

OPERATIONAL WATER MANAGEMENT PLAN

**MORTDALE RESOURCE
RECOVERY FACILITY**

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OPERATIONAL WATER MANAGEMENT PLAN (OWMP)

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ACRONYMS AND DEFINITIONS

Acronym / Term	Meaning
ARI	Average recurrence interval
Bingo	Bingo Recycling Pty Ltd
CoC	Conditions of Consent
DPIE	Department of Planning, Environment and Industry
EIS	Environmental Impact Statement
EMS	Environmental Management System
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
GPT	Gross Pollutant Trap
kL	Kilolitre
LGA	Local government area
ML	Megalitre
O&M Manual	Operation and Maintenance Manual
OEMP	Operational Environmental Management Plan
OWMP	Operational Water Management Plan
EPIRMP	Emergency and Pollution Incident Response Management Plan
PMF	Probable Maximum Flood
POEO Act	<i>Protection of the Environment Operations Act 1997 (NWS)</i>
RMS	Roads and Maritime Services
SSD	State significant development
TPA	Tonnes per Annum
TN	Total Nitrogen
TP	Total Phosphorous
TSS	Total Suspended Solids
VENM	Virgin Excavated Natural Material
WCMP	Water Cycle Management Plan

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1 INTRODUCTION

1.1 Background

Bingo Recycling Pty Ltd (Bingo) was granted development consent by the then Planning Assessment Commission in December 2017 (State Significant Development (SSD) 7421) for the demolition, construction and operation of a Resource Recovery Facility at 20 Hearne Street, Mortdale NSW (the Facility). The approval allows the Facility to process up to 220,000 tonnes per annum (tpa) of general solid waste (non-putrescible). Operations of the Facility are due to commence in January 2020.

A modification to SSD 7421 was submitted and determined in May 2019 (SSD-7421-Mod-1) to change the operational requirements of the site. These changes included an expansion of the incoming waste receival area, a reduction in the scale of recycling and waste processing plant and changes to the operational layout of the site to promote simpler waste processing to better suit the broader network of resource recovery material available to the company.

The Facility operates under an Environmental Protection Licence (EPL 20622) issued to Mortdale Recycling Pty Ltd (Bingo) for resource recovery, waste processing (non-thermal treatment) and waste storage. The EPL will be amended to align with Modification 1 (SSD 7421 MOD 1) prior to the commencement of the Facility operation.

1.2 Purpose and Application

This Operational Water Management Plan (OWMP) has been developed to address Conditions B39 and B40 of the Development Consent (SSD 7421 as modified by SSD 7421 MOD 1) which require the preparation of an OWMP to the satisfaction of the Secretary of the Department of Planning, Industry and Environment (DPIE) prior to the commencement of operation. The specific conditions relevant to the development of this plan are identified in Section 3.2.1.

This OWMP identifies the operational environmental management measures that will be applied to activities undertaken across the Mortdale Resource Recovery Facility (detailed in Section 4.2.4) to manage identified surface water risks.

The most recent, approved version of this plan will be implemented to manage surface water risks associated with Facility operations and activities.

1.3 Objectives and Targets

The following outlines the objectives and targets set out for the Facility for the management of water during operation. These objectives and targets were developed based on collective industry experience and best practice.

The key objectives for water management during the Facility operation include:

- Utilising rainwater harvesting to meet water needs
- Minimising potable water use
- Minimising potential sources of pollutants
- Minimising the potential for surface water runoff to mobilise pollutants and adversely impact the downstream environment

1.4 Consultation

The OWMP does not require consultation with stakeholders, including the public authority.

Condition B40 of the Development Consent requires that the OWMP is approved by the DPIE, prior to operation commencing.

2 PROJECT DESCRIPTION

The Facility as managed under this OWMP includes a resource recovery facility for non-putrescible general solid waste, as well as associated use of car parking, a site office and amenities building use.

The Facility covers an area of 0.76 hectares and is situated in the Peakhurst Industrial Area within the Georges River Council local government area (LGA). Land uses surrounding the Facility are predominantly industrial and include manufacturing, automotive services, printing and supply services. Hurstville golf course is located approximately 450 metres south of the Facility. A location map is provided in **Figure 2-1** below.

2.1 Facility Overview

Access to the site is from Hearne Street, Mortdale. This is a two-lane street that connects Barry Avenue in the south to Boundary Road to the north. The surrounding arterial road network (including Forest Road, King Georges Road and M5) is serviced from the site via Boundary Road.

The Facility comprises of the following elements:

- A building incorporating site offices and amenities. The main office building is located at the front of the transfer terminal building, adjacent to the Hearne Street, Mortdale entrance.
- Light vehicles parking area for staff (11 spots).
- An access road for waste trucks entering and exiting the facility from Hearne Street, Mortdale.
- Incoming and outgoing weighbridges to check the waste type and weight of the waste being delivered to and leaving the facility. This entrance includes a temporary truck parking area prior to the incoming weighbridge.
- Two outbound weighbridges (11 m and 22 m) for load out of processed waste.
- An enclosed building for the unloading, screening and loading of waste. Waste storage at the Facility is temporary and subject to availability of transport and markets for products.
- One waste screening unit located on the eastern side of the building.

Key operational facility componentry is outlined below in the site layout site (refer to **Appendix A**).

2.1.1 Activity Methodology

Waste processing at the Facility consists of screening incoming material into various size fractions, before being sent on for further resource recovery at a different facility downstream in the Bingo network.

Operations at the Facility are performed largely within a purpose-built building. All material unloading, handling, storage, processing and loading activities are performed within this building, with only material transport being performed external to the building.

The following list the operational process of waste sorting and screening to be undertaken under the Development Consent:

- Mixed waste would be delivered from an entrance located on the south west elevation of the building
- Waste would be tipped onto an expanded tip floor, which would allow for two vehicles to tip at one time
- Waste would be inspected. Eligible waste to be accepted would be loaded into a feed hopper using mobile plant.
- Any non-conforming waste would be separated and stored in a designated storage bay until it can be removed in accordance with the current approval. Any large items of steel, timber, and oversized concrete would be separated and stored in a designated storage bay
- Waste would be fed through the hopper and onto a screener which separates waste into two fraction sizes: <60 mm soils and rubble; and >60 mm soil, rubble and other products. Other materials including oversized concrete, timber and steel would also be recovered in this step
- The two material streams are then sent by conveyors to the respective storage areas until it is loaded into an outbound truck using mobile plant.

Figure 2-2 details the processing flow of waste material as it enters the Facility, is processed, stored and sent on for further processing and resource recovery.

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Figure 2-1: Facility Location

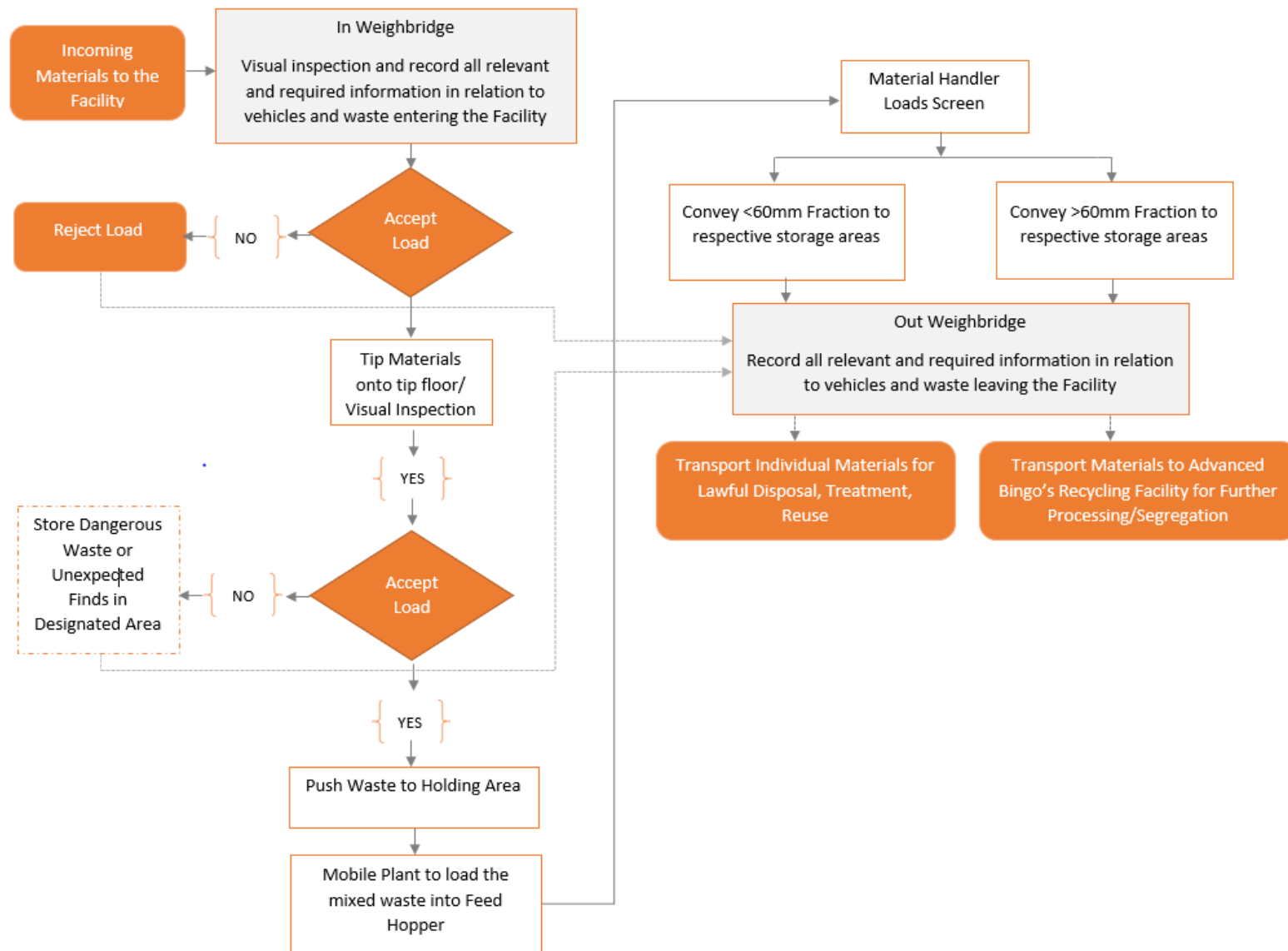


Figure 2-2: Process Flow of Facility Inputs and Outputs

2.1.2 Accepted Waste streams

Waste streams received and processed on site will include:

- Wood waste
- Non-chemical manufacturing waste (metal, timber, paper, ceramics, plastics, thermosets and composites)
- Asphalt waste
- Soils
- Paper and cardboard
- Glass, plastic, rubber, plasterboard, ceramics, bricks, concrete or metal
- Household waste from municipal clean-up that does not contain food waste
- Office and packaging waste that is not contaminated or mixed with any other type of waste
- Building and demolition waste
- Virgin excavated natural material (VENM).

Limited quantities of green waste will also be accepted at the site within other mixed waste streams (less than 1% of waste held at any one time).

2.1.3 Waste streams not permitted

The following waste streams will not be accepted on site:

- Asbestos;
- Liquid wastes;
- Putrescible wastes;
- Flammable materials;
- Hazardous wastes; and
- Radioactive wastes.

2.1.4 Operating Hours

Waste is received and loaded out between the hours of 6:00am and 10:00pm from Monday to Saturday with no processing undertaken on Sundays or public holidays.

3 STATUTORY REQUIREMENTS

3.1 Legal and Other Obligations

The legislation, planning instruments and guidelines considered during development of this plan are listed below with specific details provided in the Legislation Register within Appendix B of the OEMP.

- *Environmental Planning and Assessment Act 1979*
- *Environmental Planning and Assessment Regulation 2000*
- *Protection of the Environment Operations (POEO) Act 1997*
- *Sydney Water Act 1994*
- *Water Act 1912*
- *Water Management Act 2000*

Additional legislation, standards and guidelines relating to the management of water include:

- Australian Rainfall and Runoff, Engineers Australia
- Managing Urban Stormwater: Soils and Construction ('the Blue Book') (Landcom 2004)
- Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (2000)

3.2 Development Consent

3.2.1 EP&A Act Approval

The Facility was approved under Part 4, Division 4.7 (previously Division 4.1 prior to 1 March 2018) of the EP&A Act on 20 December 2017. A modification to the original approval (SSD 7421) under section 4.55(1A) was approved on 29 May 2019.

The Development Consent includes requirements to be addressed in this plan and to be delivered during operation of the Facility. These requirements, and how they are addressed are provided within Table 3-1 for Conditions B39 and B40 relating to SSD 7421.

Table 3-1: SSD 7421 Relevant Conditions

CoC	Requirement	Document Reference
B39	Prior to the commencement of operation, the Applicant must prepare a Water Management Plan (Water MP) to the satisfaction of the Secretary. The Water MP must form part of the OEMP required by Condition C4 and be prepared in accordance with Condition C6. The Water MP must:	This plan
a)	detail water use, metering, disposal and management on-site	Section 4.1
b)	detail the management of wastewater streams on-site, including leachate	Section 5.1.3
c)	contain a Surface Water Management Plan, including: <ul style="list-style-type: none"> (i) a program to monitor: <ul style="list-style-type: none"> • surface water flows and quality • surface water storage and use; and • sediment basin operation 	Section 6 Section 5.1 N/A. Sediment basins are not being used on site
c)	(ii) sediment and erosion control plans	N/A
c)	(iii) surface water impact assessment criteria, including trigger levels for investigating and potential adverse surface water impacts; and	Section 6.2

CoC	Requirement	Document Reference
c)	(iv) a protocol for the investigation and mitigation of identified exceedances of the surface water impact assessment criteria	Section 6.2
B40	The Applicant must:	
a)	not commence operation until the Water MP required by Condition B39 is approved by the Secretary; and	Section 1.2
b)	implement the most recent version of the Water MP approved by the Secretary for the duration of the Development	Section 1.2
C4	The Applicant must prepare an Operational Environmental Management Plan (OEMP) to the satisfaction of the Secretary. The OEMP must:...	This plan
9)	include the following environmental management plans: (v) Water (see Condition B39)	
C6	The Applicant must ensure that the environmental management plans required under Condition C4 of this consent are prepared by a suitably qualified person or persons in accordance with best practice and include:	Page 2
a)	detailed baseline data;	Section 4.1
b)	a description of: (i) the relevant statutory requirements (including any relevant approval, license or lease conditions); (ii) any relevant limits or performance measures/criteria; and (iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the Development or any management measures;	Section 2 Section 1.3 Section 1.3
c)	a description of the management measures that would be implemented to comply with the relevant statutory requirements, limits or performance measures/criteria;	Section 4.2.4
d)	a program to monitor and report on the: (i) impacts and environmental performance of the Development; and (ii) effectiveness of any management measures (see (c) above);	Section 4.2 Section 4.2.4
e)	a contingency plan to manage any unpredicted impacts and their consequences;	Section 5.3
f)	a program to investigate and implement ways to improve the environmental performance of the Development over time;	Section 7.3
g)	a protocol for managing and reporting any: (i) incidents (ii) complaints (iii) no-compliances with statutory requirements; and (iv) exceedances of the impact assessment criteria and/or performance criteria; and	Section 7.4 Section 7.5 Section 7.6 Section 4.2.1
h)	a protocol for periodic review of the plan	Section 7.3
Secondary Conditions		
A26	Prior to operation of the Development, the Applicant must obtain a Compliance Certificate for water and sewerage infrastructure servicing of the site under Section 73 of the <i>Sydney Water Act 1994</i> .	Section 3.4

CoC	Requirement	Document Reference
B35	Stormwater Management System Prior to the commencement of operation, the Applicant must design and install a stormwater management	Appendix A
a)	be designed by a suitably qualified and experienced person(s) whose appointment has been endorsed by the Secretary;	Page 2
b)	include a system to capture leachate generated within the processing shed and the bund under the awning for offsite disposal and treatment;	Section 5.1.5
c)	include a system to capture, contain and dispose of contaminated firewater, prepared in consultation with and to the satisfaction of Fire and Rescue NSW;	Section 4.2.4
d)	be generally in accordance with the conceptual design in the EIS;	Appendix A Section 4.2.4
e)	be in accordance with applicable Australian Standards;	Appendix A
f)	demonstrate that discharge limits can meet those in Landcom's WSUD Guideline;	Table 4-1
g)	ensure that the system capacity has been designed in accordance with Australian Rainfall and Runoff (Engineers Australia, 2016) and Managing Urban Stormwater: Council Handbook (EPA, 1997) guidelines (as may be updated or replaced from time to time);	Appendix A
h)	divert existing clean surface water around operational areas of the site;	Appendix A Section 4.2.4
i)	direct all sediment laden water in overland flow away from the leachate management system; and	Appendix A Section 4.2.4
j)	prevent cross-contamination of clean and sediment or leachate laden water	Appendix A Section 4.2.4

The Updated Statement of Commitments are presented within Appendix B of the Development Consent document (SSD 7421). A list of Mitigation Measures as relevant to the Facility and how they have been complied within this plan are provided in Table 3-2.

Table 3-2: Relevant Statement of Commitments

Measure	Requirement	Document Reference
Water Cycle Management	Operations A Water Cycle Management Plan (WCMP) will be incorporated into the OEMP. The OEMP will address matters such as:	Section 5
	<ul style="list-style-type: none"> The installation and regular maintenance of a control measures including: <ul style="list-style-type: none"> Rocla First Defence treatment device** Rocla Water Level Controller Litter baskets Rainwater tank Gutters and downpipes Sweeping of internal and external hardstand areas Cleaning and removal of leachate from blind sumps Fogging system; and Leachate sump and alarm system 	Table 4-2 WA-06 Section 5.2 Table 5-2

Measure	Requirement	Document Reference
	<ul style="list-style-type: none"> Procedures to ensure all wastes are stored in an enclosed environment 	Section 4.1.2 Table 4-2 WA-10
	<ul style="list-style-type: none"> Implementation of a general vehicle speed limit of 5 km/hr will be imposed across all areas of the site 	Table 4-2 WA-07 OTMP
	<ul style="list-style-type: none"> Procedure to ensure all vehicles are checked for mud and soil on tyres prior to leaving site and where mud or soil is detected on the entrance road (i.e. "track out"), staff will be deployed to sweep the road. 	Table 4-2 WA-08 & WA-09
	<ul style="list-style-type: none"> Procedures for monitoring any water quality limits as specified in the EPC 	Section 6
	<ul style="list-style-type: none"> The Final OEMP will be developed in consultation with the EPA prior to commencement of operations and will include: <ul style="list-style-type: none"> Leachate management and disposal; and Maintenance triggers and actions for the stormwater management system. 	Section 5.1.5 Section 6

Note **: The previous stormwater strategy proposed the use of a Rocla First Defence Gross Pollutant Trap (GPT) which provides treatment in terms of sediment, suspended solids, free oil and sediment bound heavy metal removal. To achieve the proposed pollutant reduction targets, particularly nutrients, the proposed GPT has been changed to a Humes Jellyfish GPT¹.

3.3 Environment Protection Licence Conditions

The most recent Environment Protection Licence (EPL 20622) associated with the Facility was issued by NSW EPA on 5 January 2016. Conditions within EPL 20622 associated with water and how they have been addressed within this plan are presented in Table 3-3.

Table 3-3: Relevant Conditions of EPL 20622

EPL Condition	Requirement	Document Reference
L1.1	Pollution of waters Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the <i>Protection of the Environment Operations Act 1997</i> .	This Plan
05.5	Clean stormwater must be diverted around waste storage and waste processing areas of the premises	Section 4.2.4 Appendix A

3.4 Other Permits and Licences

3.4.1 Water and Sewerage Infrastructure

In accordance with Condition A26, a Compliance Certificate for water and sewerage infrastructure servicing the site is required under Section 73 of the *Sydney Water Act 1994*. This will be obtained prior to operation.

¹ Mortdale Resource Recovery Facility Response to DPE Comments Regarding Water Quality, SLR, 9 November 2017.

3.5 Roles and Responsibilities

Key roles and responsibilities applicable to this OWMP are presented in Table 3-4.

Table 3-4: Roles and Responsibilities

Roles	Responsibilities
General Manager Resource Recovery NSW	<ul style="list-style-type: none"> Ensuring an OWMP is developed and implemented; ensuring compliance with conditions of consent and any regulatory or other requirements Ensuring appropriate resources are available to implement all aspects of the OWMP and maintain necessary records
Environmental Manager NSW	<ul style="list-style-type: none"> Identifying risks to water associated with operations undertaken on site Developing and implementing procedures and measures to minimise or eliminate any risks identified Ensuring that all personnel undertaking work at the site receive adequate training and education in the environmental measures developed to mitigate or minimise risks associated with water at the site Implement appropriate surface water monitoring to ensure that the management measures adopted are effective Undertaking reporting and internal audit annually Review maintain and assist implementation of the Environmental Management System
Site Supervisors	<ul style="list-style-type: none"> Assisting in the development, implementation and maintenance of mitigation measures to minimise or eliminate the identified environmental risks Complying with environmental measures and procedures implemented to minimise or eliminate environmental risks Maintaining onsite records and documents for inspection as required Attending environmental training and other educational sessions Reporting any environmental incidents that may occur in accordance with the OWMP Inducting all staff, works and any person conducting or engaged by the company to complete works onsite
Yard and Plant Operators / Weigh Bridge Officer	<ul style="list-style-type: none"> Completing the site induction Assisting management to mitigate any environmental hazards Ensuring that the site is regularly inspected for potential hazards that may cause harm Attending environmental training and other educational sessions Continuous awareness of activities and processes that may have environmental impacts Reporting incidents promptly and assisting with implementing control measures as required
Contractors	<ul style="list-style-type: none"> Completing the site induction Identifying the environmental risks associated with their activities at the site Developing mitigation measures to minimise or eliminate the identified environmental risks Being aware of and following onsite instruction and procedures implemented to minimise or eliminate environmental risks

3.6 Training

All employees, contractors and utility staff working on site will undergo site induction training (which includes environmental due diligence training) and environmental training in relation to waste management issues and the requirements of the OWMP.

Records would be kept of all personnel undertaking the site induction and training, including the contents of the training, date and name of trainer/s.

4 SURFACE WATER MITIGATION

This section provides an overview of addresses the key surface water risks associated with operation of the Facility and the environmental controls established to manage key risks.

4.1 Existing Environment

4.1.1 Regional Environment

The following overview of the regional environment has been sourced from the SLR 2016 Soil and Water Assessment of the Facility. The Facility is located within the Peakhurst Industrial Area catchment. The catchment drains through the Hurstville Golf Course stormwater harvesting system to supply the golf courses irrigation system with excess flows discharged directly to Lime Kiln Bay. Lime Kiln Bay is one of the largest sub-catchments of the Lower Georges River catchment, which covers an area of approximately 960 km².

A review of the Georges River Floodplain Risk Management Study and Plan (Bewsher Consulting, 2004) found that the Facility is not affected by mainstream flooding associated with the nearest watercourses including the Georges River, Salt Pan Creek or Lime Kiln Bay during a Probable Maximum Flood (PMF) event.

A review of the Draft Hurstville Overland Flood Study flood mapping (SMEC, 2015) found that some minor overland flooding would occur at the Facility during a 100-year average recurrence interval (ARI) event. However, the Facility is not located within the main overland flood flow path.

4.1.2 Site Conditions

The site is located in an industrial area with a relatively flat terrain. It is located on an irregularly shaped parcel of land, approximately 100 m by 70 m in the north-south and east-west directions respectively.

The site is highly impervious with a lack of vegetation present. All waste will be processed and stored in the site shed or kept in covered waste bins. Waste operations will be conducted on sealed surfaces, with all ground areas covered in concrete that is in good condition.

Existing stormwater infrastructure in the form of a pit and pipe drainage network services Facility which drains to the north western corner of the site. At this point stormwater discharges to the existing network via an established drainage easement (DP 585775), which conveys stormwater through 56-58 Barry Avenue before connecting with the pit and pipe network in Barry Street.

4.2 Impacts and Risks

4.2.1 EIS Identified Impacts

Operation of the Facility has the potential to generate pollutants that could impact on the surrounding stormwater drainage network of the Facility.

Key pollutants of concern include:

- Coarse sediment
- Suspended soils
- Gross pollutants.
- Hydrocarbons
- Heavy metals
- Nutrients.

4.2.2 Estimated stormwater runoff yields and pollutant load

MUSIC modelling was undertaken to assess stormwater runoff yields and pollutant load removal rates of the stormwater management system. The model accounted for the implementation of the stormwater management system discussed in Section 4.2.4 and it predicted that mean annual runoff volume for the Facility will be 7.6 ML/yr.

The rainwater tank will reduce mean annual runoff volumes by approximately 1.1 ML/year. In addition, the rainwater tank will reduce potable water demand by harvesting runoff from approximately half of the roof area. This rainwater harvesting system will provide approximately 15 % of the Coolfog dust control system (fogging system and yard sprinklers) water demand requirements. Calculations suggest that potable water use may rise from approximately 3.5 ML/year to 9.1 ML/year as a result of the Coolfog system.

The fogging system is designed to produce a fine mist which will not produce runoff. In addition, the yard sprinklers will only be used for dust suppression purposes to make the ground damp but not wet enough to produce surface water runoff and thus will not contribute to predicted runoff volumes.

The predicted performance of the stormwater management system in terms of pollutant removal rates is outlined in Table 4-1.

Table 4-1: Pollutant Load Modelling Results

Parameter	Existing Stormwater Management (%)	Landcom WSUD Targets (%)	Predicted Pollutant Removal Rate (%)
Total Suspended Solids (kg/yr)	76	85	89
Total Phosphorous (kg/yr)	29	65	73
Total Nitrogen (kg/yr)	0	45	59
Gross Pollutants (kg/yr)	5		99

4.2.3 Potential Operational Impacts

Runoff generated from external operational areas, including dust suppression activities, and from where covered waste is transported and stored has the potential to convey pollutants to the stormwater drainage system. Additionally, the following operational activities have the potential to impact on the stormwater network:

- Minor oil, solvent or chemical spills or leaks
- Seepage of leachate from waste processing activities
- Tracking of mud or soil from trucks entering and exiting the Facility.

4.2.4 Operational Site Conditions

All operations will be conducted on sealed surfaces, with all ground areas covered in concrete which is in good condition. All waste will be stored and processed in the processing building or in covered bins and all processing activities will take place in a covered environment. These locations are drained by sumps for leachate collection and are not connected to the stormwater drainage system.

The Facility includes several stormwater infrastructure components used to manage stormwater at the Facility including:

- A rainwater tank and associated drainage to collect runoff from approximately half of the roofed area of the Facility
- A truck wheel wash area is installed immediately after the exit weighbridge, and includes a rumble grid and hose reel.
- Leachate sump located in the site shed to capture any seepage of leachate from the tip floor.

- Bunds to surround product bays under the shed awnings to prevent stormwater runoff from entering into the material storage area under the awning and prevent leachate from coming into contact with stormwater
- Ecosols litter baskets with 200 µm filter bags fitted onto drainage pits which will capture pollutants and minimise hydraulic impacts.
- Humes Jellyfish GPT system that will serve a primary function of trapping sediment and free oils, and will also serve a secondary function of trapping floating gross pollutants and particulate bound nutrients
- Rocla water level controller with a raised turret for use when capturing fire-fighting water runoff
- Watertight pit lid installed on the stormwater pit found downstream of Humes Jellyfish GPT system.

The combination of the litter baskets, rainwater tank and the Humes Jellyfish GPT system will:

- Improve the quality of stormwater being discharged from the site;
- Provide adequate treatment for reducing the key pollutants (i.e. gross pollutants, coarse sediment, suspended solids and free oils)
- Provide sufficient treatment of other pollutants such as heavy metals and nutrients.

A drawing of the stormwater site layout is provided in **Appendix A**.

4.3 Management Measures

This section describes the overall approach to managing and mitigating risks to water quality during operation of the Facility.

Management measures are summarised in Table 4-2. These measures are based on best practice and compliance matrices detailed in Section 3.2, as well as Bingo's (Facility Delivery Company) requirements and standards. In addition **Appendix B**, provides details of a maintenance schedule that will be implemented to maintain stormwater infrastructure at the Facility.

Table 4-2: Management Measures

ID	Management Measure	Timing	Responsibility	Reference
WA-01	Training for all works, contractors and subcontractors in relation to spill response, chemical storage, fuel deliveries and disposal of fluids	Prior to operation and ongoing	Site Supervisor	Standard practice
WA-02	Adequate quantities of emergency response materials such as oil spill kits, absorbent materials, sandbags will be readily available	Prior to operation and ongoing	Site Supervisor	Standard practice
WA-03	All on-site fixed and mobile diesel-powered plant and equipment (excluding road vehicles) will be maintained in accordance with the manufacturers' specifications	Prior to operation and ongoing	Site Supervisor	Standard practice Statement of Commitments
WA-04	Diesel leaks and spills, oil leaks and spills and other spills will be managed in accordance with the emergency spill response procedure	Prior to operation and ongoing	Environmental Manager NSW Site Supervisor	Standard Practice
WA-05	Waste storage bays are to be covered and banded.	Prior to operation and ongoing	Site Supervisor	Standard practice Statement of Commitments
WA-06	A rainwater tank shall be installed and connected to the fogging system prior to the release of an occupation certificate issued under Section 109C of the EP&A Act to reduce demand on potable water the proposed	Prior to operation and ongoing	Site Supervisor	Standard practice Statement of Commitments
WA-07	Control measure including: <ul style="list-style-type: none"> • Jellyfish filter treatment device; • Litter baskets in all grated inlet pits external to the buildings; • Rainwater tank; • Sweeping of internal and external hardstand areas; • Cleaning and removal of leachate from blind sumps; and • Fogging system; 	Prior to operation and ongoing	Site Supervisor	Standard practice Statement of Commitments
WA-08	A general vehicle speed limit of 5 km/hr will be imposed across all areas of the site	Prior to operation and ongoing	Site Supervisor	Standard practice Statement of Commitments
WA-09	A truck wheel wash is installed immediately after the exit weighbridge to minimise transport of excess sediment off-site	Prior to operation and ongoing	Site Supervisor	Air Quality Management Plan Statement of Commitments

ID	Management Measure	Timing	Responsibility	Reference
WA-10	A dedicated street sweeper is available on site at all times to clean paved roadways, hardstand areas and driveways. In the event that the street sweeper is not available (e.g. due to maintenance), a street sweeper would be contracted to perform the required tasks.	Prior to operation and ongoing	Site Supervisor	Air Quality Management Plan Statement of Commitments
WA-11	All processing and storage of wastes will be within an enclosed environment	Prior to operation and ongoing	Site Supervisor	Air Quality Management Plan Statement of Commitments

5 WATER CYCLE MANAGEMENT PLAN

5.1 Water Use and Discharges

5.1.1 Rainwater Harvesting

Runoff from approximately half of the roof area will be piped through to the rainwater tank, which will retain this runoff for use within the proposed dust control system (fogging system and yard sprinklers) following filtration and treatment. This will provide approximately 15% of the water required for the dust control system

5.1.2 Potable Water Use

Potable water is currently used to supply internal amenity water (i.e. office and ablution facilities) and externally for dust suppression (ie fogging system and yard sprinklers). The installation of the rainwater tank will reduce potable water demand.

It is estimated that approximately 3,400 KL² of water is used annually, of which 700 KL/year of water is currently used externally (i.e. does not discharge to public sewer).

5.1.3 Wastewater Discharge

Wastewater from site amenities is currently discharged to the public sewer network. It is estimated that 2,700 KL² of wastewater is discharged annually.

5.1.4 Surface Water Runoff

MUSIC modelling (SLR, 2016) predicted that the mean annual runoff volume generated for the Facility will be 7.6 ML/annum. The rainwater tank is expected to reduce mean annual runoff volumes by approximately 1.1 ML/annum.

The Coolfog fogging system is designed to produce a fine mist which is not predicted to produce runoff. In addition, the yard sprinklers will only be used for dust suppression purposes to make the ground damp but not wet enough to produce surface water runoff.

Stormwater will be piped through a propriety stormwater treatment device (Humes Jellyfish GPT system). The vortex separator removal of sediment, hydrocarbon (free oil) and sediment bound heavy metals. The highly impervious nature of the site, lack of vegetation present and processing of waste within the existing shed is likely to result in limited generation of nutrients or oxygen demanding materials.

5.1.5 Leachate Management

Waste materials are tipped, processed and stored inside the building to minimise leachate generation. The building slab designed to prevent any leachate from running onto external hardstand areas and entering the external stormwater management system.

Leachate generated on the tip floor is diverted to a collection sump installed within the building to the south of the tip floor area. The leachate collection sump will be regularly emptied by vacuum truck and transported to the appropriately licensed waste management facility for further treatment.

5.1.6 Spill Management

Bingo operates under an Emergency Pollution Incident Response Management Plan (EPIRMP), in the event there is a major incident, emergency or crisis, which could lead to public health, safety or environmental issues. The EPIRMP has been developed as required under the EPL 20622 and is located on the Bingo's site-specific website. The primary objective of the EPIRMP is to minimise and control the risk of a pollution

² Based on period October 2014 and April 2015 data

incident at the Facility, and to allow comprehensive and timely communication about a pollution incident to staff at the premises, the EPA, other relevant government agencies and community members who may be affected by the impacts of the pollution incident.

5.1.7 Wheel Wash

A truck wheel wash is installed immediately after the exit weighbridges, and includes a rumble grid and wash down hose reel. Following exit from the wheel wash, all vehicles will be inspected for any residual mud and soil on tyres, wheel arches and on the gunnels of trailers and, where required, the hand-held hoses will be used to remove any remaining material. Should any material be tracked onto the public road, site staff will be deployed to sweep and remove this material promptly.

5.2 Water Infrastructure Maintenance Program

The Facility stormwater infrastructure maintenance requirements are outlined below in Table 5-2. Maintenance of these stormwater infrastructure is vitally important for the ongoing drainage and treatment of stormwater.

Stormwater infrastructure assets require both proactive and reactive maintenance to safeguard the long-term health and performance of the system. Proactive maintenance refers to regular scheduled maintenance tasks, whereas reactive maintenance is required to address unscheduled maintenance issues. If the asset is not functioning as intended, then rectification may be required to restore the asset back to its intended functionality. Proactive maintenance will be the preferred and recommended approach applied at the Facility.

In addition to the maintenance requirements outlined in Table 5-2, all stormwater infrastructure should be maintained in line with the requirements and recommendations of designers and manufacturers.

5.3 Operational Contingency Measures

Operations at the Facility have the potential to be disrupted by various internal and external factors. Some disruptions may be planned, such as scheduled maintenance work, while other disruptions may occur without notice.

An Operational Contingency Plan will be implemented in the event of an operational disruption. The Facility Site Supervisor will be informed of any such event and will provide further direction in accordance with the plan. The Site Supervisor will monitor water infrastructure conditions in accordance with the maintenance requirements outlined in Table 5-2.

Potential sources of disruption to the operation of water infrastructure and contingency measures are outlined in Table 5-1.

Table 5-1: Operational Contingencies Plan

External Factor	Potential Impact	Contingency Measures
Breakdown of the the Humes Jellyfish GPT	A risk of contaminated water discharge to stormwater system	<ul style="list-style-type: none"> Maintenance staff to provide on-site breakdown maintenance service Pump contaminated water using sucker truck until GTP system is operational If any discharge to stormwater system is detected the EPIRMP to be activated
Material tracked onto the public road	A risk of contaminated water discharge to stormwater system	<ul style="list-style-type: none"> Site staff will be deployed to sweep and remove this material promptly

Table 5-2: Maintenance Requirements

Infrastructure	Inspection and Maintenance Action	Timing	Responsibility	Reference
Pit and Pipe Stormwater Drainage Network	<ul style="list-style-type: none"> Inspect all drainage structures noting any sediment deposition, blockages or dilapidation in structures and carry out required repairs 	Six monthly	Site Supervisor	Statement of Commitments
Jellyfish Filter	<ul style="list-style-type: none"> Removal and rinsing of cartridges, wash down of deck level, removal of large floatable pollutants, removal of accumulated sediment (if required) Refer to the manufacturers Operation and Maintenance (O&M) Manual 	Six monthly Refer to O&M Manual	Site Supervisor	Statement of Commitments
Rocla Water Level Controller	<ul style="list-style-type: none"> Refer to the manufacturers O&M Manual 	Refer to O&M Manual	Site Supervisor	Statement of Commitments
Litter Baskets	<ul style="list-style-type: none"> Inspect for excessive litter, plant material and sediment Removal of litter and sediment manually or via a vacuum truck as required and prior to baskets reaching full capacity and disposed at an appropriate facility 	Monthly and following heavy rainfall events	Site Supervisor	Statement of Commitments
	<ul style="list-style-type: none"> Refer to the manufacturers O&M manual 	Refer to O&M Manual	Site Supervisor	
Rainwater Tank	<ul style="list-style-type: none"> General inspection of the rainwater tank and associated infrastructure (including roof, access cover and pipework) Check the structural integrity of tank noting any dilapidation in structure and carry out repairs 	As required	Site Supervisor	Statement of Commitments Soil and Water Impact Assessment
	<ul style="list-style-type: none"> Internal inspection for evidence of access by animals, birds, insects including the presence of algal growth and mosquito larvae 	Six monthly	Site Supervisor	Statement of Commitments Soil and Water Impact Assessment
	<ul style="list-style-type: none"> Check for any clogging and blockage of the tank inlets and leaf filters Remove leaves and debris from the tank inlet and leaf filters 	As required	Site Supervisor	Soil and Water Impact Assessment
	<ul style="list-style-type: none"> Check the level of sediment within the tank Sediment and debris to be removed from rainwater tank floor if sediment level is greater than the maximum allowable depth as specified by the manufacturer's specifications 	Every two years	Site Supervisor	Soil and Water Impact Assessment

Infrastructure	Inspection and Maintenance Action	Timing	Responsibility	Reference
Gutters and Downpipes	<ul style="list-style-type: none"> Inspect for excessive litter, plant material and debris Remove litter, plant material and debris 	As required	Site Supervisor	Statement of Commitments Soil and Water Impact Assessment
Internal and External Hardstand Areas	<ul style="list-style-type: none"> Inspect hardstand areas for plant material, sediment deposition and gross pollutants Sweeping of hardstand areas to remove plant material and any other debris found 	As required	Site Supervisor	Statement of Commitments Soil and Water Impact Assessment
Leachate Sump and Alarm System	<ul style="list-style-type: none"> Inspect for excessive leachate and debris Remove leachate and debris 	As required	Site Supervisor	Statement of Commitments Soil and Water Impact Assessment
Fogging System	Refer to the manufacturers O&M manual	Refer to O&M Manual	Site Supervisor	Statement of Commitments Soil and Water Impact Assessment

6 INSPECTION AND MONITORING PROGRAM

The stormwater infrastructure system will require regular inspection and maintenance. These inspections will monitor the condition of the Facility stormwater infrastructure and practices on site to ensure the identified surface water risks are being adequately mitigated.

Routine inspections will be carried out to assess the need for maintenance and will be primarily concerned with checking the functionality of the stormwater drainage facilities; items such as drains, drainage pits, rainwater tank system, Jellyfish filter, Rocla water level controller and sumps. In addition, the safety measures incorporated into the design of the stormwater infrastructure e.g. step ladders and hazard signage will be inspected.

A summary of required routine inspections is provided below. Should the monitoring of the Facility identify the need for additional investigation, repair to Facility infrastructure, inadequate Facility management or maintenance these issues will be proactively identified and addressed.

6.1 Weekly Monitoring and Inspections

- Collect accumulated surface sediment or litter from the whole of the site. Dispose to garbage.
- Inspect surface inlet grates and grated drains and remove accumulated litter and dispose to garbage debris and silt and dispose to garbage.
- Removal of debris from pit grates.

6.2 Wet Weather Monitoring and Inspections

Following a rainfall event greater than 25mm in depth within a 24-hour period:

- Inspect rainwater tank filters and inlet pipes. Remove accumulated litter and debris and dispose to garbage.
- Remove accumulated litter and debris. Removal of leaf litter and vegetation build up.
- Ensure rainwater tanks are drawing down.

6.3 Site Monthly Monitoring and Inspections

- Inspect and clean gutters of all buildings. Dispose of debris to garbage.
- Inspect rainwater tanks internally and externally for leaks and damage. Remove accumulated litter and debris and dispose to garbage.
- Inspect Jellyfish Filter, Rocla water level controller and sumps across the site.
- Inspect all stormwater pits and grates and repair any damage. Remove accumulated litter and debris and dispose to garbage.
- Remove accumulated oils/grease and dispose to accredited disposal site.
- Remove accumulated sediment and dispose to accredited disposal site.

7 REVIEW

7.1 Environmental Auditing

Environmental audits will be undertaken in accordance with the SEQ management system, the Conditions of Consent and OEMP requirements.

Detailed audit requirements used to evaluate environmental performance and the compliance status of the Facility operation is outlined in Section 6.3 of the OEMP.

Auditing applicable to the OWMP is summarised in Table 7-1.

Table 7-1: Environmental Auditing and Reporting Requirements

Requirement	Area/Location	Responsibility	Frequency
Independent Environmental Audit (Condition C12)	OWMP	External Independent Auditor (endorsed by DPIE)	Within 12 months of commencement of operation and every three years thereafter

7.2 Reporting

Reporting requirements for monitoring, auditing and as required in the Conditions of Consent will be undertaken in accordance with the overarching OEMP. Reporting requirements applicable to this OWaterMP is summarised in Table 7-2.

Table 7-2: Environmental Reporting Requirements

Requirement	Area/Location	Responsibility	Frequency
Incident reporting to EPA	Site	Environmental Manager NSW	Upon identification of an incident resulting in environmental harm

7.3 Review and Improvement

Review and improvement of this plan will be undertaken in accordance with the Conditions of Consent and Section 6.5 of the OEMP. Continuous improvement will be achieved by the ongoing evaluation of environmental management performance and effectiveness of this plan against environmental policies, objectives and targets.

The updated plan and a summary of changes will be available on site and distributed to all relevant stakeholders in accordance with SEQ Management System document control procedure.

7.4 Incidents

In the event of a safety / environmental incident or unpredicted impacts relating to waste and resource recovery operations, it is the responsibility of all personnel to report the incident or event to the Site Supervisor.

All environmental incidents are to be reported and managed in accordance with Bingo's Incident Reporting and Management Procedure (SOP-COM003). Incidents are classified based on the incident's severity as shown in Section 4.6 of the OEMP.

All incidents will be managed and reported according to Section 4.6 of the OEMP.

7.5 Complaints

Complaints may be received directly from stakeholders, or indirectly via the dedicated phone number, website. Complaints handling will be undertaken in accordance with Section 4.5 of the OEMP.

7.6 Non-Compliance, Non-Conformances and Corrective Actions

Non-compliance may be identified via internal and external audits, site monitoring, inspections and observations, environmental incidents and emergencies, complaints and management reviews.

Non-compliance, non-conformances and resulting corrective actions are to be managed in accordance with Section 6.4 of the OEMP.

8 RELEVANT DOCUMENTATION

The following are the key operating procedures and checklists relevant to the Facility Operation:

Document name
Training Needs Register
<i>Incident Reporting Investigation and Review Procedure (SOP-COM003)</i>
<i>SEQMS Monitoring and Measurement (SOP-COM008)</i>
<i>Document Control and Records Management (SOP-COM016)</i>
Reject Load Register
Complaints Register (BINWATCH / SEQ Management System Portal)
Records Management Register
Training Needs Register
Monitoring records where relevant
EPIRMP_v00_1_Generic
EPRIMP_4_Site Specific Details_Mortdale
<i>Storage of Hazardous Chemicals – Waste (OPL-YA029)</i>
<i>Storage of Hazardous Chemicals – Special Waste (OPL-YA030)</i>
<i>Asbestos at Recycling Centres (SOP-YA003)</i>
<i>Visual Inspection of inbound Waste (SOP-YA017)</i>
<i>Rejecting Loads of No Complying Waste/Prohibited Materials (SOP-YA018)</i>
<i>Reject Load Certificate Form (SF055)</i>
<i>Notification of Non-complying Waste and Reload/Rejected Load Form (SF106)</i>
<i>Transport and Disposal of Trackable / Reportable Waste (SOP-COM021)</i>
<i>Storing Dangerous Goods (OPL-COM013)</i>

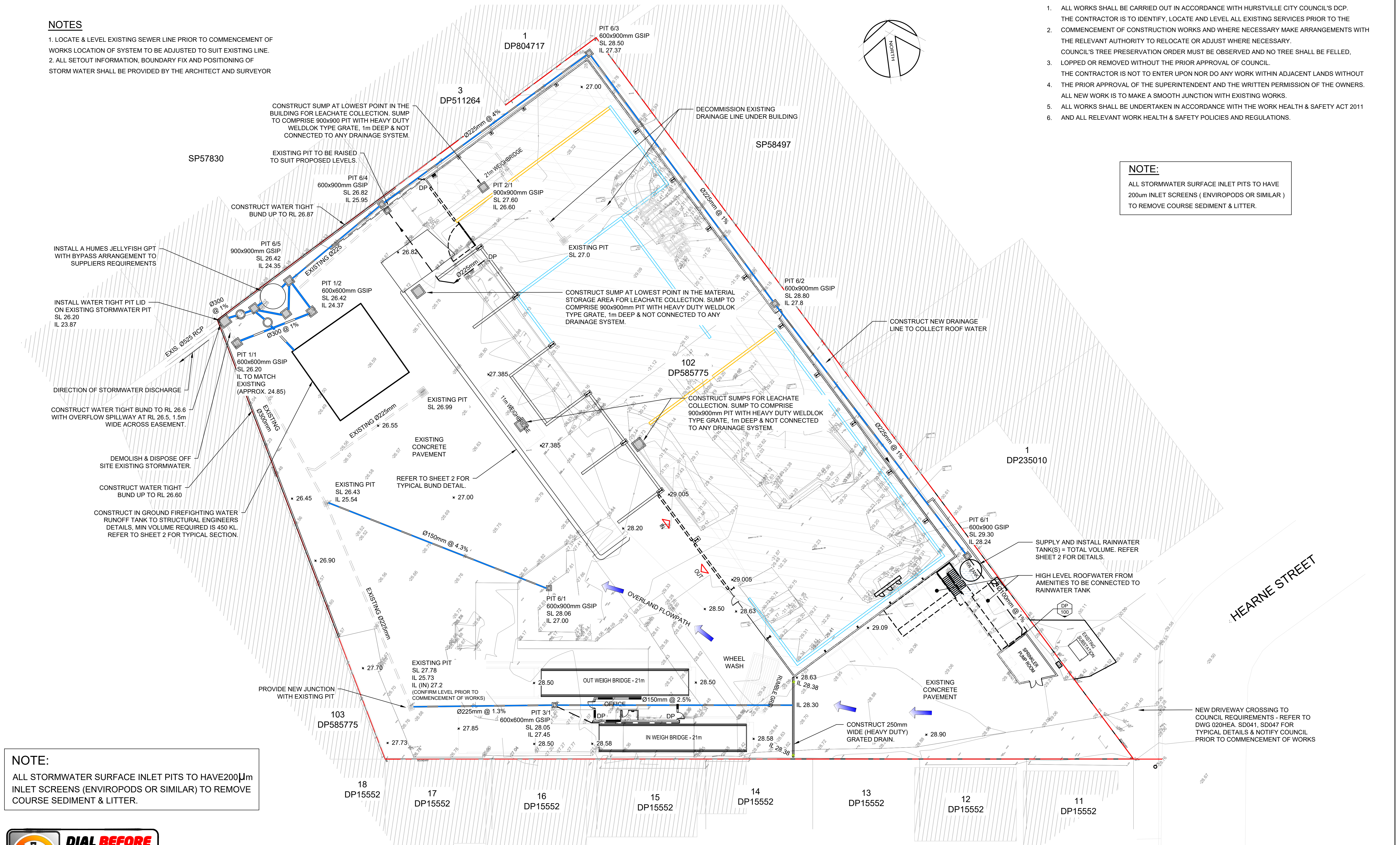
8.1 References

- Bewsher Consulting, 2004: Georges River Floodplain Risk Management Study and Plan, Volume 1 – Main Report, Final Report, May 2004
- SMEC, 2015: Draft Report Hurstville LGA Overland Flow Flood Study, The SMEC Group and Catchment Simulation Solutions, February 2015
- SLR, 2016: Soil and Water Assessment, 5 May 2016 Report Number 610.14692-R4-V2.0
- SLR 2017: Mortdale Resource Recovery Facility Response to DPE Comments Regarding Water Quality, SLR, 9 November 2017.

APPENDIX A **STORMWATER SITE LAYOUT**

NOTES


1. LOCATE & LEVEL EXISTING SEWER LINE PRIOR TO COMMENCEMENT OF WORKS LOCATION OF SYSTEM TO BE ADJUSTED TO SUIT EXISTING LINE.
2. ALL SETOUT INFORMATION, BOUNDARY FIX AND POSITIONING OF STORM WATER SHALL BE PROVIDED BY THE ARCHITECT AND SURVEYOR



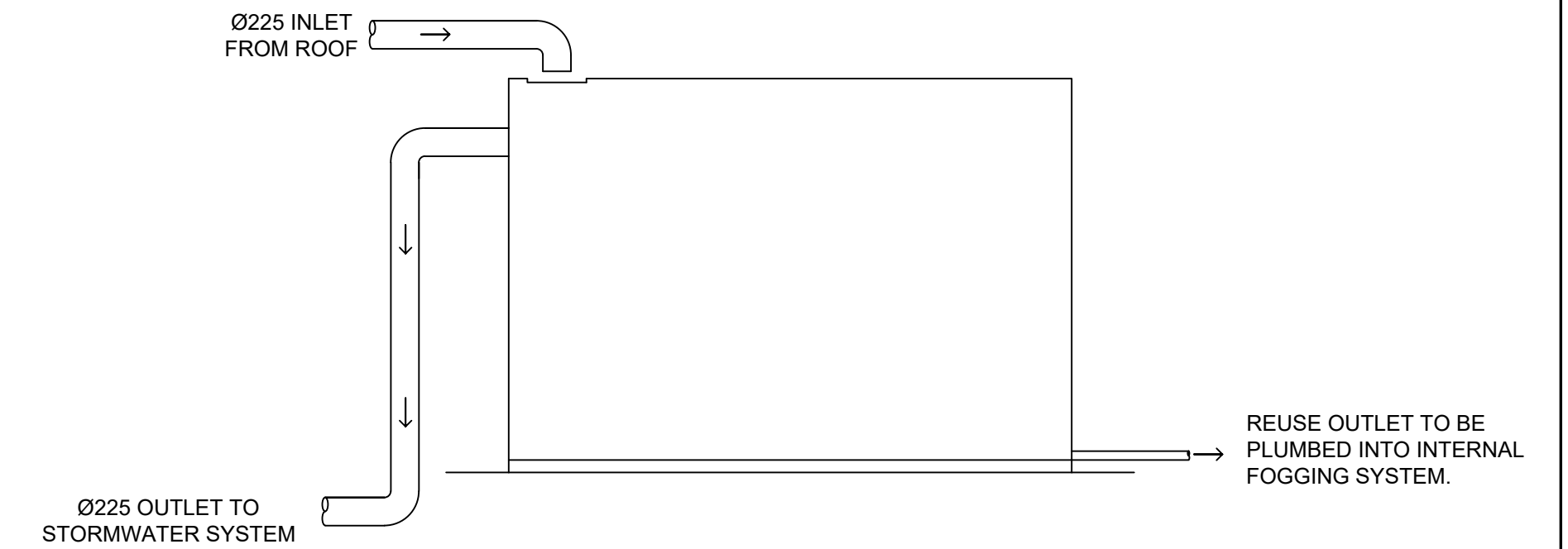
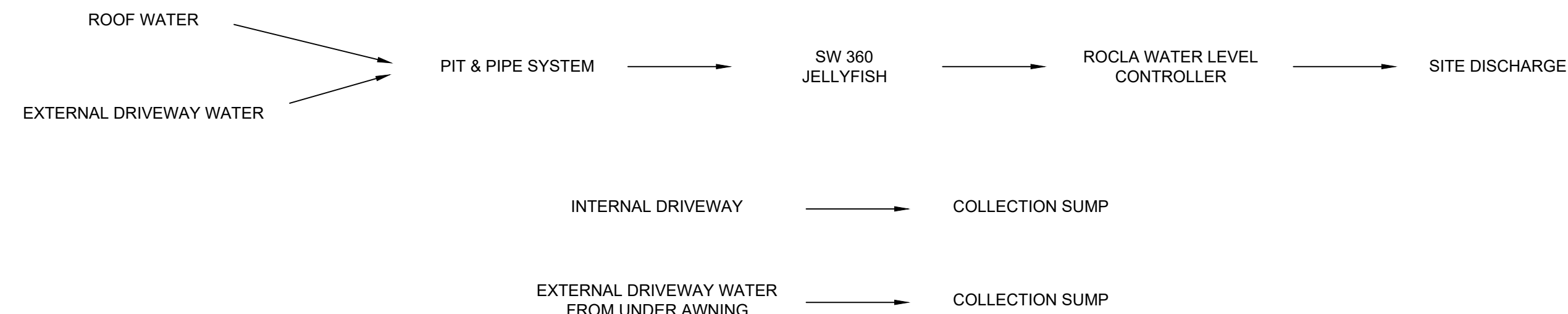
NOTE:

ALL STORMWATER SURFACE INLET PITS TO HAVE 200µm INLET SCREENS (ENVIROPODS OR SIMILAR) TO REMOVE COURSE SEDIMENT & LITTER.



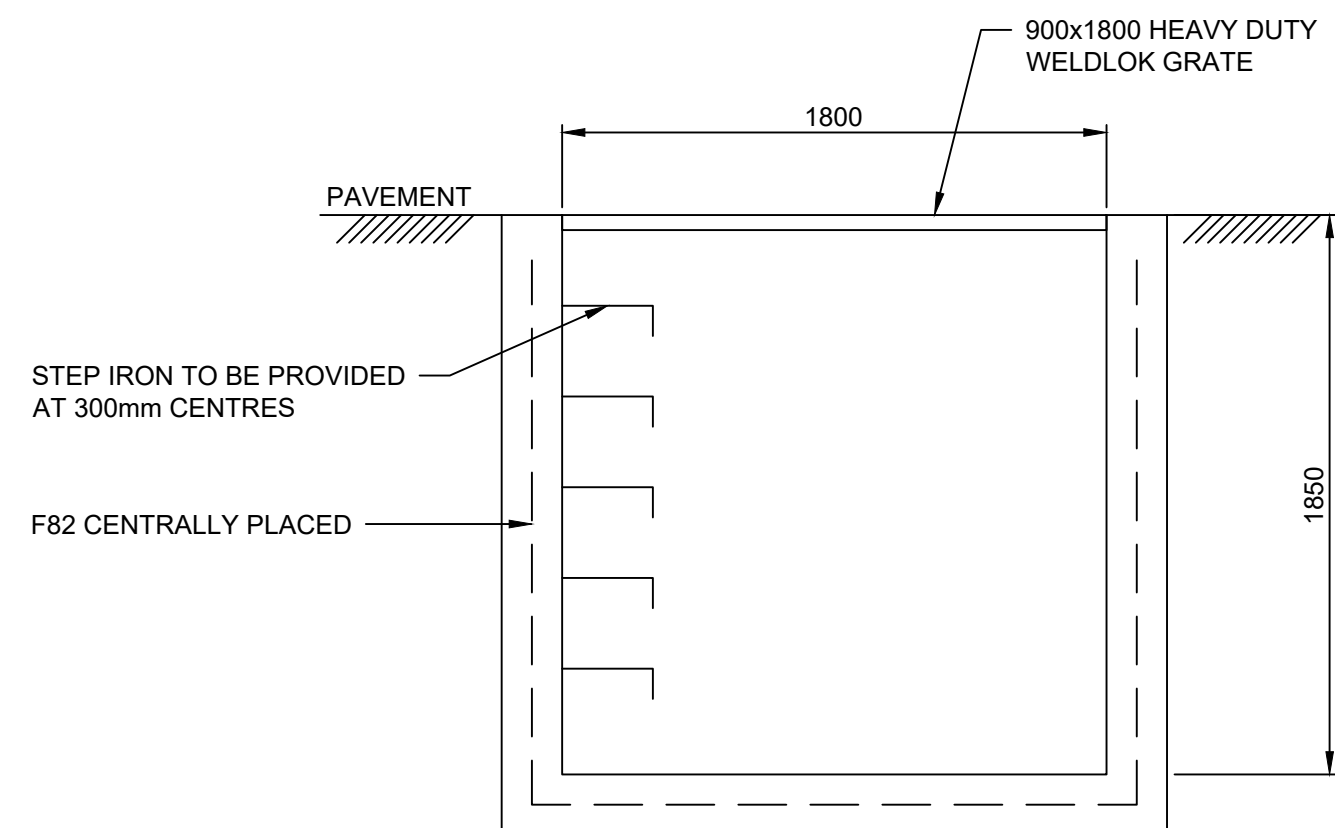
J	10/07/18	ESCP AMENDED	 <div>Barker Ryan Stewart</div> <div>Sydney Central Coast P: 02 9659 0005 P: 02 4325 5255 Hunter P: 02 4966 8388</div> <div>ABN: 26 134 067 842 barkerryanstewart.com.au mail@barkerryanstewart.com.au</div> <div>© BARKER RYAN STEWART PTY LTD</div>	Client: BINGO GROUP	STORMWATER DESIGN SERVICES 20 HEARNE STREET, MORTDALE	STORMWATER PLAN	Designed: GJ	Scales: Plan 1:250	Plan No.
K	11/09/18	PUMP ROOM ADDED					Drawn: CM	Horiz.	SY16043C101
L	11/10/18	PITS 6/1 6/2 & 6/3 LOWERED					Checked: GJ	Vert.	
M	12/09/19	ARCHITECTURAL PLANS AMENDED						X-Section.	
N	26/09/19	SUMP PITS							File Ref. REV. SY16043C_N.dwg SHEET 1 OF 6 SHEETS
No	DATE	AMENDMENT					Datum: A.H.D.		N

STORM WATER MANAGEMENT SYSTEM

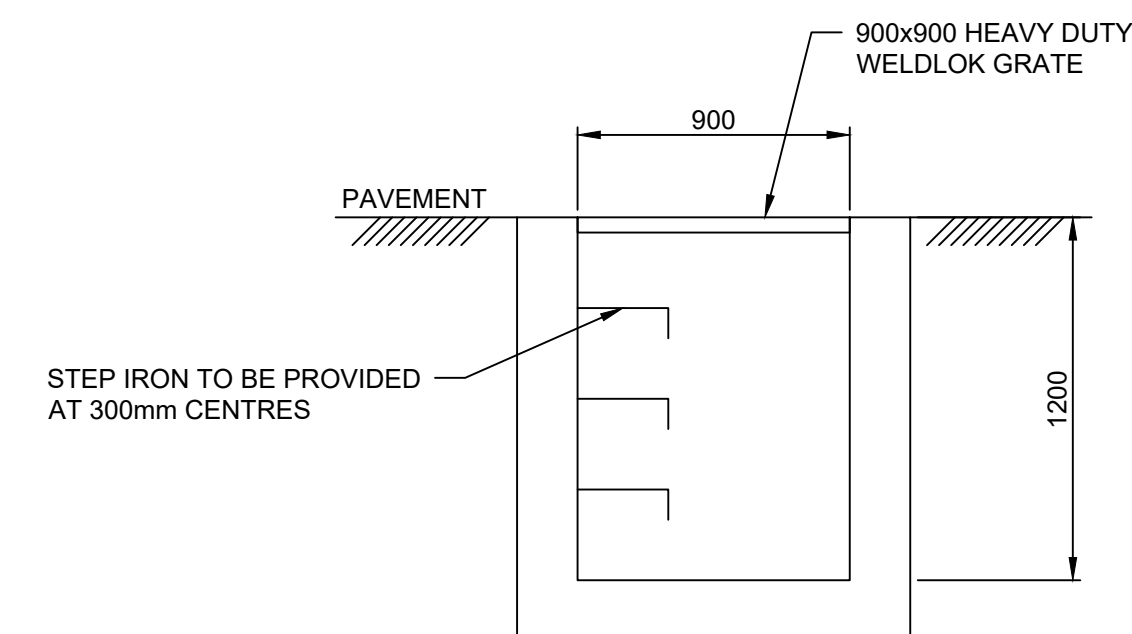


RAINWATER TANK SYSTEM

SCALE 1:50



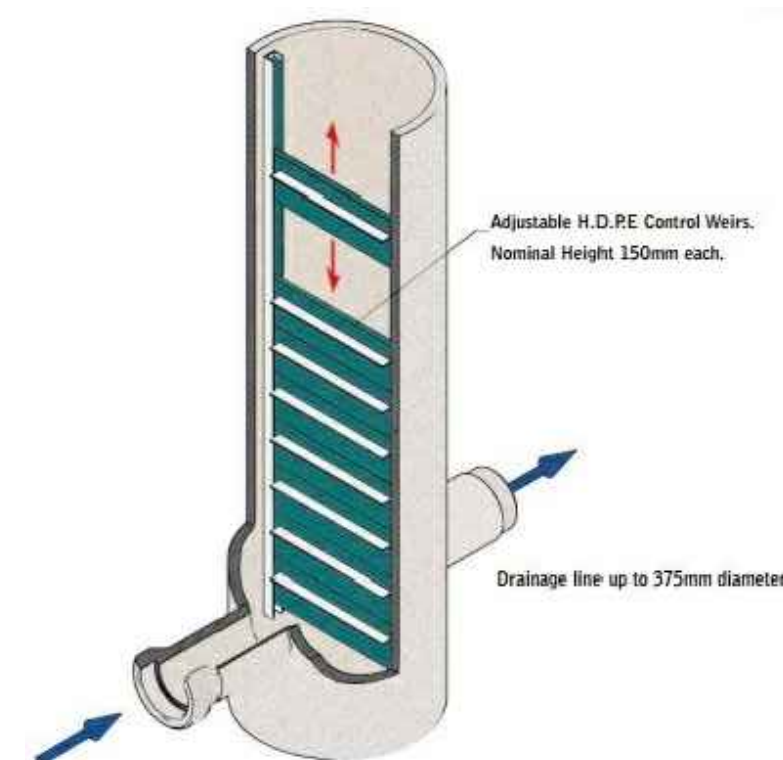
MATERIAL STORAGE LEACHATE COLLECTION
SUMP DETAIL UNDER BUILDING
SCALE 1:25



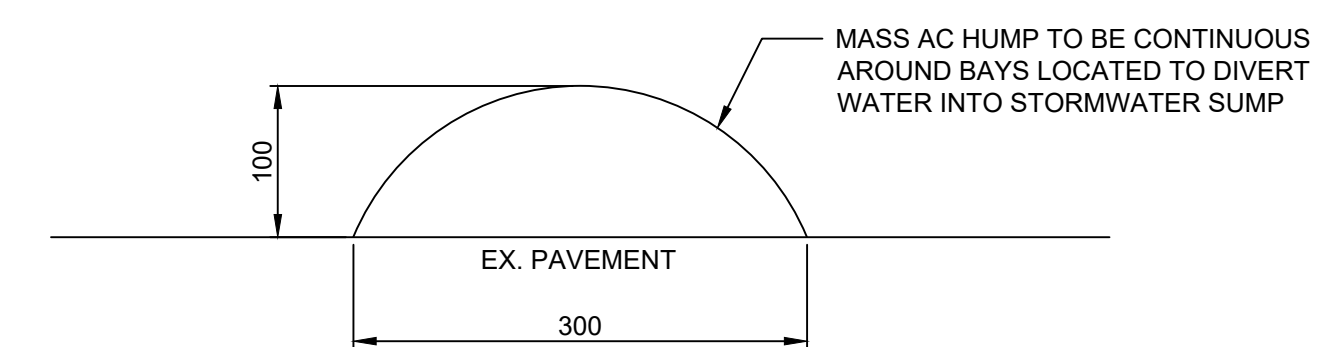
BUILDING LEACHATE COLLECTION
SUMP DETAIL WITHIN BUILDING
SCALE 1:25



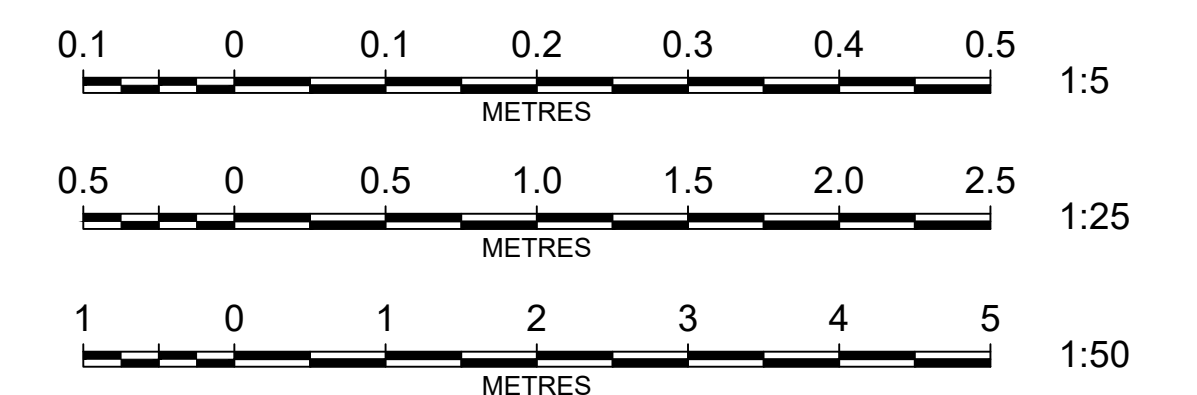
HUMES
JELLYFISH DETAIL
NOT TO SCALE




ROCLA WATER LEVEL
CONTROLLER DETAIL
NOT TO SCALE



TYPICAL BUND DETAIL
SCALE 1:5



J	10/07/18	ESCP AMENDED
K	11/09/18	PUMP ROOM ADDED
L	11/10/18	PITS 6/1 6/2 & 6/3 LOWERED
M	12/09/19	ARCHITECTURAL PLANS AMENDED
N	26/09/19	SUMP PITS
No	DATE	AMENDMENT



Sydney

P: 02 9659 0005

Hunter

P: 02 4966 8388

Central Coast

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Client:

BINGO GROUP

STORMWATER DESIGN SERVICES

20 HEARNE STREET, MORTDALE

DETAIL SHEET

Designed: GJ

Drawn: CM

Checked: GJ

Scales: Plan 1:5, 1:25, 1:50

Horiz.

Vert.

X-Sect.

Datum: A.H.D.

Plan No.

SY16043C102

File Ref.

SY16043C_N.dwg

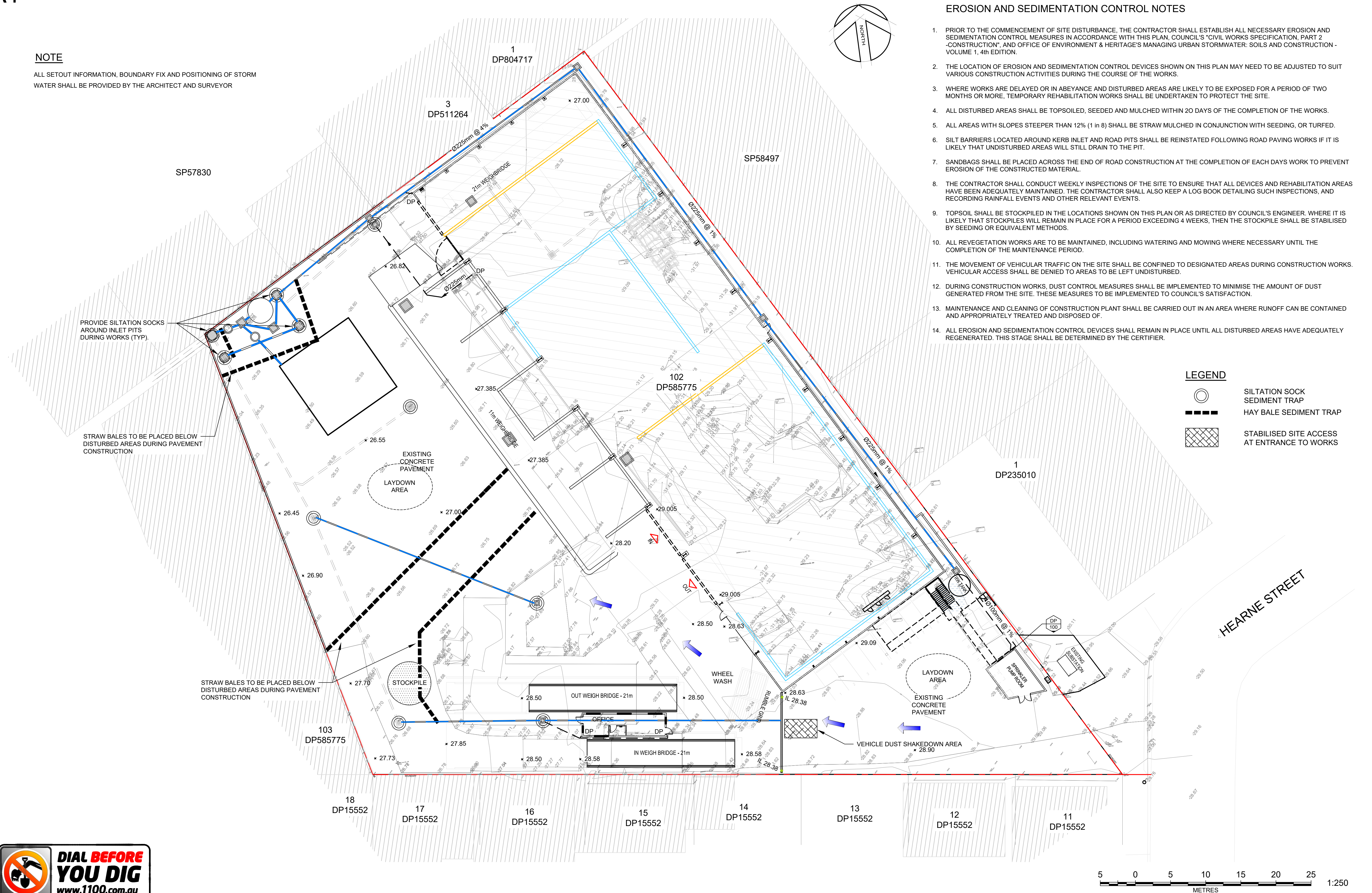
REV.

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SHEET 2 OF 6 SHEETS

NOTE

ALL SETOUT INFORMATION, BOUNDARY FIX AND POSITIONING OF STORM
WATER SHALL BE PROVIDED BY THE ARCHITECT AND SURVEYOR



J	10/07/18	ESCP AMENDED
K	11/09/18	PUMP ROOM ADDED
L	11/10/18	PITS 6/1 6/2 & 6/3 LOWERED
M	12/09/19	ARCHITECTURAL PLANS AMENDED
N	26/09/19	SUMP PITS
No	DATE	AMENDMENT



Sydney P: 02 9659 0005
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Client:

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STORMWATER DESIGN SERVICES
20 HEARNE STREET, MORTDALE

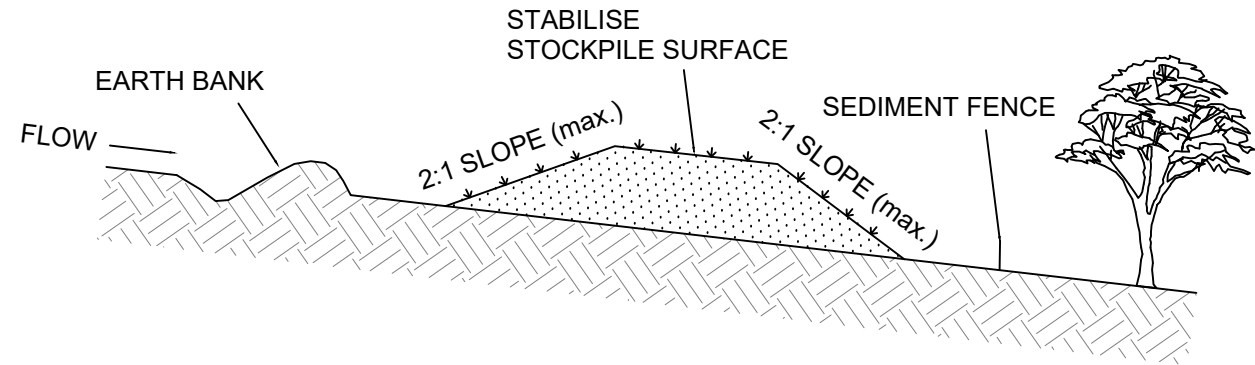
EROSION & SEDIMENT CONTROL PLAN

Designed: GJ Scales: Plan 1:250
Drawn: CM Horiz.
Checked: GJ Vert.
X-Sept.

Datum: A.H.D.

Plan No.
SY16043C103

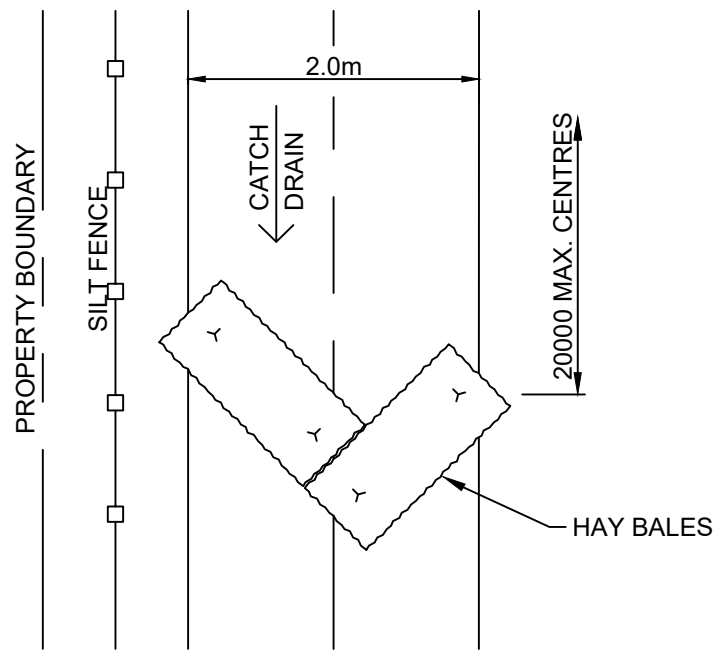
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SY16043C_N.dwg
SHEET 3 OF 6 SHEETS **N**



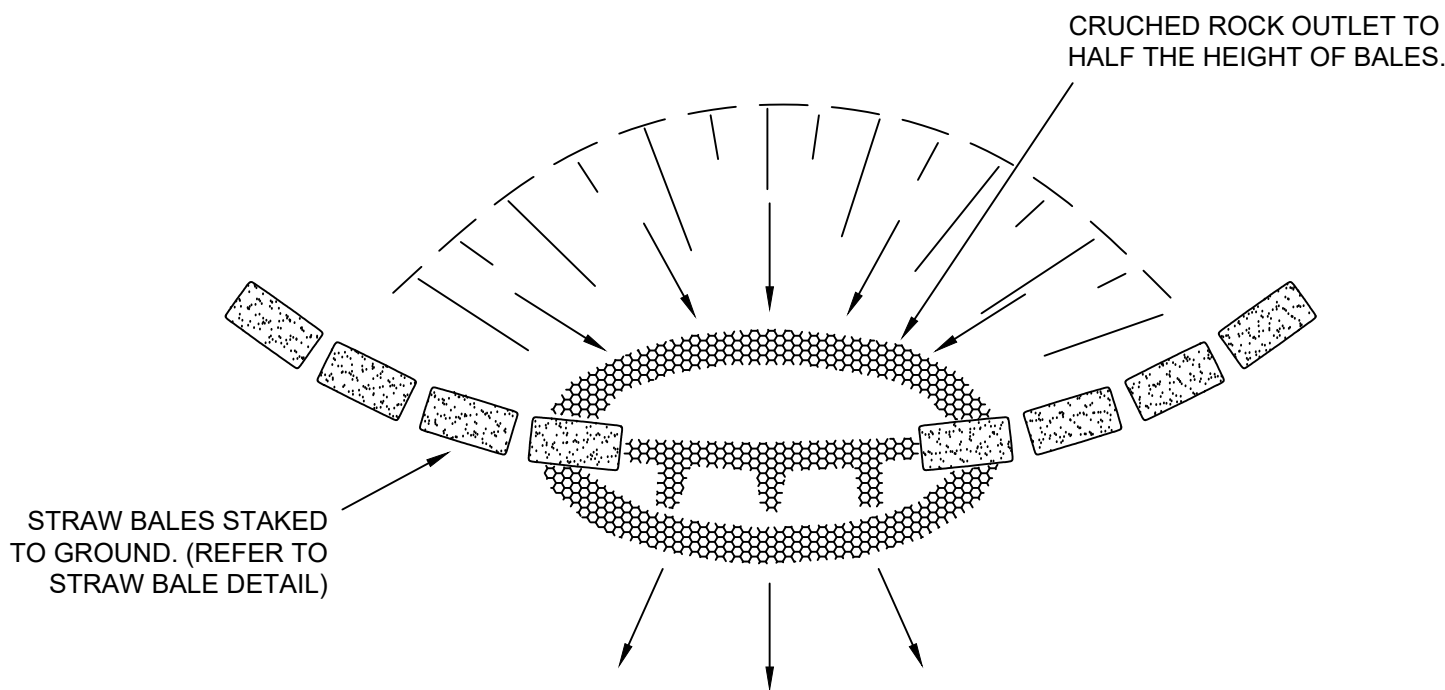
CONSTRUCTION NOTES

1. WHERE POSSIBLE LOCATE STOCKPILE AT LEAST 5 METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOWS, ROADS, HAZARD AREAS AND MIN. 1.5m AWAY FROM EMBANKMENTS.
2. CONSTRUCT ON THE CONTOUR AS A LOW, FLAT ELONGATED MOUND.
3. WHERE THERE IS SUFFICIENT AREA TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. REHABILITATE IN ACCORDANCE WITH THE SWMP/ESCP.
5. CONSTRUCT EARTH BANK (STANDARD DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT RUN OFF AROUND THE STOCKPILE AND A SEDIMENT FENCE (STANDARD DRAWING 6-8) 1 TO 2 METRES DOWNSLOPE OF STOCKPILE.

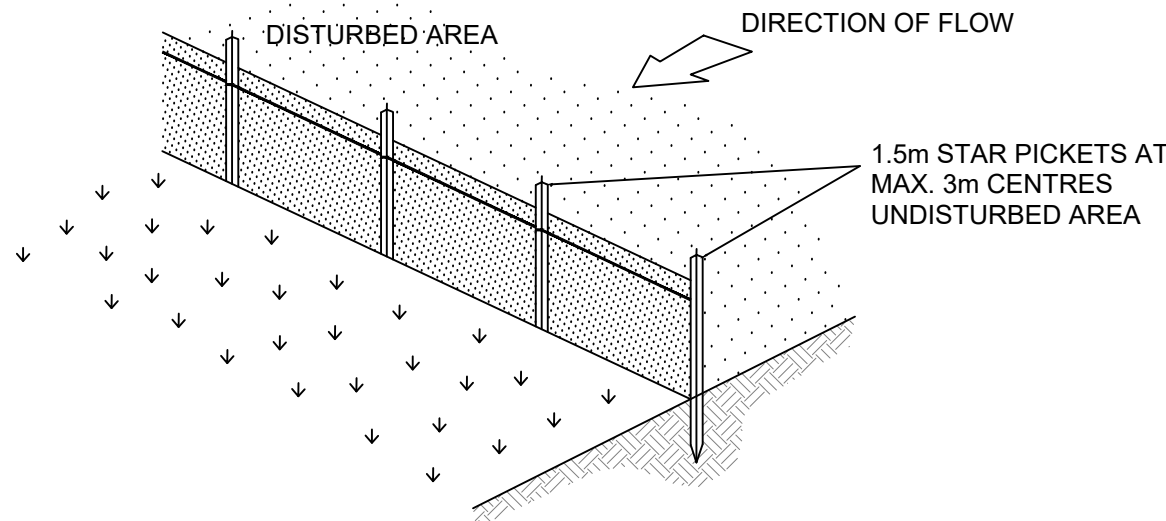
TOPSOIL STOCKPILE



CATCH DRAIN DETAIL



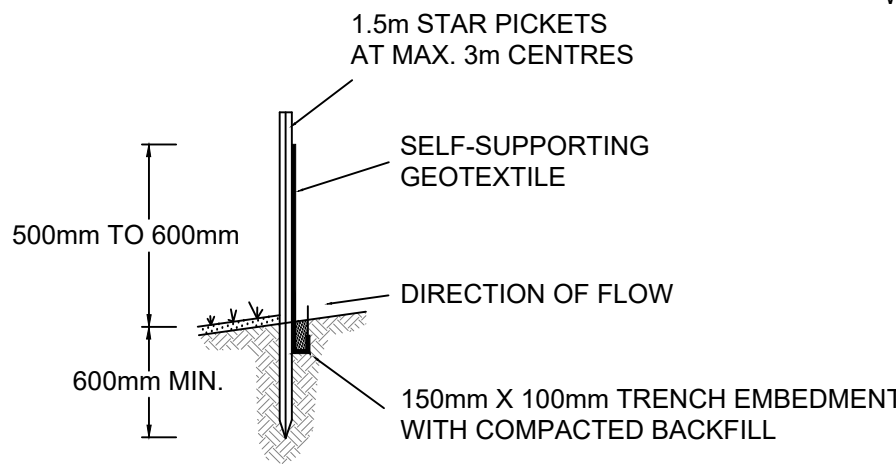
STRAW BALE & CRUSHED ROCK SEDIMENT FILTER



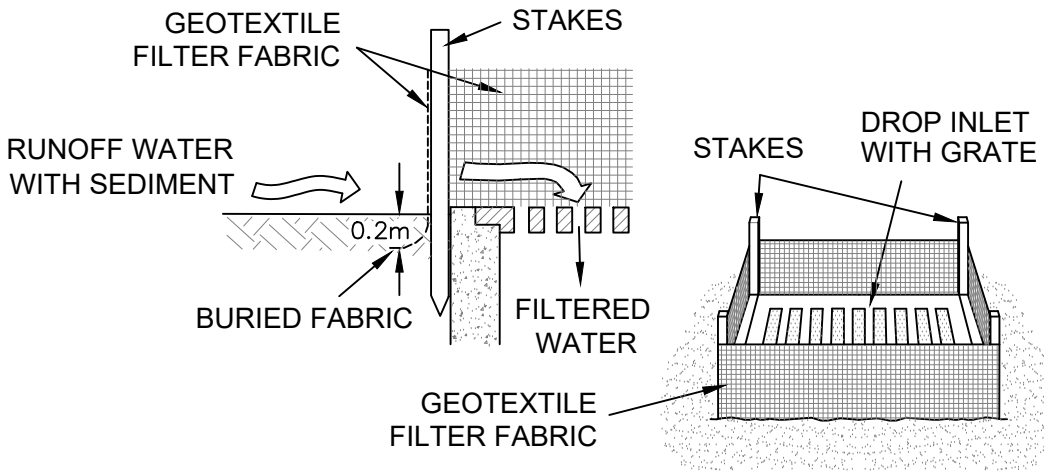
CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARRALLEL TO THE CONTOURS OF THE SITE.
2. DRIVE 1.5m LONG STAR PICKETS INTO GROUND 2.5 METRES APART (MAX.)
3. DIG A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
4. FIX SELF-SUPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

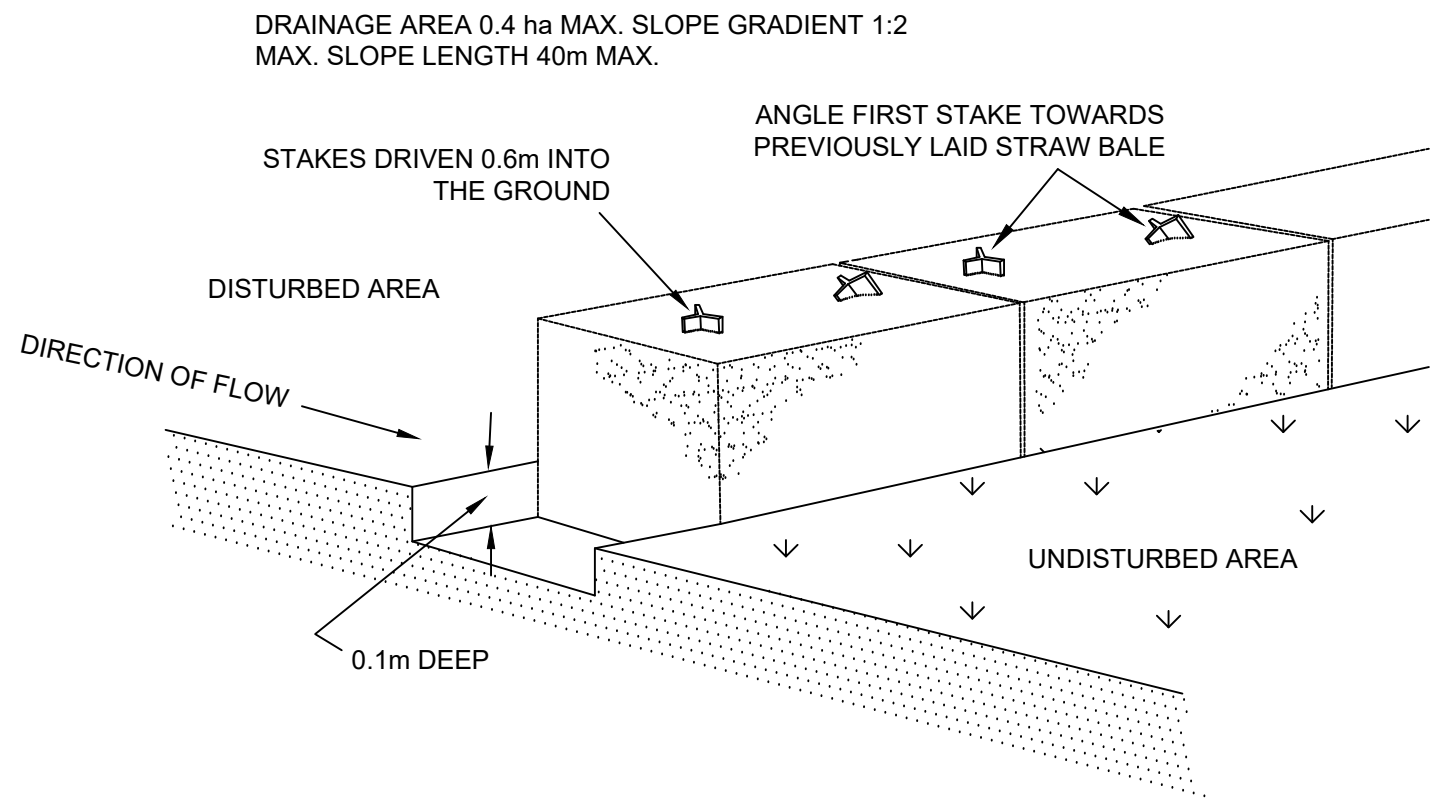
SEDIMENT FENCE



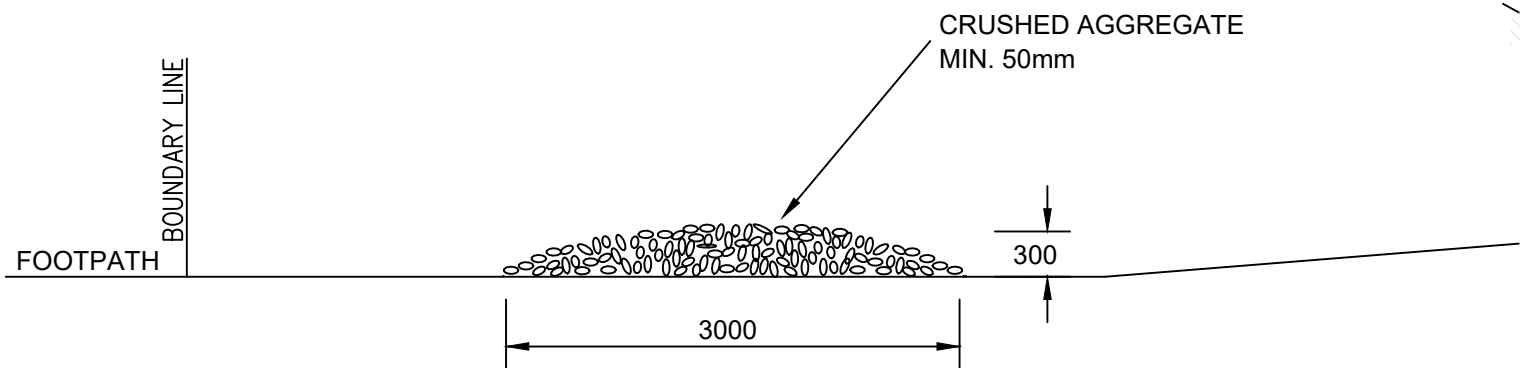
SECTION DETAIL



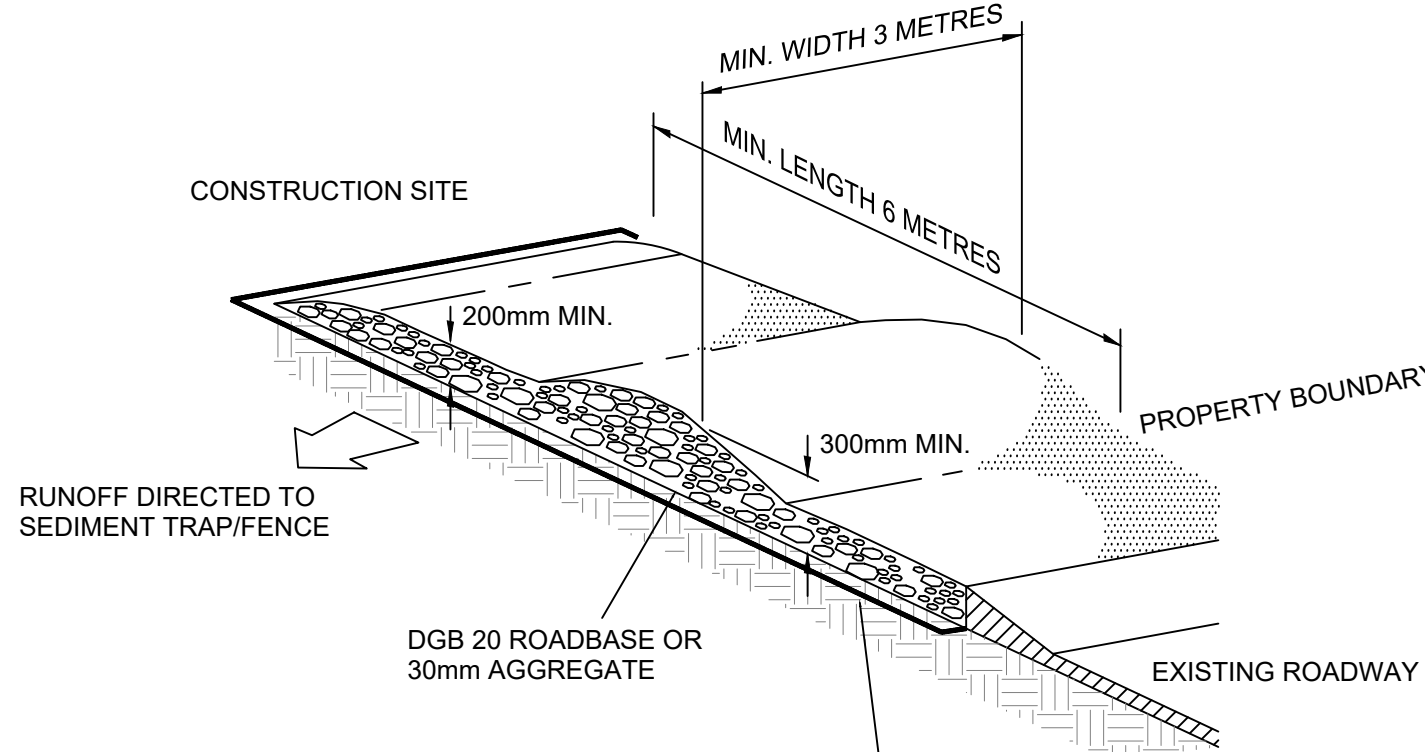
SURFACE INLET PIT SEDIMENT TRAP



STRAW BALE SEDIMENT FILTER



VEHICLE DUST SHAKE DOWN DETAIL



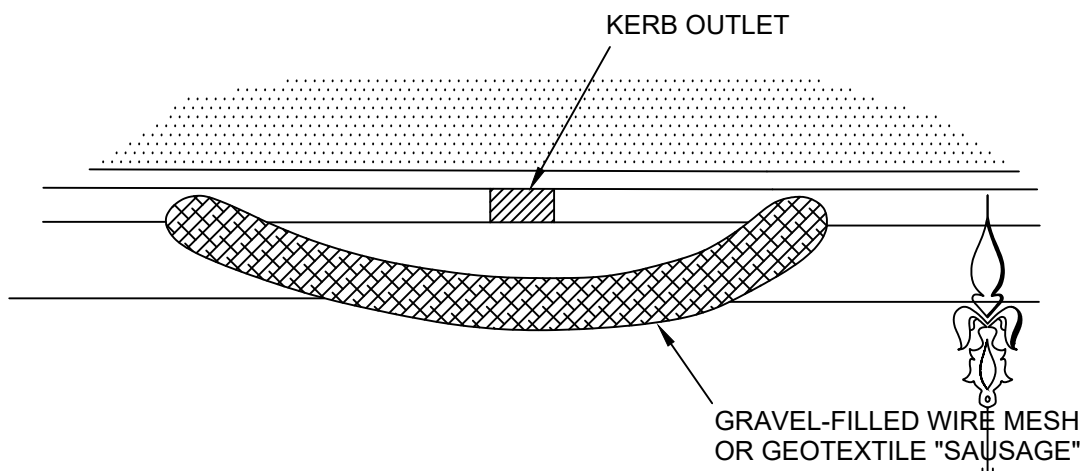
CONSTRUCTION NOTES

1. STRIP TOPSOIL AND LEVEL SITE.
2. COMPACT SUBGRADE.
3. COVER AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
4. CONSTRUCT 200mm THICK PAD OVER GEOTEXTILE USING ROADBASE OR 30mm AGGREGATE. MINIMUM LENGTH 15 METRES OR TO BUILDING ALIGNMENT. MINIMUM WIDTH 3 METRES.
5. CONSTRUCT HUMPS IMMEDIATELY WITHIN BOUNDARY TO DIVERT WATER TO A SEDIMENT FENCE OR OTHER SEDIMENT TRAP.

GEOTEXTILE FABRIC DESIGNED TO PREVENT INTERMIXING OF SUBGRADE AND BASE MATERIALS AND TO MAINTAIN GOOD PROPERTIES OF THE SUB-BASE LAYERS.

GEOTEXTILE MAY BE A WOVEN OR NEEDLE PUNCHED PRODUCT WITH A MINIMUM CBR BURST STRENGTH (AS3706.4-90) OF 2500 N

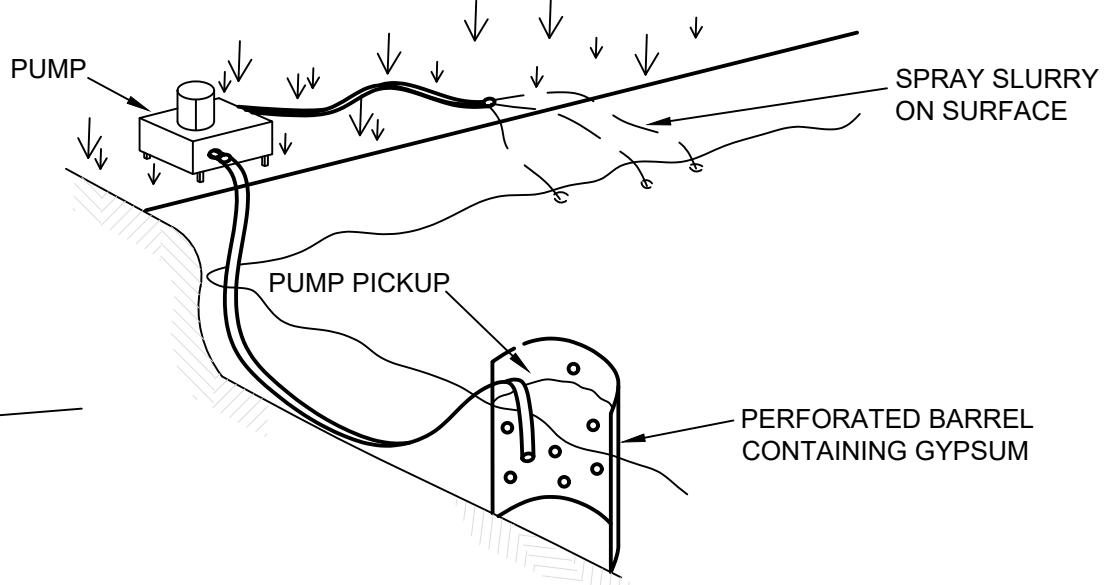
STABILISED SITE ACCESS



CONSTRUCTION NOTES

1. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH AND FILL IT WITH 25mm TO 50mm GRAVEL.
2. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH X 400mm WIDE.
3. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING FILTER.
4. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

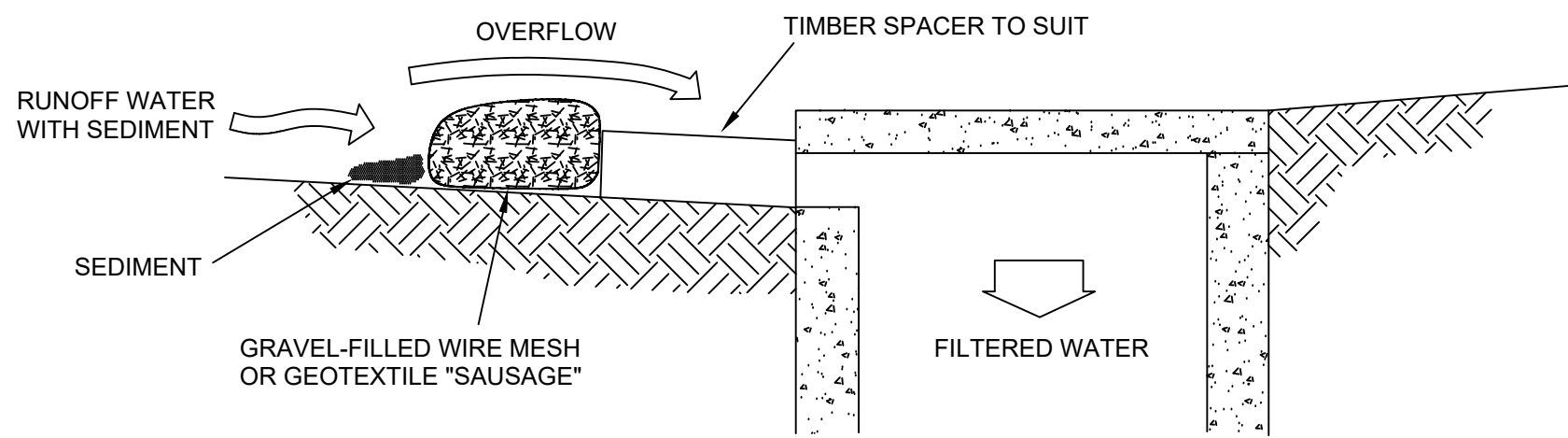
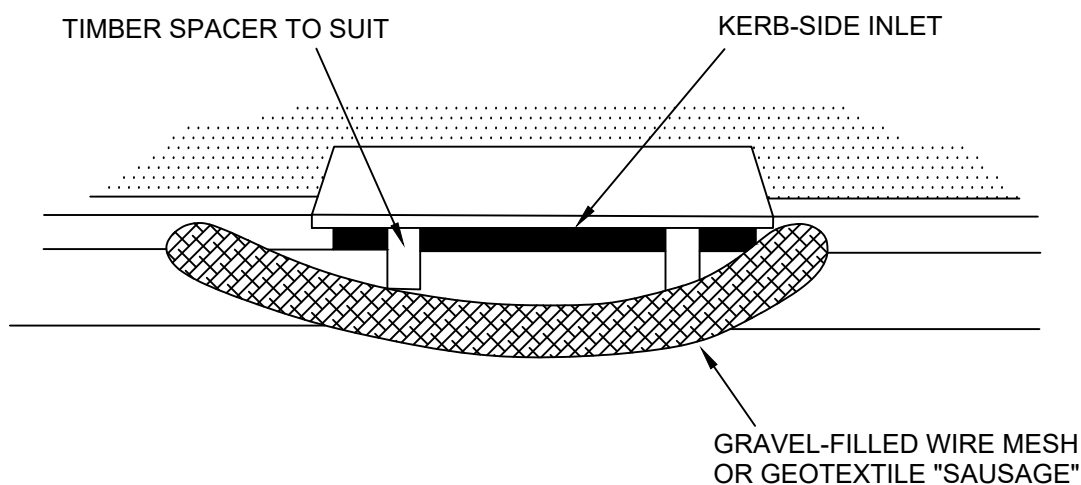
MESH & GRAVEL FILTER "SAUSAGE" BARRIER



NOTE:

1. FLOCCULATION TO BE USED IF WATER IS NOT CLEAR (IE: SEDIMENT GREATER THAN 50 mg/L) PRIOR TO DISCHARGING FROM TEMPORARY PUMP OUT
2. FOR RATES & AGENTS SEE APPENDIX E OF HOUSING NSW "MANAGING URBAN SW SOILS & CONSTRUCTION".

FLOCCULATION DETAIL



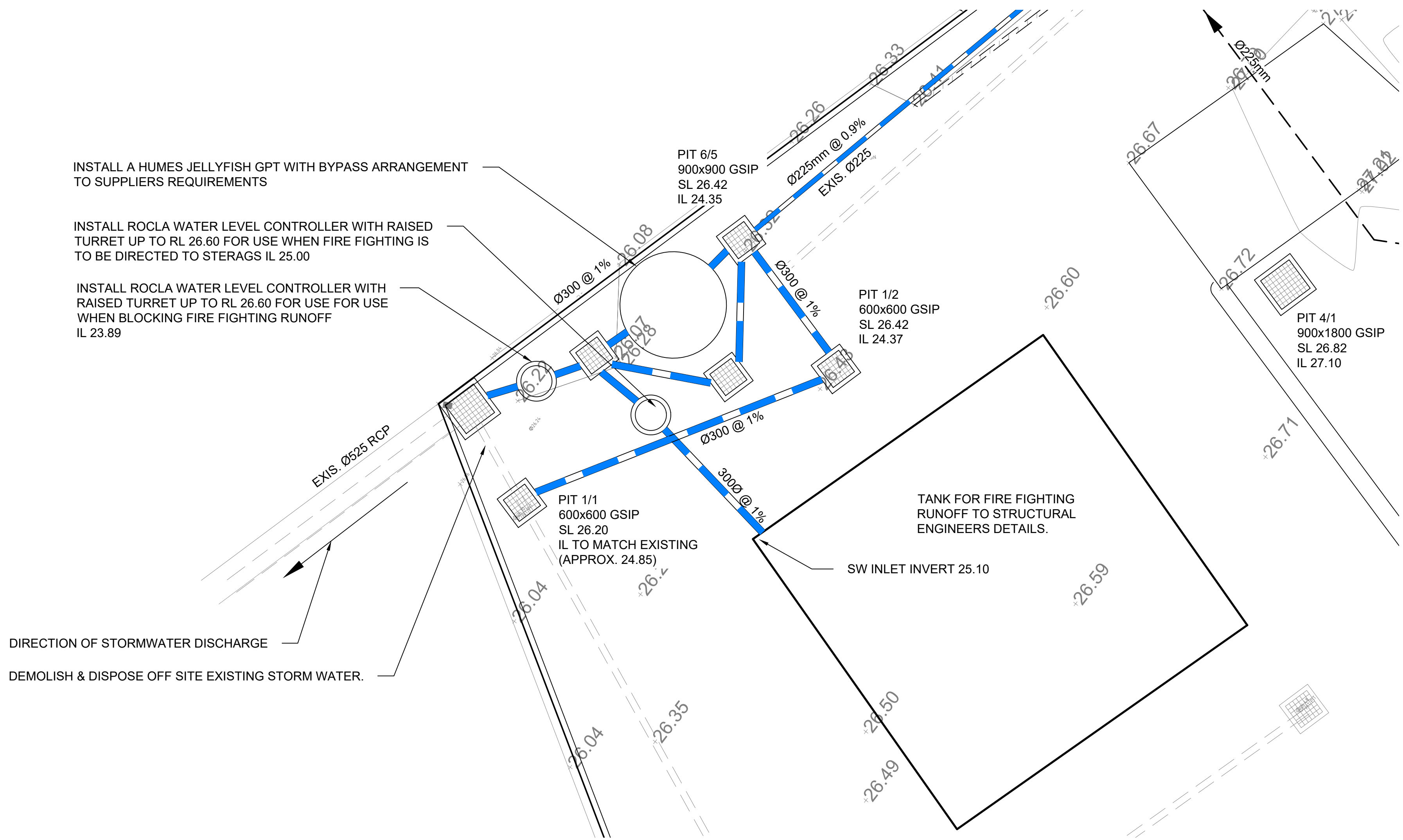
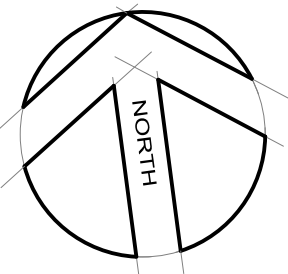
CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLET ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH X 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

MESH & GRAVEL INLET "SAUSAGE" FILTER



J	10/07/18	ESCP AMENDED	 <div><div>BarkerRyanStewart</div><div>Sydney P: 02 9659 0005 Central Coast P: 02 4325 5255 Hunter P: 02 4966 8388</div><div>ABN: 26 134 067 842 barkerryanstewart.com.au mail@barkerryanstewart.com.au</div><div>© BARKER RYAN STEWART PTY LTD</div></div>	Client: BINGO GROUP	STORMWATER DESIGN SERVICES 20 HEARNE STREET, MORTDALE	Designed: GJ Drawn: CM Checked: GJ	Scales: Plan Horiz. Vert. X-Sect.	Plan No. SY16043C104 REV. File Ref. SY16043C_N.dwg SHEET 4 OF 6 SHEETS N
K	11/09/18	PUMP ROOM ADDED						
L	11/10/18	PITS 6/1 6/2 & 6/3 LOWERED						
M	12/09/19	ARCHITECTURAL PLANS AMENDED						
N	26/09/19	SUMP PITS						
No	DATE	AMENDMENT						
			EROSION & SEDIMENT CONTROL DETAILS					



STORM WATER OUTLET CONFIGURATION
SCALE 1:100



NOTE
ALL SETOUT INFORMATION, BOUNDARY FIX AND POSITIONING OF STORM WATER SHALL BE PROVIDED BY THE ARCHITECT AND SURVEYOR



J	10/07/18	ESCP AMENDED
K	11/09/18	PUMP ROOM ADDED
L	11/10/18	PITS 6/1 6/2 & 6/3 LOWERED
M	12/09/19	ARCHITECTURAL PLANS AMENDED
N	26/09/19	SUMP PITS
No	DATE	AMENDMENT

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Client:

BINGO GROUP

STORMWATER DESIGN SERVICES
20 HEARNE STREET, MORTDALE

ROOFWATER DESIGN PLAN & DETAILS

Designed: GJ
Drawn: CM
Checked: GJ

Scales: Plan 1:100
Horiz.
Vert.
X-Sect.

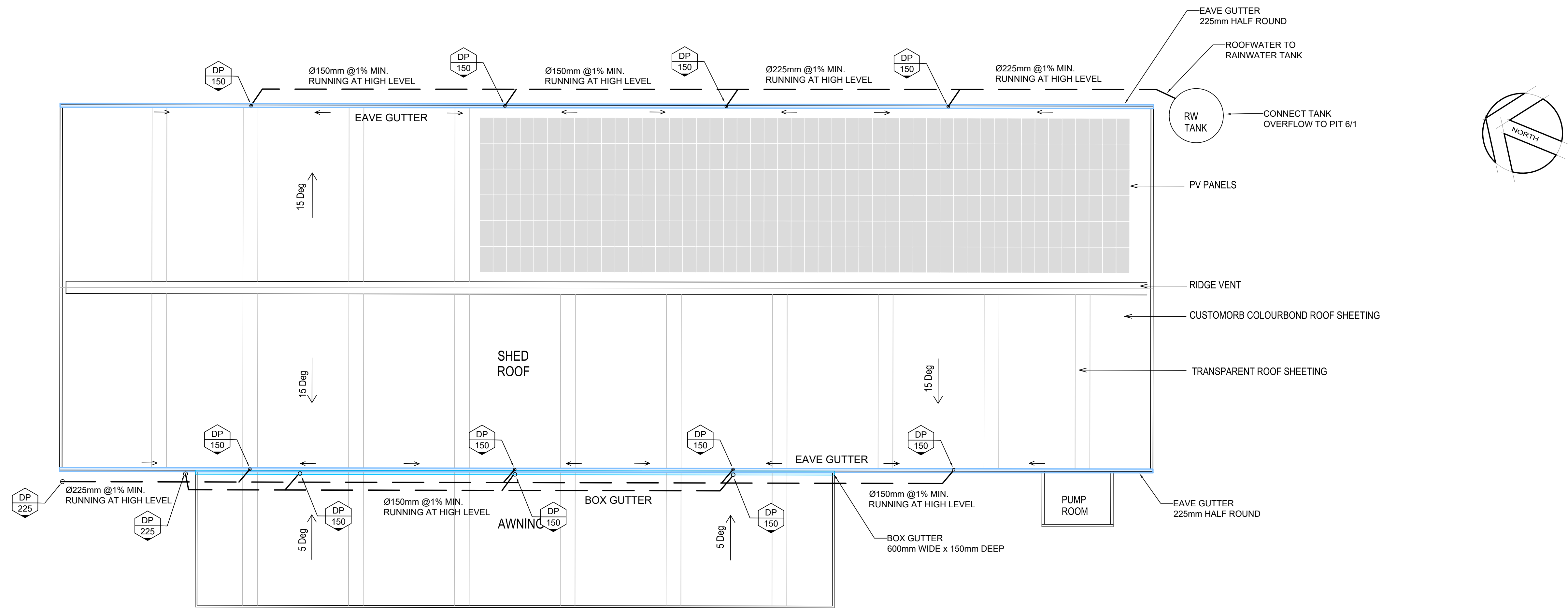
Datum: A.H.D.

Plan No.
SY16043C101

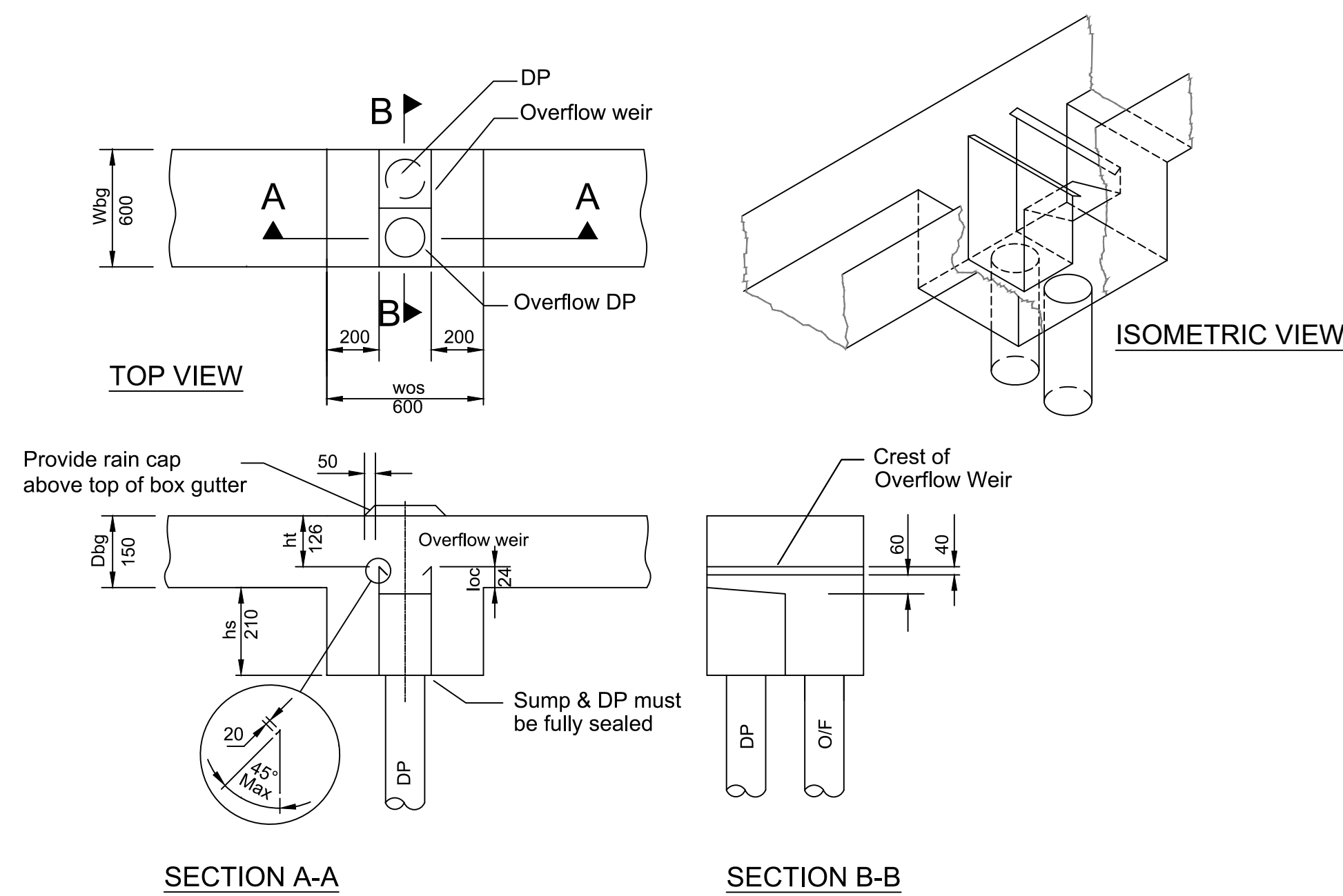
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SHEET 5 OF 6 SHEETS

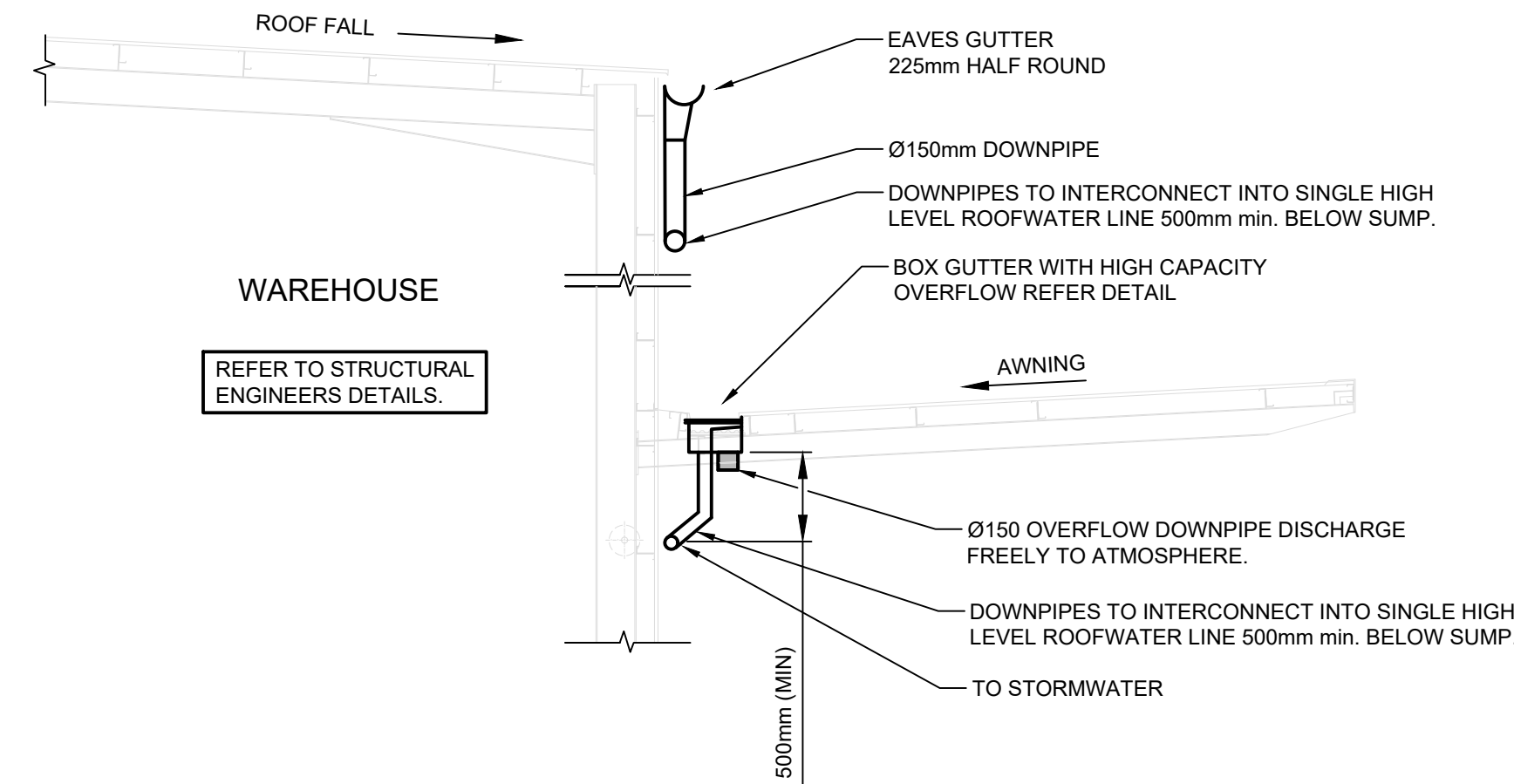
REV.
N



ROOF WATER DESIGN
SCALE 1:200



BOX GUTTER 1 (BG 1)
SUMP/HIGH CAPACITY
OVERFLOW DEVICE
NOT TO SCALE



TYPICAL EAVES GUTTER OVER BOX GUTTER CONNECTION
NOT TO SCALE

LEGEND

Ø150mm @ 1% DOWNPIPE & ROOFWATER LINE TO PIT

DP 150 Ø150mm DOWNPIPE

O/F 150 Ø150mm OVERFLOW PIPE

NOTE
ALL SETOUT INFORMATION, BOUNDARY FIX AND POSITIONING OF STORM WATER SHALL BE PROVIDED BY THE ARCHITECT AND SURVEYOR



J	10/07/18	ESCP AMENDED
K	11/09/18	PUMP ROOM ADDED
L	11/10/18	PITS 6/1 6/2 & 6/3 LOWERED
M	12/09/19	ARCHITECTURAL PLANS AMENDED
N	26/09/19	SUMP PITS
No	DATE	AMENDMENT

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Client:
BINGO GROUP

STORMWATER DESIGN SERVICES
20 HEARNE STREET, MORTDALE

ROOFWATER DESIGN PLAN & DETAILS

Designed: RW
Drawn: JB
Checked: RW

Scales: Plan 1:200
Horiz.
Vert.
X-Sect.

Datum: A.H.D.

Plan No.
SY16043C101

File Ref.
SY16043C_N.dwg

REV.
N

SHEET 6 OF 6 SHEETS

APPENDIX B STORMWATER INFRASTRUCTURE OPERATION AND MAINTENANCE MANUALS



Jellyfish Filter

Operations & Maintenance Manual

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Introduction

The primary purpose of stormwater treatment devices is to capture and prevent pollutants from entering waterways, maintenance is a critical component of ensuring the ongoing effectiveness of this process. The specific requirements and frequency for maintenance depends on the treatment device and pollutant load characteristics of each site. This manual has been designed to provide details on the cleaning and maintenance processes for the Jellyfish Filter as recommended by the manufacturer.

The Jellyfish Filter is a stormwater quality treatment technology featuring high surface area and high flow rate membrane filtration at low driving head. By incorporating pre-treatment with light-weight membrane filtration, the Jellyfish Filter removes floatables, trash, oil, debris, TSS and a high percentage of particulate-bound pollutants; including phosphorus and nitrogen, metals and hydrocarbons.

Why do I need to perform maintenance?

Adhering to the maintenance schedule of each stormwater treatment device is essential to ensuring that it functions properly throughout its design life.

During each inspection and clean, details of the mass, volume and type of material that has been collected by the device should be recorded. This data will assist with the revision of future management plans and help determine maintenance interval frequency. It is also essential that suitably qualified and experienced personnel carry out all maintenance (including inspections, recording and reporting) in a systematic manner.

Maintenance of your stormwater management system is essential to ensuring ongoing at-source control of stormwater pollution. Maintenance also helps prevent structural failures (e.g. prevents blocked outlets) and aesthetic failures (e.g. debris build up), but most of all ensures the long term effective operation of the Jellyfish.

Health and Safety

Access to a Jellyfish unit requires removing heavy access covers/grates, and entry into a confined space. Pollutants collected by the Jellyfish will vary depending on the nature of your site. There is potential for these materials to be harmful. For example, sediments may contain heavy metals, carcinogenic substances or objects such as broken glass and syringes. For these reasons, all aspects of maintaining and cleaning your Jellyfish require careful adherence to Occupational Health and Safety (OH&S) guidelines.

It is important to note that the same level of care needs to be taken to ensure the safety of non-work personnel. As a result, it may be necessary to employ traffic/pedestrian control measures when the device is situated in, or near areas with high vehicular/pedestrian activity.

Personnel health and safety

Whilst performing maintenance on the Jellyfish, precautions should be taken in order to minimise (or, if possible, prevent) contact with sediment and other captured pollutants by maintenance personnel. The following personal protective equipment (PPE) is subsequently recommended:

- Puncture resistant gloves
- Steel capped safety boots
- Long sleeve clothing, overalls or similar skin protection
- Eye protection
- High visibility clothing or vest

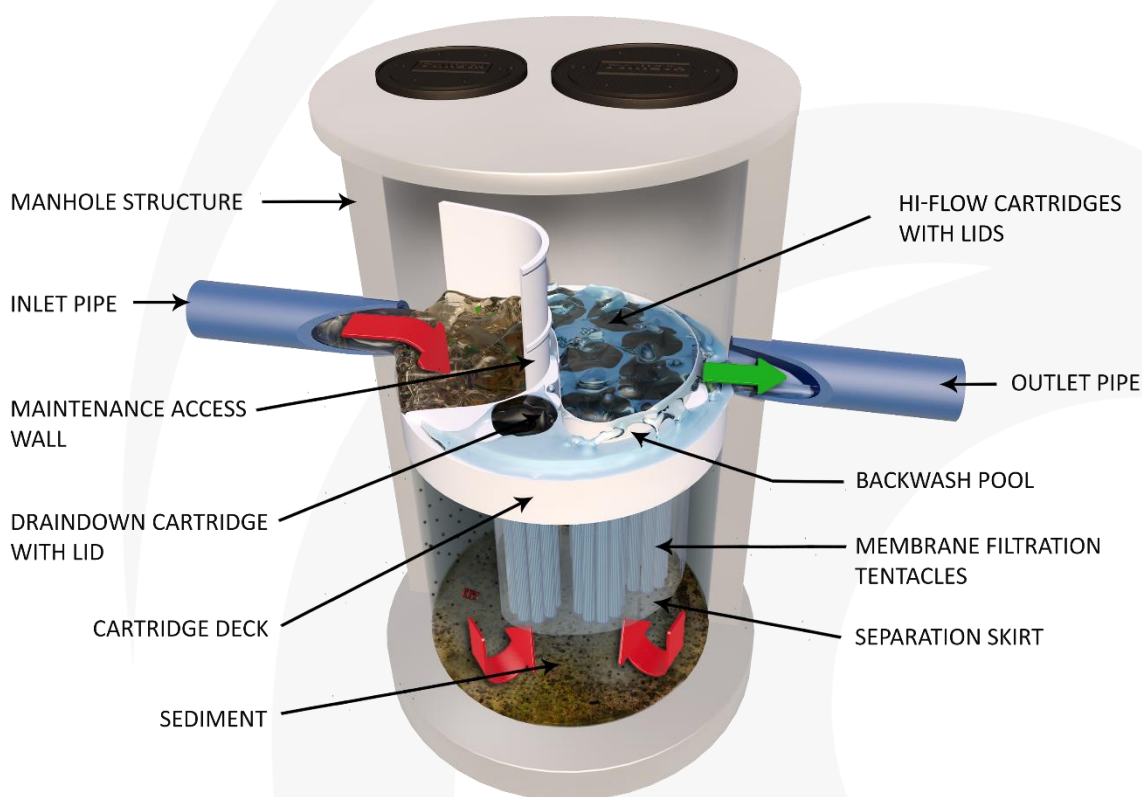
During maintenance activities, it may be necessary to implement traffic control measures. Ocean Protect recommend that a separate site-specific traffic control plan is implemented as required to meet the relevant governing authority guidelines.

Whilst some aspects of Jellyfish maintenance can be performed from surface level, there will be a need to enter the Jellyfish pit (confined space) for both minor and major services. It is recommended that all maintenance personnel evaluate their own needs for confined space entry and compliance with relevant industry regulations and guidelines. Ocean Protect maintenance personnel are fully trained and carry certification for confined space entry applications.

How does it Work?

Stormwater enters the Jellyfish system through the inlet pipe where floatable pollutants are captured behind the maintenance access wall. As stormwater enters the treatment chamber a separation skirt ensures the retention of oils whilst simultaneously protecting the filtration cartridges and allowing coarse particles to settle below on the chamber floor. Stormwater then passes through the Jellyfish cartridges and onto the Jellyfish deck, at this point the backwash pool will fill and overflow allowing treated stormwater to exit via the outlet pipe.

Jellyfish Filter and Components



As the storm event subsides, the treated water held in the backwash pool passes back through the high flow cartridges into the treatment chamber. This passive backwash helps to clear the cartridge surface by dislodging sediment onto the chamber floor. The drain down cartridge(s) located outside the backwash pool enables water levels to balance, leaving the cartridge deck level free of standing water.

Maintenance Procedures

To ensure optimal performance, it is advisable that regular maintenance is performed. Typically the Jellyfish requires a service every 6 months, additionally as the Jellyfish cartridges capture pollutants they will need to be replaced (expected cartridge life is 2-5 years with a maximum cartridge life of 5 years).

Primary Types of Maintenance

The table below outlines the primary types of maintenance activities that typically take place as part of an ongoing maintenance schedule for the Jellyfish.

	Description of Typical Activities	Frequency
Minor Service	Removal & rinsing of cartridges Wash down of deck level Removal of large floatable pollutants Removal of accumulated sediment (if required)	Every 6 Months
Major Service	Replacement of Jellyfish cartridges	As required

Maintenance requirements and frequencies are dependent on the pollutant load characteristics of each site. The frequencies provided in this document represent what the manufacturer considers to be best practice to ensure the continuing operation of the device is in line with the original design specification.

Minor Service

This service is designed to assess the condition of the Jellyfish cartridges and record necessary information that will establish whether a major service is required.

1. Establish a safe working area around the access point
2. Remove access covers
3. Using a vacuum unit or net remove any floatable gross pollutants contained behind the maintenance access wall
4. Using a vacuum unit decant the water until the level drops below the base of the cartridges
5. Remove Jellyfish cartridges*
 - a. Remove cartridge lid
 - b. Remove cartridges vertically from chamber, lifting from eye nut lifting points only
 - c. Replace and secure cartridge lid back into deck to reduce trip hazards during maintenance
6. Unscrew all 11 tentacles from the cartridge head plate, keep all components for reassembly*
7. Rinse each tentacle individually NOTE: excessive water pressure may damage the tentacles
 - a. Position tentacle in a container (to capture runoff) with the open end facing down
 - b. Rinse entire length of cartridge using only low pressure water source (e.g. garden hose).
 - c. Evaluate and note the condition of the tentacles
 - d. Ensure runoff is disposed appropriately
 - e. Re-assemble cartridges ready for reinstallation*
8. Wash down deck level to remove any built up sediment (if required)
9. Measure the level of accumulated sediment in the chamber if depth is greater than 300mm use vacuum unit to remove sediment.
10. Re-install Jellyfish cartridges
 - a. Remove cartridge lid
 - b. Lower cartridge into chamber, lifting from eye nut lifting points only
 - c. Insert cartridge vertically into cartridge receptacle, and secure cartridge lid back in place
11. Replace access covers

**Refer appendix 1 for Jellyfish Cartridge Schematic*

Major Service (Filter Cartridge Replacement)

For the Jellyfish system a major service is a reactionary process based on the outcomes from the minor service.

Trigger Event	Maintenance Action
Rinsing does not remove accumulated sediment from the tentacles	Replace Jellyfish tentacles ^[1]
Jellyfish tentacles are damaged	Replace Jellyfish tentacles ^[1]
Jellyfish cartridges have been in operation for 5 years	Replace Jellyfish tentacles ^[1]

[1] Replacement filter tentacles and components are available for purchase from Ocean Protect.

This service is designed to return the Jellyfish device back to optimal operating performance

1. Establish a safe working area around the access point
2. Remove access covers
3. Using a vacuum unit or net remove any floatable gross pollutants contained behind the maintenance access wall
4. Using a vacuum unit decant the water until the level drops below the base of the cartridges
5. Remove Jellyfish cartridges*
 - a. Remove cartridge lid
 - b. Remove cartridges vertically from chamber, lifting from eye nut lifting points only
 - c. Replace and secure cartridge lid back into deck to reduce trip hazards during maintenance
6. Unscrew all 11 tentacles from the cartridge head plate for disposal, keep all components for fixing of new tentacles to existing head plate*
7. Wash down deck level to remove any built up sediment (if required)
8. Use vacuum unit to remove accumulated sediment and pollutants in the chamber
9. Install replacement tentacles into each head plate*
10. Install Jellyfish cartridges
 - a. Remove cartridge lid
 - b. Lower cartridge into chamber, lifting from eye nut lifting points only
 - c. Insert cartridge vertically into cartridge receptacle, and secure cartridge lid back in place
11. Replace access covers

**Refer appendix 1 for Jellyfish Cartridge Schematic*

Additional Types of Maintenance

Occasionally events on site can make it necessary to perform additional maintenance to ensure the continuing performance of the device.

Hazardous Material Spill

If there is a spill event on site, the Jellyfish unit should be inspected and serviced accordingly. Specifically, all captured pollutants and liquids from within the unit should be removed and disposed in accordance with any additional requirements that may relate to the type of spill event. Additionally, it will be necessary to inspect the filter cartridges and assess their contamination, depending on the type of spill event it may be necessary to replace the filtration cartridges.

Blockages

The Jellyfish treatment system is designed to operate in an offline arrangement, where an upstream high flow bypass structure is in used. In the unlikely event that flooding occurs upstream of the Jellyfish system, the following steps should be undertaken to assist in diagnosing the issue and determining the appropriate response.

1. Inspect the upstream diversion structure to ensure that it is free of debris and pollutants
2. Inspect the Jellyfish unit checking both the inlet and outlet pipes for obstructions (e.g. pollutant build-up, blockage), which if present, should be removed.

Major Storms and Flooding

In addition to the scheduled activities, it is important to inspect the condition of the Jellyfish after a major storm event. The focus is to inspect for damage and higher than normal sediment accumulation that may result from localised erosion. Where necessary, damaged components should be replaced and accumulated pollutants should be removed and disposed.

Disposal of Waste Materials

The accumulated pollutants found in the Jellyfish must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. If the filter cartridges have been contaminated with any unusual substance, there may be additional special handling and disposal methods required to comply with relevant government/authority/industry regulations.

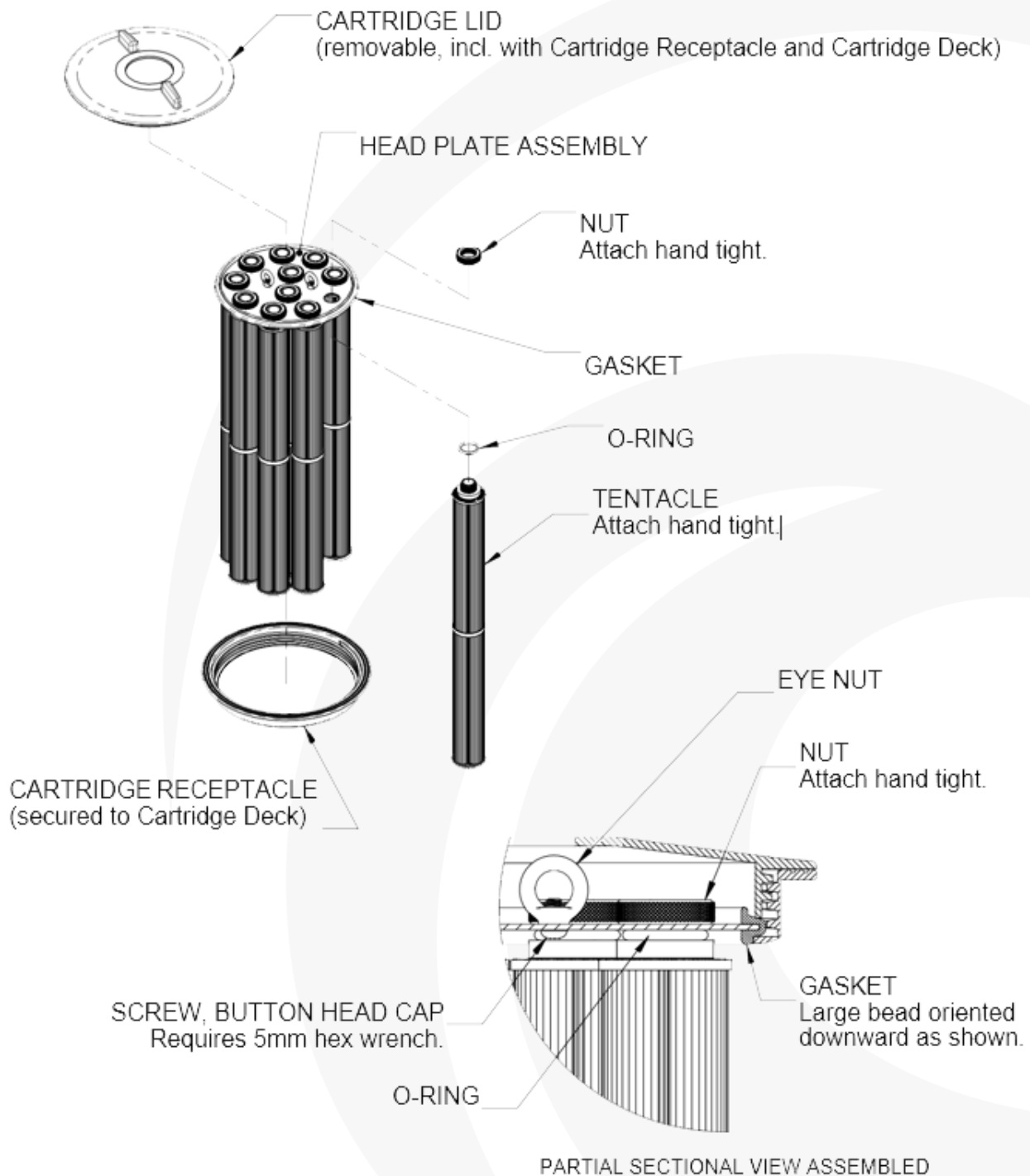
Maintenance Services

With over a decade and a half of maintenance experience Ocean Protect has developed a systematic approach to inspecting, cleaning and maintaining a wide variety of stormwater treatment devices. Our fully trained and professional staff are familiar with the characteristics of each type of system, and the processes required to ensure its optimal performance.

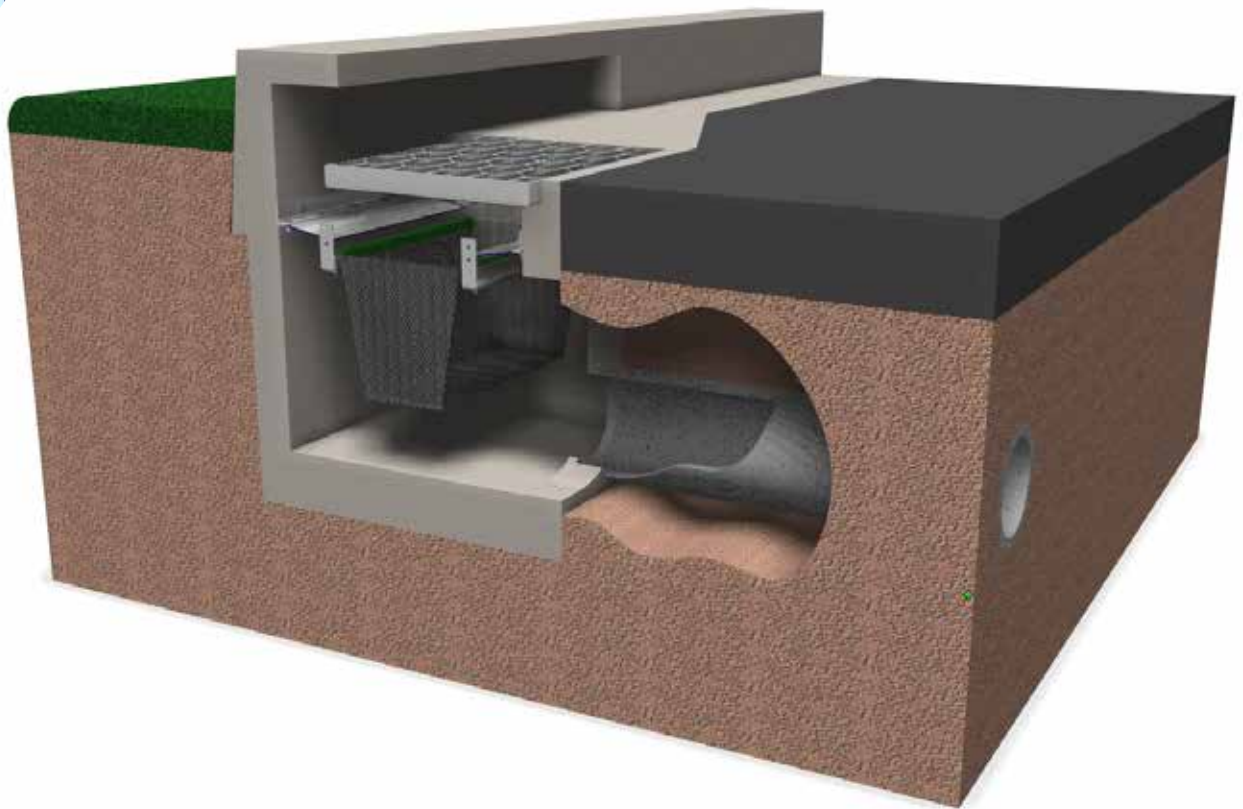
Ocean Protect has several stormwater maintenance service options available to help ensure that your stormwater device functions properly throughout its design life. In the case of our Jellyfish system we offer long term pay-as-you-go contracts, pre-paid once off servicing and replacement cartridges.

For more information please visit www.OceanProtect.com.au

Appendix 1 – Jellyfish Cartridge Schematic



Ecosol™ Litter Basket Maintenance Guide



environmentally engineered
for a better future

CONTENTS

1.0 Introduction

2.0 Key Dimensions

3.0 Monitoring

4.0 Cleaning And Maintenance Procedures

5.0 Reporting

6.0 Monitoring, Cleaning And Maintenance Services

7.0 Catchment Size And Recommended Cleaning Frequency

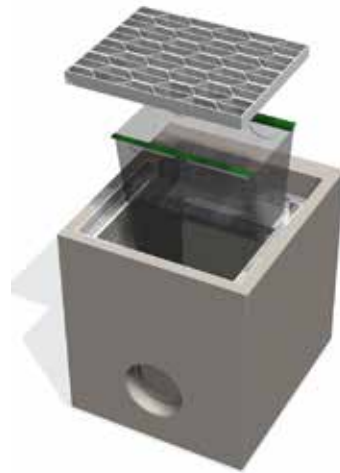
8.0 Life Expectancy

9.0 Warranty

10.0 Supplier And Technical Product Contact Details

11.0 Ecosol™ Litter Basket Cleaning And Maintenance Inspection

The Ecosol™ Litter Basket has been designed specifically for easy, safe on site cleaning and maintenance using a licensed waste contractor equipped with a vacuum truck.



1.0 Introduction

The of Ecosol™ Litter Basket (at-source primary treatment solution) is an efficient and cost-effective pre-screening primary treatment system that captures and retains solid pollutants at drainage entry points. It consists of a capture basket and flow plate with ample by-pass capacity for peak rain events. The basket is fitted below the invert of the gutter, inside the drainage pit and importantly does not obstruct flow in the outlet pipe.

2.0 Key Dimensions

The Ecosol™ Litter Basket is able to be custom designed to suit most stormwater entry pits. The below table provides a general guide on typical unit configurations and typical pollutant holding capacities.

Stormwater Inlet Pit Description	Dimensions (Length x Width)		Holding Capacity (typical basket depth 450mm)	Treatable Flow Rate (L/s)		By-pass Capacity	Static Head in By-pass
	Pit	Litter Basket	(m ³)	200µm mesh	1.5mm mesh	L/s	mm
Drainway	600 x 595	600 x 445	0.120	53	106	110	150
Single Grated Kerb Inlet (with Lintel)	600 x 600	600 x 450	0.121	53	106	110	150
	900 x 750	900 x 450	0.182	83	167	215	150
	900 x 900	900 x 600	0.243	83	167	215	150
Double Grated Kerb Inlet (with Lintel)	1200 x 600	2 x 600 x 450	0.243	103	212	220	150
	1200 x 900	2 x 600 x 600	0.324	103	212	430	150
	1800 x 600	2 x 900 x 450	0.364	106	220	230	150
	1800 x 900	2 x 900 x 600	0.496	106	220	440	150
Single Side Kerb Inlet (with Lintel - no grate)	600 x 660	600 x 450	0.121	53	106	110	150
	900 x 750	900 x 450	0.182	83	167	215	150
	900 x 900	900 x 600	0.243	83	167	215	150
Double Side Kerb Inlet (with Lintel - no grate)	1200 x 600	2 x 600 x 450	0.243	103	212	220	150
	1200 x 900	2 x 600 x 600	0.324	106	220	430	150
	1800 x 600	2 x 900 x 450	0.364	106	220	230	150
	1800 x 900	2 x 900 x 600	0.486	106	220	440	150
Grated Field Inlet (no Kerb or Lintel)	600 x 600	600 x 450	0.121	53	106	110	150
	900 x 750	900 x 450	0.182	83	167	215	150
	900 x 900	900 x 600	0.243	83	167	215	150
Circular Inlet	600	437 x 437	0.085	54	108	120	150
	750	558 x 558	0.140	92	184	172	150
	900	680 x 680	0.208	103	212	225	150
	1050	801 x 801	0.228	103	212	225	150

Table 1 - Ecosol™ Litter Basket Key Dimensions

3.0 Monitoring

Initially Urban Asset Solutions Pty Ltd recommends that monthly monitoring and cleaning is undertaken. Once the unit has been in operation for an extended period of time (say, 12 months) the monitoring and cleaning schedule can be adjusted to reflect the actual operating conditions specific to the catchment. It is also recommended that the unit is inspected after every major storm event.



4.0 Cleaning And Maintenance Procedures

One of the key advantages of the Ecosol™ Litter Basket is that it can be cleaned by vacuum method using street-sweeping vehicles. This is safe and cost efficient.

Prior to cleaning day



It is important that, prior to commencing a clean, you confirm all plant and equipment is available and operational with service records and pre-start checklists available. It is also recommended that weather conditions for the day of the proposed clean be confirmed as cleaning can only be completed in dry weather conditions. Ensure that you:

- Advise all concerned parties of the proposed date and time that the clean is to take place
- Load all equipment
- Obtain approvals from the appropriate authorities
- Complete a safe work method statement for the work to be undertaken

4.0 Cleaning And Maintenance Procedures Continued

Site establishment

- Review and amend as necessary and sign off the safe work method statement
- If required, ensure all necessary traffic controls are implemented
- Ensure that the Ecosol™ Litter Baskets to be cleaned are exposed and accessible
- Ensure that barricades are available for all working areas and that signs are in place to prevent injuries to public or staff
- Ensure all working areas are safe and all equipment is in place, and ready for operation
- Ensure all plant and equipment is positioned within the area allocated for cleaning and maintenance
- Commence recording cleaning data on the cleaning form provided



Cleaning Steps

- Open and secure the pit access cover or grate
- (Manual method) - lift the internal filtration liner containing the captured pollutants from the pit (lifting handles are attached to the removable filtration liner to avoid contact with the pollutants). Employ safe manual handling practice
- (Vacuum method) - insert the vacuum hose from the vacuum vehicle and remove the pollutants from the filtration liner
- (manual method) Place the captured material into a receptacle and cover it ready for transportation to an approved waste disposal facility
- (Manual method) - prior to reinstalling the liner ensure that no obstructions exist in the bottom of the gully pit. Remove obstructions, if any, and carefully re-install the liner into the support brackets
- Ensure that the by-pass flap(s) is functioning properly and make sure that the liner is firmly fitted and not obstructing the by-pass flap(s)
- Secure the pit access cover or grate and remove all equipment and signage
- Ensure any affected areas are restored to their original condition
- Dispose of all captured pollutants at an approved waste disposal facility



5.0 Reporting

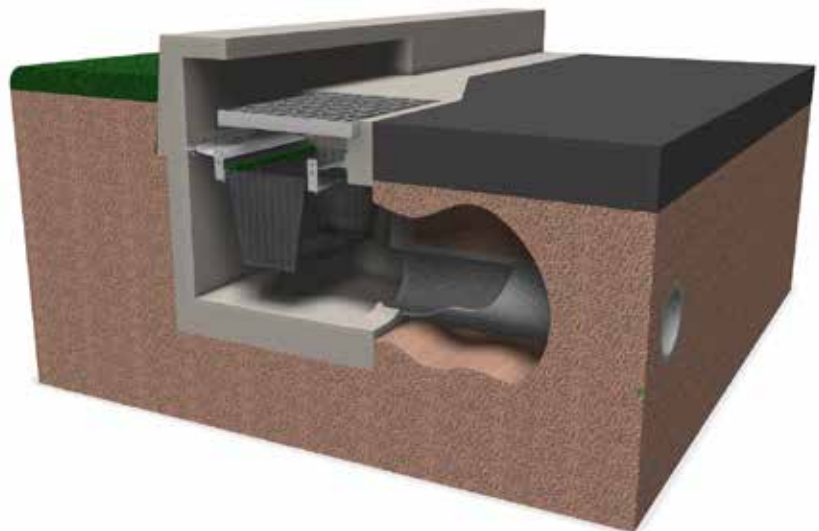
After each clean and inspection it is important that all data is recorded for use in ongoing asset management activities. A cleaning report should be prepared that details as a minimum the following information

- Site location;
- Date and time of the clean
- Duration of the clean
- Volume or weight of material removed
- Composition of the captured material eg. sediment, vegetation and litter
- Details of any remedial work undertaken or required at a later stage

Reporting of the above information is included in the cost of any clean undertaken by Urban Asset Solutions Pty Ltd please refer to the next section for more details.

6.0 Monitoring, Cleaning And Maintenance Services

Urban Asset Solutions Pty Ltd has a very competitive cleaning service using an eductor truck for the removal of all captured pollutants. After each clean we provide a full report detailing the volume and type of pollutants removed. We believe that it is in your best interests for Urban Asset Solutions Pty Ltd staff to clean and maintain the unit, not only because we are specialists, but also because proper monitoring and maintenance enhances the unit life significantly.



7.0 Catchment Size And Recommended Cleaning Frequency

The table below provides a broad guideline about the catchment size and number of cleans required annually.

Optimal Catchment Size (Ha)	Recommended cleaning frequency based on optimal catchment sizes and typical pollutant loads (per annum)
	Typical Developed Urban Catchment
Up to 0.2	2
Up to 0.3	2-3
Up to 0.5	3-4

Table 2 - Ecosol™ Litter Basket Cleaning Frequencies

Quoted cleaning frequencies are based on typical gross pollutant loads anticipated for standard commercial, residential and light industrial catchments. Gross pollutants in this instance includes vegetation as well as anthropogenic litter, and sediment. Cleaning frequencies may vary based on local catchment conditions and rainfall however the above theoretical cleaning frequencies are based on a pollutant loading of 0.660m³/ha/year.

8.0 Life Expectancy

The Ecosol™ Litter Basket is covered by a twelve-month warranty provided the unit is maintained and cleaned with the frequency, and using the method, recommended in this maintenance guide.

9.0 Warranty

The Ecosol™ Litter Basket is designed to meet strict engineering guidelines and manufacturers guarantees. The stainless steel components have a life expectancy of 15 years while the filtration bag has a life expectancy of 5 years providing appropriate maintenance practices are employed.

10.0 Supplier And Technical Product Contract Details

For any maintenance or technical product enquiries please contact:

Urban AssetSolutions Pty Ltd

Tel: 1300 706 624

Fax: 1300 706 634

Email: info@urbanassetsolutions.com.au

11.0 Ecosol™ Litter Basket Cleaning And Maintenance Inspection Form

Customer Details

Asset Owner:

Asset ID:

Unit Location :

Ecosol Ref:

Date:

Time:

Product Code: Ecosol™ Litter Basket

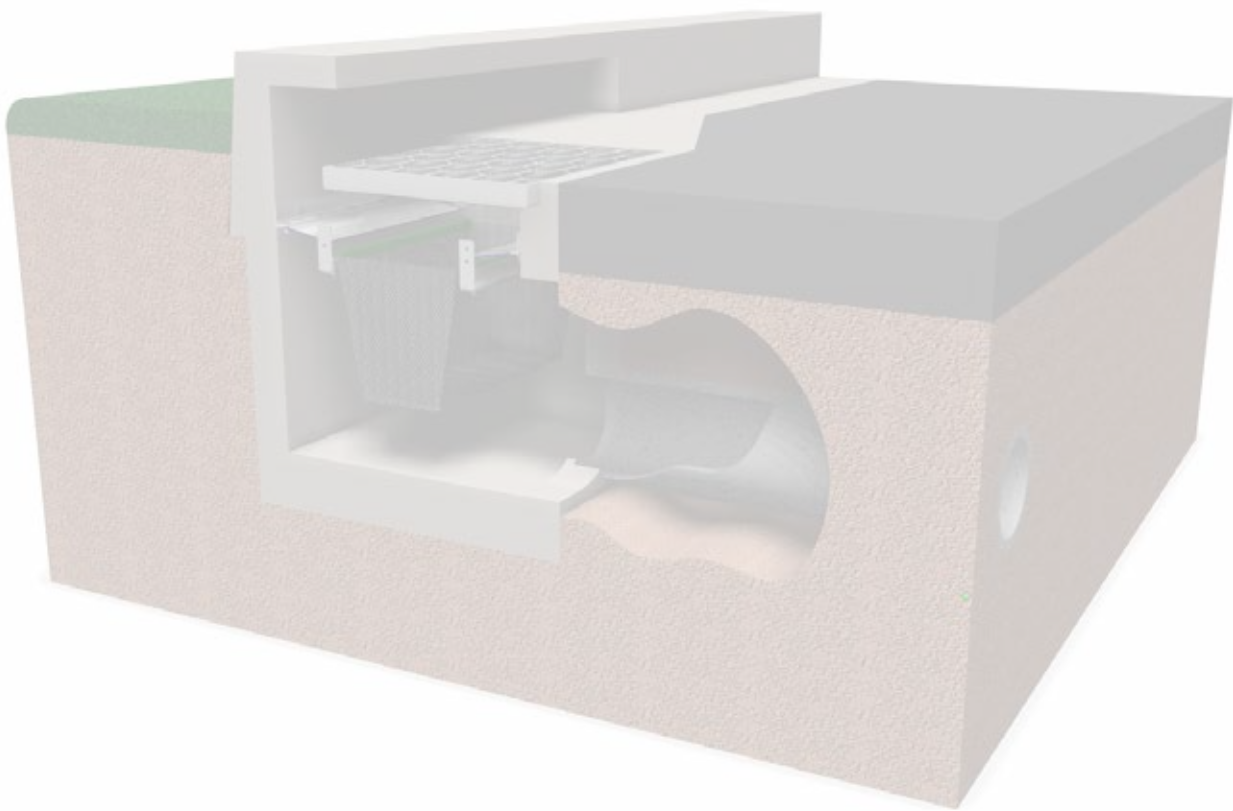
Inspected By:

Visual Inspection

SEP No.	Location	Primary Treatment Chamber	Good	Fair	Poor	Comment
		Condition of SEP grate/cover				
		General condition of SEP				
		Condition of filtration basket				
		Condition of flow plate				
		Condition of Litter Basket support frame				
		Percentage of fill		%		
		Volume of material removed		Kg		
		Condition of SEP grate/cover				
		General condition of SEP				
		Condition of filtration basket				
		Condition of flow plate				
		Condition of Litter Basket support frame				
		Percentage of fill		%		
		Volume of material removed		Kg		
		Condition of SEP grate/cover				
		General condition of SEP				
		Condition of filtration basket				
		Condition of flow plate				
		Condition of Litter Basket support frame				
		Percentage of fill		%		
		Volume of material removed		Kg		
		Condition of SEP grate/cover				
		General condition of SEP				
		Condition of filtration basket				
		Condition of flow plate				
		Condition of Litter Basket support frame				
		Percentage of fill		%		
		Volume of material removed		Kg		

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HAMBAKER



INSTALLATION / OPERATION AND MAINTENANCE MANUAL

**Model F35 Penstocks
Model ZW Penstocks
Model P1000 Penstocks & Stopgates**

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INSTALLATION INSTRUCTIONS

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General

1. Remove all strapping and protective packaging.
2. Check all parts are undamaged and accounted for. Fasteners and anchor bolts will be packed in a separate box – please ensure this is located.
3. Keep the gate or board in the closed position, as supplied, as this provides rigidity and assists with alignment during installation.
4. Do not disassemble or alter the settings of any sealing arrangements.
5. Do not remove any frame bracing until installation is complete.
6. Please take the time to read and understand these instructions. If in doubt, ask!
7. These instructions are to be read in conjunction with the general arrangement drawing and any other relevant project documentation.
8. Lifting should be performed using the anchor bolt holes or slinging under the head rail beams with certified webbing straps.

NEVER SLING WITH CHAINS AS THIS CAN DAMAGE AND CONTAMINATE THE EQUIPMENT!

Refer to the drawings for weights.

Wall Mounted Penstocks and Stopgates

1. Check the concrete wall face for flatness in both the vertical and horizontal planes. The surface should be free from debris, dust, sludge and algae growth. Ideally it should be pressure washed and scabbled to ensure cleanliness and provide good keying in of the grout.
2. Check the opening dimensions and the distance from invert to top of concrete are correct to drawing.
3. Mark a vertical centre line of the opening on the wall extending beyond the top and bottom of the opening. If there is a precast or cored hole in an over hang or cover slab above for the stem to pass through, check that this aligns with the center of the opening, is of sufficient size and is set at the correct offset position out from the wall as per the drawing.
4. If the invert of the penstock or stopgate is to be embedded, the floor will have been provided with a block-out across and in front of the opening to suit. Check that the block-out size is positioned correctly and is of sufficient size to accommodate the penstock or stopgate frame. Refer to the drawing for details.
5. Place the penstock or stopgate against the wall and support it over the opening ensuring correct positioning. For correct height positioning the bottom rubber invert seal should be flush with the invert of the opening.
6. Set the penstock or stopgate vertically and centred with the line marked on the wall. Using a spirit level ensure the penstock or stopgate is vertical in both directions i.e. front and side elevations.
***Tip:** Use a plumb bob line to ensure positioning and alignment with any remote penstock operating equipment that is to be installed above.*
7. At this point it is necessary to check with a feeler gauge that the bottom edge of the gate is making continuous and consistent contact with the bottom rubber invert seal. It may be necessary to pack up the bottom cross rail member to achieve this. A straight edge and/or string line may also be useful to ensure straightness.
8. Using the penstock or stopgate frame hole pattern as a template, drill all anchor holes as per the manufacturers recommendations and to depths stated on the drawing. Holes must also be thoroughly cleaned to the manufacturer's recommendations.
***Important!:** Anchor bolt installation is critical to achieve full structural integrity and capacity of the equipment. Failure to install anchors correctly and to full specified depth could result in the penstock or stopgate "blowing" off the wall under hydrostatic loading.*
9. Install chemical anchors as per the manufacturer's recommendations ensuring they are square and perpendicular to the frame and are centred in their holes through the frame.
If the penstock or stopgate is to have non-shrink grout behind the frame, screw the backing nuts onto the anchor stud. *(Anchors supplied by AWE have a hex drive head to allow setting with a drill. The backing nut is held in the fingers behind the frame and the stud is drilled through it.)*
Allow anchor adhesive to cure as per the manufacturer's recommendations.
10. The penstock or stopgate is to be positioned with a gap between the wall and frame to allow for grouting. This gap is normally 25mm but check the drawing to confirm. Importantly, it should be noted that the penstock should be set to align with any remote operating equipment that is to be installed above. Therefore this gap may need to be slightly adjusted to accommodate construction

tolerances.

11. Using a spirit level and straight edge or string line, ensure the penstock or stopgate is vertical in both directions and is free from distortion and twist which can affect operation and performance of the penstock or stopgate. Use the backing nuts and front nuts to achieve this and lock into position.

Important!: It is necessary to use a nickel anti-seize compound to prevent galling of threaded stainless steel fasteners.

12. If the penstock has a top seal or is a downward opening weir type penstock, the cross seal needs to be set. To set, the cross rail member is pushed out tightly against the gate so there is continuous contact and compression. Use the anchor bolt rear jacking nuts and adjusting screws in the cross rail member to achieve this.

Important!: The correct setting of the cross seal is paramount to ensuring leakage is minimised through this seal. **DO NOT PULL THE CROSS SEAL AWAY FROM THE GATE WHEN TIGHTENING THE ANCHORS.** This may create gaps between the seal and the gate.

13. Check for gaps between the seals and gate using a feeler gauge. If gaps are present then the frame has been distorted or the cross seal has not been set correctly.

STOP! If the penstock arrangement includes remote operating equipment, it should be fitted and installed at this stage prior to grouting the penstock. Refer to the relevant section further on in this manual.

14. To ensure a sound bond and seal for the grout, it is recommended a primer of 50:50 PVA to water be applied to the concrete wall and rear of the penstock or stopgate frame.

15. Install formwork as necessary ensuring all gaps are shuttered up sufficiently to prevent grout from leaking out.

16. Grout fill the void between the penstock or stopgate frame and the wall using a pourable non-shrink type grout. Ensure air pockets are removed and all cavities are filled.

Tip: If the formwork leaks, slowing down the pour and letting the grout thicken often overcomes this. Lightly tapping the formwork and frame as the grout is being poured helps remove air pockets and bubbles.

Beware!: Do not pour in stages that allow previous pours to set. Non-shrink grout usually has an added expanding agent where the amount of expansion is dependent on the water/cement ratio. An expanding layer over a previously expanded layer that has already set can cause serious leaks between the frame and the grout.

Important!: Adding the correct water volume and mixing time are paramount to ensuring the grout performs and doesn't shrink. It is also recommended that grouting be performed late afternoon out of the heat of the day, not in direct sunlight and when the penstock or stopgate frame is cool. Shielding with a damp cloth drop sheet or hessian can assist.

PLEASE REFER TO AND STRICTLY FOLLOW THE GROUT MANUFACTURER'S INSTRUCTIONS.

17. When the grout has cured, (refer to manufacturer's recommendations), remove the formwork. Check that the grout has not shrunk away from the frame. Ensure any overspill of grout is removed from the penstock or stopgate especially on the seals, the stem and the rear surface of the gate. Operating a penstock with grout left stuck to the rear surface of the gate will damage the cross seal as it passes over it. Likewise, grout left on the stem will damage the threads. All anchor bolts should now be tightened and bracing removed.

Channel Embedded Penstocks and Stopgates

1. During construction, the channel will have been provided with block-outs in the walls and floor to suit the penstock or stopgate. Check that the channel width and depth as well as block-out sizes are correct and of sufficient size to accommodate the penstock or stopgate. Refer to the drawing for details.
2. Place the penstock or stopgate into the block-outs and evenly pack under the frame so the rubber invert seal is flush with the channel floor. Check with a spirit level and straight edge or string line that the penstock or stopgate is level straight across the channel. Using a feeler gauge check that the bottom edge of the gate makes continuous and consistent contact with the rubber invert seal.
3. Pack the penstock or stopgate in the wall block-outs so that it is held rigid and is vertical and square leaving equal space either side of the vertical frame member for grout. Check with a spirit level and straight edge or string line that they are vertical and straight. Do not over pack as this may cause distortion and twist which can affect operation and performance of the penstock or stopgate.
***Tip:** The gate should remain in the closed position to provide rigidity to the frame when positioning, packing and setting into the block-outs.*
4. Install formwork as necessary ensuring all gaps are shuttered up sufficiently to prevent grout leaking out.
5. It is essential to double check the frame is free of distortion and twist prior to grouting.
6. Grout fill the block-outs as per item 14 above.
***Tip:** The gate should remain in the closed position to provide rigidity to the frame whilst grouting.*
7. All embedded penstocks and stopgates are provided with a flush invert, therefore the grouting at the invert of the channel should finish flush with the seal.
8. Allow grout to cure (refer to manufacturer's recommendations) and remove formwork.
***Important!:** Do not remove the gate from the frame and do not remove any temporary frame bracing until after the grout has set.*
9. Remove all debris and any grout that may have come into contact with other parts of the penstock or stopgate. Pay particular attention to the seals and stem as grout will damage these under operation.
10. All bracing can now be removed.

Remote Penstock Operating Equipment

1. After a penstock unit has been set in position level and plumb, all remote operating equipment such as extension stems, guide brackets and pedestals should be fitted prior to grouting. This is to ensure correct alignment and levels are achieved so that moving parts run smoothly and binding does not occur under operation.
2. Check the distance from the invert of the opening to the floor level against the drawing. It is important to maintain this distance in order for the operating equipment to fit and function correctly although a tolerance of +/-20mm can usually be accommodated.
3. It is important that stem guide brackets are positioned at heights as shown on the drawing. Guide brackets are adjustable in two planes and act as supports preventing the stem from buckling when the penstock is being closed.

Important! *Ensure to tighten all bolts after equipment has been aligned. Failure to do so may result in damage to components.*

4. Pedestals are anchored at floor level and should be set level, plumb and in true alignment with the stem. It is important that the chemical anchors are set correctly and installed to the manufacturer's recommendations to achieve full structural capacity. It may be necessary to grout under the pedestal base to achieve dead level or a correct height. Similarly, where wall support brackets are used it is necessary to achieve correct level and alignment. Wall support brackets are generally supplied with two plane adjustment.

Tip: *Use a plumb bob line to check alignment of components between top of pedestal and where the stem connects onto the gate.*

Tip: *Components supplied loose are generally labelled and matched marked to assist with site assembly. The labelling and marking used generally refers to the drawings supplied.*

Rising Stem Penstocks

All manually operated rising stem penstocks are fitted with limit nuts to prevent over travel and exerting excessive force on the stem once the closed position has been reached. It is important that limit nuts are set correctly to prevent the stem from buckling and damage to the rubber invert seal. For transport reasons, handwheels and stem cover tubes are supplied loose so it is necessary to fit these.

1. Fit the handwheel onto the hexagon shaped bronze lift nut. Tighten the retainer bolt and locking nut.
For gearboxes the handwheel is fitted to the input shaft in the same way.
2. Fit the acme leadscrew stem by screwing through the lift nut from beneath.
3. Fit all stem extensions, couplings and guide brackets
4. Check alignment of all components and tighten all bolts.

5. Wind the penstock to its fully closed position. The gate should be wound down to compress the rubber invert seal 1 to 2mm. **DO NOT OVER WIND!**
6. Wind the limit nut down the stem thread to seat onto the top of the lift nut. Tighten the grub screw to lock into position. For gearboxes the penstock will need to be raised back up slightly to access the grub screw.
7. Fit the stem cover tube by pushing it into the spigot on top of the handwheel. Take care not to damage or dislodge the internal o-ring seal.
Tip: A little lubrication with soapy water greatly assists with this.
 For gearboxes and actuators the stem cover tube will have a threaded connection and PTFE thread sealing tape should be used to ensure watertightness.
 To gauge the correct length of stem cover tube to be used with a particular penstock refer to the drawing provided.
Important!: Under no circumstances should the top of a gearbox or actuator be left exposed to the weather. Ingress of water may cause corrosion, damage and significantly reduce the life of internal components.
8. Lubricating the whole threaded portion of the stem is necessary as handwheel or actuator forces assume that grease lubrication will be applied. This significantly reduces the co-efficient of friction and wear rate of the bronze drive nut.
 Prior to applying grease to the stem threads they should be fully cleaned to remove all grit and dust.
Tip: If the penstocks are not going to be put into service and used for some time it is recommended that lubrication of the stem be performed at a later stage as the exposed grease can become contaminated over time.

Non-Rising Stem Penstocks

Most non-rising stem penstocks are furnished with non-metallic thrust nuts fitted to the top of the gate. The interface between the stem and nut is self-lubricating and therefore requires no greasing. Most non-rising applications are operated with a removeable T-key that couples to the top of the stem terminating with a square cap.

1. Fit the acme leadscrew stem by screwing through the thrust nut from above. When the gate is in the closed position the nut should be fully engaged with enough thread protruding through to fit the limit nut.
2. Fit all stem extensions, couplings and guide brackets.
 For gearboxes and actuators the stem is terminated with a stepped shaft and keyway suited for connecting and locking into the drive nut. Ensure the locking nut and washer are fitted.

A plug in the top of the gearbox or actuator will have a threaded connection and PTFE thread sealing tape should be used to ensure watertightness when fitted.

Important!: Under no circumstances should the top of a gearbox or actuator be left exposed to the weather. Ingress of water may cause corrosion, damage and significantly reduce the life of internal components.

3. Check alignment of all components and tighten all bolts.
4. Wind the penstock to its fully closed position. The gate should be wound down to compress the rubber invert seal 1 to 2mm. **DO NOT OVER WIND!**
5. Wind the limit nut up the stem thread to seat onto the underside of the thrust nut housing. Tighten the grub screw to lock into position.

FOR THE DETAIL FITTING OF GEARBOXES AND ACTUATORS PLEASE REFER TO THE MANUFACTURER'S INSTRUCTIONS

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OPERATION AND MAINTENANCE INSTRUCTIONS FOR PENSTOCKS

Prior to Operation

1. The penstock should be brushed off to clear all dirt, grit and grout particularly around the seals and gate rear and sealing faces. A high pressure wash down with clean water is also recommended.
2. Clean the stem from grit and debris. The entire threaded portion of the stem is to be adequately lubricated with grease prior to operation. Should grit or other foreign matter contaminate the grease it should be cleaned off and re-greased as necessary prior to operating.

If the penstock has a non-metallic nut, there is no requirement to lubricate the stem.

3. Do not lubricate the seals. The seal material is of wear resistant low friction material (UHMWPE). Applying grease will only entrap grit and debris into the seals which may cause damage.

General Operation

1. Ensure the handwheel or tee key provided with the penstock is of the correct size for the operation of that penstock. Oversizing these or the use of bars etc., to gain additional leverage may result in damage to the penstock and its components.
2. Penstocks are generally clockwise closing. Refer to handwheel markings to confirm opening and closing directions.
3. The penstock should operate freely and unlaboured throughout its full travel. A sudden increase in the input effort means that the gate has reached the end of its travel or something has caused the gate to jam mid travel. Increasing input force will overstress the penstock and may result in damage.
4. Electric actuators, bevel and spur gearboxes and pneumatic and hydraulic cylinders should be operated in accordance with the manufacturer's standard instructions.

General Maintenance

1. Penstocks in frequent use require the stem and nut to be cleaned and re-greased at least on a monthly basis. It is recommended that the old grease be cleaned off before new grease is applied. Any debris should be cleaned from the threads before re-greasing. Failure to provide consistent adequate clean lubrication will result in accelerated wear of the drive nut threads.
2. Penstocks in frequent use are inherently subject to a greater wear rate on the nut threads and this should be inspected at a minimum of 3 monthly intervals. When the wear becomes excessive the nut should be replaced. A quick check is to examine the amount of backlash in the threads by rotating the handwheel back and forth noting the angle of engagement from one direction to the other.

3. Penstocks in occasional use should have stems cleaned and re-greased at 6 monthly intervals.
4. It is recommended that penstocks be washed down and cleaned from grit and debris build up at 12 monthly intervals. This opportunity should also be used to inspect seals and other components for wear and damage and check bolt tension.
5. Upon each inspection it is important to ensure that each penstock will open and close fully. Cycling the penstock through its full stroke should form part of the maintenance schedule.
6. Infrequent use of a penstock can result in stiff operation. In this case all old grease must be removed from the stem threads with a suitable solvent and re-greased accordingly.
7. Electric actuators, bevel and spur gearboxes should be maintained in accordance with the manufacturer's standard instructions.
8. The recommended grease to lubricate stem threads and thrust bearings is Castrol EPL-2 grease or equivalent.

OPERATION AND MAINTENANCE INSTRUCTIONS FOR STOPGATES

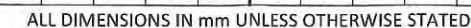
General Operation

1. Stopgates are generally made from aluminium for its lightness and easy of handling. As such, aluminium is relatively soft and care should be taken when handling so as not to knock or drop the boards resulting in damage especially to the sealing edges and surfaces. Should boards be knocked or dropped they should be inspected for burrs, scratches and dents and treated with emery cloth or hand file accordingly prior to inserting into the frame as seals can be easily damaged by sharp irregularities.
2. Under no circumstances are boards to be dragged across any surface.
3. Segmented stopgates incorporate an intermediate cross seal. These are somewhat exposed at the corners and care should be taken in the same way so as not to damage these.
4. Stopgates are bidirectional in their sealing capabilities. That is, boards may be placed in either orientation provided they spatially fit in that orientation.
5. Stopgates should be inserted and removed under balanced head conditions. Attempting to remove the board under unbalanced head conditions will require significant extra force.
6. Ensure the correct size stopgate is used for the frame. Forcing a stopgate inside an incompatible frame will result in damage to both the frame seals and the board. Equally, placing a board of insufficient width inside a frame may result in the board jamming or failure of the board under hydrostatic loading.
7. Under no circumstance are boards to be dropped into place. This may result in damage to the bottom seal.

8. Inserting and removing segmented stopgates is a two man operation and the lifting ladders supplied should be used. Lifting ladders hook onto the lifting pins located at the top corners of each segment. Segments should be inserted and removed at a steady rate whilst keeping it level. Inserting or removing one side faster or slower than the other will result in the board segment jamming in the frame.
9. Larger stopgates requiring a crane lift are provided with lifting lugs for others D-shackle and slings to attach to. Boards must be lifted straight and vertically so as not to place undue stress into the frame, seals and board.
10. Do not lubricate the seals. The seal material is of wear resistant low friction material (UHMWPE). Applying grease will only entrap grit and debris into the seals which may cause damage.

Maintenance and Storage

1. After stopgates have been used they should be washed down, cleaned and stored away in an orderly fashion. The manufacturer can provide a purpose built storage frame for this upon request.
2. Check sealing edges and faces for burrs, scratches and dents. These can generally be treated with some emery cloth or hand file. It is important that these are attended to as the seals could be damaged.
3. If a purpose built storage frame is not used, stopgates should be stored with wooden chocks underneath to protect them from damage and secured appropriately to prevent wind blowing them over.
4. Segmented stopgates with intermediate cross seals should be stored out of direct sunlight to protect the seal from UV degradation.
5. It is recommended that stopgate frames be washed down and cleaned from grit and debris build up at 12 monthly intervals. This opportunity should also be used to inspect seals for wear and damage and check bolt tension.



JOB No. 16022	SCALE 1:10
DRAWING NUMBER 16022-01-01	REV 1