank in the north of the property. The proposed detention system meets the policy requirements of Liverpool City Council.

6 STORMWATER QUALITY CONTROLS

6.1 Regional Parameters

There is a need to provide 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 the Liverpool City Council.

Liverpool City Council have nominated, in *Section 6.4* of their *DCP 2008 & MUSIC Link*, the requirements for stormwater quality to be performed on a catchment wide basis. These are presented in terms of annual percentage pollutant reductions on a developed catchment and are as follows:

Gross Pollutants	90%
Total Suspended Solids	85%
Total Phosphorus	65%
Total Nitrogen	45%
Total Hydrocarbons	90%

6.2 Proposed Stormwater Treatment System

Stormwater Treatment Measures (STM's) are to be implemented in accordance with the Liverpool Council Policy and the strategy and measures outlined in the Bringelly Road Business Hub Engineering Report by Northrop Engineers (Ref:140089) approved under SSD_6324. The STM's are to be sized according to the new development area only.

The STM's for the development shall be based on a treatment train approach to ensure that all of the objectives above are met.

Components of the treatment train for the development are as follows:

- Primary treatment to parking, hardstand & roof areas is to be performed via an appropriately sized Gross Pollutant Trap (GPT) located on site. The proposed system is the Rocla CDS GPT or similar;
- Tertiary treatment is to be made off-lot, via the Bedwell Park Wetland located to the north-east of the estate. The Bedwell Park Wetland will provide treatment of nutrients and sediments as set out in the Northrop Report quoted above. Stormwater discharge to the Bedwell Park Wetland is via an overland flow path to the north of the site.

6.3 Stormwater Harvesting

Refer to **Section 4.6** for the description of the stormwater harvesting system proposed on site.

A nominal tank size is subject to detailed analysis during detail design stage by the Hydraulic Engineering Consultant. The tank will be located on site to best suit the development layout and servicing needs.

6.4 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 6.3** below) to assist in the effective operation and maintenance of the various water quality components.

Note that inspection frequency may vary depending on site specific attributes and rainfall patterns in the area. In addition to the below nominated frequency it is recommended that inspections are made following large storm events.

Table 6.3. Indicative Maintenance Schedule

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
SWALES/LANDSCAPED AREAS			
Check density of vegetation and ensure minimum height of 150mm is maintained. Check for any evidence of weed infestation	Six monthly	Maintenance Contractor	Replant and/or fertilise, weed and water in accordance with landscape consultant specifications
Inspect swale for excessive litter and sediment build up	Six monthly	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 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	Six Monthly	Maintenance Contractor	Replace top soil in eroded area and cover and secure with biodegradable fabric. Cut hole in fabric and revegetate.
OSD SYSTEM			
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
Inspect and remove any blockage from orifice	Six Monthly	Maintenance Contractor/ Owner	Remove grate and screen to inspect orifice.
Inspect trash screen and clean	Six Monthly	Maintenance Contractor/ Owner	Remove grate and screen if required to clean it.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
Inspect flap valve and remove any blockage.	Six Monthly	Maintenance Contractor/ Owner	Remove grate. Ensure flap valve moves freely and remove any blockages or debris.
Inspect pit sump for damage or blockage.	Six Monthly	Maintenance Contractor/ Owner	Remove grate & screen. Remove sediment/ sludge build up and check orifice and flap valve is clear.
Inspect storage areas and remove debris/ mulch/ litter etc likely to block screens/ grates.	Six Monthly	Maintenance Contractor/ Owner	Remove debris and floatable materials.
Check attachment of orifice plate and screen to wall of pit	Annually	Maintenance Contractor	Remove grate and screen. Ensure plate or screen mounted securely, tighten fixings if required. Seal gaps if required.
Check orifice diameter is correct and retains sharp edge.	Five yearly	Maintenance Contractor	Compare diameter to design (see Work-as-Executed) and ensure edge is not pitted or damaged.
Check screen for corrosion	Annually	Maintenance Contractor	Remove grate and screen and examine for rust or corrosion, especially at corners or welds.
Inspect overflow weir and remove any blockage	Six monthly	Maintenance Contractor/ Owner	Ensure weir is free of blockage.
Inspect walls for cracks or spalling	Annually	Maintenance Contractor	Remove grate to inspect internal walls, repair as necessary.
Check step irons	Annually	Maintenance Contractor	Ensure fixings are secure and irons are free from corrosion.

MAINTENANCE ACTION	FREQUENCY	RESPONSIBILITY	PROCEDURE
INLET & JUNCTION PITS			
Inside of pits	Six Monthly	Maintenance Contractor	Remove grate and inspect internal walls and base, repair where required. Remove any collected sediment, debris, litter.
Outside of pits	Four Monthly/ After Major Storm	Maintenance Contractor	Clean grate of collected sediment, debris, litter and vegetation.
PROPRIETARY TREATMENT DEVICES (ROCLA CDS or Equiv.)			
Refer to Manufacturers Operation and Maintenance Manual	Annually	Maintenance Contractor	Refer to Manufacturers Operation and Maintenance Manual
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.

7 EROSION & SEDIMENT CONTROL PLAN

An erosion and sediment control plan (ESCP) is shown on drawings **CO11994.10-DA20 & 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.

7.1 General Conditions

- 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.
- Contractors will ensure that all soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in Landcom document *Managing Urban Stormwater, Soils and Construction (1998) – The Blue Book* and Liverpool City Council specifications.
- All subcontractors will be informed of their responsibilities in minimising the potential for soil erosion and pollution to down slope areas.

7.2 Land Disturbance

Where practicable, the soil erosion hazard on the site will be kept as low as possible and as recommended in **Table 7.1**

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 7.1 Limitations to access

7.3 Erosion Control Conditions

- 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.
- 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.
- Where practicable, schedule the construction program so that the time from starting land disturbance to stabilisation has a duration of less than six months.
- 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.
- 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.
- Where practical, foot and vehicular traffic will be kept away from all recently established areas
- Earth batters shall be constructed in accordance with the Geotechnical Engineers Report or with as low 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

- All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the design storm event.
- 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.

7.4 Pollution Control Conditions

- 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.
- Sediment fences will:
 - 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.

- 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
- 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.
- 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.
- 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.
- Temporary soil and water management structures will be removed only after the lands they are protecting are stabilised.

7.5 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.

7.6 Site Inspection and Maintenance

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

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 be required to provide a short monthly written report. 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.

Waste bins will be emptied as necessary. Disposal of waste will be in a manner approved by the Site Superintendent.

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 or 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.).

Sand/soil/spoil materials placed closer than 2 meters from hazard areas will be removed. Such hazard areas include areas of high velocity water flows (e.g. waterways and gutters), paved areas and driveways.

Recently stabilised lands will be checked to ensure that erosion hazard has been effectively reduced. Any repairs will be initiated as appropriate.

Excessive vegetation growth will be controlled through mowing or slashing.

All sediment detention systems will be kept in good, working condition. In particular, attention will be given to:

- Recent works to ensure they have not resulted in diversion of sediment laden water away from them
- Degradable products to ensure they are replaced as required, and
- Sediment removal, to ensure the design capacity or less remains in the settling zone.

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.

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.

Erosion and sediment control measures will be maintained in a functioning condition until all earthwork activities are completed and the site stabilised

Litter, debris and sediment will be removed from the gross pollutant traps and trash racks as required.

8 CONCLUSION

This *Civil Engineering Report* has been prepared to support the SSD_8586218 development application for a proposed warehouse facility at Lot 4 in Bringelly Road Business Hub on Bringelly Road, Horningsea Park.

A civil engineering strategy for the site has been developed which provides a best fit solution within the constraints of the existing landform, structures and pavements, the proposed architectural layout and the Stormwater Management Strategy as defined by Northrop Consulting Engineers as part of SSD_6324 and SEAR's requirements of SSD_8586218. The stormwater quality and quantity management strategy has been developed to reduce pollutant loads in stormwater leaving this site in accordance with engineering principles and council policy.

It is recommended that the management strategies mentioned in this report be incorporated into the future detailed design. Detailed design may result in changes to the concept however design criteria will be followed.

Appendix A

DRAWINGS BY COSTIN ROE CONSULTING

PROPOSED WAREHOUSE FACILITY

LOT 4, BRINGELLY ROAD, HORNINGSEA PARK, NSW 2171

CIVIL DRAWINGS FOR DEVELOPMENT APPLICATION

DRAWING LIST

DRAWING NO.	DRAWING TITLE
C011994.10-DA10	DRAWING LIST & GENERAL NOTES
C011994.10-DA20	EROSION AND SEDIMENT CONTROL PLAN
C011994.10-DA25	EROSION AND SEDIMENT CONTROL DETAILS
C011994.10-DA30	BULK EARTHWORKS PLAN
C011994.10-DA35	BULK EARTHWORKS SECTIONS - SHEET 1
C011994.10-DA36	BULK EARTHWORKS SECTIONS - SHEET 2
C011994.10-DA41	STORMWATER DRAINAGE PLAN - SHEET 1
C011994.10-DA42	STORMWATER DRAINAGE PLAN - SHEET 2
C011994.10-DA45	STORMWATER DRAINAGE DETAILS - SHEET 1
C011994.10-DA46	STORMWATER DRAINAGE DETAILS - SHEET 2
C011994.10-DA51	FINISHED LEVELS PLAN - SHEET 1
C011994.10-DA52	FINISHED LEVELS PLAN - SHEET 2
C011994.10-DA55	TYPICAL SECTIONS

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 DRAWING TO BE READ IN CONJUNCTION WITH ENGINEERING REPORT C011994-01-05.rpt

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.
- SILT FENCES AND SILT FENCE RETURNS SHALL BE ERECTED CONVEX TO THE CONTOUR TO POND WATER.
 - 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.
 - 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.
 - CLEAR WATER IS TO BE DIVERTED AWAY FROM DISTURBED GROUND AND INTO THE DRAINAGE SYSTEM.
 - THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND PROVIDING ON GOING ADJUSTMENT TO EROSION CONTROL MEASURES AS REQUIRED DURING CONSTRUCTION.
 - 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.
 - ALL FINAL EROSION PREVENTION MEASURES INCLUDING THE ESTABLISHMENT OF GRASSING ARE TO BE MAINTAINED UNTIL THE END OF THE DEFECTS LIABILITY PERIOD.
 - ALL EARTHWORKS AREAS SHALL BE ROLLED ON A REGULAR BASIS TO SEAL THE EARTHWORKS.
 - 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.
 - ALL CUT AND FILL SLOPES ARE TO BE SEEDED AND HYDROMULCHED WITHIN 10 DAYS OF COMPLETION OF FORMATION.
 - 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.
 - ALL TOPSOIL STOCKPILES ARE TO BE SUITABLY COVERED TO THE SATISFACTION OF THE SITE MANAGER TO PREVENT WIND AND WATER EROSION.
 - 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.
 - 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.
 - 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.
 - 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.
 - 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.

SITE PREPARATION NOTES :

- ALL EARTHWORKS SHALL BE COMPLETED GENERALLY IN ACCORDANCE WITH THE GUIDELINES SPECIFIED BY THE GEOTECHNICAL ENGINEER UNDER LEVEL 1 SUPERVISION
- EXISTING LEVELS ARE BASED ON INFORMATION PROVIDED BY AXIOM SPATIAL SURVEYORS REF 1938804.4 DATED 27/11/2019.
- STRIP ANY TOP SOIL OR DELETERIOUS MATERIAL AND DISPOSE OF FROM SITE OR STORE AS DIRECTED
- 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.
- PREPARE STEEP BATTERS TO RECEIVE FILL BY CONSTRUCTING BENCHING TO FACILITATE FILL PLACEMENT AND COMPACTION.
- 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.
- SITE WON FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HLF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HLF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
- IMPORTED FILL SHALL BE COMPACTED IN MAXIMUM 300mm LAYERS AND TO DRY OR HLF DENSITY RATIOS (STANDARD COMPACTION) OF BETWEEN 98% AND 103%. THE PLACEMENT MOISTURE VARIATION OR HLF MOISTURE VARIATION SHALL BE CONTROLLED TO BE BETWEEN 2% DRY AND 2% WET.
- 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 HLF 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 CONTRACTOR AFTER PLACEMENT AND COMPACTION.
- 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.
- PRIOR TO ANY EARTHWORKS, EROSION CONTROL AS OUTLINED IN THE EROSION AND SEDIMENTATION CONTROL PLAN SHALL BE COMPLETED.
- EXISTING ROCK, IF ANY, SHALL BE REMOVED BY HEAVY ROCK BREAKING OR RIPPING.
- MATCH EXISTING LEVELS AT BATTER INTERFACE.
- 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.
- 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.

ELECTRONIC INFORMATION NOTES:

- THE ISSUED DRAWINGS IN HARD COPY OR PDF FORMAT TAKE PRECEDENCE OVER ANY ELECTRONICALLY ISSUED INFORMATION, LAYOUTS OR DESIGN MODELS.
- 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.
- 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.
- 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.

STORMWATER DRAINAGE NOTES:

- ALL STORMWATER WORKS TO BE COMPLETED IN ACCORDANCE WITH AUSTRALIAN STANDARD AS3500.3 PLUMBING AND DRAINAGE, PART 3: STORMWATER DRAINAGE.
- 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.
- ALL FINISHED PAVEMENT LEVELS SHALL BE AS INDICATED ON FINISHED LEVELS PLANS DA51 & DA52.
- PIT SIZES SHALL BE AS INDICATED IN THE SCHEDULE WHILE PIPE SIZES AND DETAILS ARE PROVIDED ON PLAN.
- EXISTING STORMWATER PIT LOCATIONS AND INVERT LEVELS TO BE CONFIRMED BY SURVEY PRIOR TO COMMENCING WORKS ON SITE.
- ALL STORMWATER PIPES Ø375 OR GREATER SHALL BE CLASS 2 REINFORCED CONCRETE WITH RUBBER RING JOINTS UNLESS NOTED OTHERWISE.
- ALL PIPES UP TO AND INCLUDING Ø300 TO BE uPVC GRADE S8 UNO.
- PIPE CLASS NOMINATED ARE FOR IN-SERVICE LOADING CONDITIONS ONLY. CONTRACTOR IS TO MAKE ANY NECESSARY ADJUSTMENTS REQUIRED FOR CONSTRUCTION CONDITIONS.
- 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 Fc 25 MPA. PRECAST PITS MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
- IN ADDITION TO ITEM 6 ABOVE, ALL CONCRETE PITS GREATER THAN 3000mm DEEP SHALL HAVE WALLS AND BASE THICKNESS INCREASED TO 200mm.
- 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.
- WHERE PIPE LINES ENTER PITS, PROVIDE 2m LENGTH OF STOCKING WRAPPED SLOTTED Ø100 uPVC TO EACH SIDE OF PIPE.
- 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.
- ALL PIPE GRADES 1 IN 100 MINIMUM UNO.
- PROVIDE STEP IRONS IN PITS DEEPER THAN 1000mm.
- MIN. 600 COVER TO PIPE OBVERT BENEATH ROADS & MIN. 400 COVER BENEATH LANDSCAPED AND PEDESTRIAN AREAS.
- PIT COVERS IN TRAFFICABLE PAVEMENT SHALL BE CLASS D 'HEAVY DUTY', THOSE IN CONTAINER PAVEMENT SHALL BE CLASS G 'HEAVY DUTY', AND THOSE LOCATED IN NON-TRAFFICABLE AREAS SHALL BE CLASS B 'MEDIUM DUTY' UNO.
- PROVIDE CLEANING EYES (RODDING POINTS) TO PIPES AT ALL CORNERS AND T-JUNCTIONS WHERE NO PITS ARE PRESENT.
- 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.
- 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.

FINISHED LEVELS PLAN NOTES:

- LEVELS DATUM IS A.H.D.
- ALL CONTOUR LINES & SPOT LEVELS INDICATE FINISHED PAVEMENT LEVELS U.N.O. ON PLAN.
- THE MAJOR CONTOUR INTERVAL IS 0.5m
- THE MINOR CONTOUR INTERVAL IS 0.1m.
- MINIMUM PAVEMENT GRADE IS TO BE 1:100 (1%).
- MAXIMUM PAVEMENT GRADE IS TO BE 1:20 (5%) IN CARPARKING AREAS AND 1:25 (4%) ELSEWHERE.
- MAXIMUM RAMP GRADES ARE TO BE 1:12 (8.3%) U.N.O. ON PLAN.
- PROVIDE MINIMUM 3.0m LONG TRANSITION WHERE CHANGES GRADE EXCEED 1:20 (5%).
- PERMANENT BATTER SLOPES ARE TO HAVE A MAXIMUM GRADE OF 1V:3H.
- ALL BATTER SLOPE WITH GRADES AT OR EXCEEDING 1V:6H ARE TO BE TURFED IMMEDIATELY OR APPROPRIATE EROSION CONTROL IS TO BE PROVIDED TO THE SATISFACTION OF THE ENGINEER.
- ALL FOOTPATHS ARE TO FALL AWAY FROM THE BUILDING AT 2.5% NOMINAL GRADE.
- ALL PAVEMENTS ARE TO BE SET AT 50mm BELOW THE FINISHED FLOOR LEVEL OF THE WAREHOUSE AND OFFICE AREAS.



FOR APPROVAL

						ARCHITECT			CLIENT			<div> ESR</div>			PROJECT			<div> Costin Roe Consulting Pty Ltd. Consulting Engineers ***** Level 1, 8 Windmill Street Rahm Bay, Sydney NSW 2000 Tel: (02) 8551-7899 Fax: (02) 9541-3721 email: mail@costinroe.com.au ©</div>			<div> Costin Roe Consulting</div>			DRAWING TITLE DRAWING LIST & GENERAL NOTES																							
ISSUED FOR APPROVAL			14.08.20			C									DESIGNED			DRAWN			DATE			CHECKED			SIZE			SCALE			CADD			DRAWN BY			DRAWING NO.			C011994.10-DA10					
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ISSUED FOR INFORMATION			24.07.20			A																																									
AMENDMENTS			DATE			ISSUE			AMENDMENTS			DATE			ISSUE			AMENDMENTS			DATE			ISSUE			AMENDMENTS			DATE			ISSUE			AMENDMENTS			DATE			ISSUE					

LEGEND:

PROVIDE 1m RETURNS TO SILT FENCE AT 30m MAX. INTERVALS.
TYPICAL (N.S.O.P.)

- DENOTES SILT FENCE WITH CATCH DRAIN
- DENOTES SILT FENCE ONLY
- DENOTES DIVERSION DRAIN
- DENOTES DIRECTION OF FLOW

SEDIMENTATION BASIN NOTE:

FOR SEDIMENT & EROSION CONTROL DETAILS REFER TO DRAWING C011994.10-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 (24.4mm).

APPROXIMATE AREA OF DISTURBED SITE = 7.0 Ha

SEDIMENT BASIN 1:
CATCHMENT AREA = 7.0 Ha
REQUIRED BASIN VOLUME = 1640m³
BASE DIMENSIONS (L X W) = 40.0m x 20.0m
TOP DIMENSIONS (L X W) = 50.0m x 30.0m
MAX SIDE SLOPE = 1V:3H
DEPTH = 1.5m
PROVIDED BASIN VOLUME = 1700m³

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/SILTY CLAY)
2. ASSUME GROUP D SOIL (HIGH PLASTICITY AND SHRINK/SWELL PROPERTIES)



EROSION & SEDIMENT CONTROL PLAN
SCALE 1:500

FOR APPROVAL

5m 0 10 20 30 40 50m
SCALE 1:500 AT A0 SIZE SHEET

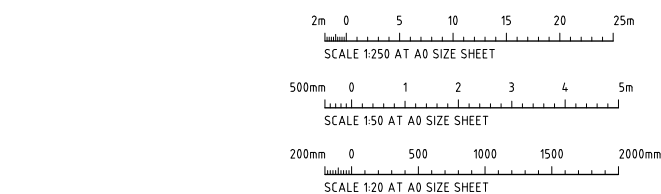
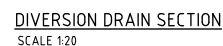
ISSUED FOR APPROVAL			14.08.20	C	ARCHITECT			CLIENT			PROJECT			Costin Roe Consulting Pty Ltd.			DRAWING TITLE		
REVISED AS CLOUDED			06.08.20	B							LOT 4 WAREHOUSE FACILITY			Consulting Engineers			EROSION AND SEDIMENT		
ISSUED FOR INFORMATION			24.07.20	A							BRINGELLY ROAD, BUSINESS HUB			Level 1, 8 Windmill Street			CONTROL PLAN		
AMENDMENTS			DATE	ISSUE	AMENDMENTS			AMENDMENTS			DESIGNED (DRAWN)			Level 1, 8 Windmill Street			C011994.10-DA20		
			DATE	ISSUE							JULY 20			Walsh Bay, Sydney NSW 2000			C		
			DATE	ISSUE							CHECKED			Tel: (02) 8551-7889 Fax: (02) 9541-3721					
			DATE	ISSUE							SIZE			email: mail@costinroe.com.au					
			DATE	ISSUE							SCALE								
			DATE	ISSUE							AS SHOWN								
			DATE	ISSUE							CNO REF:								
			DATE	ISSUE							C011994.10-DA20								



TYPICAL SILT FENCE DETAIL
N.T.S.
PROVIDE 1m RETURNS AT 30m INTERVALS
TYPICAL



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.



NOTES:

ALL EROSION & SEDIMENT CONTROL MEASURES TO BE INSPECTED & MAINTAINED DAILY BY SITE MANAGER.

MINIMISE DISTURBED AREAS.

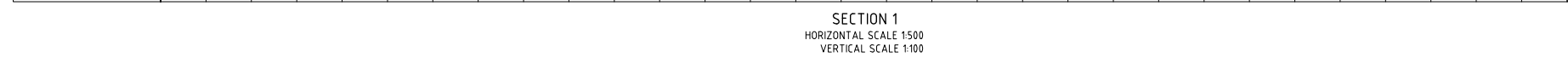
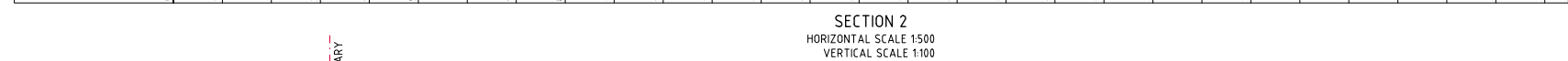
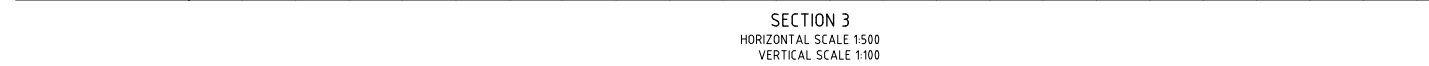
ROADS & FOOTPATHS TO BE SWEEPED DAILY.

12m TURF TO BE PLACED BEHIND KERBS.

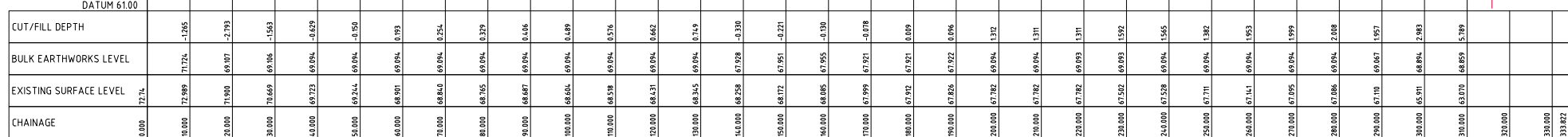
DUST MINIMISATION CONTROL BY WATERING TO BE IMPLEMENTED BY SITE MANAGER AS REQUIRED OR AS DIRECTED BY THE EPA.

FOR APPROVAL

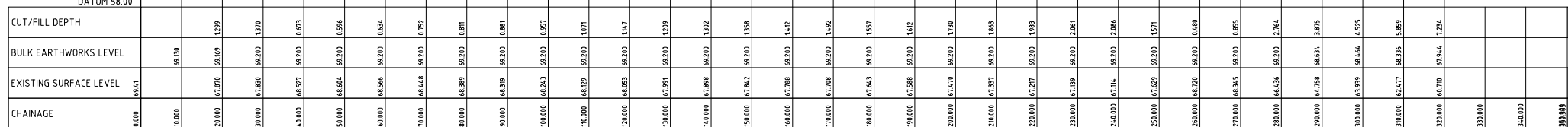
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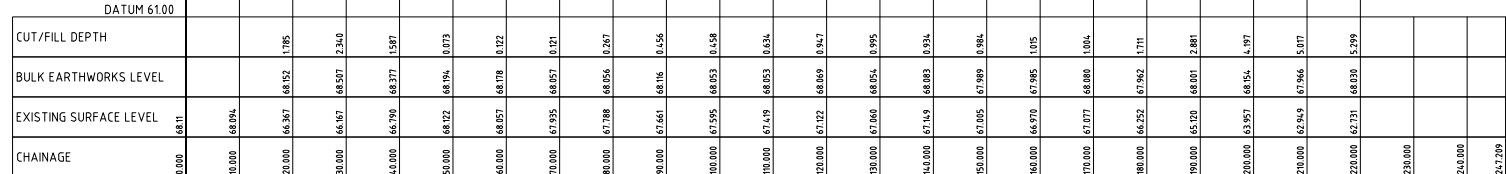
FOR APPROVAL



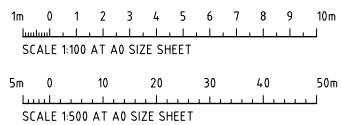
SECTION 6
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



SECTION 5
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100

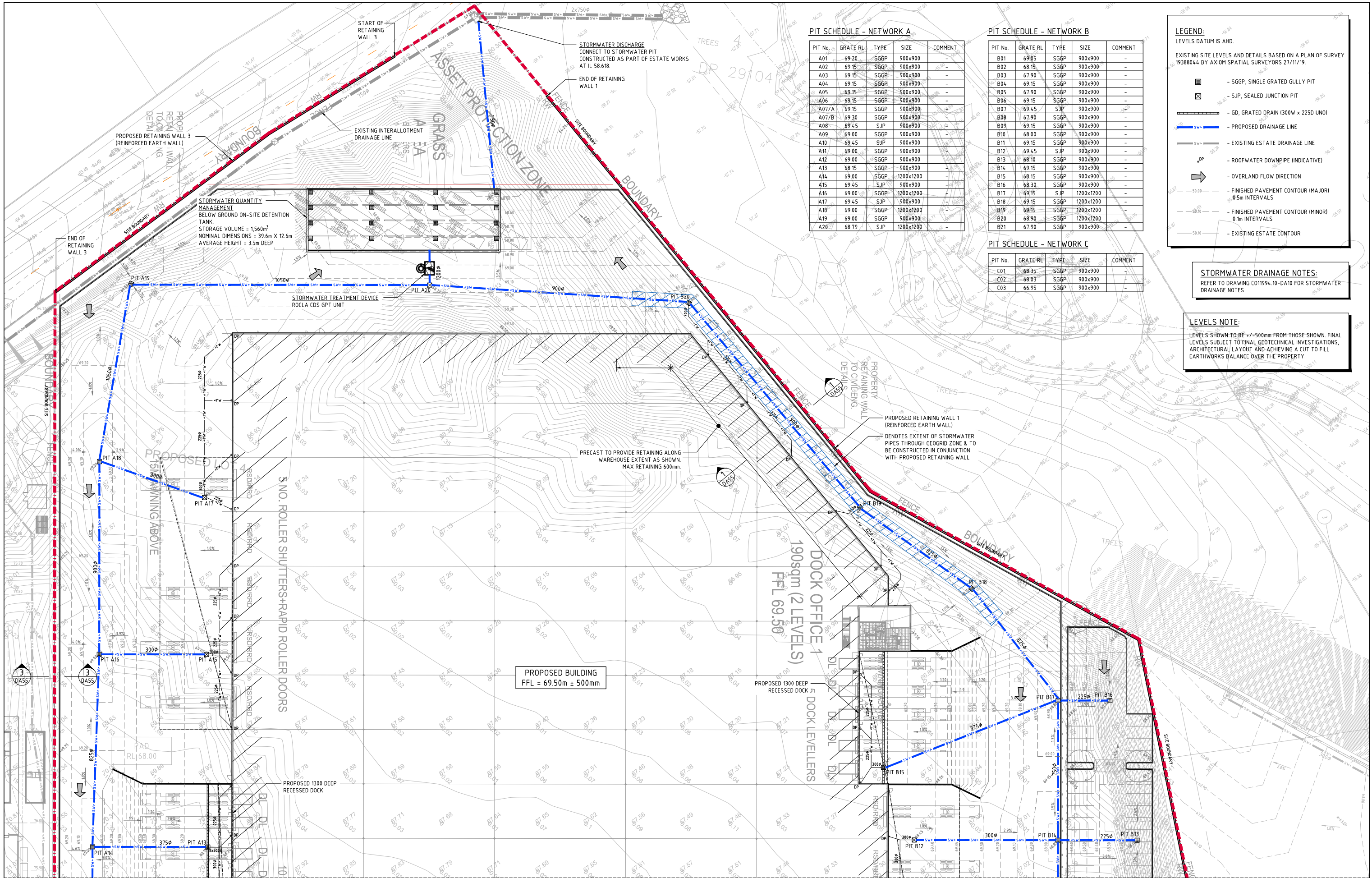


SECTION 4
HORIZONTAL SCALE 1:500
VERTICAL SCALE 1:100



FOR APPROVAL

[illegible]



PIT SCHEDULE - NETWORK A

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
A01	69.20	SGGP	900x900	-
A02	69.15	SGGP	900x900	-
A03	69.15	SGGP	900x900	-
A04	69.15	SGGP	900x900	-
A05	69.15	SGGP	900x900	-
A06	69.15	SGGP	900x900	-
A07/A	69.15	SGGP	900x900	-
A07/B	69.30	SGGP	900x900	-
A08	69.45	SJP	900x900	-
A09	69.00	SGGP	900x900	-
A10	69.45	SJP	900x900	-
A11	69.00	SGGP	900x900	-
A12	69.00	SGGP	900x900	-
A13	68.15	SGGP	900x900	-
A14	69.00	SGGP	1200x1200	-
A15	69.45	SJP	900x900	-
A16	69.00	SGGP	1200x1200	-
A17	69.45	SJP	900x900	-
A18	69.00	SGGP	1200x1200	-
A19	69.00	SGGP	900x900	-
A20	68.79	SJP	1200x1200	-

PIT SCHEDULE - NETWORK B

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
B01	69.05	SGGP	900x900	-
B02	68.15	SGGP	900x900	-
B03	67.90	SGGP	900x900	-
B04	69.15	SGGP	900x900	-
B05	67.90	SGGP	900x900	-
B06	69.15	SGGP	900x900	-
B07	69.45	SJP	900x900	-
B08	67.90	SGGP	900x900	-
B09	69.15	SGGP	900x900	-
B10	68.00	SGGP	900x900	-
B11	69.15	SGGP	900x900	-
B12	69.45	SJP	900x900	-
B13	68.10	SGGP	900x900	-
B14	69.15	SGGP	900x900	-
B15	68.15	SGGP	900x900	-
B16	68.30	SGGP	900x900	-
B17	69.15	SJP	1200x1200	-
B18	69.15	SGGP	1200x1200	-
B19	69.15	SGGP	1200x1200	-
B20	68.90	SGGP	1200x1200	-
B21	67.90	SGGP	900x900	-

PIT SCHEDULE - NETWORK C

PIT No.	GRATE RL	TYPE	SIZE	COMMENT
C01	68.35	SGGP	900x900	-
C02	68.03	SGGP	900x900	-
C03	66.95	SGGP	900x900	-

LEGEND:
LEVELS DATUM IS AHD.
EXISTING SITE LEVELS AND DETAILS BASED ON A PLAN OF SURVEY 193804.4 BY AXIOM SPATIAL SURVEYORS 27/11/19.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- PROPOSED DRAINAGE LINE
- EXISTING ESTATE DRAINAGE LINE
- ROOFWATER DOWNPIPE (INDICATIVE)
- OVERLAND FLOW DIRECTION
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- EXISTING ESTATE CONTOUR

STORMWATER DRAINAGE NOTES:
REFER TO DRAWING C011994.10-DA10 FOR STORMWATER DRAINAGE NOTES

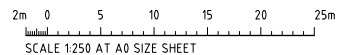
LEVELS NOTE:
LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

REFER TO CONTINUATION ON DRAWING DA42



STORMWATER DRAINAGE PLAN - SHEET 1
SCALE 1:250

FOR APPROVAL



LEGEND:

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- PROPOSED DRAINAGE LINE
- EXISTING ESTATE DRAINAGE LINE
- ROOFWATER DOWNPIPE (INDICATIVE)
- OVERLAND FLOW DIRECTION
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- EXISTING ESTATE CONTOUR

STORMWATER DRAINAGE NOTES:
REFER TO DRAWING C011994-10-DA10 FOR STORMWATER DRAINAGE NOTES

LEVELS NOTE:
LEVELS SHOWN TO BE +/- 500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

NOTES:
FOR STORMWATER PIT SCHEDULE REFER TO DRAWING DA4.1

PROPOSED BUILDING
FFL = 69.50m ± 500mm

PROPOSED OFFICE
FFL = 69.50m ± 500mm

WAREHOUSE
34,711sqm
FFL 69.50 (+/- 500mm)

DOCK OFFICE 2
190sqm (2 LEVELS)
FFL 69.50

PROPOSED 1300 DEEP RECESSED DOCK

PUMP ROOM
FSL 69.50
SPRINKLER TANK
FSL 69.50

40KL RAINWATER TANK
LOCATION SHOWN INDICATIVELY

PROPOSED RETAINING WALL 2
(NO FINES KEYSTONE WALL)

PROPOSED RETAINING WALL 1
(REINFORCED EARTH WALL)

SKYLINE CRESCENT

START OF RETAINING WALL 2

START OF RETAINING WALL 1

CONVERT KIP TO BUTTERFLY GRATE

CONVERT KIP TO BUTTERFLY GRATE

TRUCK QUEUING BAY

TRUCK ENTRY

TRUCK EXIT

BICYCLE PARKING

CAR PARK (281 SPACES)

PROPERTY RETAINING WALL TO CIVIL ENG.

SITE BOUNDARY

FENCE

BOUNDARY

EXISTING ESTATE CONTOUR

FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS

FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS

EXISTING ESTATE DRAINAGE LINE

PROPOSED DRAINAGE LINE

ROOFWATER DOWNPIPE (INDICATIVE)

OVERLAND FLOW DIRECTION

SJJ, SEALED JUNCTION PIT

SGGP, SINGLE GRATED GULLY PIT

GD, GRATED DRAIN (300W x 225D UNO)

SCALE 1:250

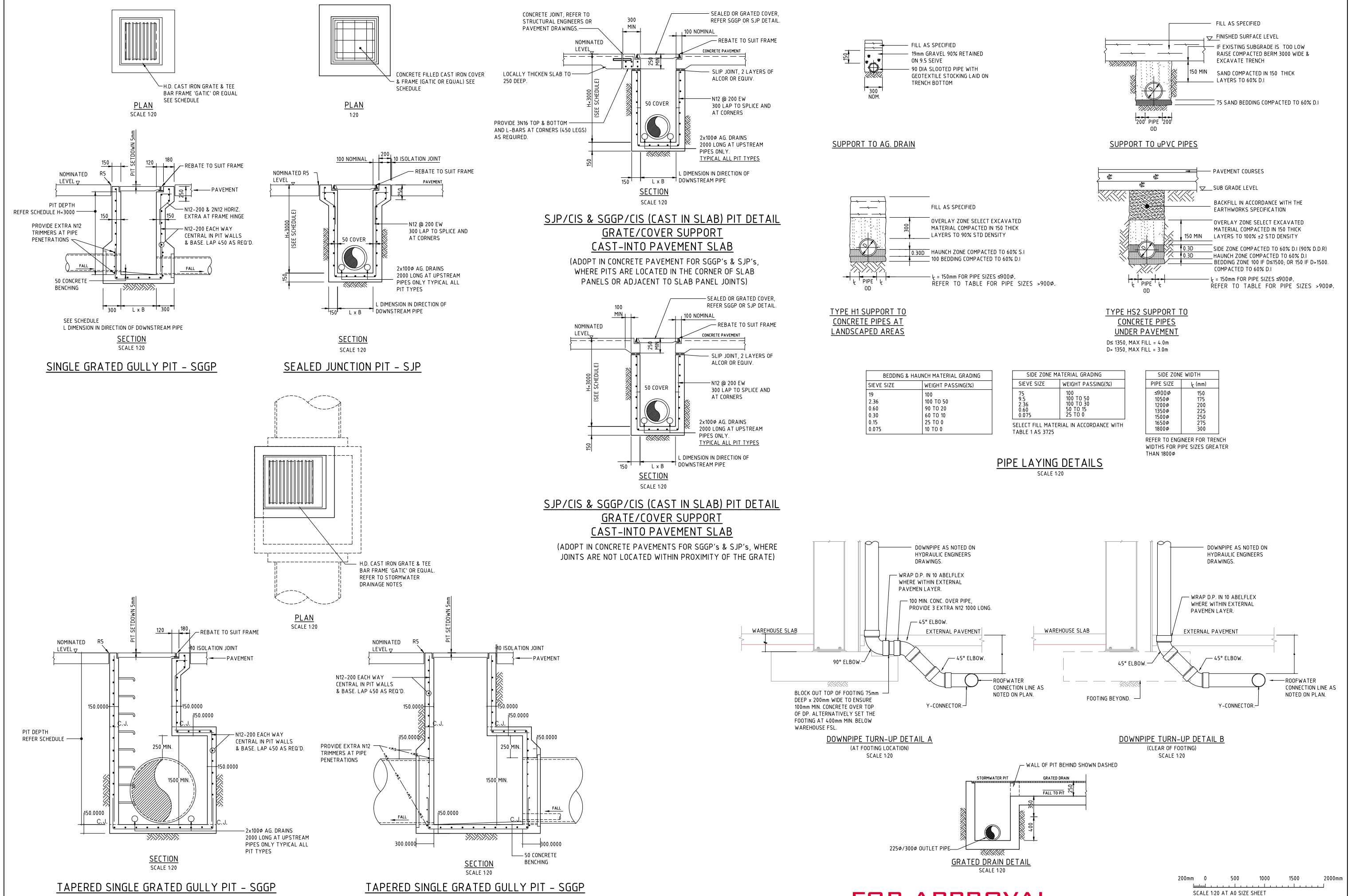
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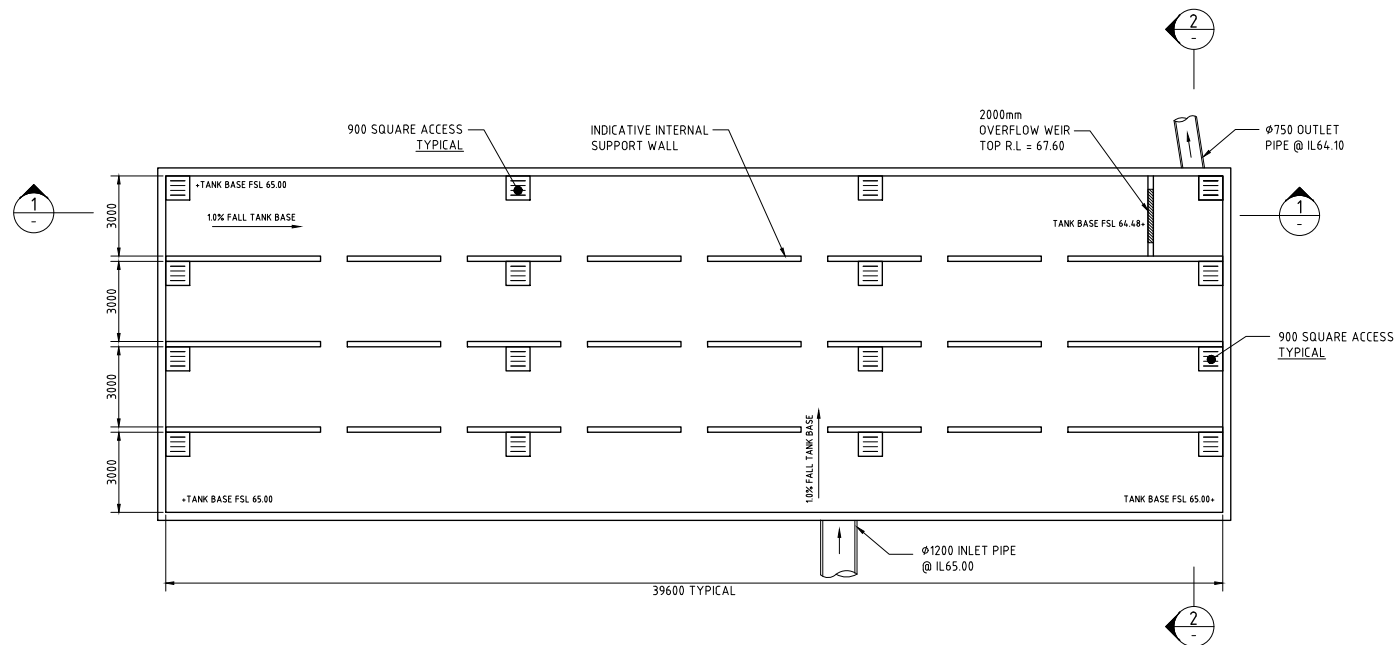
SCALE 1:250 AT A0 SIZE SHEET

FOR APPROVAL

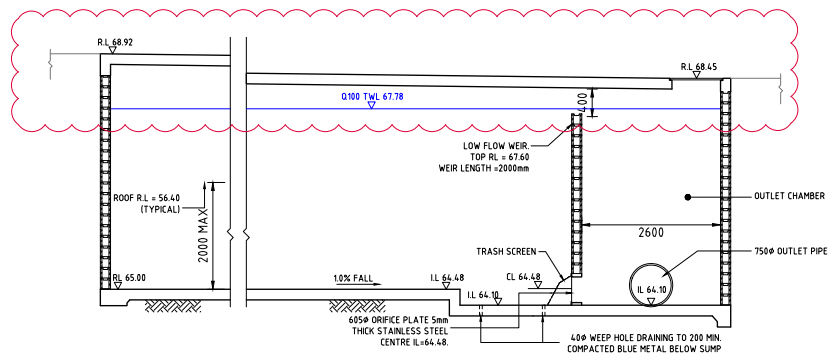
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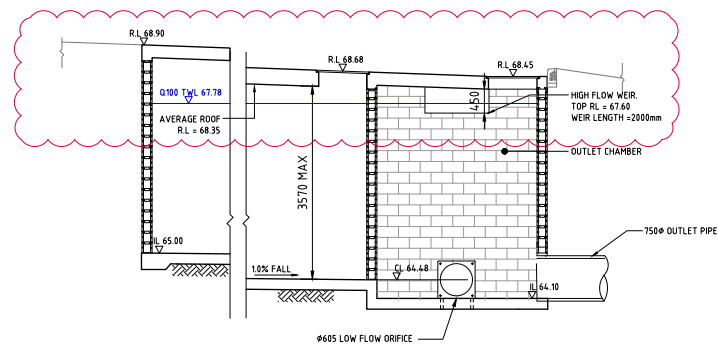




BELOW GROUND OSD TANK PLAN
SCALE 1:100



SECTION 1:50 1: TYPICAL THRU' TANK



SECTION 1:50 2:

OSD TANK DETAILS

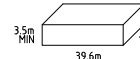
SITE AREA
TOTAL SITE AREA 69 740m²

TOTAL SITE AREA DRAINING TO STORAGE
(90% IMPERVIOUS) 64 870m²

STORAGE

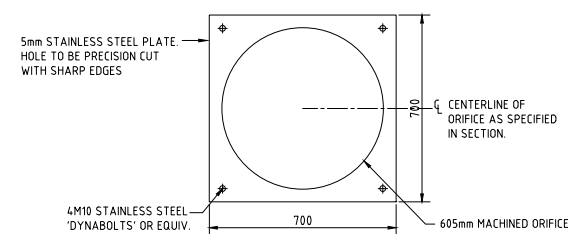
ORIFICE Ø 605mm
STORAGE VOLUME 1,560m³

INTERNAL TANK DIMENSIONS
(INC. HIGH FLOW CHAMBERS)



OSD HYDRAULIC DETAILS

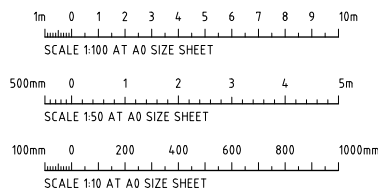
STORM A.R.I. EVENT	STORM DURATION	PRE-DEVELOPMENT FLOW (m ³ /s)	POST-DEVELOPMENT FLOW (UN-ATTENUATED) (m ³ /s)	POST-DEVELOPMENT FLOW (ATTENUATED) (m ³ /s)	OSD TANK WATER DEPTH (mm)	OSD TANK STORAGE VOLUME (m ³)
5 YEAR	1 HOUR	1.31	2.02	1.05	1660	790
20 YEAR	2 HOURS	1.78	2.37	1.25	2420	1160
100 YEAR	2 HOURS	2.24	2.88	1.64	3270	1560



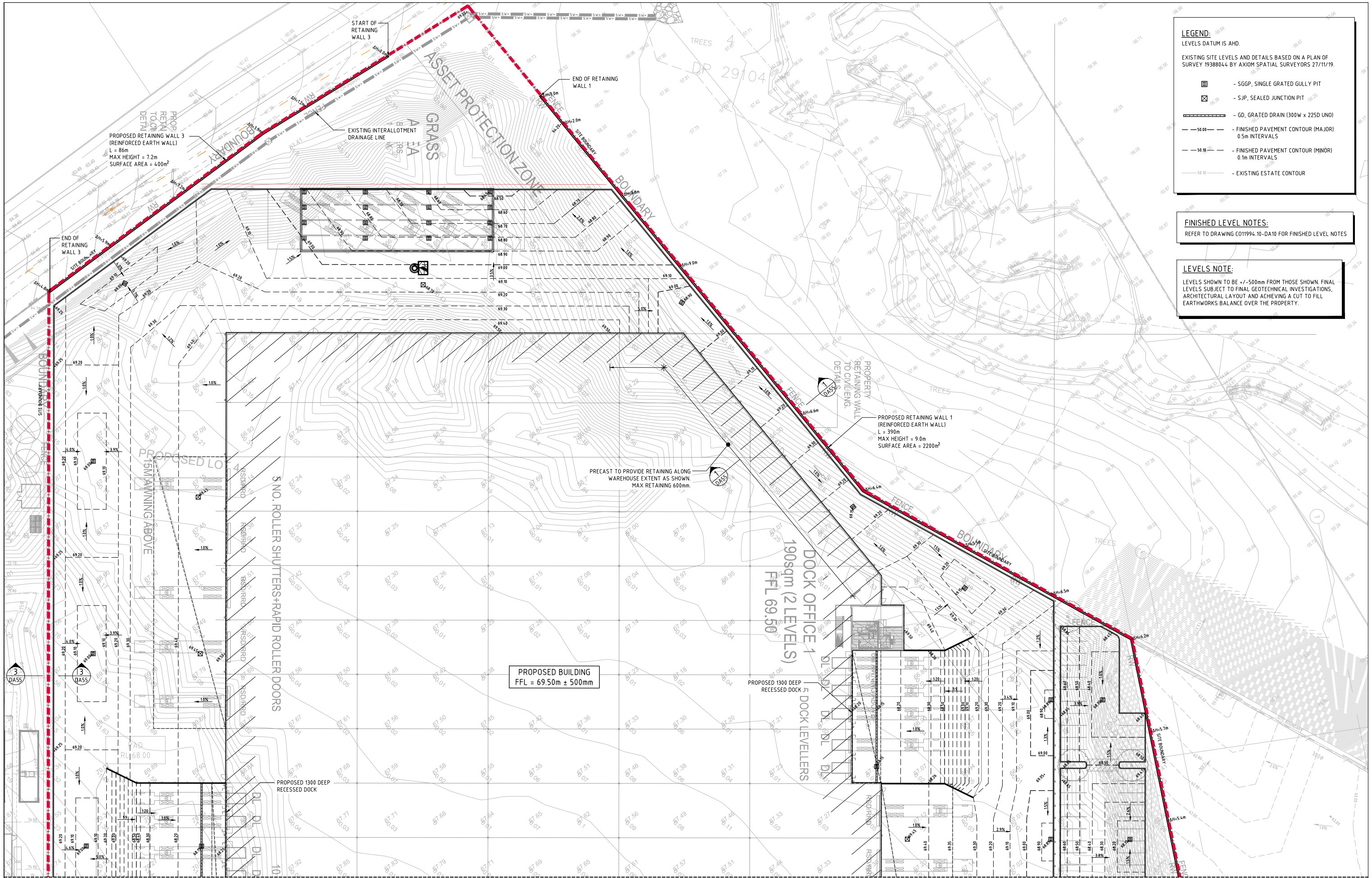
ORIFICE PLATE DETAIL

1:10

NOTE:
STRUCTURAL DESIGN OF TANK BY STRUCTURAL ENGINEER IN DETAIL DESIGN STAGE.



FOR APPROVAL



LEGEND:
LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON A PLAN OF SURVEY 19388044 BY AXIOM SPATIAL SURVEYORS 27/11/19.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- EXISTING ESTATE CONTOUR

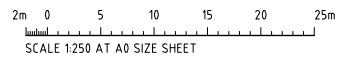
FINISHED LEVEL NOTES:
REFER TO DRAWING C011994.10-DA10 FOR FINISHED LEVEL NOTES

LEVELS NOTE:
LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

REFER TO CONTINUATION ON DRAWING DA52

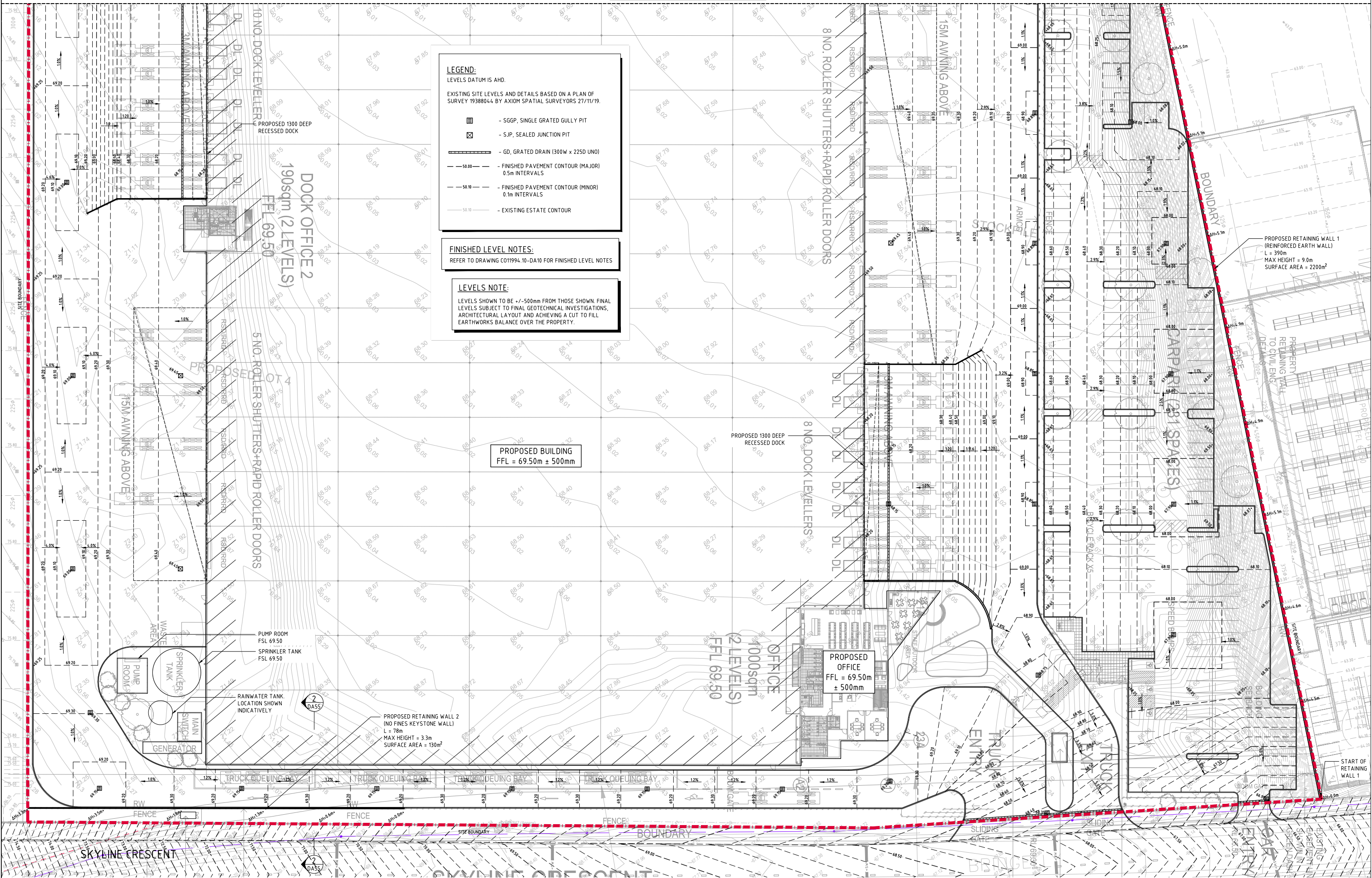


FINISHED LEVELS PLAN - SHEET 1
SCALE 1:250



FOR APPROVAL

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LEGEND:
LEVELS DATUM IS AHD.

EXISTING SITE LEVELS AND DETAILS BASED ON A PLAN OF SURVEY 19388044 BY AXIOM SPATIAL SURVEYORS 27/11/19.

- SGGP, SINGLE GRATED GULLY PIT
- SJP, SEALED JUNCTION PIT
- GD, GRATED DRAIN (300W x 225D UNO)
- 50.00 - FINISHED PAVEMENT CONTOUR (MAJOR) 0.5m INTERVALS
- 50.10 - FINISHED PAVEMENT CONTOUR (MINOR) 0.1m INTERVALS
- 50.10 - EXISTING ESTATE CONTOUR

FINISHED LEVEL NOTES:
REFER TO DRAWING C011994.10-DA10 FOR FINISHED LEVEL NOTES

LEVELS NOTE:
LEVELS SHOWN TO BE +/-500mm FROM THOSE SHOWN. FINAL LEVELS SUBJECT TO FINAL GEOTECHNICAL INVESTIGATIONS, ARCHITECTURAL LAYOUT AND ACHIEVING A CUT TO FILL EARTHWORKS BALANCE OVER THE PROPERTY.

PROPOSED BUILDING
FFL = 69.50m ± 500mm

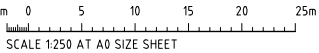
PROPOSED OFFICE
FFL = 69.50m ± 500mm

PROPOSED RETAINING WALL 1
(REINFORCED EARTH WALL)
L = 390m
MAX HEIGHT = 9.0m
SURFACE AREA = 2200m²

PROPOSED RETAINING WALL 2
(NO FINES KEYSTONE WALL)
L = 78m
MAX HEIGHT = 3.3m
SURFACE AREA = 130m²

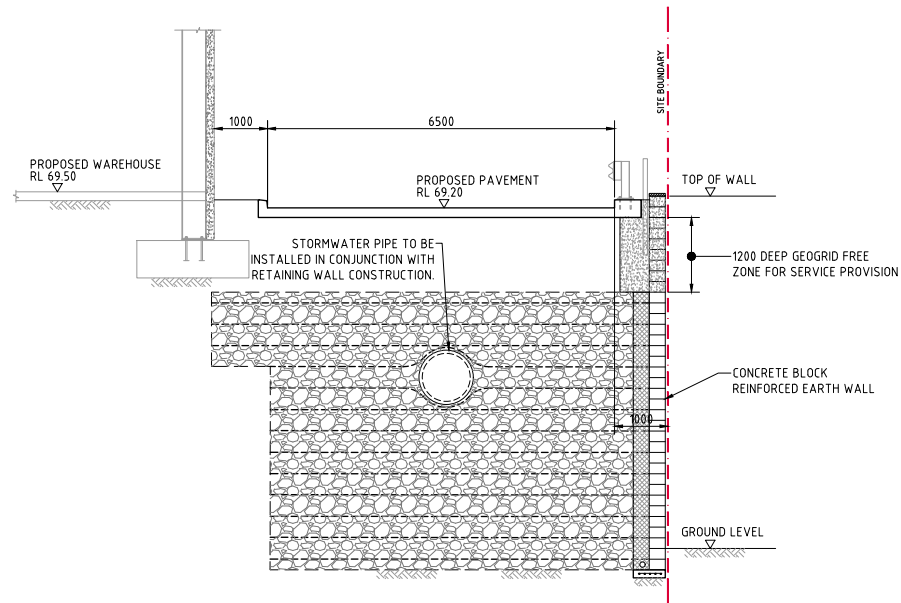


FINISHED LEVELS PLAN - SHEET 2
SCALE 1:250

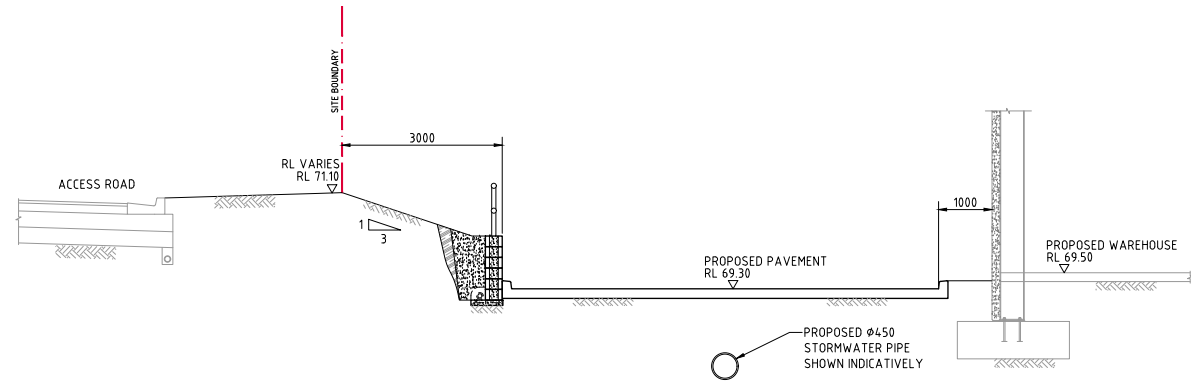


FOR APPROVAL

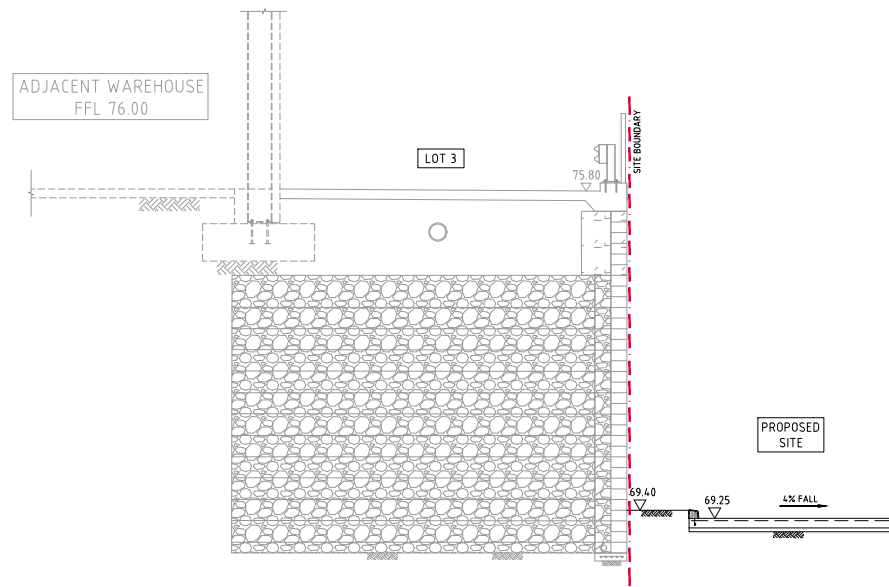
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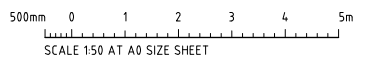
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SECTION 2:50 2
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SECTION 3:50 3
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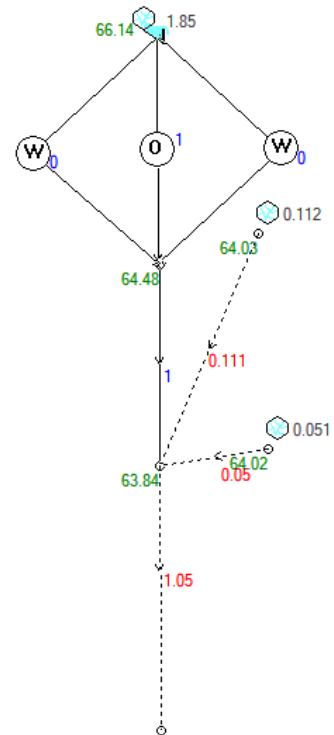
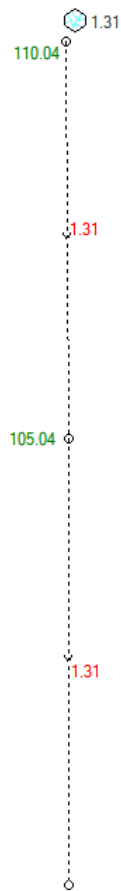


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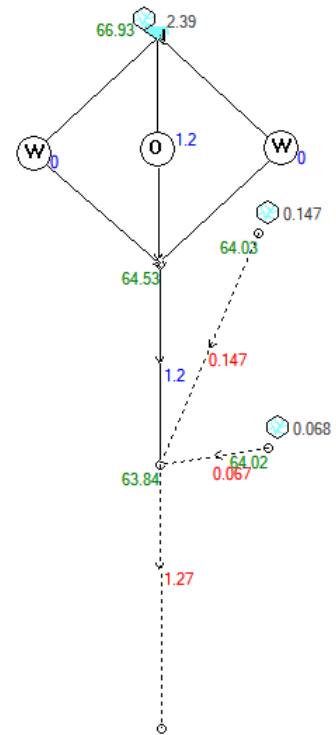
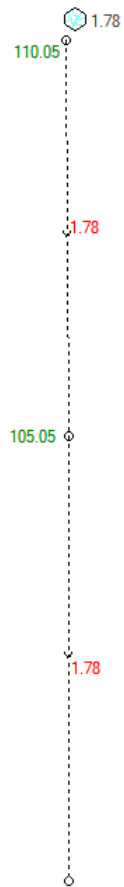
PROJECT				CLIENT				ARCHITECT			
LOT 4 WAREHOUSE FACILITY				ESR				Costin Roe Consulting Pty Ltd.			
BRINGELLY ROAD, BUSINESS HUB				CONSULTING ENGINEERS				Level 1, 8 Windmill Street			
HORNINGSSEA PARK, NSW				Wahah Bay, Sydney NSW 2000				Tel: (02) 8551-7889 Fax: (02) 8541-3721			
DESIGNED (DRAWN) DATE CHECKED BY SCALE				C/O REF: C011994.10-DA55				email: mail@costinroe.com.au ©			
1:0 1:0 JULY 20 M.W. A0 AS SHOWN				PRECISION COMMUNICATION ACCOUNTABILITY				DRAWING TITLE			
ISSUED FOR APPROVAL 14.08.20 B				TYPICAL SECTIONS				DRAWING NO: C011994.10-DA55			
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Appendix B

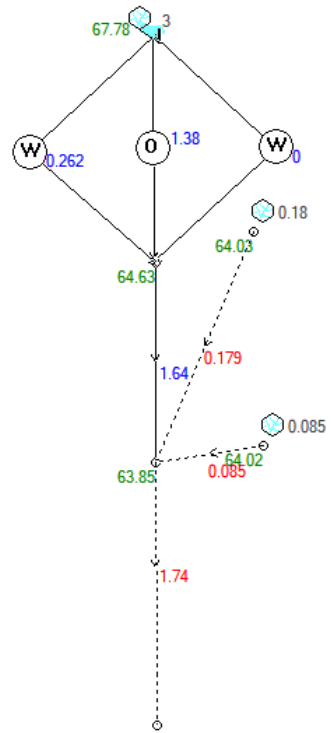
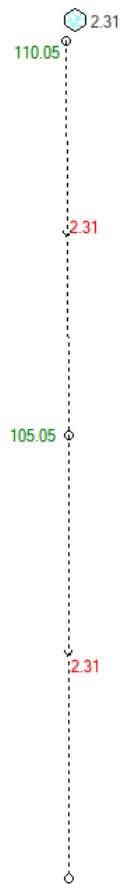
DRAINS MODEL



Q5 MODEL



Q20 MODEL



Q100 MODEL

Appendix C

SEARS SSD_8586218 (Dated 11 August 2020)

Planning Secretary's Environmental Assessment Requirements

Section 4.12(8) of the *Environmental Planning and Assessment Act 1979* Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*

Application Number	SSD-8586218
Project Name	Temperature Controlled Warehouse Facility, Lot 4 Bringelly Road Business Hub
Development	Construction and operation of a light industrial building, encompassing a temperature controlled warehouse facility, ancillary office administration, car parking and landscaping within the Bringelly Road Business Hub.
Location	Lot 4 within Bringelly Road Business Hub at Bringelly Road, Homingsea Park (Lot 11 DP 29104), Liverpool local government area
Applicant	ESR Developments (Australia) Pty Ltd
Date of Issue	11/08/2020
General Requirements	<p>The Environmental Impact Statement (EIS) must be prepared in accordance with, and meet the minimum requirements of clauses 6 and 7 of Schedule 2 of the <i>Environmental Planning and Assessment Regulation 2000</i> (the Regulation). In addition, the EIS must include:</p> <ul style="list-style-type: none"> - a detailed description of the development, including: <ul style="list-style-type: none"> · a description of the proposed operation · the need and justification for the proposed development · likely staging of the development · likely interactions between the development and any existing, approved and proposed developments in the vicinity of the site · plans of any proposed works with details of the proposed setbacks, site coverage, car parking, landscaped areas · details of infrastructure upgrades or items required to facilitate the development, and a description of any arrangements to ensure the upgrades will be implemented in a timely manner and maintained. - a detailed description of how the development is consistent with the Bringelly Road Business Hub concept proposal (SSD 6324), particularly the approved land uses - consideration of all relevant environmental planning instruments, including identification and justification of any inconsistencies with these instruments - a list of any approvals that must be obtained under the <i>Roads Act 1993</i>, or any other Act or law before the development may lawfully be carried out - consideration of key issues identified by Government agencies and Liverpool City Council (see Attachment 2) - a risk assessment of any potential environmental impacts of the development, identifying the issues for further assessment <p>Where relevant, the assessment of key issues below, and any other significant issues identified in the risk assessment, must include:</p>

	<ul style="list-style-type: none"> - adequate baseline data - consideration of the potential cumulative impacts due to other developments in the vicinity (completed, underway or proposed); - measures to avoid, minimise and if necessary, offset predicted impacts, including detailed contingency plans for managing any significant risks to the environment; and - a health impact assessment of local and regional impacts associated with the development, including those health risks associated with relevant key issues. <p>The EIS must also be accompanied by a report from a qualified quantity surveyor providing:</p> <ul style="list-style-type: none"> - a detailed calculation of the Capital Investment Value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and components from which the CIV calculation is derived. The report shall be prepared on company letterhead and indicate applicable GST component of the CIV; - an estimate of jobs that will be created during the construction and operational phases of the proposed development; - and certification that the information provided is accurate at the date of preparation.
Key issues	<p>The EIS must include an assessment of potential impacts of the proposal (including cumulative impacts) and develop appropriate measures to avoid, mitigate, manage and/or offset these impacts. The EIS must address the following specific matters:</p> <p>1. Statutory and Strategic Context</p> <ul style="list-style-type: none"> o demonstrate the proposal is consistent with all relevant planning strategies, environmental planning instruments, adopted precinct plans, draft district plan(s) and adopted management plans and justification for any inconsistencies. The following documents must be addressed: <ul style="list-style-type: none"> o State Environmental Planning Policy No. 33 – Hazardous and Offensive Development o State Environmental Planning Policy No. 64 – Advertising and Signage o State Environmental Planning Policy (Infrastructure) 2007 o State Environmental Planning Policy (State and Regional Development) 2011 o State Environmental Planning Policy (Western Sydney Parklands) 2009 o Parklands Plan of Management 2030. o address the matters to be included in future development applications, as described in Part B of the development consent SSD 6324. <p>2. Community and Stakeholder Engagement – including:</p> <ul style="list-style-type: none"> o a detailed community and stakeholder engagement strategy identifying who and how stakeholders will be engaged in the process o a report detailing the issues raised and how they have been addressed including any changes to the proposal o details of proposed engagement activities throughout the construction and operation of the development.

3. Traffic and Access – including:

- o a Traffic Impact Assessment detailing all daily and peak traffic and transport movements likely to be generated (vehicle, public transport, pedestrian and cycle trips) during construction and operation of the development, including a description of vehicle access routes and the impacts on nearby intersections
- o details of access to the site from the road network including intersection location, design and sight distance
- o an assessment of predicted impacts (including cumulative impacts from nearby surrounding development) on road safety and the capacity of the road network to accommodate the development including existing and future performance of nearby key intersections, including Bringelly Road/ Skyline Crescent and Bringelly Road/ Camden Valley Way/ Cowpasture Road
- o details of any road upgrades or new roads, roundabouts or intersections required for the development, including demonstration of consultation with the relevant roads authority on the proposed design
- o details of vehicle circulation of the largest light and heavy vehicles anticipated to access the site, including swept path analysis, loading dock servicing and provisions
- o detailed plans of the proposed site access and parking provision on site in accordance with the relevant Australian Standards
- o identification of any dangerous goods likely to be transported on arterial and local roads to/ from the site and, if necessary, the preparation of an incident management strategy
- o impacts on the safety and capacity of the surrounding road network (including intersections along Bringelly Road and Cowpasture Road) and access points, using SIDRA modelling or similar to assess impacts from current traffic counts and cumulative traffic from existing and proposed development
- o details of bicycle parking and end of trip facilities
- o details of impact mitigation, management and monitoring measures.

4. Urban Design

Measures to minimise the visual impacts of the development, including:

- o a detailed assessment of the proposed development including height, colour, scale, building materials and finishes, signage and lighting, particularly from nearby residential receivers
- o detailed plans showing suitable landscaping
- o justification for any inconsistencies with the Updated Site Design Guidelines prepared by JBA Urban Planning Consultants, dated June 2015 as amended and approved under Condition A9 of the development consent for SSD 6324
- o include details of any advertising signage or structures proposed as part of the development.

5. Soil and Water – including:

- o 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
- o a detailed site water balance including a description of the water demands and breakdown of water supplies, and any water licensing requirements

- o description of the measures to minimise water use
- o 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
- o detailed flooding assessment
- o description of the proposed erosion and sediment controls during construction
- o 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) and
- o characterisation of the nature and extent of any contamination on the site and surrounding area

6. Noise and Vibration – including:

- o a description of all potential noise and vibration sources during the construction and operational phases of the development, including on and off-site traffic noise
- o a cumulative noise impact assessment of all potential noise sources in accordance with relevant Environment Protection Authority guidelines
- o details of noise mitigation, management and monitoring measures.

7. Hazards and Risks – including:

- o if the storage of dangerous goods is proposed on site, the EIS must include a preliminary risk screening completed in accordance with State Environmental Planning Policy No. 33 – Hazardous and Offensive Development and Applying SEPP 33 (DoP, 2011), with a clear indication of class, quantity and location of all dangerous goods and hazardous materials associated with the development. Should preliminary screening indicate that the project is “potentially hazardous” a preliminary hazard analysis (PHA) must be prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011).
- o report on consultation with pipeline operator Jemena to ensure that any nearby high pressure gas pipelines remain compliant with the relevant Australian Standards throughout the life of the development and include a Safety Management Study, if necessary.

8. Bushfire

Prepare a bushfire assessment report which provides an assessment of bushfire hazard, including:

- o details of the storage of flammable materials
- o an assessment against the requirements of *Planning for Bushfire Protection 2019*, particularly access and provision of water supply for firefighting purposes
- o a description of measures to ensure the proposal will not increase the bushfire risk to adjoining lands.

9. Waste Management – including:

- o details of the quantities and classification of all waste streams to be generated on site in accordance with the EPA’s Waste Classification

Guidelines (2014)

- o details of waste storage, handling, transport, and disposal
- o the measures that would be implemented to ensure the development is consistent with the aims, objectives and guidelines in the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21*.

10. Air Quality – including:

- o a description of all potential sources of odour and emissions during the construction and operational phases of the development
- o an assessment of the air quality impacts at receivers during construction and operation of the development, in accordance with the relevant Environment Protection Authority guidelines
- o details of any mitigation, management and monitoring measures required to prevent and/ or minimise emissions.

11. Social and Economic – including:

- o an analysis of the economic and social impacts of the development, including any benefits to the community.

12. Ecologically Sustainable Development and Energy Efficiency – including:

- o an assessment of how the development will incorporate ecologically sustainable development principles in all phases of the development
- o consideration of the use of green walls, green roof and/or cool roof into the design
- o climate change projections developed for the Sydney Metropolitan area and how they are used to inform the building design and asset life of the development
- o an assessment of the energy uses on-site, including measures proposed to ensure the development is energy efficient.

13. Biodiversity – including:

- o an assessment and documentation of biodiversity impacts related to the development in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR) where required under the Act, except where a waiver for preparation of a BDAR has been granted.

14. Cultural Heritage and Aboriginal Cultural Heritage – including:

- o consideration of heritage items within the vicinity of the site and any potential heritage impacts associated with the development.

15. Infrastructure Requirements – including:

- o a detailed written and graphical description of infrastructure required on the site, including a description of any arrangements to avoid locating infrastructure within public domain areas
- o identification of any infrastructure upgrades required off-site to facilitate the development, including a description of any arrangements to ensure that the upgrades will be implemented in a timely manner and appropriately maintained
- o 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.

Plans and Documents	The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the Regulation. Provide these as part of the EIS rather than as separate documents.
Consultation	<p>During the preparation of the EIS, you must consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners.</p> <p>In particular you must consult with:</p> <ul style="list-style-type: none"> - Liverpool City Council - Western Sydney Parklands Trust - Transport for New South Wales - Sydney Water - Water NSW - Rural Fire Service - Environment, Energy and Science of DPIE - Jemena - surrounding landowners and the local community - any other public transport or community service providers. <p>The EIS must describe the consultation process and the issues raised, and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, a short explanation should be provided.</p>
Further consultation after 2 years	If you do not lodge a Development Application and EIS for the development within 2 years of the issue date of these SEARs, you must consult further with the Secretary in relation to the preparation of the EIS.
References	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this proposal.

ATTACHMENT 1

Technical and Policy Guidelines

The following guidelines may assist in the preparation of the environmental impact statement. This list is not exhaustive and not all of these guidelines may be relevant to your proposal.

Many of these documents can be found on the following websites:

<http://www.planning.nsw.gov.au>

<http://www.shop.nsw.gov.au/index.jsp>

<http://www.australia.gov.au/publications>

<http://www.epa.nsw.gov.au/>

<http://www.environment.nsw.gov.au/>

<http://www.dpi.nsw.gov.au/>

Policies, Guidelines & Plans

Plans and Documents

The EIS must include all relevant plans, architectural drawings, diagrams and relevant documentation required under Schedule 1 of the *Environmental Planning and Assessment Regulation 2000*. Provide these as part of the EIS rather than as separate documents.

In addition, the EIS must include the following:

1. An existing site survey plan drawn at an appropriate scale illustrating:
 - the location of the land, boundary measurements, area (sq.m) and north point
 - the existing levels of the land in relation to buildings and roads
 - location and height of existing structures on the site
 - location and height of adjacent buildings and private open space
 - all levels to be to Australian Height Datum (AHD).
2. A locality/context plan drawn at an appropriate scale indicating:
 - significant local features
 - the location and uses of existing buildings, shopping and employment areas
 - traffic and road patterns, pedestrian routes and public transport nodes.
3. Drawings at an appropriate scale illustrating:
 - draft plan of subdivision prepared by a registered surveyor
 - detailed earthworks plan
 - stormwater concept plan
 - landscape plan
 - Construction Management Plan, inclusive of a Construction Traffic Management Plan and construction methodology and staging.

Documents to be Submitted

Documents to submit include:

- 1 electronic copy of all the documents and plans for review prior to exhibition
- Additional copies as determined by the Department once the development

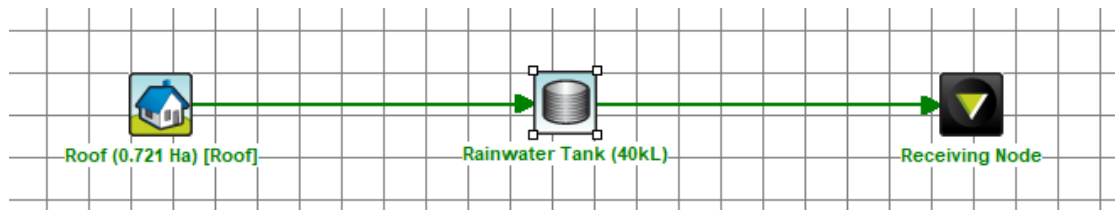
application is lodged


ATTACHMENT 2

Government Authority Responses to Request for Key Issues
For Information Only

Appendix D

MUSIC MODEL



	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
	DHL LSHC Building Lot 4, Bringelly Road, Leppington		


Appendix L

Complaints Register

	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
	DHL LSHC Building Lot 4, Bringelly Road, Leppington		

Complaints Register

Date Received	Complaint Originator (Name & Company / Address)	Issue Reported To (Prime Staff First Receiving Complaint)	Corrective Action	Response Date	Other Comments

	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
	DHL LSHC Building Lot 4, Bringelly Road, Leppington		

Appendix M

Air Quality Report

BRINGELLY ROAD BUSINESS HUB - LOT 4

Air Quality Impact Assessment

Prepared for:

ESR Australia
Level 29, 20 Bond Street
Sydney 2000 NSW

SLR Ref: 610.17734-R12
Version No: -v1.0
August 2020



PREPARED BY

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with ESR Australia (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
610.17734-R12-v1.0	14 August 2020	D Dsouza, V Marwaha	J Cox	V Marwaha

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APPENDICES

Appendix A	Construction Phase Risk Assessment Methodology
Appendix B	Operational Phase Risk Assessment Methodology

1 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by ESR Australia (ESR), to prepare an Air Quality Impact Assessment (AQIA) for the construction and operation of a warehouse to be located at Lot 4 (the Development Site) within the Bringelly Road Business Hub.

This report has been prepared to inform a Development Application (DA) for the construction and operation of a light industrial warehouse facility for storage and distribution of materials, including the following:

- Bulk delivery and storage of materials;
- Dispatch and distribution; and
- Ancillary office administration.

This AQIA has been prepared by SLR to determine potential air quality impacts associated with the proposed development due to:

- The construction of the Development Site; and
- Potential impacts of air emissions from the development, in the event that the development has the potential to emit air pollutants during operations.

This document has been prepared in consideration of the Planning Secretary's Environmental Assessment Requirements (SEARs) issued for the proposal (SSD - 8586218) issued on 11 August 2020. **Table 1** below summaries all key issues relevant to this report and how they have been addressed in this report.

Table 1 Secretary's Environmental Assessment Requirements (SEARs) – Air Quality

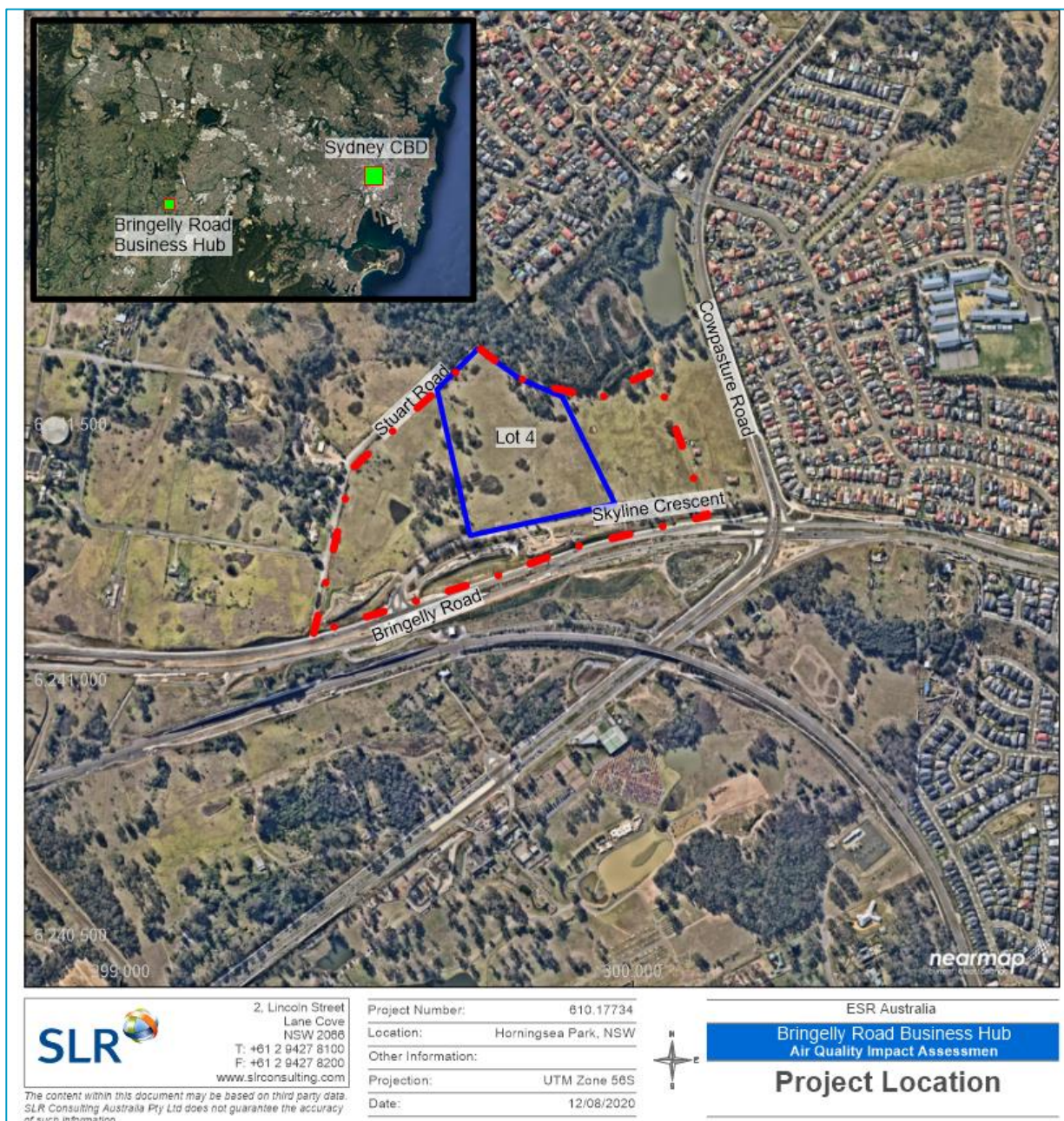
SEAR	Section
A description of all potential sources of odour and emissions during the construction and operational phases of the development.	Section 2.5
An assessment of the air quality impacts at receivers during construction and operation of the development, in accordance with the relevant Environment Protection Authority guidelines	Section 6 (Construction) Section 7 (Operation)
Details of any mitigation, management and monitoring measures required to prevent and/ or minimise emissions.	Section 6.2.4 (Mitigation Measures)

2 Project Overview

2.1 Regional Setting

The proposed development will be constructed on Lot 4 of the Bringelly Road Business Hub. The local setting of the Development Site is shown in **Figure 1**. **Figure 1** also shows the neighbouring plot to the east of the business hub which consists of two existing residential buildings approximately 220 m and 270 m from the Development Site boundary and residential areas located to the northeast of the Development Site, approximately 140 m from the Development Site boundary. The indicative layout of the Development Site is shown in **Figure 2**.

Figure 1 Satellite Image of the Development Site



[illegible]SLR 

2.2 Construction Activities

This report includes an assessment of the potential air quality impacts due to the construction works at the Development Site (see **Section 6**) which includes the following activities:

- Removal of existing vegetation, including some trees (approved & completed under SSD 6324);
- Earthworks across the Lot 4 (~69,740 m²) (Approved under SSD 6324);
- Building works for the warehouse facility with ancillary office space (approximately 36,064 m²); and
- Structure works for approximately 230 car parking spaces.

The construction works are anticipated to take between eight and nine months. The proposed working hours for the construction period are 7:00am to 6:00pm, Monday to Friday, between 8:00am to 1:00pm on Saturdays, and no work to be conducted on Sundays or public holidays.

It is noted that removal of vegetation and earthworks for the overall Bringelly Road Business Hub are already approved under a separate application SSD 6324, therefore the earthworks are not assessed within this application and not considered any further in this report.

2.3 Operational Activities

Operations at the Development Site will include the storage and distribution of materials to the Greater Sydney market and will include:

- Bulk delivery and storage of materials;
- Temperature control for warehousing facilities;
- Dispatch and distribution; and
- Ancillary office administration.

Warehouse operating hours would be 24 hours per day, seven days per week. Office operating and truck delivery hours would be expected to be between 8:00 am – 5.30 pm Monday to Friday.

A total of 227 truck movements per day are expected as part of the operations, in addition to mechanical plant and forklift (diesel) use for the loading/unloading activities.

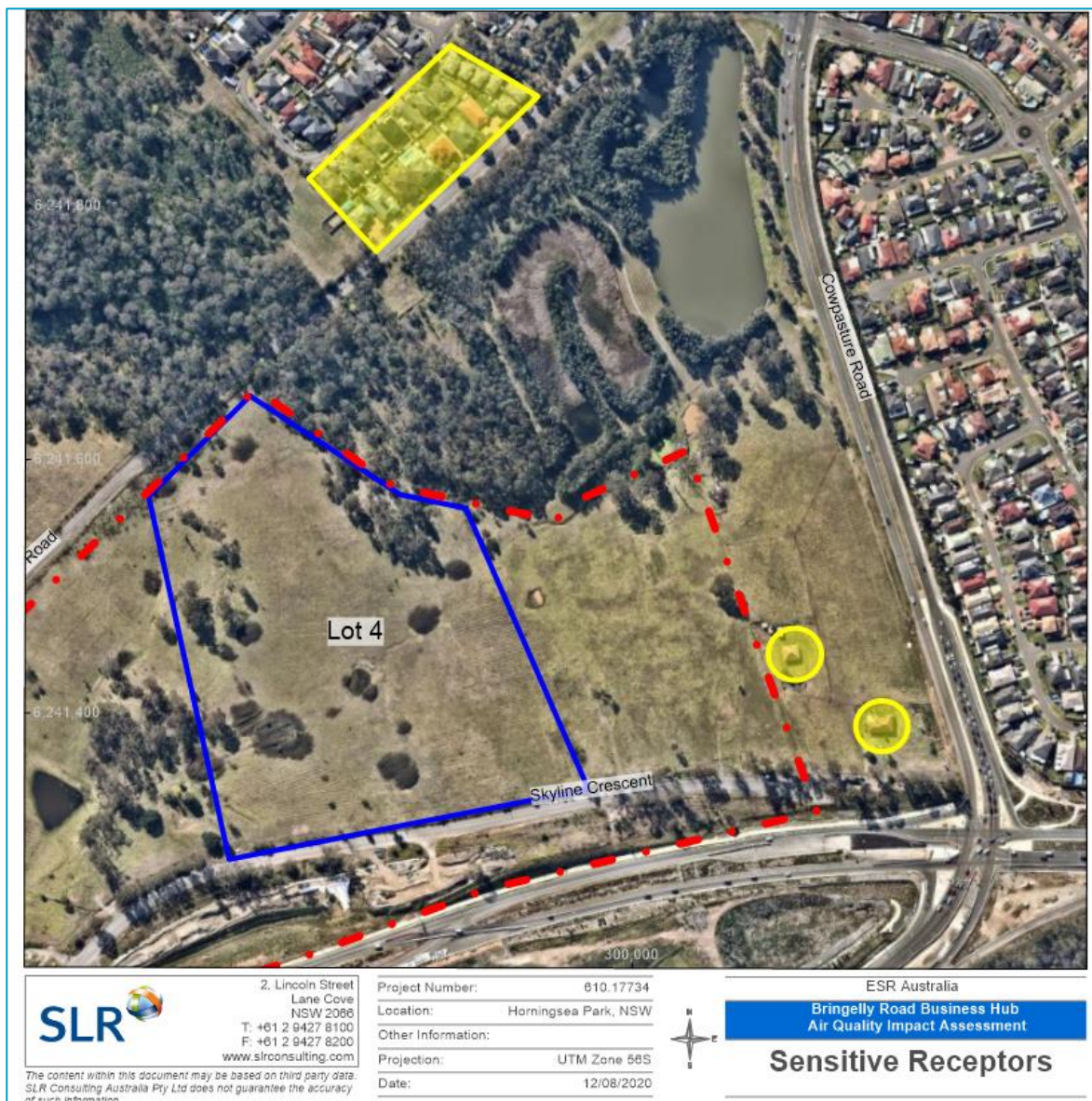
The tenants at the Development Site have not been decided as yet, however onsite activities would be comparable to those expected at a warehouse facility. These include storage, material handling and transportation of material. Additionally, temperature control for the warehousing facilities is also expected to be implemented at the Development site. A total of 14 Fusion heating, ventilation, and air conditioning (HVAC) systems are to be installed on site to regulate temperatures between 1.5°C and 22.5°C during summer and -1.5°C and 17.0°C during winter. In addition, a backup generator is also expected to be installed at the Development Site to be used in emergencies.

2.4 Sensitive Receptors

A number of residential properties have been identified as sensitive receptor locations in the area surrounding the Development Site, with the closest residences located approximately 140 m to the northeast, 220 m and 270 m to the east from the closest Development Site boundary for Lot 4. The locations of these closest identified sensitive receptors are shown in **Figure 3**. It is noted that the residence to the east appears to be in an abandoned condition, but has been included for completeness.

The impact of air emissions on nearby sensitive receivers is dependent on the prevailing meteorological conditions (primarily wind speed and direction), but also the distance from the source to the receiver, and any mitigation between the source and receiver. Such mitigation might be in the form of barriers or vegetation, that may act as a physical obstacle or result in changes to airflow, which may help in reducing air quality impacts.

Figure 3 Location of the Closest Identified Sensitive Receptors



2.5 Identification of Potential Air Emission Sources

As outlined in **Section 1**, the scope of this AQIA covers potential air quality impacts on surrounding sensitive receptors associated with the construction and operation of the proposed development.

During the construction works, there is potential for fugitive dust emissions to be generated which could give rise to nuisance and/or health impacts for the surrounding residential areas if the impacts are inadequately managed. These potential impacts have been assessed in **Section 6**. Where diesel-powered mobile machinery and vehicles are being used, localised elevations in ambient concentrations of combustion-related pollutants would also be anticipated, but fugitive dust emissions generally have the greatest potential to give rise to downwind air quality impacts at construction sites. The impacts of combustion emissions have therefore not been considered further.

During the operational phase, the main source of air emissions would be emissions of wheel generated dust and products of combustion associated with the trucks and other vehicles entering and leaving the site, or idling at the site during loading/unloading operations. No significant sources of air emissions have been identified in the warehouse, with no significant emissions of dust to atmosphere anticipated from the warehousing operations.

The 14 units of Fusion HVAC systems to be installed on the roof of the warehouse are not expected to release any significant air emissions from their operations that could result in potential air quality impacts at the neighbouring sensitive receptors. In addition, the backup diesel generator is expected to be used roughly once per year only in case of emergencies. Thus, any air emissions arising from the use of the backup generator is negligible and hence has not been considered further in this assessment.

3 Legislation, Regulation and Guidance

3.1 Pollutants of Concern

As identified in **Section 2.5**, the key air pollutants of interest are considered to be:

- Nuisance dust from construction at the Development Site; and
- Wheel generated dust and products of combustion associated with the trucks and other vehicles entering and leaving the site, or idling at the site during loading/unloading operations.

The following sections outline the potential health and amenity issues associated with the above pollutants of concern, while **Section 3.2** identifies the relevant air quality assessment criteria.

3.1.1 Particulate Matter

Airborne contaminants that can be inhaled directly into the lungs can be classified on the basis of their physical properties as gases, vapours or particulate matter. In common usage, the terms “dust” and “particulates” are often used interchangeably. The health effects of particulate matter are strongly influenced by the size of the airborne particles. Smaller particles can penetrate further into the respiratory tract, with the smallest particles having a greater impact on human health as they penetrate to the gas exchange areas of the lungs. Larger particles primarily cause nuisance associated with coarse particles settling on surfaces.

The term “particulate matter” refers to a category of airborne particles, typically less than 30 microns (μm) in diameter and ranging down to 0.1 μm and is termed total suspended particulates (TSP). Particulate matter with an aerodynamic diameter of 10 microns or less is referred to as PM_{10} . The PM_{10} size fraction is sufficiently small to penetrate the large airways of the lungs, while $\text{PM}_{2.5}$ (2.5 microns or less) particulates are generally small enough to be drawn in and deposited into the deepest portions of the lungs. Potential adverse health impacts associated with exposure to PM_{10} and $\text{PM}_{2.5}$ include increased mortality from cardiovascular and respiratory diseases, chronic obstructive pulmonary disease and heart disease, and reduced lung capacity in asthmatic children.

3.1.2 Products of Combustion

Emissions associated with road traffic and the combustion of fossil fuels (diesel, petrol, etc.) will include carbon monoxide (CO), oxides of nitrogen (NO_x), particulate matter (PM_{10} and $\text{PM}_{2.5}$), sulfur dioxide (SO_2) and volatile organic compounds (VOCs).

CO is an odourless, colourless gas formed from the incomplete burning of fuels in motor vehicles. It can be a common pollutant at the roadside and highest concentrations are found at the kerbside with concentrations decreasing rapidly with increasing distance from the road. CO in urban areas results almost entirely from vehicle emissions and its spatial distribution follows that of traffic flow. The incomplete combustion of fuel in diesel powered vehicles can generate particulate in the form of black soot.

Oxides of nitrogen (NO_x) is a general term used to describe any mixture of nitrogen oxides formed during combustion. In atmospheric chemistry, NO_x generally refers to the total concentration of nitric oxide (NO) and nitrogen dioxide (NO_2). NO is a colourless and odourless gas that does not significantly affect human health. However, in the presence of oxygen, NO can be oxidised to NO_2 which can have significant health effects including damage to the respiratory tract and increased susceptibility to respiratory infections and asthma. NO will be converted to NO_2 soon after leaving the engine exhaust.

Engine exhausts can also contain emissions of sulfur dioxide (SO₂) due to impurities in the fuel. The sulfur content in diesel fuel has significantly reduced over the years and currently ambient SO₂ concentrations in Australian cities are typically well below regulatory criteria. Hence, SO₂ has not been considered further in this assessment.

3.2 Air Quality Criteria

3.2.1 Particulate Matter and Products of Combustion

State air quality guidelines specified by the NSW Environmental Protection Agency (EPA) for the pollutants identified in **Section 3.1** are published in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA 2017) [hereafter 'Approved Methods']. The ground level air quality impact assessment criteria listed in Section 7 of the Approved Methods have been established by NSW EPA to achieve appropriate environmental outcomes and to minimise risks to human health. They have been derived from a range of sources and are the defining ambient air quality criteria for NSW, and are considered to be appropriate for use in this assessment.

A summary of the relevant impact assessment criteria for particulate matter and products of combustion is provided in **Table 2**.

Table 2 NSW EPA Goals for Particulate Matter and Combustion Gases

Pollutant	Averaging Period	Concentration	
CO	15 minutes	87 ppm	100 mg/m ³
	1 hour	25 ppm	30 mg/m ³
	8 hours	9 ppm	10 mg/m ³
NO ₂	1 hour	12 pphm	246 µg/m ³
	Annual	3 pphm	62 µg/m ³
PM ₁₀	24 Hours	-	50 µg/m ³
	Annual	-	30 µg/m ³
PM _{2.5}	24 Hours	-	25 µg/m ³
	Annual	-	8 µg/m ³

Source: EPA 2017

3.3 State Environmental Planning Policy (Western Sydney Parklands) 2009

This policy aims to put in place planning controls in to enable the Western Sydney Parklands Trust to develop the Western Parklands into a multi-use urban parkland for the region of western Sydney by:

- allowing for a diverse range of recreational, entertainment and tourist facilities in the Western Parklands,
- allowing for a range of commercial, retail, infrastructure and other uses consistent with the Metropolitan Strategy, which will deliver beneficial social and economic outcomes to western Sydney,
- continuing to allow for and facilitate the location of government infrastructure and service facilities in the Western Parklands,
- protecting and enhancing the natural systems of the Western Parklands, including flora and fauna species and communities and riparian corridors,

-
- e. protecting and enhancing the cultural and historical heritage of the Western Parklands,
 - f. maintaining the rural character of parts of the Western Parklands by allowing sustainable extensive agriculture, horticulture, forestry and the like,
 - g. facilitating public access to, and use and enjoyment of, the Western Parklands,
 - h. facilitating use of the Western Parklands to meet a range of community needs and interests, including those that promote health and well-being in the community,
 - i. encouraging the use of the Western Parklands for education and research purposes, including accommodation and other facilities to support those purposes,
 - j. allowing for interim uses on private land in the Western Parklands if such uses do not adversely affect the establishment of the Western Parklands or the ability of the Trust to carry out its functions as set out in section 12 of the *Western Sydney Parklands Act 2006*,
 - k. ensuring that development of the Western Parklands is undertaken in an ecologically sustainable way.

The Development Site is located within the Western Sydney Parklands (WSP) and therefore the aims of the WSP State Environmental Planning Policy (SEPP) 2009 apply to this site. There are no air quality specific development standards or provisions identified in the SEPP, however the broader environmental protection context is considered relevant to this air quality assessment.

4 Local Meteorological Conditions

4.1 Wind Speed and Wind Direction

Local wind speed and direction influence the dispersion of air pollutants. Wind speed determines both the distance of downwind transport and the rate of dilution as a result of 'plume' stretching. Wind direction, and the variability in wind direction, determines the general path pollutants will follow and the extent of crosswind spreading. Surface roughness (characterised by features such as the topography of the land and the presence of buildings, structures and trees) will also influence dispersion.

The Bureau of Meteorology (BoM) maintains and publishes data from weather stations across Australia. The closest such stations to the proposed development are the Horsley Park Equestrian Centre Automatic Weather Station (AWS) and Badgerys Creek AWS, which are located approximately 11 km north and 11.5 km northwest of the Development Site respectively. Considering the relatively flat terrain between Development Site and Badgerys Creek AWS, it may be assumed that the wind conditions recorded at the Badgerys Creek AWS are a reasonable representation of the wind conditions experienced at the Development Site. Hence, meteorology recorded at the Badgers Creek AWS are presented below.

Annual and seasonal wind roses for the years 2015 to 2019 compiled from data recorded by the AWS at Badgerys Creek are presented in **Figure 5**. Wind roses show the frequency of occurrence of winds by direction and strength. The bars correspond to the 16 compass points (degrees from north). The bar at the top of each wind rose diagram represents winds blowing from the north (i.e. northerly winds), and so on. The length of the bar represents the frequency of occurrence of winds from that direction, and the widths of the bar sections correspond to wind speed categories, the narrowest representing the lightest winds. Thus, it is possible to visualise how often winds of a certain direction and strength occur over a long period, either for all hours of the day, or for particular periods during the day.

The following description of wind speeds at the Development site references the Beaufort Wind Scale, as outlined in **Table 3**. Use of the Beaufort Wind Scale is consistent with terminology used by the BoM.

Table 3 Beaufort Wind Scale

Beaufort Scale #	Description	m/s	Description on land
0	Calm	0-0.5	Smoke rises vertically
1	Light air	0.5-1.5	Smoke drift indicates wind direction
2-3	Light/gentle breeze	1.5-5.3	Wind felt on face, leaves rustle, light flags extended, ordinary vanes moved by wind
4	Moderate winds	5.3-8.0	Raises dust and loose paper, small branches are moved
5	Fresh winds	8.0-10.8	Small trees in leaf begin to sway, crested wavelets form on inland waters
6	Strong winds	>10.8	Large branches in motion, whistling heard in telephone wires; umbrellas used with difficulty

Source: <http://www.bom.gov.au/lam/glossary/beaufort.shtml>

The annual wind roses for the years 2015 to 2019 (**Figure 5**) indicate the predominant wind directions in the area are southwest and west-southwest. Lower frequency of winds are recorded to be blowing from the north and north-northeast direction with very low frequency of winds from the western and southern directions. The annual frequency of calm wind conditions was recorded to be 9.1% for the years 2015 to 2019.

Winds from between the south and west directions, which would blow air emissions from the Development Site towards the nearest residential receptors occurred between 30% (2019) to 41% (2015) of the time.

The seasonal wind roses for the years 2015 to 2019 (**Figure 5**) indicate that:

- In summer wind speeds ranged from light to strong (between 0.5 m/s and 13.3 m/s). During this time winds were predominantly observed to be blowing from the east with lower frequency of winds blowing from between the north-northeast to east-northeast and east-southeast to southwest directions. Very low frequency of winds were observed to be blowing from the northwest quadrant. Calm winds conditions were observed to occur for 8.5% of the time during summer.
- In spring, wind speeds ranged from light to strong winds (between 0.5 m/s and 12.9 m/s) with winds predominantly blowing from the southwest direction. Lower frequency of winds were observed to be blowing almost evenly from all directions, with the exception of very low frequency of winds from the northwest quadrant. Calm wind conditions were observed to occur for 8.4% of the time during spring.
- In autumn and winter, wind speeds range from light to strong winds (between 0.5 m/s and 12.6 m/s) with winds predominantly observed to be blowing from the southwest direction. Lower frequency of winds were recorded from the north-northeast direction in autumn and the west-southwest direction in winter. Calm wind conditions were observed to occur 10.5% and 9.0% of the time during autumn and winter respectively.

The wind speed frequency chart for 2019 is shown in **Figure 4**. Wind erosion of dust from exposed surfaces (ie, during the construction phase of the development) is usually initiated when wind speeds exceed the threshold friction velocity for a given surface or material, however a general rule of thumb is that wind erosion can be expected to occur above 5 m/s (USEPA 2006). The frequency of wind speeds exceeding 5 m/s over the year 2019 at Badgerys Creek AWS was approximately 47%.

Figure 4 Wind Speed Frequency Chart for Badgerys Creek AWS (2015 – 2019)

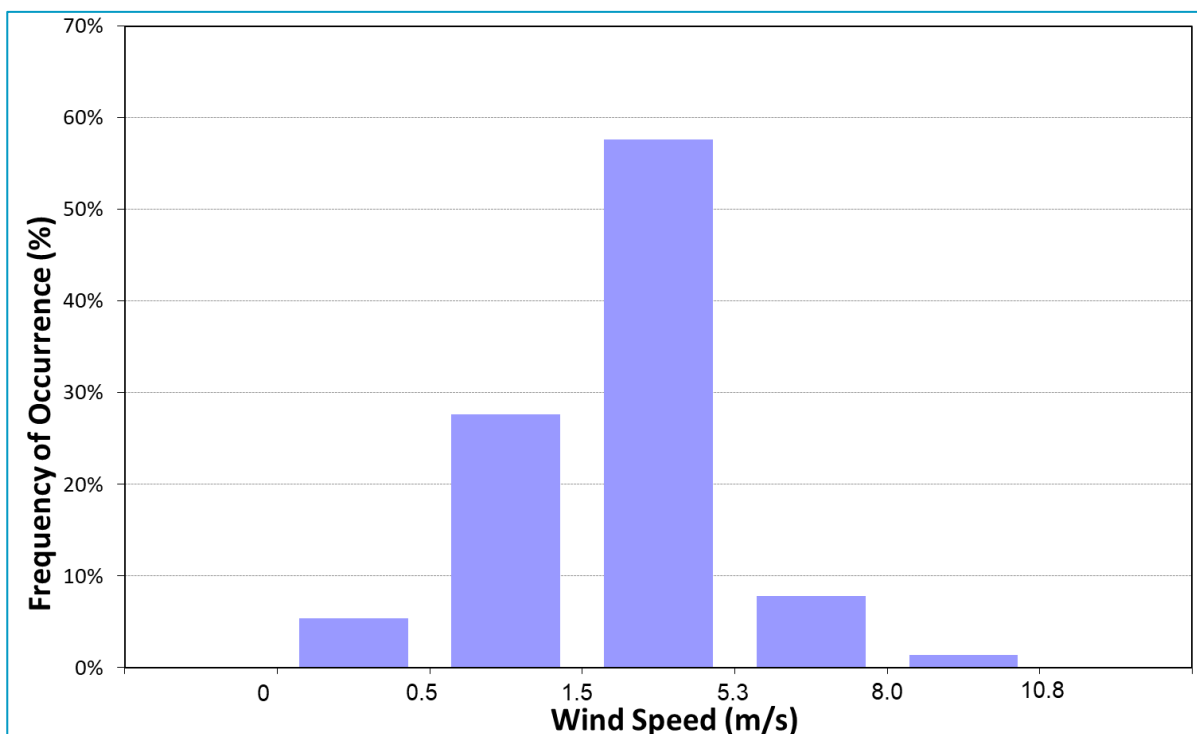
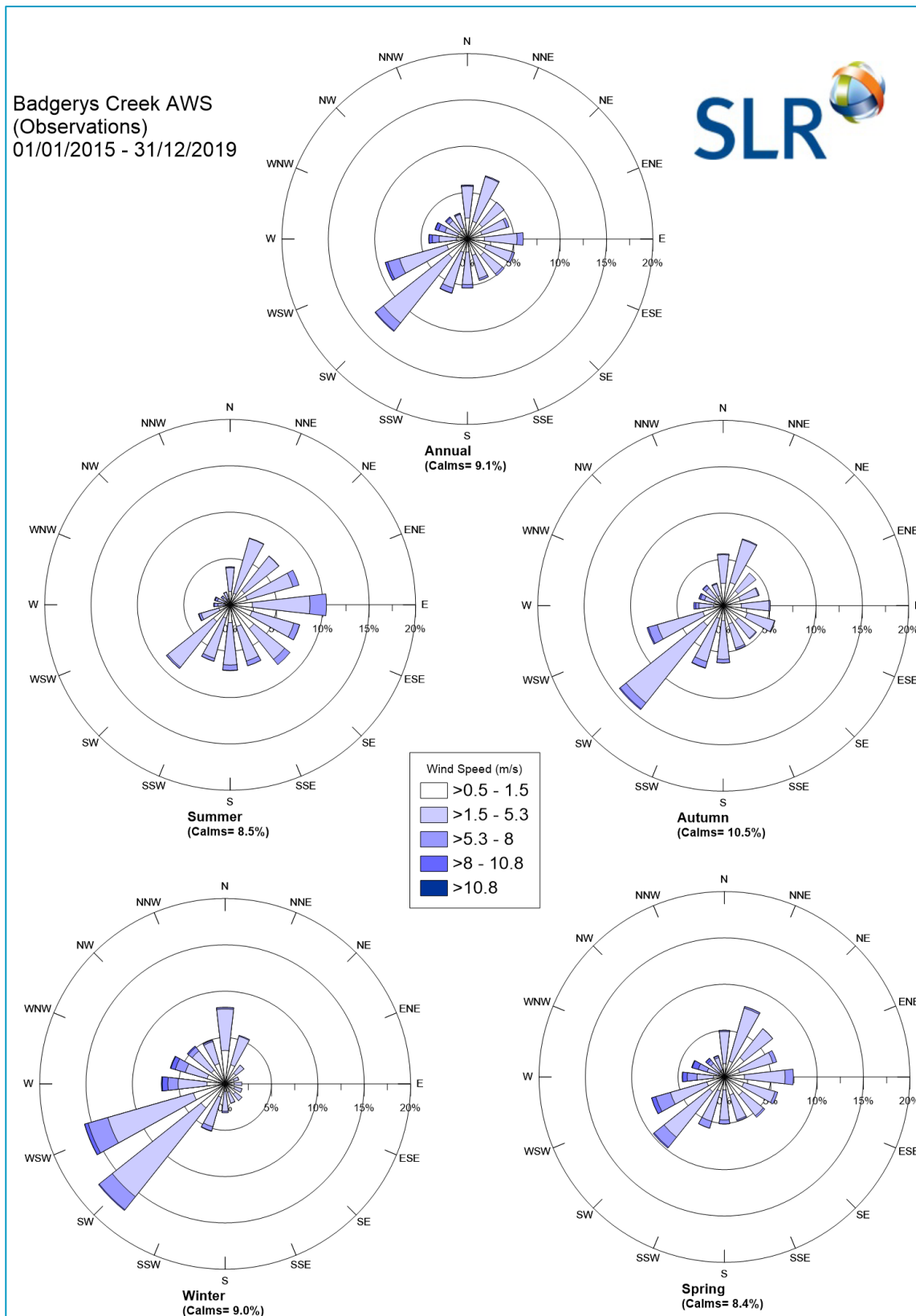


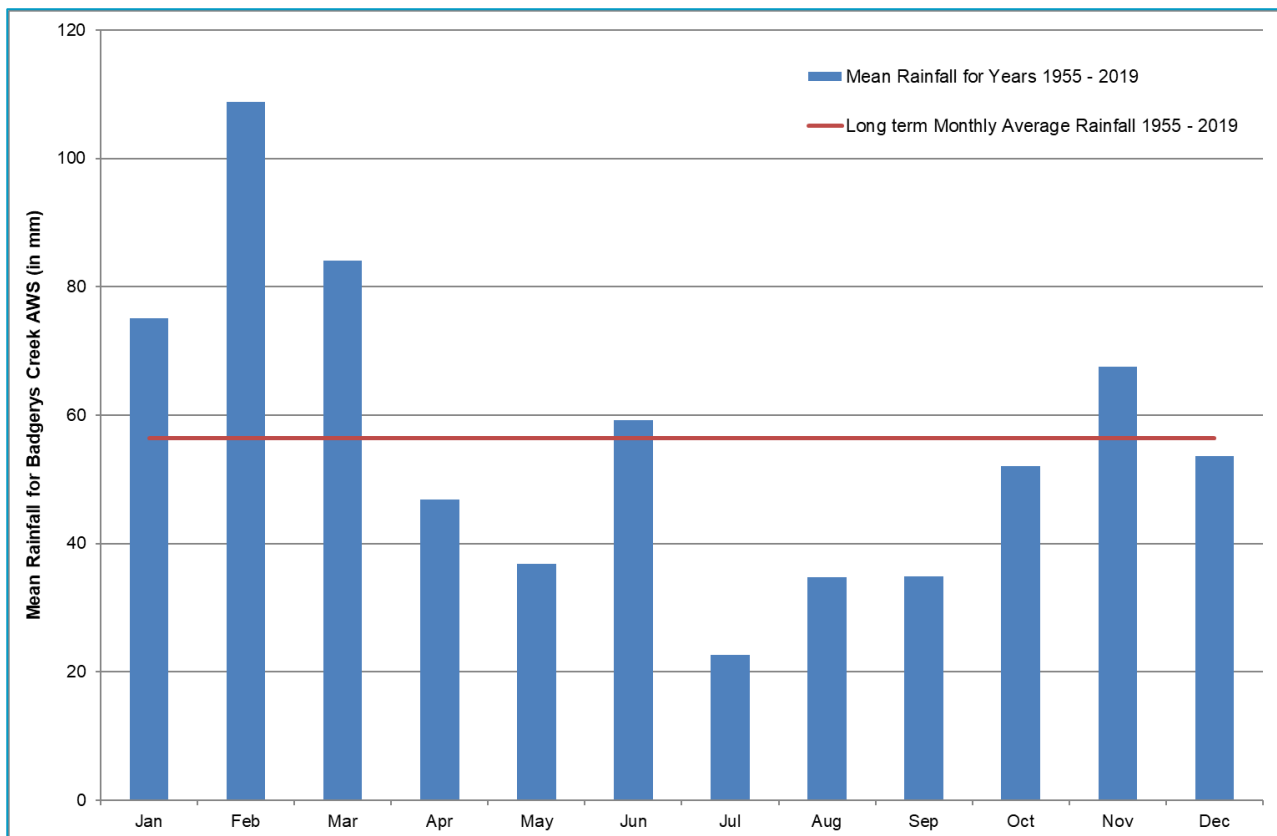
Figure 5 Annual and Seasonal Wind Roses for Badgerys Creek AWS (2015-2019)



4.2 Rainfall

Dry periods (no rainfall) have the greatest potential for fugitive dust emissions during construction. The long term monthly rainfall averages recorded at Badgerys Creek AWS is shown in **Figure 6**. It is noted that generally the periods between April to May and July to October have recorded the lowest monthly rainfalls compared to long term monthly average rainfall.

Figure 6 Long term Mean Rainfall for Badgerys Creek AWS – 1955 to 2019



4.3 Summary

The 2019 wind patterns suggest that the construction and operations at the Development Site have the greatest potential to impact receptors located towards the north and east of the Development Site during the months of autumn and winter, based on the low rainfall and conducive wind directions.

5 Background Air Quality

Air quality at the receptors neighbouring the Development Site will be affected by regional background air quality, as well as the localised impacts of air emission sources within the surrounding area. The following section presents a summary of ambient air quality monitoring data available for the region.

Air quality monitoring is performed by the NSW Department of Planning, Industry and Environment (DPIE) at a number of monitoring stations across NSW. The nearest such station is located at Liverpool approximately 7 km to the northeast, and Bringelly approximately 7.5 km northwest of the proposed development.

Considering the relatively flat terrain between the Development Site and Bringelly Air Quality Monitoring Station (AQMS) as well as similar land use surrounding both locations, it is assumed that the air quality monitoring data recorded at the Bringelly AQMS is a reasonable representation of the air quality experienced at the Development Site. Hence, air quality monitoring data recorded at Bringelly AQMS are presented below.

The Bringelly AQMS is located on the council reserve on Ramsay Road, and is situated in the south of the Hawkesbury basin in a semi-rural area. The Bringelly AQMS monitors concentrations of following air pollutants:

- Oxides of nitrogen (NO, NO₂ and NO_x); and
- Fine particles (PM_{2.5} and PM₁₀).

As Bringelly AQMS does not record CO, the nearest AQMS located at Liverpool has been considered for background CO levels.

A summary of the monitored pollutant concentrations for the last five years (2015-2019) is presented in **Table 4** and the data for 24-hour average PM₁₀ and 24-hour average PM_{2.5} are presented graphically in **Figure 7** and **Figure 8**.

Table 4 Summary of Air Quality Monitoring Data at Bringelly and Liverpool AQMS (2015 - 2019)

Pollutant	Bringelly AQMS						Liverpool AQMS	
	NO ₂		PM ₁₀		PM _{2.5}		CO	
	Maximum 1-hour	Annual	Maximum 24-hour	Annual	Maximum 24-hour	Annual	Maximum 8-hour	Maximum 1-hour
	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	mg/m ³
2015	55.4	7.5	57.0	15.8	ND	ND	0.2	2.9
2016	61.5	9.3	61.6	16.9	21.6	7.6	2.4	2.8
2017	73.8	9.4	83.7	19.8	52.5	7.5	2.3	2.8
2018	73.8	10.7	92.9	21.2	55.6	8.0	2.4	3.0
2019	69.7	10.4	134.0	23.6	178.0	11.3	2.3	4.6
Criterion	246	62	50	25	25	8	10	30

ND – No data, as the PM_{2.5} monitoring commenced on 30 June 2016.

The monitoring data for NO₂ and CO indicate that the concentrations for these pollutants are well below the respective air quality criteria (short term and long term) at the Bringelly and Liverpool AQMS sites. Thus, it could be interpreted that these pollutants are unlikely to pose a significant risk to the receptors in the vicinity of the Development Site and hence have not been considered further in this assessment.

Exceedances of the 24-hour average PM_{10} criterion were recorded by the Bringelly AQMS in all years. A review of the exceedances recorded during these years indicates that they were associated with natural events such as bushfires or dust storms, or hazard reduction burns.

Based on their review of ambient monitoring data from their 43 station air quality monitoring network, NSW EPA (in their publication *NSW Annual Air Quality Statement 2018* [OEH 2019]), concluded that the air quality index was in the 'very good', 'good' or 'fair' category for at least 87% of the time in any Sydney region.

Figure 7 Measured 24-Hour Average PM_{10} Concentrations at Bringelly AQMS (2015 - 2019)

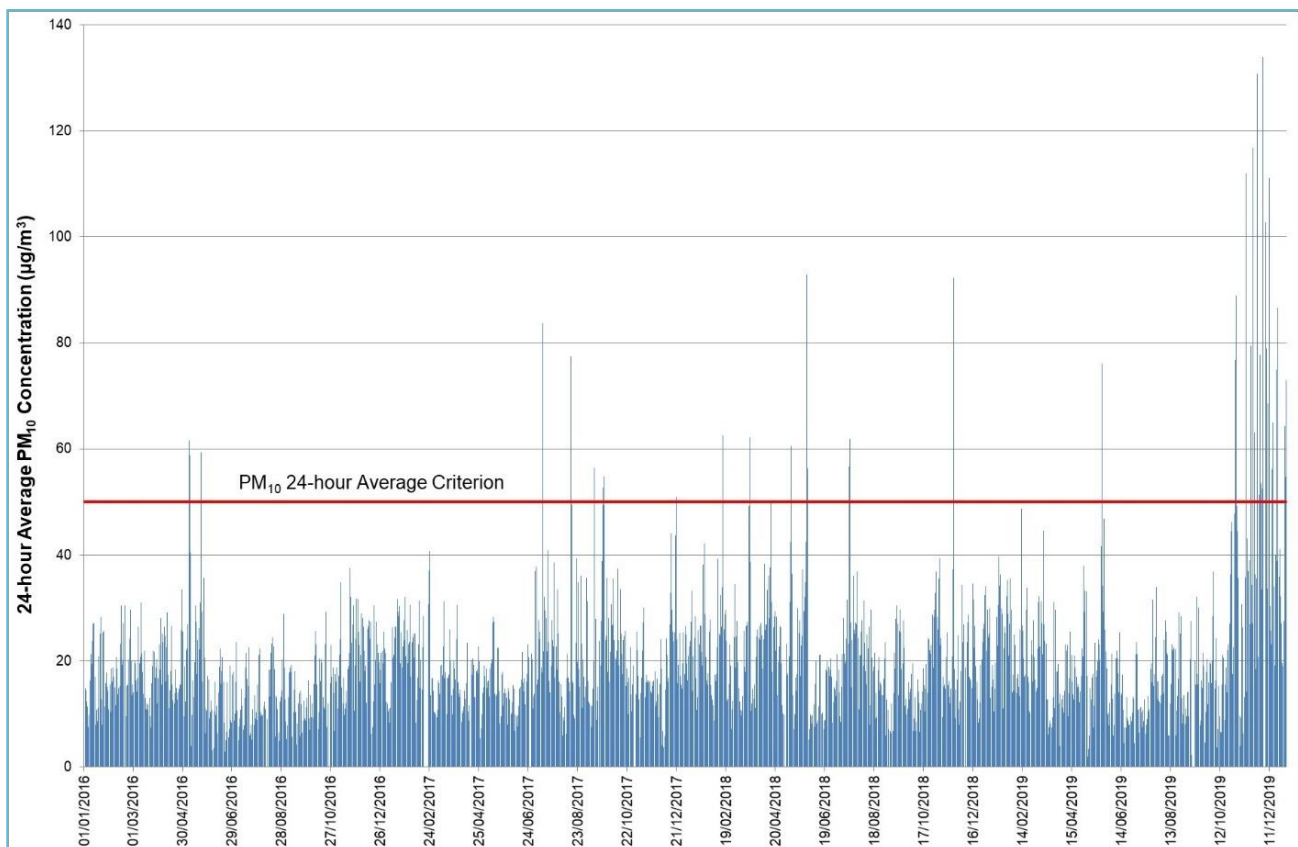
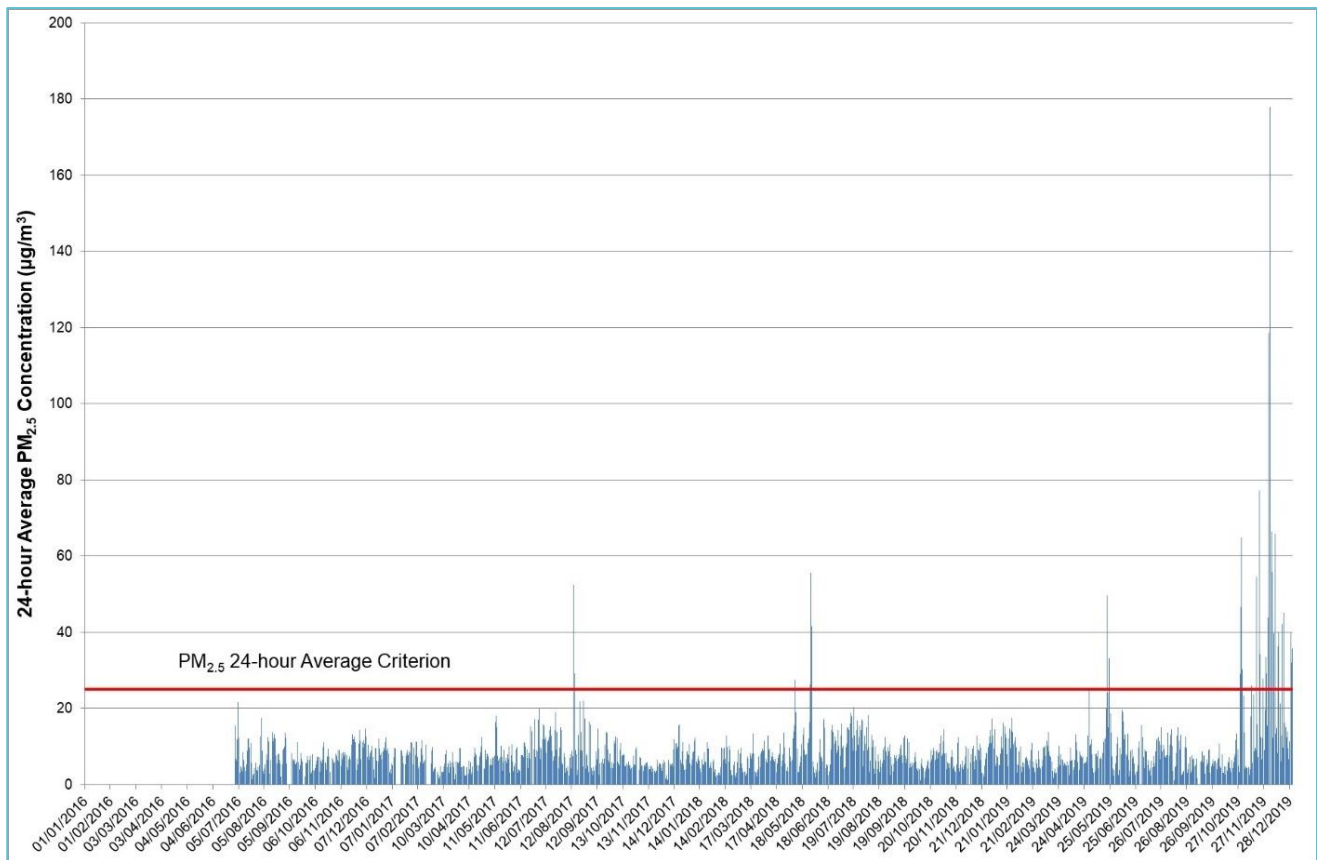


Figure 8 Measured 24-Hour Average PM_{2.5} Concentrations at Bringelly AQMS (2015 - 2019)



Ambient monitoring of toxic air pollutants is not routinely carried out as part of the NSW DPIE's air quality monitoring network. The Ambient Air Quality Research Project was completed by NSW EPA in the late 1990s and early 2000s, which analysed the ambient levels of air toxics (including dioxins, organics, PAHs and heavy metals) at sites representative of general urban air quality in the Sydney, Newcastle and Wollongong area (EPA 2002). The aim of the study was to obtain data on the concentrations of a wide range of air toxics. The study ran for 5.5 years from early 1996 to August 2001 and examined dioxins, 41 organic compounds, 11 PAHs and 12 heavy metals. The study concluded:

"In summary, the study found that most air toxics levels in NSW are low and well below current international standards and benchmarks."

Even though the study is almost 20 years old, current air toxic levels are expected to still be low compared to ambient air quality criteria given the ongoing technical improvements in car engine technology and emissions controls.

6 Assessment of Dust Emissions During Construction

The key potential air pollution and amenity issues associated with construction at the Development Site are:

- Annoyance due to dust deposition (soiling of surfaces) and visible dust plumes.
- Elevated suspended particulate concentrations (PM₁₀) due to dust-generating activities.

Modelling of dust from construction projects is generally not considered appropriate as emission rates can vary significantly depending on a combination of the construction activity and prevailing meteorological conditions (ie rainfall and wind speed), which cannot be reliably predicted. The following sections therefore describe the methodology used to perform a qualitative assessment of the potential risks to air quality associated with dust from construction activities at the Development Site.

6.1 Construction Dust Risk Assessment Methodology

For this assessment, the *IAQM Guidance on the Assessment of Dust from Demolition and Construction* developed in the United Kingdom by the Institute of Air Quality Management (Holman *et al* 2014) has been used to provide a qualitative assessment method (see **Appendix A** for full methodology). The IAQM method uses a four-step process for assessing dust impacts from construction activities:

- **Step 1:** Screening based on distance to the nearest sensitive receptor; whereby the sensitivity to dust deposition and human health impacts of the identified sensitive receptors is determined.
- **Step 2:** Assess risk of dust effects from activities based on:
 - the scale and nature of the works, which determines the potential dust emission magnitude; and
 - the sensitivity of the area surrounding dust-generating activities.
- **Step 3:** Determine site-specific mitigation for remaining activities with greater than negligible effects.
- **Step 4:** Assess significance of remaining activities after management measures have been considered.

6.2 Construction Phase Dust Risk Assessment

6.2.1 Step 1 – Screening Based on Separation Distance

The nearest existing residential receptors have been identified as being located approximately 140 m to the northeast, 220 m and 270 m to the east of the of the Development Site boundary.

As the sensitive receptors are located within 350 m from the boundary of the site, less than 50 m from the route used by construction vehicles on public roads, and within 500 m from the site entrance, further assessment is required.

6.2.2 Step 2a – Assessment of Scale and Nature of the Works

Based on the above assumptions and the IAQM definitions presented in **Appendix A**, the dust emission magnitudes have been categorised as presented in **Table 5**. As noted in **Section 2.2**, the earthworks required during the construction phase are already approved and have not been considered in this assessment.

Table 5 Categorisation of Dust Emission Magnitude

Activity	Dust Emission Magnitude	Basis
Construction	Medium	Total building volume greater than 100,000 m ³ . <i>Note: The height of warehouse buildings are assumed to be 13.7 m and total area of 36,064 m², equating to a total building volume of approximately 484,100 m³. Also, it is noted that onsite batching and sand blasting will be very unlikely to be employed, so a classification of 'medium' is considered to be more realistic based on the IAQM definition.</i>
Trackout	Medium	Estimated 10 and 50 heavy vehicle movements per day, surface materials with a moderate potential for dust generation, between 50 m and 100 m of unpaved road length.

6.2.3 Step 2b – Risk Assessment

6.2.3.1.1 Receptor Sensitivity

Based on the criteria listed in **Table A1** in **Appendix A**, the sensitivity of the identified receptors in this study is concluded to be high for health impacts and medium for dust soiling, as they include residential areas where people may be reasonably expected to be present continuously as part of the normal pattern of land use.

6.2.3.1.2 Sensitivity of an Area

Using the classifications shown in **Table A2** in **Appendix A**, the sensitivity of the area to dust soiling is classified as low and the sensitivity of the surrounding area to health effects (**Table A3** in **Appendix A**) has been classified as low. This categorisation has been made taking into account the individual receptor sensitivities derived above, the annual mean background PM₁₀ concentration of 23.6 µg/m³ recorded at Bringelly Air Quality Monitoring Station (AQMS) for 2019 (as presented in **Section 5**) and the anticipated number of receptors present (>100 within 350 m for dust soiling, and >100 within 200 m for health impacts).

6.2.3.1.3 Risk Assessment

Given the sensitivity of the general area is classified as low for dust soiling and low for health effects, and the dust emission magnitudes for the various construction phase activities as shown in **Table 5**, the resulting risk of air quality impacts is as presented in **Table 6**. The results indicate that there is a low risk of adverse dust soiling and medium risk for human health impacts occurring at the off-site sensitive receptor locations if no mitigation measures were to be applied to control emissions from the building construction and trackout.

Table 6 Preliminary Risk of Air Quality Impacts from Construction Activities (Uncontrolled)

Impact	Sensitivity of Area	Dust Emission Magnitude		Preliminary Risk	
		Construction	Trackout	Construction	Trackout
Dust Soiling	Low	Medium	Medium	Low Risk	Low Risk
Human Health	Low			Low Risk	Low Risk

6.2.4 Step 3 - Mitigation Measures

Table 7 lists the relevant mitigation measures designated as *highly recommended* (H) and *desirable* (D) by the IAQM methodology for a development shown to have a low risk of adverse impacts. Not all these measures would be practical or relevant to the Development Site, hence a detailed review of the recommendations should be performed as part of the development of the Construction Environmental Management Plan (CEMP) and the most appropriate measures adopted.

Table 7 Site-Specific Management Measures Recommended by the IAQM

1	Communications	
1.1	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	H
1.2	Display the head or regional office contact information.	H
1.3	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority.	D
2	Site Management	
2.1	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	H
2.2	Make the complaints log available to the local authority when asked.	H
2.3	Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.	H
3	Monitoring	
3.1	Perform daily on-site and off-site inspections where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary.	D
3.2	Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.	H
3.3	Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	H
4	Preparing and Maintaining the Site	
4.1	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H
4.2	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H
4.3	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	D
4.4	Avoid site runoff of water or mud.	H
4.5	Keep site fencing, barriers and scaffolding clean using wet methods.	D
4.6	Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.	D
4.7	Cover, seed or fence stockpiles to prevent wind erosion.	D

5	Operating Vehicle/Machinery and Sustainable Travel	
5.1	Ensure all on-road vehicles comply with relevant vehicle emission standards, where applicable.	H
5.2	Ensure all vehicles switch off engines when stationary - no idling vehicles.	H
5.3	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H
5.4	Impose and signpost a maximum-speed-limit of 20 km/h on surfaced and 10 km/h on unsurfaced haul roads and work areas.	D
6	Operations	
6.1	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	H
6.2	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H
6.3	Use enclosed chutes and conveyors and covered skips.	H
6.4	Minimise drop heights from loading shovels and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H
6.5	Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	D
7	Waste Management	
7.1	Avoid bonfires and burning of waste materials.	H
8	Construction	
8.1	Avoid scabbling (roughening of concrete surfaces) if possible.	D
8.2	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	D
9	Trackout	
9.1	Use water-assisted dust sweeper(s) on the access and local roads to remove, as necessary, any material tracked out of the site.	D
9.2	Avoid dry sweeping of large areas.	D
9.3	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	D
9.4	Record all inspections of haul routes and any subsequent action in a site log book.	D
9.5	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	D

H = Highly recommended; D = Desirable;

6.2.5 Step 4 - Residual Impacts

A reappraisal of the predicted unmitigated air quality impacts on sensitive receptors has been performed to demonstrate the opportunity for minimising risks associated with the use of mitigation strategies. These are termed 'residual impacts'. The results of the reappraisal are presented below in **Table 8**.

Table 8 Residual Risk of Air Quality Impacts from Construction

Impact	Sensitivity of Area	Residual Risk	
		Construction	Trackout
Dust Soiling	Low	Low Risk	Low Risk
Human Health	Low	Low Risk	Low Risk

The mitigated dust deposition and human health impacts for trackout and construction phase activities are anticipated to be low. For almost all construction activity, the IAQM Methods notes that the aim should be to prevent significant effects on receptors through the use of effective mitigation and experience shows that this is normally possible.

7 Assessment of Impacts from Warehouse Operations

As discussed in **Section 2.5**, air quality issues associated with the proposed warehouse operations predominantly relate to emissions of wheel generated dust and products of combustion from trucks and other vehicles accessing and idling at the site.

These emissions will be of a similar nature to existing emissions from traffic on Bringelly and Cowpasture Roads. However, the scale and magnitude of emissions from the Development Site will be significantly lower (227 truck movements per day for the Development Site, compared to the estimated annual average daily traffic on Bringelly Road of 29,000 vehicles/day-43,000 vehicles per day). It is noted that the traffic volumes for Bringelly Road are estimated based on 2019 traffic volumes available (sourced from RMS Traffic Volume Viewer ¹) for similar arterial roads ie Campbelltown Road and Elizabeth Drive. To assess the risk of air emissions from the Development Site impacting on surrounding sensitive receptors during the operational phase, the following “risk based” approach has therefore been adopted.

The risk-based assessment (detailed in **Appendix B**) takes account of a range of impact descriptors, including the following:

- **Nature of Impact:** does the impact result in an adverse, neutral or beneficial environment?

The nature of impact is anticipated to be neutral to the environment.

- **Receptor Sensitivity:** how sensitive is the receiving environment to the anticipated impacts?

The nearest sensitive receptors to the Development Site include residences approximately 140 m to the northeast, 220 m and 270 m to the east (see **Section 2.4**). In terms of the methodology in **Appendix B**, the sensitivity of the surrounding residential areas to emissions from the Development Site should be considered high.

- **Magnitude:** what is the anticipated scale of the impact?

Based on the small amount of traffic movements on site, the magnitude of these emissions considered to be negligible.

Given the above considerations, and the scale of operations, the potential impact of the Development Site on the local sensitive receptors is concluded to be **neutral** for all receptors (see **Table 9**).

¹ <http://www.rms.nsw.gov.au/about/corporate-publications/statistics/traffic-volumes/aadt-map/index.html#/?z=12&q=Bringelly%20Road,%20Leppington%20NSW,%20Australia&lat=-33.92608696754494&lon=150.8095037734979&id=62001&yr=2018>

Table 9 Impact Significance

Magnitude Sensitivity	Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
Very High Sensitivity	Major Significance	Major/ Intermediate Significance	Intermediate Significance	Neutral Significance
High Sensitivity	Major/ Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

Further, a vegetative buffer exists between the Development Site and the existing sensitive receptors located to the north. This will assist in screening the existing residents to the north from any air impacts.

8 Conclusion

SLR was commissioned ESR, to prepare an AQIA for the construction and operation of a warehouse to be located at Lot 4 within the Bringelly Road Business Hub.

Available meteorological data collected in close proximity to the Development site have been examined to provide an estimate of the prevailing wind environment in the region. This review indicated that winds from between the south and west directions, which would blow air emissions from the Development Site towards the nearest residential receptors, occur between 30% to 41% of the time. In addition, construction activities at the Development Site have the greatest potential to impact on receptors located towards the north and east of the Development Site during the months of autumn and winter, based on the low rainfall and conducive wind directions during these seasons. Additional controls may be required (higher levels of watering for example) if construction occurs at these times.

The findings of the assessment are as follows:

- Off-site impacts associated with dust deposition and suspended particulate during the construction phase are anticipated to be *low* for trackout and building construction activities. A range of mitigation measures have been recommended for consideration as part of the CEMP.
- Based on the activities (storage, handling and distribution) to be used in the processes, the potential for offsite air impacts from the operations at the Development Site is concluded to *neutral*.
- The existing vegetative buffer would also assist in screening any dust or other air emissions being blown towards the existing residences to the north.

Based on the above, it is concluded that the risk of any exceedances of air quality criteria at nearby residential areas due to air emissions from the Development Site is expected to be low.

9 References

Holman *et al* 2014, *IAQM Guidance on the assessment of dust from demolition and construction*, Institute of Air Quality Management, London. <http://www.iaqm.co.uk/text/guidance/construction-dust-2014.pdf>.

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EPA 2017, Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, Environment Protection Authority NSW, January 2017.

NSW Parliamentary Counsel's Office. (2018, October 22). State Environmental Planning Policy (Western Sydney Parklands) 2009. Retrieved from NSW Legislation: <https://legislation.nsw.gov.au/#/view/EPI/2009/91>

APPENDIX A

CONSTRUCTION PHASE RISK ASSESSMENT METHODOLOGY

Step 1 – Screening Based on Separation Distance

The Step 1 screening criteria provided by the IAQM guidance suggests screening out any assessment of impacts from construction activities where sensitive receptors are located more than 350 m from the boundary of the site, more than 50 m from the route used by construction vehicles on public roads and more than 500 m from the site entrance. This step is noted as having deliberately been chosen to be conservative, and will require assessments for most projects.

Step 2a – Assessment of Scale and Nature of the Works

Step 2a of the assessment provides “dust emissions magnitudes” for each of four dust generating activities; demolition, earthworks, construction, and track-out (the movement of site material onto public roads by vehicles). The magnitudes are: *Large*; *Medium*; or *Small*, with suggested definitions for each category. The definitions given in the IAQM guidance for earthworks, construction activities and track-out, which are most relevant to this Development, are as follows:

Demolition (Any activity involved with the removal of an existing structure [or structures]. This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time):

- **Large:** Total building volume >50,000 m³, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level;
- **Medium:** Total building volume 20,000 m³ – 50,000 m³, potentially dusty construction material, demolition activities 10-20 m above ground level; and
- **Small:** Total building volume <20,000 m³, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.

Earthworks (Covers the processes of soil-stripping, ground-levelling, excavation and landscaping):

- **Large:** Total site area greater than 10,000 m², potentially dusty soil type (eg clay, which will be prone to suspension when dry due to small particle size), more than 10 heavy earth moving vehicles active at any one time, formation of bunds greater than 8 m in height, total material moved more than 100,000 t.
- **Medium:** Total site area 2,500 m² to 10,000 m², moderately dusty soil type (eg silt), 5 to 10 heavy earth moving vehicles active at any one time, formation of bunds 4 m to 8 m in height, total material moved 20,000 t to 100,000 t.
- **Small:** Total site area less than 2,500 m², soil type with large grain size (eg sand), less than five heavy earth moving vehicles active at any one time, formation of bunds less than 4 m in height, total material moved less than 20,000 t, earthworks during wetter months.

Construction (Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc):

- **Large:** Total building volume greater than 100,000 m³, piling, on site concrete batching; sandblasting.
- **Medium:** Total building volume 25,000 m³ to 100,000 m³, potentially dusty construction material (eg concrete), piling, on site concrete batching.
- **Small:** Total building volume less than 25,000 m³, construction material with low potential for dust release (eg metal cladding or timber).

Track-out (*The transport of dust and dirt from the construction / demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network*):

- **Large:** More than 50 heavy vehicle movements per day, surface materials with a high potential for dust generation, greater than 100 m of unpaved road length.
- **Medium:** Between 10 and 50 heavy vehicle movements per day, surface materials with a moderate potential for dust generation, between 50 m and 100 m of unpaved road length.
- **Small:** Less than 10 heavy vehicle movements per day, surface materials with a low potential for dust generation, less than 50 m of unpaved road length.

Note: No demolition of existing structures will be performed as part of this Development.

In order to provide a conservative assessment of potential impacts, it has been assumed that if at least one of the parameters specified in the 'large' definition is satisfied, the works are classified as large, and so on.

Step 2b – Risk Assessment

Assessment of the Sensitivity of the Area

Step 2b of the assessment process requires the sensitivity of the area to be defined. The sensitivity of the area takes into account:

- The specific sensitivities that identified sensitive receptors have to dust deposition and human health impacts;
- The proximity and number of those receptors;
- In the case of PM₁₀, the local background concentration; and
- Other site-specific factors, such as whether there are natural shelters such as trees to reduce the risk of wind-blown dust.

Individual receptors are classified as having *high*, *medium* or *low* sensitivity to dust deposition and human health impacts (ecological receptors are not addressed using this approach). The IAQM method provides guidance on the sensitivity of different receptor types to dust soiling and health effects as summarised in **Table A1**. It is noted that user expectations of amenity levels (dust soiling) is dependent on existing deposition levels.

Table A1 IAQM Guidance for Categorising Receptor Sensitivity

Value	High Sensitivity Receptor	Medium Sensitivity Receptor	Low Sensitivity Receptor
Dust soiling	Users can reasonably expect a high level of amenity; or The appearance, aesthetics or value of their property would be diminished by soiling, and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods as part of the normal pattern of use of the land.	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or The appearance, aesthetics or value of their property could be diminished by soiling; or The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.	The enjoyment of amenity would not reasonably be expected; or Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.
	<i>Examples: Dwellings, museums, medium and long term car parks and car showrooms.</i>	<i>Examples: Parks and places of work.</i>	<i>Examples: Playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.</i>
Health effects	Locations where the public are exposed over a time period relevant to the air quality objective for PM ₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM ₁₀ (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	Locations where human exposure is transient.
	<i>Examples: Residential properties, hospitals, schools and residential care homes.</i>	<i>Examples: Office and shop workers, but will generally not include workers occupationally exposed to PM₁₀.</i>	<i>Examples: Public footpaths, playing fields, parks and shopping street.</i>

According to the IAQM methods, the sensitivity of the identified individual receptors (as described above) is then used to assess the *sensitivity of the area* surrounding the active construction area, taking into account the proximity and number of those receptors, and the local background PM₁₀ concentration (in the case of potential health impacts) and other site-specific factors. Additional factors to consider when determining the sensitivity of the area include:

- any history of dust generating activities in the area;
- the likelihood of concurrent dust generating activity on nearby sites;
- any pre-existing screening between the source and the receptors;
- any conclusions drawn from analysing local meteorological data which accurately represent the area and if relevant, the season during which the works will take place;
- any conclusions drawn from local topography;

- the duration of the potential impact (as a receptor may be willing to accept elevated dust levels for a known short duration, or may become more sensitive or less sensitive (acclimatised) over time for long-term impacts); and
- any known specific receptor sensitivities which go beyond the classifications given in the IAQM document.

The IAQM guidance for assessing the sensitivity of an area to dust soiling is shown in **Table A2**. The sensitivity of the area should be derived for each of activity relevant to the project (ie construction and earthworks).

Table A2 IAQM Guidance for Categorising the Sensitivity of an Area to Dust Soiling Effects

Receptor Sensitivity	Number of receptors	Distance from the source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Note: Estimate the total number of receptors within the stated distance. Only the *highest level* of area sensitivity from the table needs to be considered. For example, if there are 7 high sensitivity receptors < 20m of the source and 95 high sensitivity receptors between 20 and 50 m, then the total of number of receptors < 50 m is 102. The sensitivity of the area in this case would be high.

A modified version of the IAQM guidance for assessing the *sensitivity of an area* to health impacts is shown in **Table A3**. For high sensitivity receptors, the IAQM methods takes the existing background concentrations of PM₁₀ (as an annual average) experienced in the area of interest into account and is based on the air quality objectives for PM₁₀ in the UK. As these objectives differ from the ambient air quality criteria adopted for use in this assessment (ie an annual average of 19.8 µg/m³ for PM₁₀) the IAQM method has been modified slightly.

This approach is consistent with the IAQM guidance, which notes that in using the tables to define the *sensitivity of an area*, professional judgement may be used to determine alternative sensitivity categories, taking into account the following factors:

- any history of dust generating activities in the area;
- the likelihood of concurrent dust generating activity on nearby sites;
- any pre-existing screening between the source and the receptors;
- any conclusions drawn from analysing local meteorological data which accurately represent the area, and if relevant the season during which the works will take place;
- any conclusions drawn from local topography;
- duration of the potential impact; and
- any known specific receptor sensitivities which go beyond the classifications given in this document.

Table A3 IAQM Guidance for Categorising the Sensitivity of an Area to Dust Health Effects

Receptor sensitivity	Annual mean PM ₁₀ conc.	Number of receptors ^{a,b}	Distance from the source (m)				
			<20	<50	<100	<200	<350
High	>25 µg/m ³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	21-25 µg/m ³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	17-21 µg/m ³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<17 µg/m ³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>25 µg/m ³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	21-25 µg/m ³	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	17-21 µg/m ³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<17 µg/m ³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Notes:

- (a) Estimate the total within the stated distance (e.g. the total within 350 m and not the number between 200 and 350 m); noting that only the highest level of area sensitivity from the table needs to be considered.
- (b) In the case of high sensitivity receptors with high occupancy (such as schools or hospitals) approximate the number of people likely to be present. In the case of residential dwellings, just include the number of properties.

Risk Assessment

The dust emission magnitude from Step 2a and the receptor sensitivity from Step 2b are then used in the matrices shown in **Table A4** (earthworks and construction) and **Table A5** (track-out) to determine the risk category with no mitigation applied.

Table A4 Risk Category from Earthworks and Construction Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table A5 Risk Category from Track-out Activities

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

APPENDIX B

OPERATIONAL PHASE RISK ASSESSMENT METHODOLOGY

Nature of Impact

Predicted impacts may be described in terms of the overall effect upon the environment:

- **Beneficial:** the predicted impact will cause a beneficial effect on the receiving environment.
- **Neutral:** the predicted impact will cause neither a beneficial nor adverse effect.
- **Adverse:** the predicted impact will cause an adverse effect on the receiving environment.

Receptor Sensitivity

Sensitivity may vary with the anticipated impact or effect. A receptor may be determined to have varying sensitivity to different environmental changes, for example, a high sensitivity to changes in air quality, but low sensitivity to noise impacts. Sensitivity may also be derived from statutory designation which is designed to protect the receptor from such impacts.

Sensitivity terminology may vary depending upon the environmental effect, but generally this may be described in accordance with the following broad categories - Very high, High, Medium and Low.

Table B1 outlines the methodology used in this study to define the sensitivity of receptors to air quality impacts.

Table B1 Methodology for Assessing Sensitivity of a Receptor

Sensitivity	Criteria
Very High	Receptors of very high sensitivity to air pollution (e.g. dust or odour) such as: hospitals and clinics, and retirement homes.
High	Receptors of high sensitivity to air pollution, such as: schools, residential areas, food retailers, glasshouses and nurseries.
Medium	Receptors of medium sensitivity to air pollution, such as: farms / horticultural land, offices/recreational areas, painting and furnishing, hi-tech industries and food processing, and outdoor storage (ie new cars).
Low	All other air quality sensitive receptors not identified above, such as light and heavy industry.

Magnitude

Magnitude describes the anticipated scale of the anticipated environmental change in terms of how that impact may cause a change to baseline conditions. Magnitude may be described quantitatively or qualitatively. Where an impact is defined by qualitative assessment, suitable justification is provided in the text.

Table B2 Magnitude of Impacts

Magnitude	Description
Substantial	Impact is predicted to cause significant consequences on the receiving environment (may be adverse or beneficial)
Moderate	Impact is predicted to possibly cause statutory objectives/standards to be exceeded (may be adverse)
Slight	Predicted impact may be tolerated.
Negligible	Impact is predicted to cause no significant consequences.

Significance

The risk-based matrix provided below illustrates how the definition of the sensitivity and magnitude interact to produce impact significance.

Table B3 Impact Significance Matrix

Sensitivity \ Magnitude		[Defined by Table B2]			
		Substantial Magnitude	Moderate Magnitude	Slight Magnitude	Negligible Magnitude
[Defined by Table B1]	Very High Sensitivity	Major Significance	Major/ Intermediate Significance	Intermediate Significance	Neutral Significance
	High Sensitivity	Major/ Intermediate Significance	Intermediate Significance	Intermediate/Minor Significance	Neutral Significance
	Medium Sensitivity	Intermediate Significance	Intermediate/Minor Significance	Minor Significance	Neutral Significance
	Low Sensitivity	Intermediate/Minor Significance	Minor Significance	Minor/Neutral Significance	Neutral Significance

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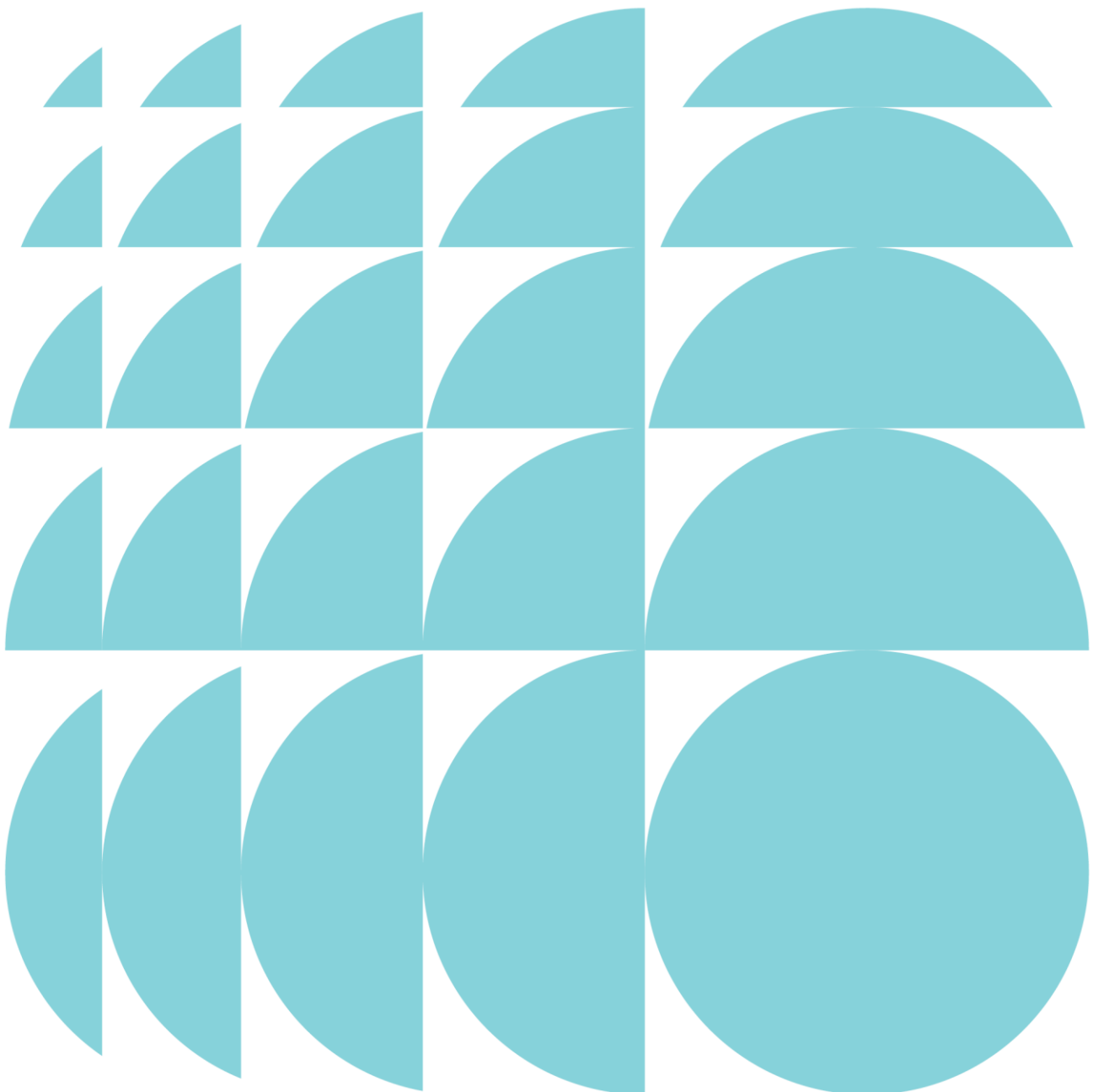
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	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN	
	DHL LSHC Building Lot 4, Bringelly Road, Leppington	

Appendix N

Consultation Strategy & Outcome Report



CONTACT

Ira Brenner	Urbanist – Engagement	IBrenner@ethosurban.com	02 9409 4924
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This document has been prepared by:



This document has been reviewed by:



Ira Brenner	14 August 2020	James Page	14 August 2020
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Appendices

Appendix A	Letter to immediate neighbours
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Appendix C	Postcard to local community
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1.0 Introduction and background

1.1 Report purpose

This Consultation Strategy and Outcomes report has been prepared by Ethos Urban on behalf of the ESR to firstly detail the Engagement Strategy and to secondly outline the communications and engagement activities undertaken in relation to the proposed development of a temperature controlled warehouse facility at Lot 4, Skyline Avenue of the Bringelly Road Business Hub.

Secretary's Environmental Assessment Requirements (SEARs) were issued on 11 August 2020. This submission has been prepared in accordance with the Department's guidelines for SSD applications lodged under Part 4 of the EP&A Act and addresses the matters identified in the SEARs. In undertaking this consultation, full consideration has been given to the NSW Department of Planning, Industry and Environment's Secretary's Environmental Assessment Requirements (SEARs).

This report includes information on the project context, the stakeholder and community engagement strategy, all engagement activities undertaken, and any feedback received. The feedback received was considered prior to the Environmental Impact Statement being submitted to the Department of Planning and Environment.

The purpose of this consultation process was to ensure that all stakeholders were informed about the proposed development and had an opportunity to provide feedback prior to the lodgement of the SSDA.

1.2 Project Background

In 2010 the Western Sydney Parklands Trust developed a 10 year Plan of Management to guide the long-term future of the Parklands (adopted in 2011 and supplemented in March 2014) and identified nine locations for proposed business hubs. The business hubs collectively will comprise a maximum of two per cent of the total area of the Parklands with the aim of generating income to help fund the management and future development of the entire Parklands.

The sites identified as proposed business hubs have the least ecological value within the Parklands and are located on the Parklands' margins, adjacent to motorways and major arterial roads. The business hubs form an important plank in securing the long term, sustainable revenue base that funds Parklands infrastructure, maintenance and improvements.

The revenue generated from the business hubs long-term leases will enable the Trust to fund key improvements to picnic and playgrounds, cycling and walking track networks and sporting facilities, as well as restore and expand natural habitat throughout the Parklands.

In 2016 the Department of Planning and Environment approved the Bringelly Road Business Hub Concept Development State Significant Development Application (SSDA), which was followed by approvals for the first three developments at the Business Hub, all SSDAs:

- CEA Australia – construction commenced in December 2018 and was completed in October 2019
- Steelforce Australia – construction commenced in July 2019 and was completed in February 2020.
- Bunnings Warehouse – approval was secured in May 2020, as one of the shovel ready projects identified in the NSW Governments first tranche of fast tracked project approvals as a response to COVID-19.

Lot 4 will be the fourth site to be developed, this also requires an SSDA. The proposed facility would consist of:

- A temperature controlled warehouse, of approximately 35,000 m²
- Vehicle entry and exit, including guardhouse
- Hardstand areas for vehicle docking and manoeuvring
- Ancillary office administration, of approximately 1,000 m²
- Staff car parking, approximately 230 spaces.

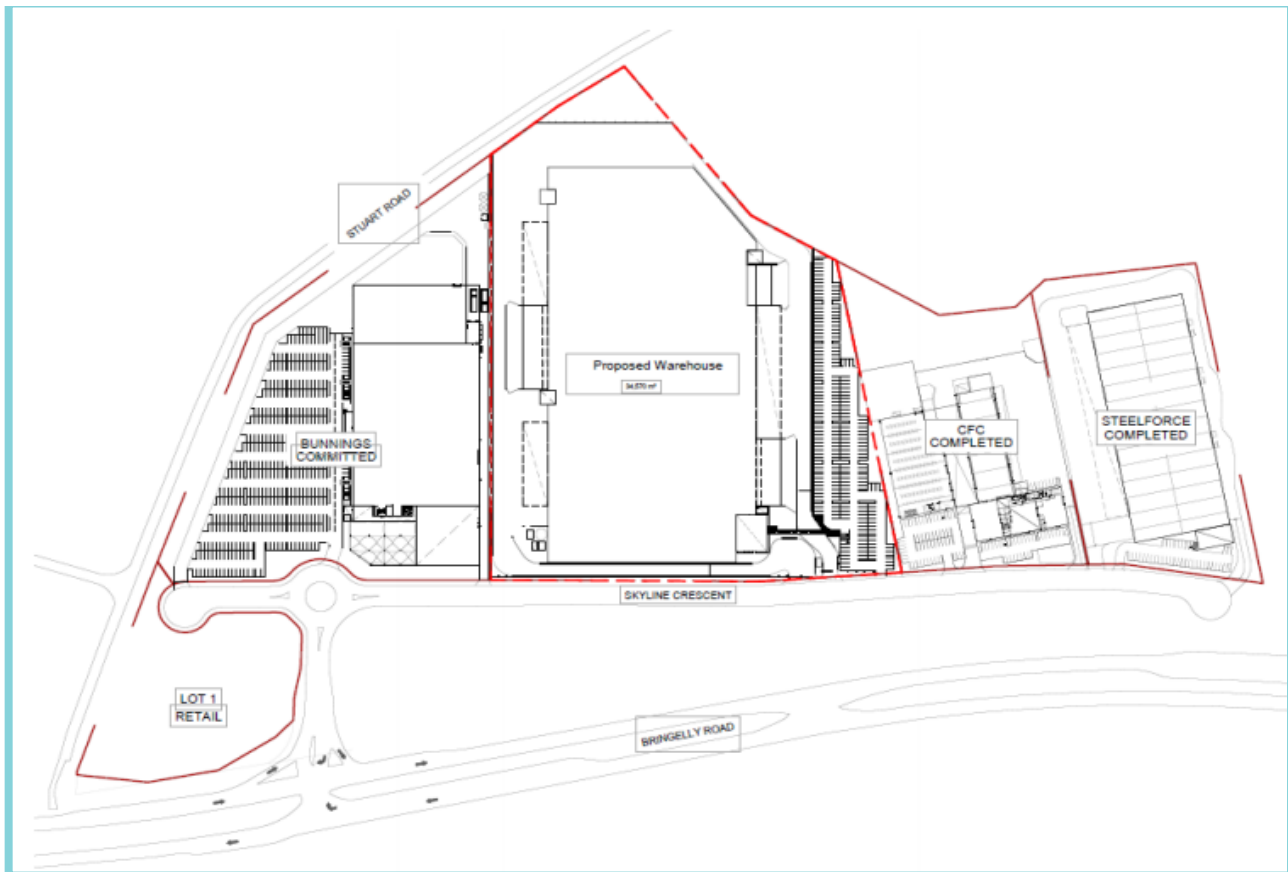


Figure 1 – Development Context

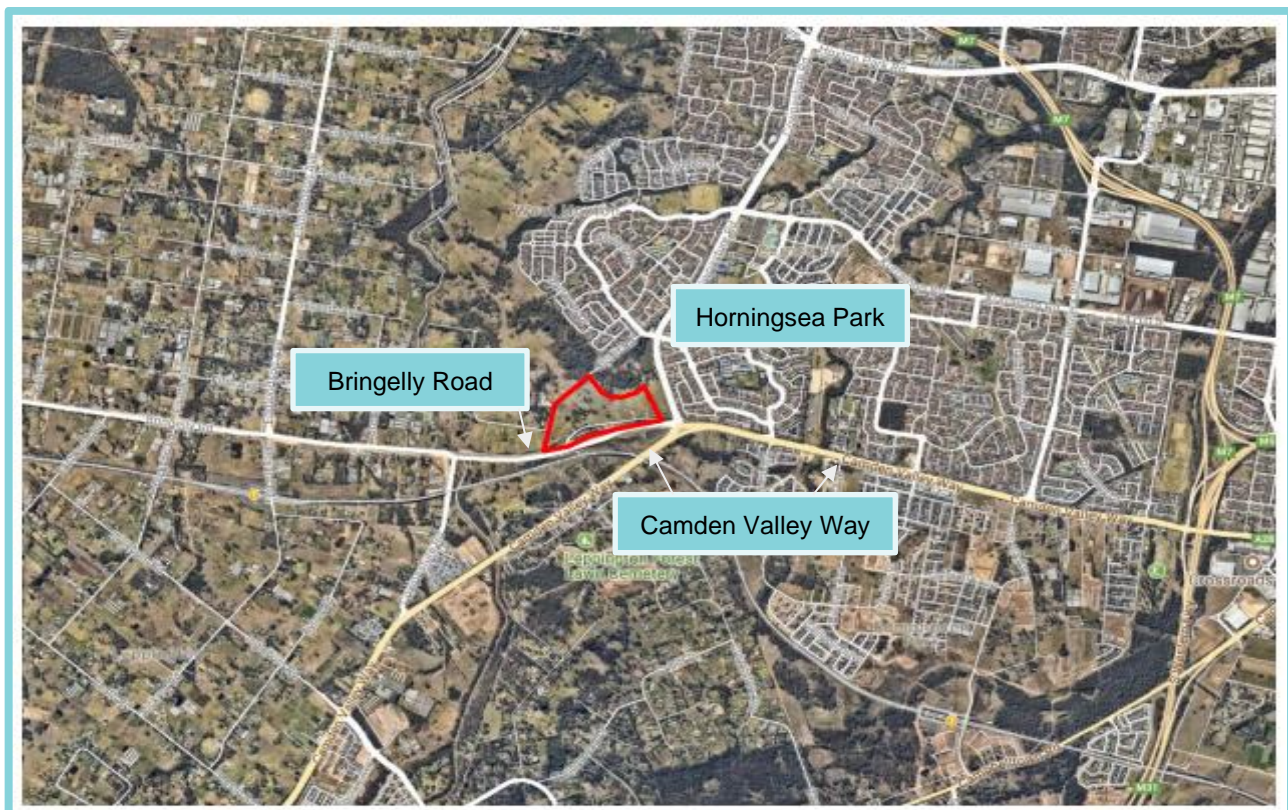


Figure 2 – Bringelly Road Business Hub location

2.0 Engagement Strategy

This section details the community and stakeholder participation strategy including who in the community has been consulted and a justification for their selection, other stakeholders consulted and the forms of consultation including a justification for the approach.

The Strategy creates a strategic framework to inform and guide the communications and engagement activities to be undertaken to support the Bringelly Business Hub redevelopment.

A proactive, inclusive, and transparent approach to communications and engagement will support planning objectives by ensuring accurate and compelling information is disseminated in a relevant, compelling, timely and accessible manner to specific target stakeholders and community members.

The approach focuses on adopting a proactive, inclusive, and transparent program and tools to facilitate a meaningful and open dialogue.

2.1 Approach and Objectives

The consultation approach was developed based considering the site context, surrounding communities, known stakeholders and the previous consultation and feedback in relation to the Bringelly Road Business Park developments. It was developed based on Ethos Urban's extensive experience of designing and delivering strategic communication and consultation processes for State Significant Development projects.

The consultation program was designed to be practical and effective providing an opportunity for feedback, mitigating risks of misinformation, highlighting key features of the proposal and where to find out further information.

The aims of the consultation were to ensure:

- Access to balanced and appropriate factual information about the project;
- Input from stakeholders and the community was documented and considered
- The narrative of the development was relevant to the audience;
- Trust and constructive dialogue; and
- The intent of the development is transparent.

The consultation adhered to the following key principles:

- **Timely** – providing the community and stakeholders with the opportunity to provide important feedback at key milestones;
- **Genuine and constructive** – providing transparent and clear opportunities for people to provide feedback;
- **Accessible** – ensuring all parts of the community have an opportunity to participate;
- **Productive** – educating the community about the constraints and opportunities to draw out usable feedback to inform the strategies; and
- **Factual** – providing the facts on the project promotes transparency in the process and helps to build trust with stakeholders.

2.2 Stakeholder Mapping

The table below outlines the government agencies that will be engaged, as required by the SEARs.

Stakeholder	Identity	Topics of relevance
Government agency	Liverpool City Council	<ul style="list-style-type: none"> • Contamination • Flooding and Stormwater • Air quality and noise • Traffic and access • Soil and water • Ecology • Environmental Health • Site suitability • Public interest
	Western Sydney Parklands Trust	<ul style="list-style-type: none"> • Consistency with Concept Plan • Flooding and Stormwater • Air quality and noise • Traffic and access • Soil and water • Ecology • Environmental Health • Site suitability • Public interest
	Sydney Water	<ul style="list-style-type: none"> • Impact on and demand for utilities • Soils and Water • Flooding • Environmental Health
	Environment, Energy and Science of DPIE	<ul style="list-style-type: none"> • Flooding and Stormwater • Air quality and noise • Soil and water • Ecology • Environmental Health • Site suitability
	Water NSW	<ul style="list-style-type: none"> • Impact on and demand for utilities • Soils and Water • Flooding • Environmental Health
	Rural Fire Service	<ul style="list-style-type: none"> • Fire risk • Emergency Management plans
	Jemena	<ul style="list-style-type: none"> • Impact on and demand for utilities
	Transport for NSW	<ul style="list-style-type: none"> • Transport and traffic impact • Traffic assessments and impacts
	NSW Fire and Rescue	<ul style="list-style-type: none"> • Effective fire safety design
Immediate neighbours of the site and adjacent	Immediate neighbours catchment area from Bringelly Rd to Cowpasture Rd, including: <ul style="list-style-type: none"> • CEA Australia • Steelforce Australia • Bunnings Warehouse 	<ul style="list-style-type: none"> • Safety of works • Contaminated land • Construction traffic • Air quality and noise • Ecology

Stakeholder	Identity	Topics of relevance
	See Figure 1 for detailed map	<ul style="list-style-type: none"> • Access routes • Public interest
Community up to 500m from the site (approximately), approximately 840 properties	<p>Community stakeholder catchment area from west of Joshua Moore Dr and Greenway Dr, to north of Camden Valley Way to east of Twenty Sixth Ave.</p> <p>See Figure 2 for detailed map.</p>	<ul style="list-style-type: none"> • Air quality and noise • Construction traffic and traffic once operational • Ecology • Public interest
Local community groups	There are no prominent community groups based in the Eastern Creek Employment Lands Precinct.	N/A



Figure 1 – Immediate neighbours catchment area from Bringelly Rd to Cowpasture Rd



Figure 2 – Community stakeholders catchment area from west of Joshua Moore Dr and Greenway Dr, to north of Camden Valley Way to east of Twenty Sixth Ave.

2.3 Engagement Tools

The following table provides a description of activities comprising the engagement process.

Activity	Target Audience	Justification for approach
Letter or email providing a summary of the project and offering meeting	Government Agencies	<ul style="list-style-type: none"> Provides a factual overview of the proposal and the project timeline Keeps stakeholders up-to-date and informed Provides the recipient with a central point of contact for all questions Provides opportunity for the recipient to give input and feedback towards the project and organise further consultation. Invites the recipient for more detailed consultation.
Letter providing a summary of the project and offering to hold a meeting	Immediate neighbours	<ul style="list-style-type: none"> Provides a factual overview of the proposal and the project timeline Keeps stakeholders up-to-date and informed Provides the recipient with a central point of contact for all questions Provides opportunity for the recipient to give input and feedback towards the project and organise further consultation. Invites the recipient for more detailed consultation.
Postcard	Community Stakeholders	<ul style="list-style-type: none"> Provides a factual overview of the proposal. Keep the community and stakeholders up-to-date and informed Provides the community with a central source of information – project website Invites the community to provide feedback
Stakeholder meetings (if requested)	Government Agencies	<ul style="list-style-type: none"> Provides a detailed overview of the project Discuss and record any issues stakeholders may have directly with the project team. Answer any questions in detail Facilitates technical discussions appropriate to the agency
Website	All stakeholders identified	<ul style="list-style-type: none"> Provides a factual overview of the proposal. Keep the community and stakeholders up-to-date and informed Provides the community source of information Provides opportunity for community to give input and feedback towards the project and organise further consultation via contact form.
Project email address - info@bringellyroadbusinesshub.com.au	All stakeholders identified	<ul style="list-style-type: none"> An accessible and ongoing point of contact stakeholder can utilise to found out more information, provide feedback or organise a meeting with the project team
Project hotline 1800 319 494	All stakeholders identified	<ul style="list-style-type: none"> An accessible and ongoing point of contact stakeholder can utilise to found out more information, provide feedback and/or organise a meeting with the project team

2.4 Communications and Engagement Action Plan

This engagement action plan outlines the key deliverables required for community and stakeholder engagement, and the associated deadlines.

Activity	Details	Timing
Prepare Strategy	<ul style="list-style-type: none"> Detail engagement approach Identify key stakeholders to engage Detail engagement mechanisms and processes Establish appropriate timeline to allow for meaningful engagement 	24.07.20
Send information letters or emails to relevant contacts at listed Government Agencies	<ul style="list-style-type: none"> Provide relevant technical information to government agencies and establish line of communications for further consultation 	24.7.20 – 12.8.2020
Send information letters to immediate neighbours of site	<ul style="list-style-type: none"> Provide information of the development and provide proposal to meet with the project team to discuss the proposal 	28.07.20
Send information letters to all community stakeholders	<ul style="list-style-type: none"> Provide an overview of the project and establish lines of communication to provide feedback or organise a meeting 	28.07.20
Launch website, community phone line and email address	<ul style="list-style-type: none"> The website, community hotline and email address will be outlined in the postcard sent to the community. Ethos Urban will respond to any feedback provided and answer any questions raised 	28.07.20
Feedback period, including meetings as requested	<ul style="list-style-type: none"> Meetings to be held with all stakeholder as requested Receive and respond to feedback received via website, email and or phone 	28.07.20 to 21.08.20

3.0 Consultation Process and Feedback

3.1 Agency Consultation

In accordance with the requirements of the Secretary's Environmental Assessment Requirements, the following stakeholders were contacted

Table 1 Details of stakeholder consultation

Organisation	Details of consultation
Transport for NSW	Ason Group contacted Transport for NSW via email to provide an overview of the project and offer an opportunity for further discussion. No response has been received to date.
NSW Rural Fire Services	NSW Rural Fire Services (RFS) were contacted in June 2020 by representatives of the project team for comment. RFS indicated they will provide comment when invited by the Department of Planning, Industry and Environment as part of public exhibition.
Liverpool City Council	A meeting was held with Council on 13 August 2020. Details of the meeting and feedback received are outlined in section 3.7 of this report.
Western Sydney Parklands Trust	Consultation with the Western Sydney Parklands Trust (WSPT) has been ongoing. A Lot Development Proposal for the site was approved by WSPT and subsequent Land Owners Consent has been granted.
Water NSW / Sydney Water	An email was sent to Water NSW/Sydney Water on 12 August 2020 informing of the intent to lodge a SSDA for the site and included a high level summary of the proposal as well as offered to discuss the project further. No response has been received to date
Environment, Energy and Science Group	An email was sent to Environment, Energy and Science Group on 12 August 2020 informing of the intent to lodge a SSDA for the site and included a high level summary of the proposal as well as offered to discuss the project further. No response has been received to date
Jemena	An email was sent to Jemena on 12 August 2020 informing of the intent to lodge a SSDA for the site and included a high level summary of the proposal as well as offered to discuss the project further. No response has been received to date

3.2 Letter to immediate neighbours

To keep the immediate neighbouring occupants and landowners updated, a letter was sent to five immediate neighbours providing information on the project and offering the opportunity to meet with the project team to discuss the proposal.

No immediate neighbours took up this opportunity.

A copy of the letter can be found in **Appendix A** and a copy of the distribution range for the letter can be found in **Appendix B**.

3.3 Flyer to local community

To inform the surrounding community of the proposal and invite them to provide feedback, a postcard was distributed to approximately 840 neighbouring landowners, residents and businesses on Tuesday 28 July 2019.

None of the 840 community stakeholders (landowners of surrounding lots) provided feedback. No meetings with the project team were requested.

A copy of the flyer can be found in **Appendix C** and the distribution range can be found in **Appendix D**.

3.4 Project webpage

A project webpage was created to include the latest information about the proposal. This included information on the other developments at the Bringelly Business Hub, and contact details for the project team.

The project webpage was advertised on the newsletter send to 840 local residents and can be viewed at <https://bringellyroadbusinesshub.com.au/lot-4/>.

The project webpage included a section to leave feedback and to contact the project team. No feedback or comments were received.

3.5 Communication Channels

The following communication channels were available to receive feedback:

- Contact form on the project website - <https://bringellyroadbusinesshub.com.au/contact/>
- Email address - info@bringellyroadbusinesshub.com.au
- Phone number - 1800 319 494

3.6 Community Stakeholder Feedback

Of the immediate landowners (5) and surrounding landowners (840) notified, there was no feedback received through the various channels available.

3.7 Liverpool City Council Feedback

A meeting was held on 13 August 2020 between ESR and Council. During this meeting, ESR provided an outline of the proposed development and any key areas that may concern Council.

Council commented that it is important ESR demonstrate considered internal circulation and truck circulation in the plans. This has been addressed in the Traffic and Transport Report prepared by Ason Group.

Council questioned what ESD measures are included in the proposal. ESR are proposing to include solar panels, a rainwater tank, and energy efficient lighting which was considered sufficient by Council.

Council also inquired about ESR's mitigation strategy for the heat island effect. ESR will implement considered landscaping around the premise to reduce heat gain.

4.0 Next Steps

ESR will continue to provide opportunities for local residents, landowners, businesses, and key agencies to make enquiries and provide feedback as the development application progresses. Information about the project will be available for continued future viewing on the website. Contact details including a telephone number and email address will also be published on the website for anyone to contact at any time.

ESR are committed to continuing to keep stakeholders and the community updated as the proposal progresses.

5.0 Conclusion

This consultation Strategy and Outcomes Report provides a succinct overview of the communications and stakeholder engagement activities Ethos Urban undertook prior to lodgement of the SSDA in relation to the Lot 4, Bringelly Road Business Hub.

In accordance with the SEARs requirements for communications and stakeholder engagement, Ethos Urban has implemented a strategy to inform local residents, landowners, businesses and key agencies about the proposed resource recovery facility. This has not only ensured that the community have a clear understanding of the proposal, but has also provided an important mechanism to gather feedback prior to lodgement of the SSDA.

5 agencies provided feedback, none of which raised any objection to the project during the consultation period. 845 community stakeholders were provided with information, none provide feedback. This suggests limited interest or objection to the works, and an acknowledgement that the proposal is appropriate in the context of the local environment.

Letter to Immediate Neighbours

24/07/2020



ESR Australia

Level 29, 20 Bond Street,

Sydney, 2000

RE: Bringelly Road Business Hub– New Warehouse, Lot 4, Skyline Avenue

Dear Neighbour,

On behalf of ESR Australia, we would like to notify you that ESR Australia is in the process of preparing a State Significant Development Application (SSDA) to build a Temperature Controlled Warehouse Facility on Lot 4 at the Bringelly Road Business Hub.

ESR Australia is seeking approval for the detailed development and construction of:

- A temperature-controlled warehouse facility of approximately 35,000m²;
- Vehicle entry and exit including guardhouse;
- Hardstand areas for vehicle docking and vehicle maneuvering;
- Ancillary office administration (approx. 1,000m²); and
- Staff car parking (approx. 230 spaces).

The facility will not process or produce any products and is intended for storage purposes only.

Ethos Urban has been appointed by ESR to prepare the SSDA and undertake stakeholder engagement activities under the *Environmental Planning and Assessment Act 1979*. An Environmental Impact Statement (EIS) is currently being prepared as part of the SSDA, and is expected to be submitted for public exhibition during the second half of 2020.

ESR is therefore inviting questions or feedback about the proposal prior to the exhibition of the EIS from its neighbours, the surrounding community, and other relevant stakeholders, to ensure that the EIS comprehensively responds to any issues or concerns.

ESR and Ethos Urban is also available to meet with any stakeholder to discuss any aspect of the proposed facility in more detail. Alternatively, you can provide your thoughts on the Bringelly Road Business Hub website <https://bringellyroadbusinesshub.com.au/>

If you have any questions or feedback about the new Warehouse, or would like to request a meeting with the project team, please contact Ira Brenner from Ethos Urban on 0420 325 913 or email ibrenner@ethosurban.com

A handwritten signature in dark ink, appearing to be "SF", is located below the contact information.

Scott Falvey | ESR General Manager - NSW

**Letter to Immediate
Neighbours – Distribution
Range**



Flyer to Local Community

New Warehouse at Bringelly Road Business Hub

ESR Australia is looking to develop a new Warehouse on Lot 4 at Bringelly Road Business Hub, located on Skyline Crescent between the CFC Warehouse and Bunnings Warehouse.

The proposal includes:

- A temperature-controlled warehouse facility of approximately 35,000 m²;
- Vehicle entry and exit including guardhouse;
- Hardstand areas for vehicle docking and vehicle maneuvering;
- Ancillary office administration (approx. 1,000m²); and
- Staff car parking (approx. 230 spaces).

The facility will not process or produce any products, and is intended for storage purposes only.


A comprehensive Environmental Impact Assessment (EIA) is being prepared and will soon be submitted to the NSW Department of Planning, Industry and Environment, as part of the State Significant Development Approval. The EIA will provide a basis for DPIE to assess the impacts likely to occur as a result of the construction and operation of the new Warehouse.

The Warehouse will create jobs for local and regional communities and will ultimately create long term income for the Western Sydney Parklands Trust for ongoing maintenance and upkeep.

**To find out more and provide feedback, please
visit bringellyroadbusinesshub.com.au**

**Flyer to Local Community
– Distribution Range**



	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN		
	DHL LSHC Building Lot 4, Bringelly Road, Leppington		

Appendix O

Biodiversity Development Assessment Report Waiver

14 July 2020

Our ref: 20SYD-16606

ESR Australia
Level 29, 20 Bond St,
Sydney NSW 2000

Attention: Riley Sampson

Dear Riley,

Bringelly Rd Business Hub, Horningsea Park – Biodiversity Assessment / Biodiversity Development Assessment Report Waiver

Eco Logical Australia (ELA) was engaged by ESR Australia to undertake a biodiversity assessment of a proposed development located at 50 Bringelly Rd, Horningsea Park (Lot 4 of the Bringelly Rd Business Hub (SSD 6324), the 'subject site', **Figure 1**). ESR propose to lodge a development application for development of a warehouse and associated infrastructure and parking. This proposal is a State Significant Development (SSD) under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). This biodiversity assessment would accompany the Environmental Impact Statement (EIS) provided in response to the Secretary's Environmental Assessment Requirements (SEARs) issued by the Department of Planning Industry and Environment (DPIE 2020).

BACKGROUND

The proposed development site, located on Lot 4 of the Bringelly Road Business Hub development land (the 'subject site', **Figure 1**), lies within the Liverpool City Council Local Government Area (LGA) and forms part of Western Sydney Parklands. Development Consent for the Stage 1 subdivision and early works of the Bringelly Road Business Hub was granted by the Minister for Planning and Environment in early 2016 (SSD 6324). The development land is also located within the South West Growth Centres, which was subject to Biodiversity Certification under the NSW *Threatened Species Conservation Act 1995* (TSC Act). However, the study area is on non-certified land.

The proposed development will involve the construction of a c.35,000 sqm warehouse, two levels of office space, three dock offices and 230 car parking spaces and associated pavement for vehicle movement around the warehouse (**Figure 2**).

The subject site has been completely cleared of vegetation and levelled as a part of the Stage 1 earth works. Approval of this clearing was provided following the purchase and retirement of biodiversity offset credits as required by the Development Consent for the Bringelly Rd Business Hub (SSD 6324). There are no other habitat features, such as dams or water courses on the subject site.

LEGISLATIVE CONTEXT

In accordance with clause 7.9(2) of the NSW *Biodiversity Conservation Act 2016* (BC Act), any SSD application is to be accompanied by a Biodiversity Development Assessment Report (BDAR) *unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values*. To waive the requirements for a BDAR, it must be demonstrated that the site does not contain biodiversity values in accordance with Clause 1.5 of the BC Act and Clause 1.4 of the *Biodiversity Conservation Regulation 2017*.

The subject site covers an area approximately 6.97 ha, which does not contain any vegetation or habitat features including dams or waterbodies (**Figure 1**). The development proposal does not involve the removal of vegetation for the proposed works. Additionally, the subject site does not contain habitat for threatened species or ecological communities.

The proponent may therefore request the Department of Planning Industry and Environment (DPIE) waive the preparation of a BDAR. In accordance with the DPIE (2019) advice, **Table 1** provides the BDAR waiver request information requirements and **Table 2** describes the impacts of the proposed development on biodiversity values.

As the subject site does not contain any vegetation or any potential habitat for threatened species (i.e. waterbodies or dams), no tests of significance under the NSW *Biodiversity Conservation Act 2016* (BC Act) or significant impact criteria under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) have been applied.

It was determined that the proposed development will not have a significant impact on biodiversity values, and as such, a BDAR waiver should be sought. This letter should be submitted in support of that application for a BDAR waiver.

Regards,



Bronwyn Callaghan
Botanist, BAM Accredited Assessor

REFERENCES

Department of Planning & Environment, 2016a. State Significant Development Assessment Report: Bringelly Road Business Hub Bringelly Road, Leppington (SSD 6324).

Department of Planning & Environment, 2016b. Development Consent (SSD 6324).

Department of Planning, Industry & Environment, 2019. How to apply for a biodiversity development assessment report waiver.

Site and Location Map

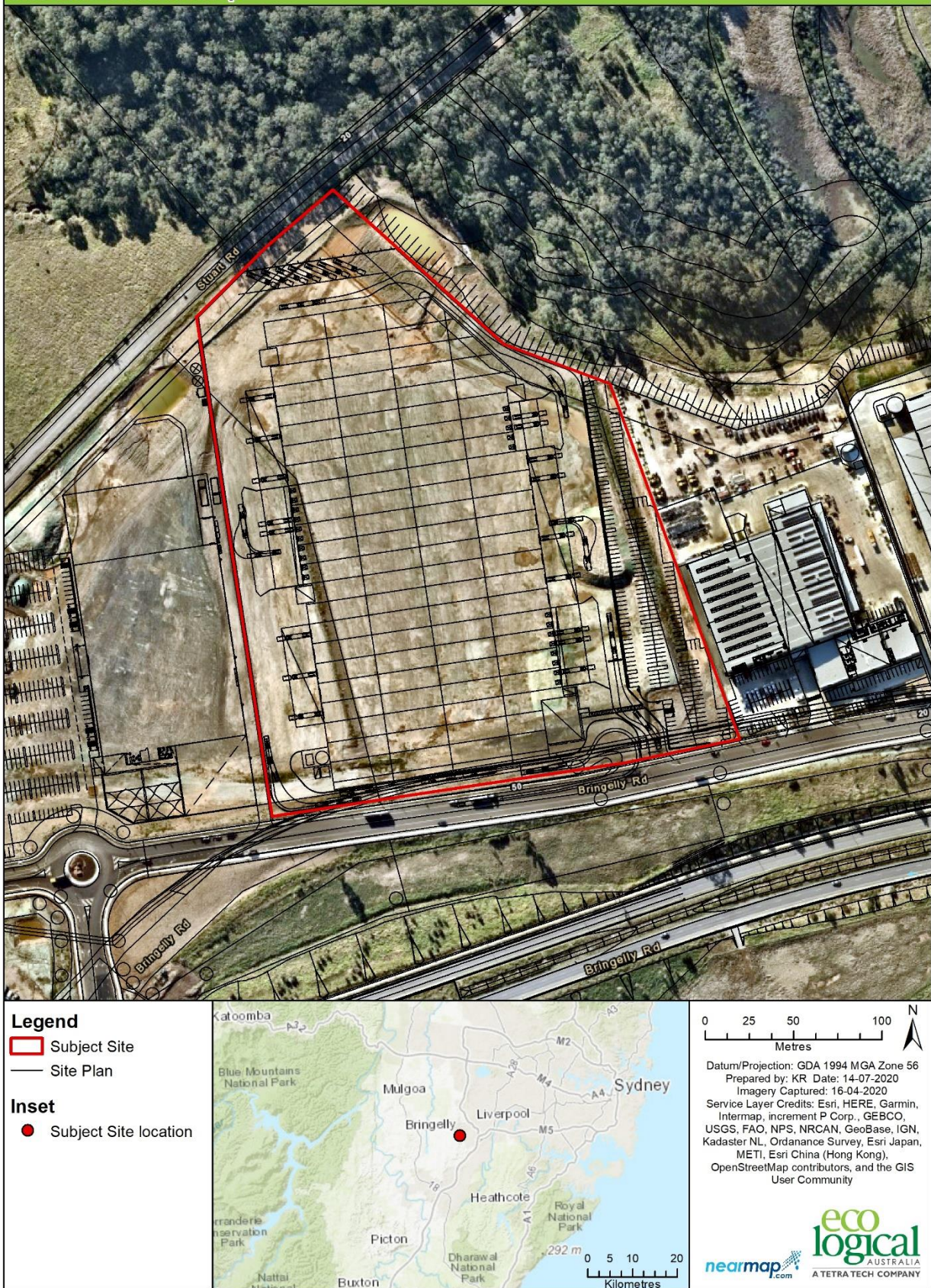


Figure 1: Site and location map.

Table 1: BDAR waiver request information requirement

Category	Details required	Information
Admin	<ul style="list-style-type: none"> Proponent name and contact details Name and ecological qualifications of person completing Table 2. 	<ul style="list-style-type: none"> ESR Australia Level 29, 20 Bond St, Sydney NSW 2000 Bronwyn Callaghan, Botanist and BAM Accredited Assessor (#BAAS20019) with 8 years experience, B. Env. Sc. (Hons) UOW.
Site details	<ul style="list-style-type: none"> Street address, Lot and DP, local government area. Description of existing development site, i.e., the area of land that is subject to the proposed development application Location map showing the development site in the context of surrounding areas and landscape features. Satellite image of site in context of adjoining sites. Site Map (to scale, ideally as a spatial shapefile). 	<ul style="list-style-type: none"> 50 Bringelly Rd, Horningsea Park NSW, Lot 4 within Bringelly Road Business Hub development areas (SSD 6324) (Lot 2, 3, 12, 13, DP29104), Liverpool local government area The proposed development site is a 6.97 ha lot within the Bringelly Rd Business Hub which lies between Bringelly Rd and Stuart Rd in Horningsea Park. The proposed development site is currently unoccupied has no buildings on it. It has recently been subject to preliminary earth works, which involved the removal of all vegetation on site. See regional inset map in Figure 1 See Figure 1
Proposed development	<ul style="list-style-type: none"> Project Description providing enough information to enable an understanding of the nature and scale of the proposed development and any associated activities (including construction etc). Proposed Site Plan 	<ul style="list-style-type: none"> ESR Australia proposes to develop a 34,570 m² warehouse on the subject site, which includes two levels of offices covering 1000 m². Three smaller dock offices will be located around the perimeter of the warehouse. A small guard house (19 m²) will be located at the entrance in the south east corner of the subject site. Car parking will be provided with 230 spaces on the eastern edge of the subject site, and light and heavy duty pavement will allow for vehicle movement around the outside of the warehouse. Please see Figure 2 and Figure 3 below
Impacts on biodiversity values		<ul style="list-style-type: none"> Provided below in Table 2

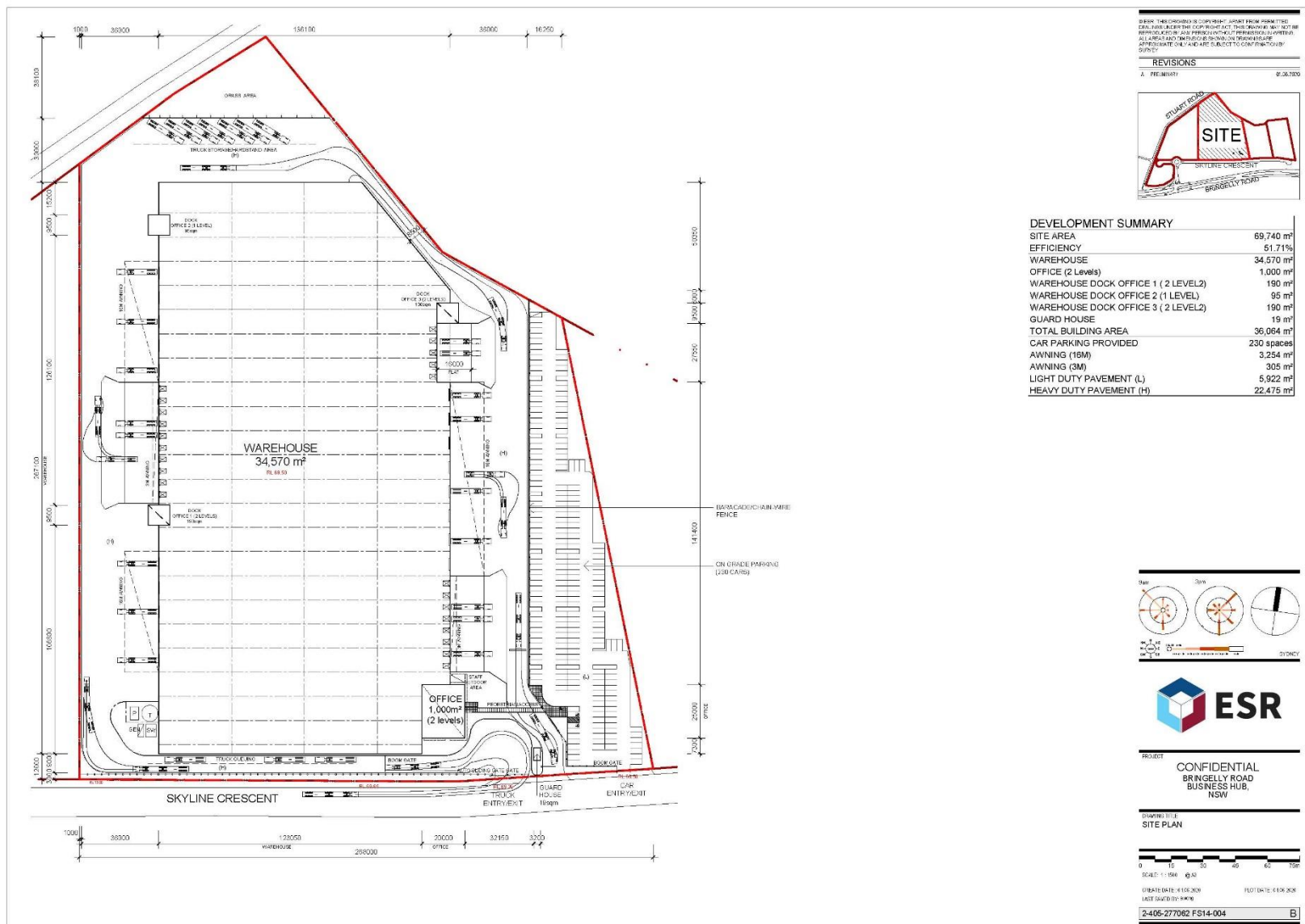


Figure 2: Proposed site plan – ground floor.



Figure 3: Proposed site plan – development in the context of the Bringelly Road Business Hub.

Table 2: Criteria to assess biodiversity under the BC Act and BC Regulation

Biodiversity Value	Meaning	Discussion of values within study area
<i>Biodiversity Conservation Regulation (Clause 1.4)</i>		
<i>a) Threatened species abundance</i>	<i>The occurrence and abundance of threatened species or threatened ecological communities, or their habitat, at a particular site.</i>	<p>No threatened ecological communities (TEC) are present within the subject site.</p> <p>No threatened flora species are present on the subject site and, due to the lack of vegetation and highly altered state of the soils within the subject site, there is no habitat available for threatened flora species.</p> <p>As there are no vegetation present at the subject site, there is no potential foraging habitat for the threatened fauna.</p> <p>No roosting habitat is available within the subject site for hollow-dependent threatened fauna species due to the absence of trees.</p> <p>There are no human-made structures present within the subject site that could provide potential roosting habitat for threatened microbat species such as culverts, bridges or railway tunnels.</p> <p>There is no litter layer or coarse woody debris due to the lack of vegetation and, therefore, no habitat is available within the subject site for threatened fauna species dependent on natural litter layers or coarse woody debris.</p>
<i>b) Vegetative abundance</i>	<i>The occurrence and abundance of vegetation at a particular site.</i>	There is no vegetation within the subject site and no Plant Community Types are present.
<i>c) Habitat connectivity</i>	<i>The degree to which a particular site connects different areas of habitat of threatened species to facilitate movement of those species across their range.</i>	There is no vegetation within the subject site. The subject site does not provide connection between different areas of habitat that would facilitate threatened species movement across their range.
<i>d) Threatened species movement</i>	<i>The degree to which a particular site contributes to the movement of threatened species to maintain their lifecycle.</i>	<p>The subject site is entirely cleared of vegetation and is surrounded by large industrial buildings to the east and west (in development) and roads and cleared areas to the south and an isolated patch of vegetation to the north.</p> <p>Movement across the subject site for less mobile threatened fauna, such as mammals, is highly unlikely due to the lack of vegetation cover. Whilst more mobile threatened fauna, including birds and bats, may fly over the subject site, it doesn't contribute to their movement in any way as there is no vegetation or structures which might assist their movement to maintain their lifecycle.</p> <p>Due to the highly disturbed soil within the subject site, there would be very little opportunity for genetic dispersal of threatened flora species in the form of germinating seeds. Further, given the absence of vegetation on site, dispersal of pollen from threatened plants via insect or other animal vectors through the subject site is likewise unlikely.</p>

Biodiversity Value	Meaning	Discussion of values within study area
		The subject site is not considered to be significant for the movement of any threatened species to maintain their lifecycle.
<i>e) Flight path integrity</i>	<i>The degree to which the flight paths of protected animals over a particular site are free from interference.</i>	The subject site is comprised of cleared land. It does not contain any vegetation and therefore does not contribute to landscape connectivity. Flight paths of protected animals are unlikely to currently come in close contact with the subject site. The maximum height of the proposed warehouse is 13.7 m in height, which is similar to the large industrial buildings in its immediate surrounds. The flight paths of protected animals, therefore, are unlikely to be affected by the proposed development.
<i>f) Water sustainability</i>	<i>The degree to which water quality, water bodies and hydrological processes sustain threatened species and threatened ecological communities at a particular site.</i>	No natural water courses are present within the subject site. The subject site in its current state has been altered through preliminary earth works and does not contain water bodies or contribute to hydrological processes that sustain threatened species or ecological communities within or adjacent to the site.
Biodiversity Conservation Act (Clause 1.5 (2))		
<i>a) Vegetation integrity</i>	<i>The degree to which the composition, structure and function of vegetation at a particular site and the surrounding landscape has been altered from a near natural state.</i>	There is no vegetation on the subject site due to previously approved earth works which included the removal of all vegetation. The proposed development will not compromise the vegetation integrity of the site.
<i>b) Habitat suitability</i>	<i>The degree to which the habitat needs of threatened species are present at the particular site.</i>	<p>Suitable habitat for threatened species is highly limited within the subject site given there is no vegetation or habitat features such as dams, habitat trees, woody debris or human-made structures.</p> <p>As the subject site has been entirely cleared of native vegetation and the soil has been significantly altered due to preliminary earth works, there is no habitat for any threatened flora species.</p> <p>Due to the lack of vegetation, there is no foraging habitat for threatened fauna species. Likewise, there is no roosting habitat available within the study area for hollow-dependent threatened fauna species.</p> <p>There is no potential roosting habitat for threatened microbat species in the form of human-made structures, such as culverts, bridges or railway tunnels on the subject site.</p> <p>There is no natural litter layer or coarse woody debris on the subject site and, therefore, no habitat available for threatened fauna species dependent on natural litter layers or coarse woody debris.</p> <p>The proposed development will not compromise any habitat needs of threatened species on the subject site.</p>