global environmental solutions

Minto Resource Recovery Facility

13 Pembury Road Minto

Soil and Water Assessment

Report Number 610.14692-R22-V3.5

6 April 2017

Version: v3.5

Minto Resource Recovery Facility

13 Pembury Road Minto

Soil and Water Assessment

PREPARED BY:

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
Level 2, 15 Astor Terrace
Spring Hill QLD 4000 Australia
(PO Box 26 Spring Hill QLD 4004)
T: +61 7 3858 4800 F: +61 7 3858 4801
brisbane@slrconsulting.com www.slrconsulting.com

DOCUMENT CONTROL

Reference	Status	Date	Prepared	Checked	Authorised
610.14692-R22-V3.5	Rev3.5	6 April 2017	Sarah Kill Duncan Barnes	Adam Marshall	Adam Marshall

Table of Contents

Table of Contents

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR) was engaged by Skylife Properties Pty Ltd to conduct a Soil and Water Assessment to support a State Significant Development Application in relation to the existing resource recovery facility (the facility) at 13 Pembury Road, Minto, NSW (the Site).

The assessment is required to accompany an Environmental Impact Study (EIS) to be submitted to the Department of Planning and Environment for the increase in operating capacity and building amendments.

2 SITE DESCRIPTION

The site at 13 Pembury Road, Minto is owned by Pembury Street Pty Ltd and is an existing waste storage and processing facility, occupied by Minto Recycling Pty Ltd (Minto) that accepts general non-putrescible solid waste materials from domestic, municipal, commercial industrial, construction and demolition sources for the purpose of resource recovery. The site is legally identified as Lot 1 on DP1013852, 13 Pembury Road, Minto, New South Wales and falls within the Campbelltown City Council (CCC) area. The locality of the Facility at Minto is shown in Figure 1.

Waste streams received by the facility 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; and
- Virgin excavated natural material.

The site's current infrastructure consists of a number of buildings including a site office with amenities, an in and out weighbridge, a main shed with an attached ancillary building, a storage shed, diesel fuel storage (30 000L) with refuelling point and a dust suppression system (Coolmist Systems Australia fogging sprinklers within the buildings). The existing site plan is shown in Figure 2.

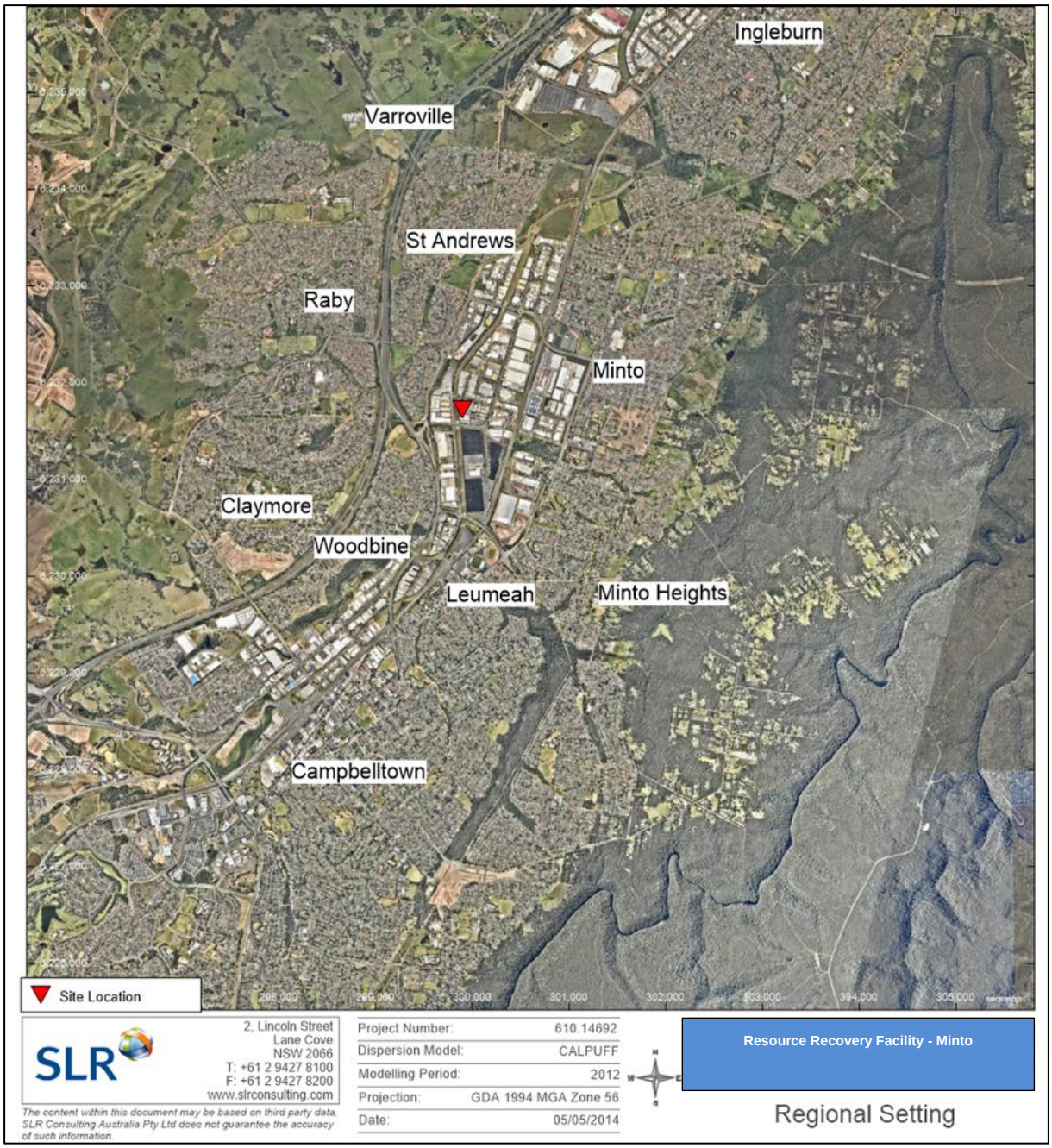


Figure 1 Locality Plan

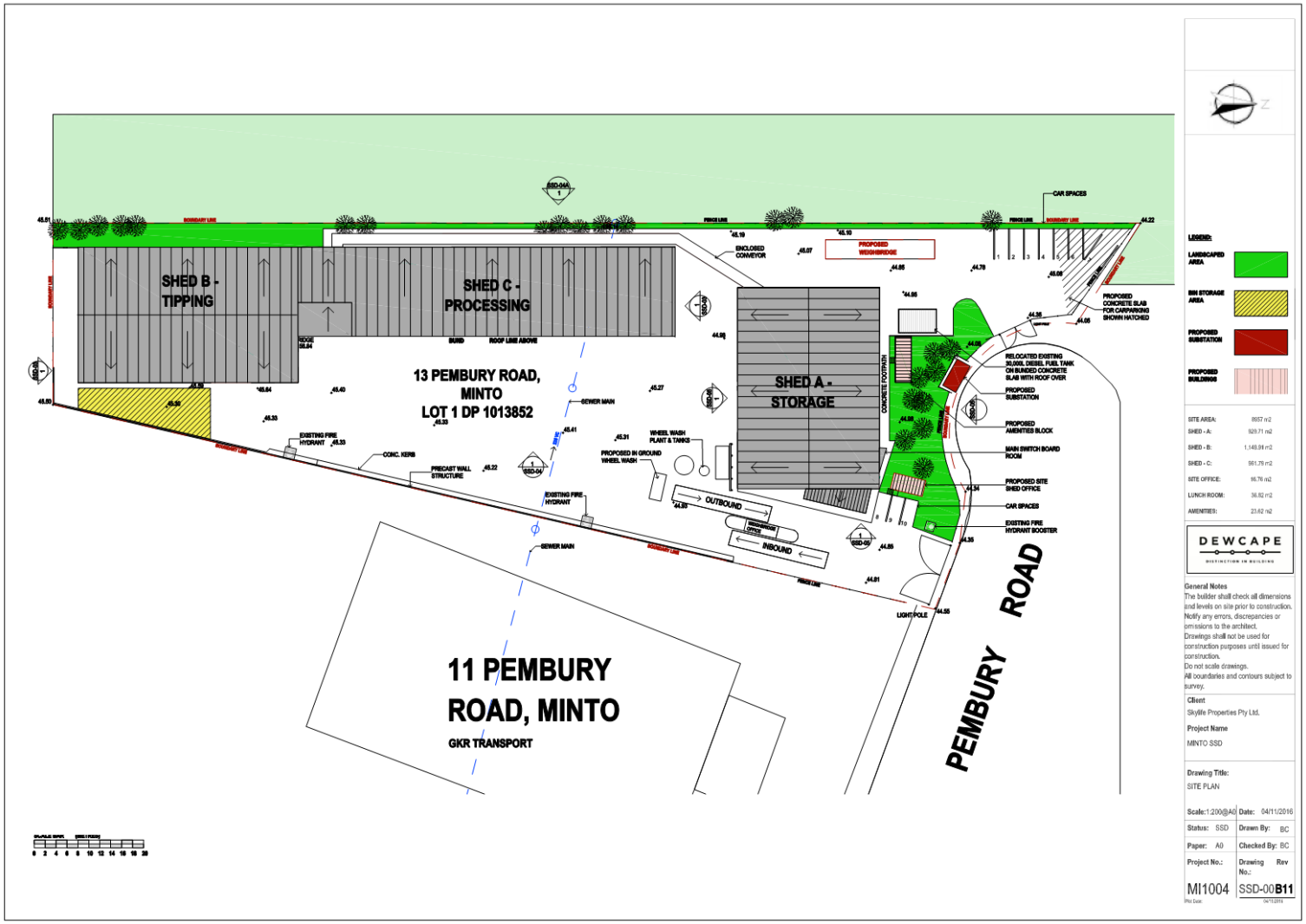


Figure 2 Existing Site Plan and Proposed Amendments

3 PROPOSED PROJECT DESCRIPTION

The proponent seeks to increase its maximum annual tonnage of general non-putrescible solid waste material from 30 000 tonnes to 220 000 tonnes per annum (tpa). Waste streams currently received by the facility include building and demolition waste and scrap metal.

The proponent seeks to receive additional types of general non-putrescible solid waste material, however, none of the following waste streams will be accepted on site:

- Asbestos
- Liquid Wastes
- Putrescible Wastes
- Flammable Materials
- Hazardous Wastes
- Radioactive Wastes

Future development of the site, as part of this project, will include the following:

- A new in-ground weighbridge (20m x 3.2m) for large trucks
- Proposed in-ground wheelwash at existing outbound weighbridge
- A new substation
- A new site office
- A new amenities block
- 10 new car parking spaces

The proposed amendments to the site are shown in Figure 2.

A dust suppression system, Coolmist has been installed onsite as part of recent upgrades. The design is based on Coolmist lines overhead and around the doorways in the Sheds and sprinklers across the yard. The Coolmist layout is provided Appendix A. Water for this system is sourced from the potable water supply.

3.1 Proposed Process

All inbound waste will enter the site via the driveway crossing with Pembury Road, where they will be weighed at the ‘eastern’ in-bound weighbridge. The contents of trucks are also visually inspected at this point by the weighbridge operator or traffic controller.

Trucks will then enter into the covered Shed B and unload. Waste is offloaded by either tipping trailer or tipping bins to remove contents. Unloading is completed wholly within the covered shed. The load will be inspected again on the tipping floor during and after unloading to determine waste acceptability prior to processing. All unloading and sorting activities are to be carried out within the enclosed tipping shed.

Figure 3 demonstrates the proposed flow of waste and vehicle movements through the facility.

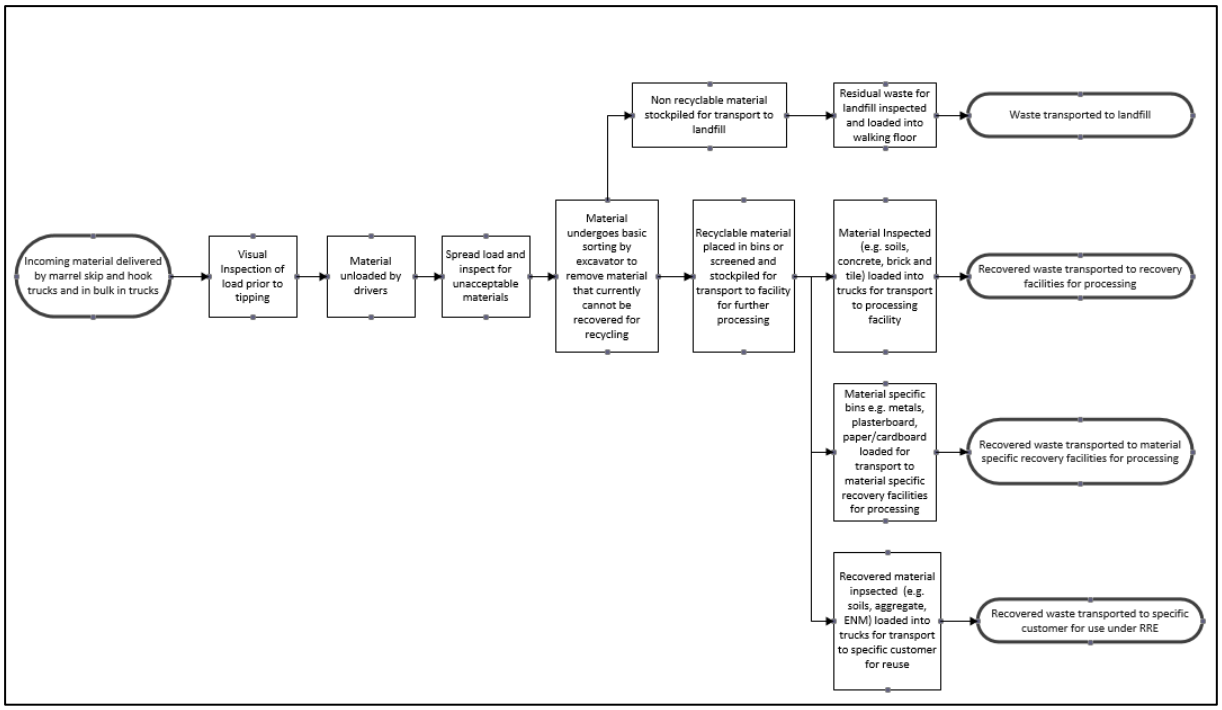


Figure 3 Proposed flow of waste and vehicle movements

Processing will occur in Shed C. Any non-complying waste identified will be managed in accordance with Safety Environment and Quality (SEQ) procedures and the adopted Operations Environmental Management Plan and Asbestos and Non Complying Waste Management Procedures.

Once trucks have exited the unloading area, sorting and processing operations will result in wastes being separated into the following products which are then moved into the designated bins and stockpile bays in Shed A:

- Metals – ferrous and non-ferrous
- Concrete, brick and tile
- Wood
- Plastics
- Paper and Cardboards
- Soils including VENM, ENM and recovered fines
- Glass
- Aggregate
- Plasterboard
- Green waste
- Asphalt
- Mixed residual including textiles, plastics, glass, composites, containers (metal and plastic) and treated timber
- Non recoverable / recyclable materials

After sorting and processing, the product materials are stockpiled in Shed A and transported off-site. All vehicles will exit the site via the existing western and the proposed third weighbridge on the western boundary. All recovered materials are transported for reuse, recycling or further recovery and residual materials which may contain both recycling and non-recyclable materials are transported for either lawful disposal or further processing. Residual materials are stored in Shed C for loading and transport off site. Based on existing operations and other similar facilities, approximately 10 - 15 percent of waste will be transported to landfill.

An Operational Environmental Management Plan (OEMP) will provide further detail on waste handling procedures on-site for matters such as waste sampling and soil analysis, waste tracking requirements under the Protection of the Environment Operations (Waste) Regulation, 2014, traffic management, air quality management, water management, noise management, and response requirements for management of pollution incidents (PIRMP) and to meet ISO 14001: Environmental Management Systems, ISO9001: Quality Management Systems and AS/NZ 4801: Workplace Health and Safety Management System requirements.

3.2 Proposed Storage Arrangements

Unprocessed waste will be contained within the building in stockpiles prior to processing or held within covered bins in the designated bin storage area. Processed waste (separated and sorted) will be stockpiled in the designated material bays and bins. No changes are proposed to the approved material storage capacity for the site.

Any waste streams not permitted to be kept on site will either be rejected at the eastern weighbridge or within the tipping or processing area and subsequently reloaded before leaving the site.

3.3 Plant, Equipment and Technology

The proposed plant, equipment and machinery to be used on site includes the following:

- Volvo ECR145C Excavator
- Volvo EC140C Excavator with Magnet
- Volvo L110F Wheel Loader
- Fuel Fix 30KL Self Bunded Tank
- Liebherr LH22M Hydraulic Excavator
- In line processing / separating plant incorporating:
    - Finger Screens
    - Magnet
    - Picking Station
    - De Stoner

3.4 Proposed Fuel and Chemical Storage

Approximately 30 000 litres of diesel will continue to be stored on site in a bunded area separate from other onsite chemicals i.e. <220L of hydraulic oils, greases and diesel additives. The designated area is illustrated on the proposed Stormwater Plan (Appendix B). There will be no LPG stored on site.

3.5 Proposed Hours of Operation and Staffing Arrangements

Truck movements, including delivery and unloading of waste materials are proposed on a 24 hour basis. The proposed hours of operation for processing are:

- Monday to Saturday: 6:00am to 10:00pm

- Sunday & Public holidays: no operations

Approximately 12 full time staff will be employed on-site:

- 1 weighbridge staff
- 4 yard staff
- 7 processing and sorting

4 PURPOSE AND SCOPE OF SOIL AND WATER ASSESSMENT

4.1 Purpose

This report address the Environmental Impact Assessment requirements specified in the Secretary's Environmental Assessment Requirements (SEARs) dated 5 January 2016 (i.e. Protection of the Environment Operations Act 1997 (POEO Act)) associated with the land and water to support a State Significant Development Application for the facility at 13 Pembury Road, Minto.

4.2 Scope

The site is currently surfaced with hardstand and minimal ground works will be required as part of the proposed development. Therefore, the focus of this assessment is on surface water. A Preliminary Contaminated Land Investigation has been conducted for the site and has been reported separately in 610.14692-R23-V1.0 Phase 1 Contaminated Site Investigation, 13 Pembury Road, Minto, NSW, dated 05 August 2016.

The proposed scope of work included:

- Literature review;
- Review and description of the existing soil and water environment within the site and surrounding area / catchment;
- Description of existing soil and water management onsite in relation to potable water, surface water, leachate, wastewater, fuel and chemicals;
- Stormwater assessment to assess the performance of the existing and proposed stormwater management system;
- Assessment of potential soil and water impacts and recommendation of measures to mitigate the identified impacts; and
- Assessment of potential cumulative soil and water impacts.

4.3 Potential Impacts

The key elements of this Project which have the potential to impact on the soil and water and environment are as follows:

- Water quantity and quality impacts associated with stormwater run-off;
- Water quality or soil quality impacts as a result of fuel and chemical spills; and
- Increased potable water usage.

4.4 Planning Context

The following relevant legislation, policies and guidelines were considered as part of this SWA:

- Water Management Act (2000) and Water Act (1912)

- Greater Metropolitan Region Unregulated River Water Sources (2011)
- Protection of the Environment Operations Act (1997)
- Managing Urban Stormwater: Soils & Construction (NSW Government, 2004)
- Site Environmental Planning Policy No. 55 – Remediation of Land
- National Environmental Protection Council (2013) National Environmental Protection (Assessment of Site Contamination) April 2011, Schedule B2, Guideline on Site Characterisation (hereafter referred to as the Amendment 1 NEPM 2013)
- National Water Quality Management Strategy, Department of Environment, Australian Government, 1992
- NSW State Rivers and Estuaries Policy, NSW Government 1993
- State Water Management Outcomes Plan (WM Act, 2000)
- Campbelltown Local Environmental Plan 2015
- Georges River Regional Environmental Plan

5 EXISTING ENVIRONMENT

5.1 General Description

The Site is located in an industrial area of relatively flat terrain. It is located on an irregularly rectangular shaped parcel of land, 8957m^2 in area and approximately 160 m by 30 m in the east and south directions respectively and 190 m by 70m in the west and north directions respectively. The ground elevation has been mildly modified to suit operations on site and ranges from RL45.5m at the southern end of the site to RL44m adjacent to the driveway crossing in the north eastern corner.

The site is surfaced with hardstand and contains three sheds with push walls and machinery used for tipping, processing and storage of waste materials, a site office, amenities and two weighbridges for small trucks.

5.2 Climate

A summary of the mean rainfall and temperature statistics for the local area, obtained from the Bureau of Meteorology climate station at Campbelltown (Mount Annan) Station (Site Number 68257) was used for this assessment as it is the closest station to the site that contained both rainfall and temperature data. Data shown in Figure 4 was sourced over a 10 year period between 2006 and 2016.

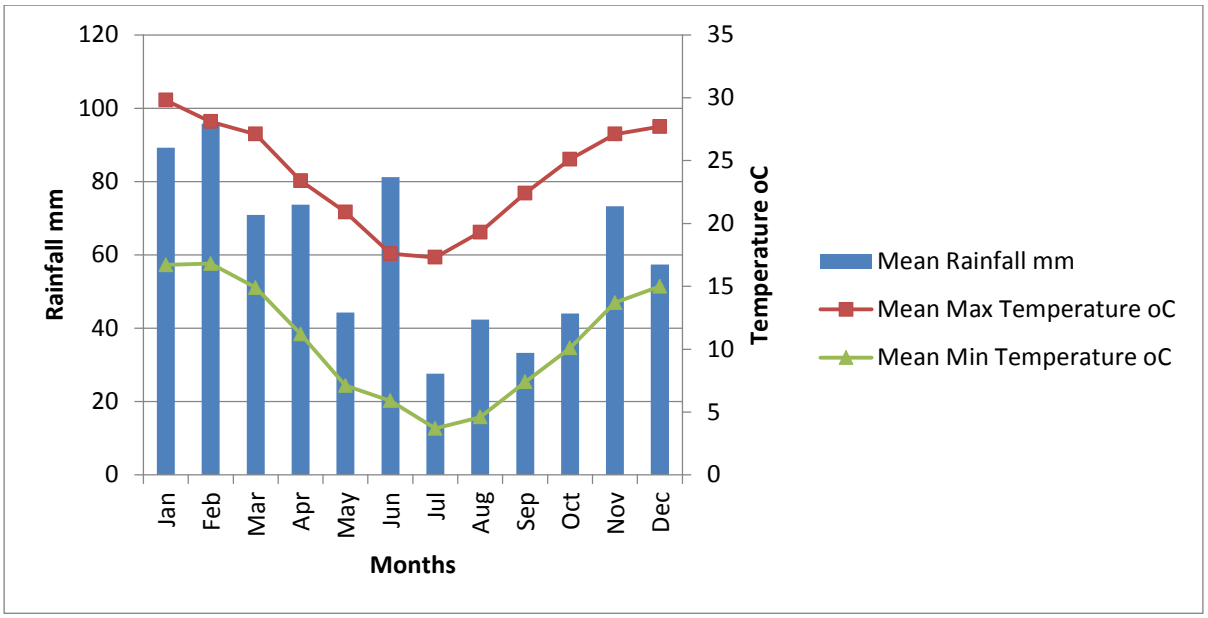


Figure 4 Mean Monthly Rainfall and Temperature Data

5.3 Geology

The Geological Survey of NSW Wollongong 1:250 000 Geological Series Sheet 56-9 (Edition 2) 1966 indicates that the site is underlain by the boundary between Quaternary Alluvium comprising gravel deposits and sand dunes and the Triassic Liverpool Sub-Group which comprise shale with some sandstone beds.

5.4 Soils

No intrusive investigations were undertaken as part of this investigation. Consequently, the underlying soils were unable to be characterised.

The facility has an impervious surface (with the exception of landscaped areas) and ground cover should not be disturbed by core operations at the facility (i.e. storing and processing waste material).

Due to the topographical height of the site being 44-45.5m AHD and Acid Sulfate Soils (ASS) predominately being encountered at <20m AHD, ASS are not expected to be encountered on Site.

5.5 Hydrogeology

The Commonwealth of Australia, 1:5 000 000 Hydrogeology Map of Australia developed in 1987 indicates the Site falls within an area consisting of exposed bedrock aquifers from the Triassic Period of low-moderate productivity and non-saline groundwater.

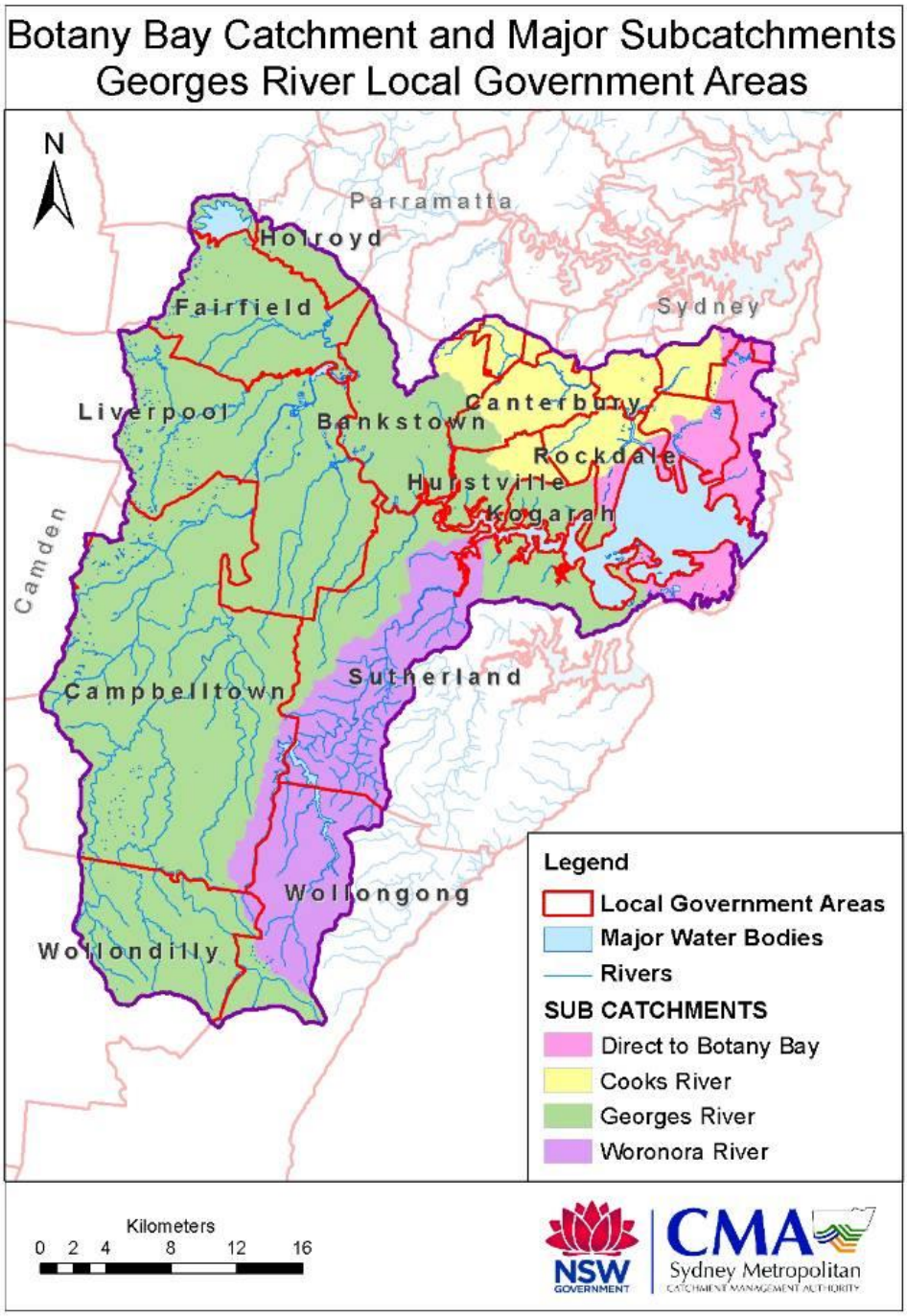
A search of the NSW Department of Primary Industries real-time groundwater data (www.realtimedata.water.nsw.gov.au) conducted on 18 February 2016 did not reveal any real-time monitoring groundwater bores in the vicinity of the site.

A search of the Australian Government Bureau of Meteorology (www.bom.gov.au/water/groundwater) indicated the groundwater at the site falls under the Sydney Basin Central Management Area and falls in an area that has a bore density of 7 bores per 25km^2.

5.6 Hydrology

5.6.1 Catchment

The Minto facility is located within the Georges River Sub Catchment Area which is located within the Botany Bay Catchment Area. The Georges River Catchment Area ultimately discharges into Georges River which in turn discharges into Botany Bay. Figure 5 outlines the Georges River Sub Catchment Area.



.

Figure 5 Georges River Subcatchment Area

5.6.2 Local Drainage

Bow Bowing Creek runs directly adjacent the western boundary of the Site. The portion of Bow Bowing Creek that runs along the Site's western boundary has been converted into a concrete lined channel with a bund to separate the channel from the industrial properties to the east. McBarron Creek (which has also been converted into a concrete lined channel) runs along Airds Road to the south of the Site, with this road separating the Site and McBarron Creek. The McBarron Creek flows into Bow Bowing Creek which flows into Georges River approximately 9.5km downstream of the Site

5.6.3 Flooding

Campbelltown City Council advises that all properties within the Campbelltown City local government area may be affected by flooding caused by overland flow or local topography. Council are currently undertaking a flood study of the Bow Bowing / Bunbury Curran Creek Catchments (Figure 6) of which the property is a part. The results of the flood study are not yet available and there is currently no flood mapping available for this area, but given the Site's proximity to Bow Bowing Creek there is a high potential for this Site to be affected by flooding.

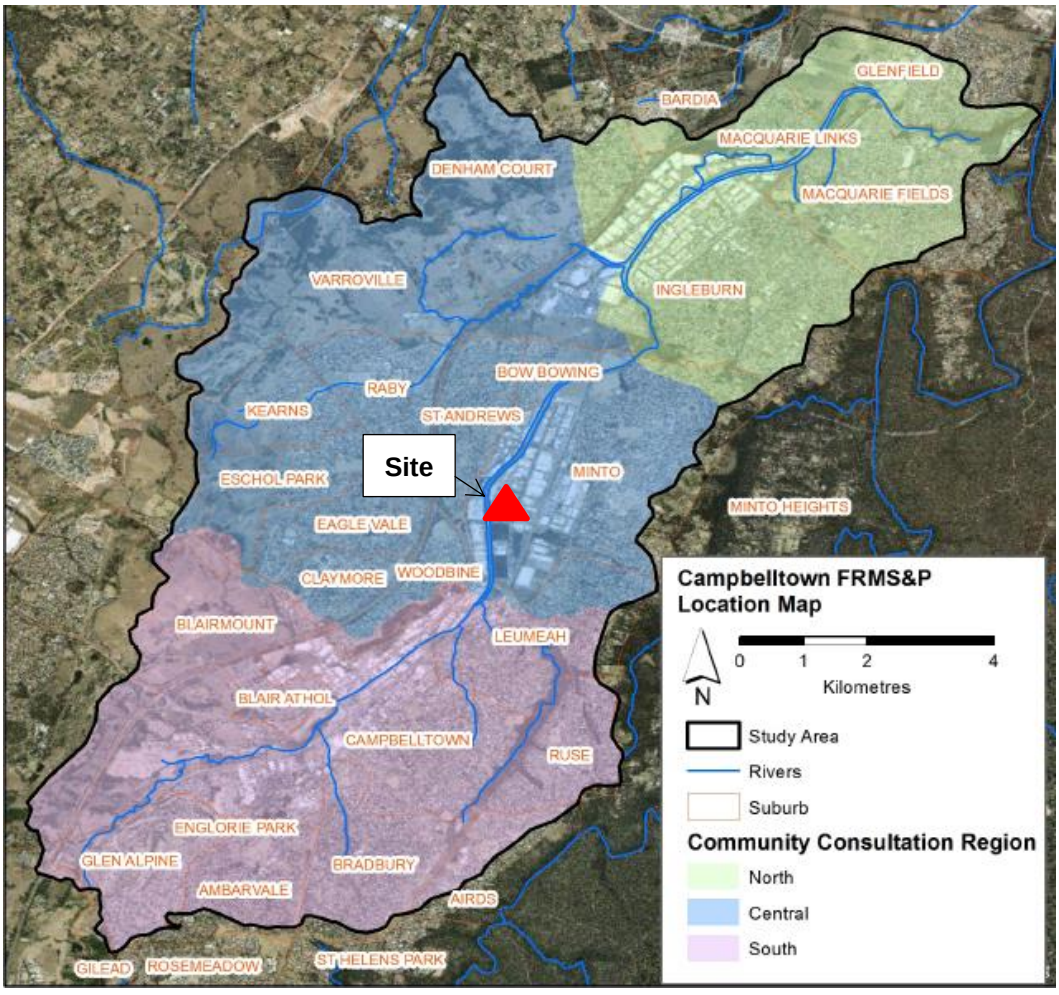


Figure 6 Bow Bowing Creek Catchment Study Area

6 EXISTING SOIL AND WATER MANAGEMENT SYSTEM

6.1 Wastewater Management

Wastewater from site amenities is currently discharged to the public sewer network.

No water bills for wastewater disposal for the Site were available to use in this assessment since the site has been recently occupied; therefore wastewater disposal estimates have been based on data from a comparative site (Waste Transfer Facility at Mortdale, New South Wales). Sydney Water bills were reviewed for a similar site at Mortdale, between the period of 8 October 2014 and 7 April 2015 for wastewater disposal. The bills indicate that 1345 KL of wastewater was discharged during this six month period. Therefore it is estimated that 2700 KL of wastewater would be discharged annually.

6.2 Potable Water

Potable water is currently used to supply internal amenity water. Roof stormwater is currently harvested but is not currently used to supplement potable water use at the Site.

No water bills for potable water use were available for the Site to use in this assessment for the reasons outlined above; therefore potable water usage estimates have been based on data from a comparative site (Waste Transfer Facility at Mortdale, New South Wales). Potable water usage at the comparative site was determined based on a review of the sites Sydney Water Bills between the period of 8 October 2014 and 7 April 2015. The bills indicate that 1689 KL of water was supplied during this six month period. Therefore it is estimated that approximately 3400 KL of water would be used annually.

Based upon the predicted annual potable water usage and the predicted annual wastewater discharge (refer to Section 6.1 it is estimated that approximately 700 KL/year of water is currently used externally (i.e. does not discharge to public sewer).

6.3 Stormwater Management

The site gently slopes towards the north and northwest. All surface water is currently conveyed (via an existing pit/pipe network) to a proprietary stormwater treatment device (Stormwater 360 Filter Chamber) before discharging offsite into the Campbelltown City Council (CCC) stormwater system which flows into Bow Bowing Creek adjacent to the site. In addition to the pit/pipe stormwater system, bunding also exists on either side of the site to ensure that runoff is contained on-site and directed to the stormwater treatment system.

Information obtained from Stormwater 360's website (Stormwater 360, 2016) indicates that the proposed treatment device cleans stormwater through a patented passive filtration system, effectively removing pollutants to meet water quality requirements. The StormFilter stormwater treatment system uses rechargeable, self-cleaning, media-filled cartridges to absorb and retain the most challenging pollutants from stormwater runoff including total suspended solids, hydrocarbons, nutrients, soluble heavy metals, and other common pollutants (Stormwater 360, 2016).

Existing stormwater pits are fitted with EnviroPod Gross Pollutant Traps (GPTs) to provide primary treatment of the site runoff prior to the downstream StormFilter stormwater treatment system.

All roof water is currently directed into an underground 100 kL rainwater tank for re-use at the site. This rainwater tank is used to reduce the demand for potable water by re-use of runoff landing on the roof surfaces at the site (i.e. for all external hose cocks and landscape watering systems).

6.4 Fuel and Chemical Management

Currently diesel is stored within an above ground bunded diesel tank which has a storage capacity of 30 000L. This tank is currently located behind Shed C. Other substances (e.g. hydraulic fluid and oils) are stored in bunded drums or containers of 220 litres or less. All fuel and chemicals are suitably contained, covered and bunded to prevent spills from reporting offsite.

Operational areas of the site are entirely covered in impervious hardstand.

7 STORMWATER QUANTITY AND QUALITY ASSESSMENT

Waste will be processed and stored in the sheds, or kept in covered waste bins until the stockpiles are removed. Material may be removed from the internal storage bays to the loading areas in the yard for the purpose of loading trucks for transport off site. This material may be kept in the loading areas awaiting removal. The stormwater discharge quality is expected to be similar to that of a standard commercial / industrial development with the key pollutants of concern including coarse sediment, suspended solids, gross pollutants, hydrocarbons, nutrients (nitrogen and phosphorous) and some trace heavy metals.

Stormwater runoff from existing and proposed roofed areas will be directed to the existing underground 100 kL rainwater tank for non-potable water re-use at the site including all external hose cocks and landscape watering systems (Appendix B). Runoff from hardstand areas will be conveyed to the stormwater drainage system for treatment prior to discharge into the existing CCC stormwater system.

The highly impervious nature of the site, lack of vegetation present and processing and storage of waste within the existing sheds is likely to result in limited generation of nutrients or oxygen demanding material.

The Stormwater 360 Stormfilter system treatment device provides treatment in terms of sediment, suspended solids, free oil and sediment-bound heavy metal removal. A minor amount of gross pollutants are likely to be removed by being trapped by metal screens and EnviroPods located in each drainage pit.

7.1 Proposed Stormwater Management Plan

The proposed stormwater management plan for the site is shown in Appendix B and includes the following:

- Use of the existing rainwater tank and associated drainage to collect runoff from all existing and proposed roofed areas;
- Changes to the existing stormwater pit/pipe network to tie in to the proposed water conveyance and treatment system;
- Use of existing Stormwater 360 Stormfilter System and existing enviropods;
- Installation of downpipes to new amenities and office building, connecting to the underground stormwater tank;
- Connection of all external hose cocks and landscape watering system to the rainwater tank;
- The modification of the pavement in Shed C and installation of a closed leachate sump pit, any leachate generated will be collected and disposed by an authorised liquid waste disposal company;
- Cleanout of all existing stormwater pipes and pits on a regular basis and verification that they are all in good working order;

- Installation of an inground wheel wash prior to the outbound weighbridge; and
- Installation of conveyors between sheds A and C to limit manual handling of material which has the potential to cause material to be tracked on hardstand areas.

7.2 Assessment Approach

7.2.1 Water Quantity

Any increase in peak flow rates and runoff volumes from the Site are anticipated to be negligible since the increase in impervious area associated with the additional car parks is very small (118m^2), additional storage capacity will be created within the proposed stormwater pit/pipe network and runoff from additional areas will be directed to the rainwater tank.

7.2.2 Pollutant load reduction criteria

The objective of providing stormwater quality controls is to safeguard the environment by improving the quality of stormwater run-off entering the receiving waters.

In accordance with the CCC DCP (Volume 2, Engineering Design for Development 2009) document the stormwater quality pollutant load reduction requirements for industrial developments, which include alterations and additions, where the increase in the roofed and impervious area is equal to or greater than 2500m^2 are:

- 80% reduction in the post development mean annual load of Total Suspended Solids (TSS);
- 45% reduction in the post development mean annual load of Total Phosphorus (TP); and
- 45% reduction in the post development mean annual load of Total Nitrogen (TN).

Whilst no significant additional impervious/hardstand areas are proposed at the site other than the 188m^2 for additional car parks, the pollutant load reduction rates have been investigated in MUSIC to assess the anticipated water quality improvements at the site.

7.2.3 MUSIC model

MUSIC modelling software was used to test the performance of the proposed stormwater treatment system.

MUSIC can be used to generate both pollutant concentrations and long term pollutant loads and is recognised as the most appropriate modelling software for the planning of stormwater treatment measures for urban catchments. The model can generate pollutant loads and event mean concentrations for TSS, TP and TN.

Typical stormwater treatment devices are generally not designed to meet concentration based water quality objectives. This is due to these criteria being set to reflect the overall water quality of the receiving water body and they are therefore not directly applicable when assessing stormwater discharge quality.

Background concentrations typically used within MUSIC for various treatment measures (1st order decay model) are generally above these target water quality objectives, therefore making the concentration based objectives unattainable. This is an industry recognised limitation.

The proposed development scenario (as detailed in Section 7.1 and Appendix B) was modelled in MUSIC as detailed in the sections below.

7.2.4 MUSIC modelling

The model data input consists of the following:

- Catchment areas and parameters including percentage impervious and pollutant generation rates – adopted based upon Appendix B and the industrial land use and roof values specified within the NSW MUSIC Modelling Guidelines respectively;
- Meteorological data for the Minto region;
- Treatment nodes were used to model the 100 kL rainwater tank, the EnviroPod GPTs and the Stormwater 360 cartridge stormfilter system and based upon information supplied by the manufacturers; and
- Conservatively estimated non-potable water re-use demand of 385 kL/year (1054 L/day).

The model pollutant parameters are un-calibrated. Therefore the MUSIC modelling results are considered to be indicative for the purpose of assessing the performance of the treatment system rather than accurately assessing pollutant load discharges.

7.2.5 MUSIC Modelling Results

The model predicts that the mean annual runoff volume generated for the site will be 6.45 ML/yr. The below ground 100kL rainwater tank is expected to reduce mean annual runoff volumes by approximately 0.71 ML/year.

MUSIC modelling results are provided in **Table 1** below.

Table 1 MUSIC modelling – Treatment Performance

Pollutant	Target %	Proposed Development		
		Predicted Reduction in pollutant load %	**Target achieved**	**Predicted Mean Annual Discharge Loads (kg/yr)**
Gross Pollutants	NA	100.0	Yes	0
TSS	80	80.4	Yes	272
TP	45	67.1	Yes	0.87
TN	45	51.1	Yes	7.26

The modelling indicates that the proposed treatment system will meet Council's objectives for gross pollutants, TSS, TP and TN for the proposed development.

A comparison of the pollutant concentrations with ANZECC freshwater criteria is shown in **Table 2** below. It is noted that the ANZECC criteria relates to ambient water quality rather than stormwater discharge quality which typically has higher pollutant concentrations. The predicted concentrations are lower than the mean concentrations reported in Australian Rainfall and Runoff (EA, 2006) for industrial site runoff and are therefore considered to be acceptable.

Table 2 Mean Pollutant Discharge Concentrations

Pollutant	Default ANZECC criteria (mg/L)	ARQ mean concentration for industrial runoff (mg/L)	Proposed Development 90 Percentile concentration (mg/L)
TSS	-	150	1.15
TP	0.05	0.3	0.024
TN	0.5	2.4	0.642

7.3 Conclusions

The combination of the proposed treatment devices will:

- Improve the quality of stormwater being discharged from the Site; and
- Provide adequate treatment in terms of reducing the key pollutants (i.e. gross pollutants, coarse sediment, suspended solids, total phosphorous, total nitrogen and free oils).

8 SOIL AND WATER IMPACTS AND MANAGEMENT METHODS

It is proposed to process and store all wastes inside, under cover or within covered waste bins. Material may be removed from the internal storage bays to the loading areas in the yard for the purpose of loading trucks for transport off site. This material may be kept in the loading areas awaiting removal. Any minimal residual leachate from these areas is conveyed to closed collection pits / sumps within the sheds which will be pumped out to tanker if required. Leachate generation will be negligible. Pollutants associated with the wastes are therefore unlikely to be conveyed by stormwater runoff into the stormwater drainage network.

8.1 Contamination and Spills

All operations will be conducted on sealed surfaces. The proposed fuel tank area is sealed and bunded. The ongoing site operations therefore pose a low risk in terms of onsite soil and groundwater contamination impacts.

Accidental spillage or poor management of fuels, oils, lubricants, hydraulic fluids, solvents and other chemicals stored onsite will be controlled through spill management actions including but not limited to:

- Minimal daily pre-start maintenance will be undertaken on the site;
- Vehicles will be serviced externally off-site;
- Training for all workers, contractors and subcontractors in relation to spill response, chemical storage, fuel deliveries and disposal of fluids;
- Maintenance of plant and equipment onsite; and
- Specific emergency spill response operating procedures for diesel leaks and spills, oil leaks and spills and other spills including the provision of spill kits at appropriate locations.

The Operational Environmental Management Plan (OEMP) for the site will incorporate proposed management practices.

8.2 Stormwater Quantity

8.2.1 Runoff

Any increase in peak flow rates and runoff volumes from the Site are anticipated to be negligible since the increase in impervious area associated with the additional car parks is very small (118m^2), additional storage capacity will be created within the proposed stormwater pit/pipe network and runoff from additional areas will be directed to the rainwater tank. The predicted mean annual runoff volume is outlined in Section 7.2.5.

8.2.2 Erosion

As the change in peak flow rates and runoff volumes caused by the proposed development will be negligible, the Project is unlikely to cause any erosion impacts to downstream waterways.

During on-site construction works, erosion and sediment control will be established and maintained in accordance with Managing Urban Stormwater: Soils and Construction - Volume 1, 4th Edition, (the Blue Book) and CCC requirements.

8.2.3 Flooding

As no additional impervious surfaces are proposed and roof water is being harvested from the new amenity and office building, the proposed Project is likely to have negligible impact on current local overland flooding or peak flow rates to the stormwater network.

8.3 Stormwater Quality

8.3.1 Stormwater Quality Improvement Assessment

Whilst no significant additional impervious/hardstand areas are proposed at the site aside from the small additional parking area, a number of additional treatment devices are proposed to improve the water quality of runoff leaving the site. Any leachate generated within the sheds will be conveyed to closed collection pits/sumps which are isolated and will be pumped out by an authorised liquid waste disposer if required.

The water quality assessment undertaken using MUSIC software indicates that the proposed development (with implementation of the proposed treatment measures detailed in Section 7.1 and Appendix A) will provide an improvement in TSS, TP and TN pollutant concentrations being discharged to CCC's downstream stormwater system.

8.3.2 Maintenance

The performance of treatment devices tends to decline as pollutant storage capacity decreases over time. Poor maintenance of roofs and gutters will also lead to increased pollutant loading to the downstream stormwater network.

The site currently has a management, maintenance and cleaning schedule that ensure stormwater management system devices are regularly inspected and cleaned out to maintain performance and reduce pollutant loading to the stormwater network.

The key stormwater management components of the proposed maintenance schedule are summarised in **Table 3** below.

Table 3 Inspection and Maintenance Schedule

Device / Surface	Inspection and maintenance requirements
EnviroPod GPTs	EnviroPod GPTs will be inspected following heavy rainfall events and on at least a weekly basis. Litter and sediment should be removed manually or via a vacuum truck as required, and prior to the baskets reaching full capacity, and disposed of at an appropriately licensed facility. Further maintenance advice should be sought from Stormwater 360.
Rainwater tank	The structural integrity of the tank and associated pipework will be regularly inspected with repairs undertaken as required. Tank inlets, insect proofing and leaf filters will be inspected and cleaned/repaired as required. Internal inspections will also be undertaken to check for evidence of access by animals, birds or insects including the presence of mosquito larvae and algal growth (green growth or scum on or in the water). If present, the access points will be identified and closed.
Stormwater 360 cartridge stormfilter system	Although the filter cartridges are siphon-actuated and self-cleaning the Stormwater 360 cartridge stormfilter system will be regularly inspected with repairs undertaken as required and pollutants removed periodically. Maintenance activities may also be required in the event of a chemical spill. Similarly, the system should be inspected after major storm events. Further maintenance advice should be sought from Stormwater 360.
Dirty gutters	Gutters will be inspected and cleaned as required. If inspection finds large amounts of leaf material or other debris, then inspection and cleaning frequency may need to be increased.
Debris on roof	Check for the presence of accumulated debris including leaf and other plant material. Accumulated material should be cleared. If tree growth has led to overhanging branches these should be pruned.
Hardstand	Hardstand areas are swept on a regular 'as needed' basis. Where wash down of hardstand areas is required, the sediment laden water should be prevented from entering stormwater pits so that sediment can be captured above ground and managed accordingly. Temporary inlet pit protection should be implemented as required (e.g. filter sock around drainage inlet).

8.4 Groundwater

Given the majority of the site ground coverage is impermeable (with the exception of the small landscaping/grass areas), the processing of all wastes occurs undercover and the site's stormwater will improve as a result of the proposed project, the potential for infiltration of contaminates into the groundwater as a result of this development is deemed negligible.

8.5 Potable Water

Due to the proposed Coolmist dust suppression system the Project is likely to increase potable water usage on-site, however the reuse of water onsite from the 100KL rainwater tank for external hose cocks connections and landscape watering, will slightly reduce this potable water demand.

Calculations based on estimations relating to hours of operation and expected flow rates suggest that the potable water usage at the site may rise from approximately 3.5 ML/year to 10 ML/year as a result of implementing the Coolmist system (dependant on usage rates).

9 CUMULATATIVE IMPACTS

9.1 Contamination and spills

Minor oil, solvent or chemical spills or leaks could potentially impact on the ecosystem within Bow Bowing Creek downstream if stormwater conveys contaminants offsite. Effective operational management practices including training, spill management and maintenance techniques should adequately mitigate any potential impacts to downstream waterways.

9.2 Stormwater quantity

As any increase in flood peak flow rates and volumes would be negligible as a result of the proposed development, no impacts to stormwater flow rates within the down-gradient stormwater drainage system or erosion in downstream waterways are anticipated.

9.3 Flooding

As any increase in flood peak flow rates and volumes would be negligible as a result of the proposed development, the proposed development is unlikely to cause any flooding impacts onsite or to neighbouring or downstream properties.

9.4 Stormwater quality

The proposed stormwater management system should adequately manage and treat the surface water runoff prior to discharge from the site. The proposed development (including the proposed treatment measures) is expected to improve the water quality discharged to CCC's downstream stormwater system.

9.5 Potable Water

Due to the proposed Coolmist dust suppression system the Project is likely to increase potable water usage onsite.

Given the expected proposed potable water usage (approximately 10 ML/year) is equivalent to approximately 42 residential dwellings; the increase in potable water usage within this industrialised area is considered to pose a negligible impact to local water resource.

9.6 Firewater

In the event of a fire, firewater will be managed through the provision of a new gate valve on the existing stormwater pipe at the exit of the site.

10 CONCLUSIONS

The Soil and Water assessment indicates that the Project and associated current and proposed management measures will adequately control impacts related to:

- Soil contamination;
- Groundwater;
- Stormwater runoff peak flow rates and volumes;
- Stormwater quality;
- Flooding; and

- Firewater

It is considered that the proposed control measures to be implemented onsite will adequately manage pollutant loading to the stormwater drainage network in relation to the key pollutants of concern including gross pollutants, coarse sediment, suspended solids and free oils. This will be verified by ongoing monitoring and further mitigation measures employed as required.

Given the size of the Site in the context of the catchment, any elevated stormwater pollutant load discharges are unlikely to pose a significant impact to the health of ecosystems within the Georges River Catchment and other downstream waterways.

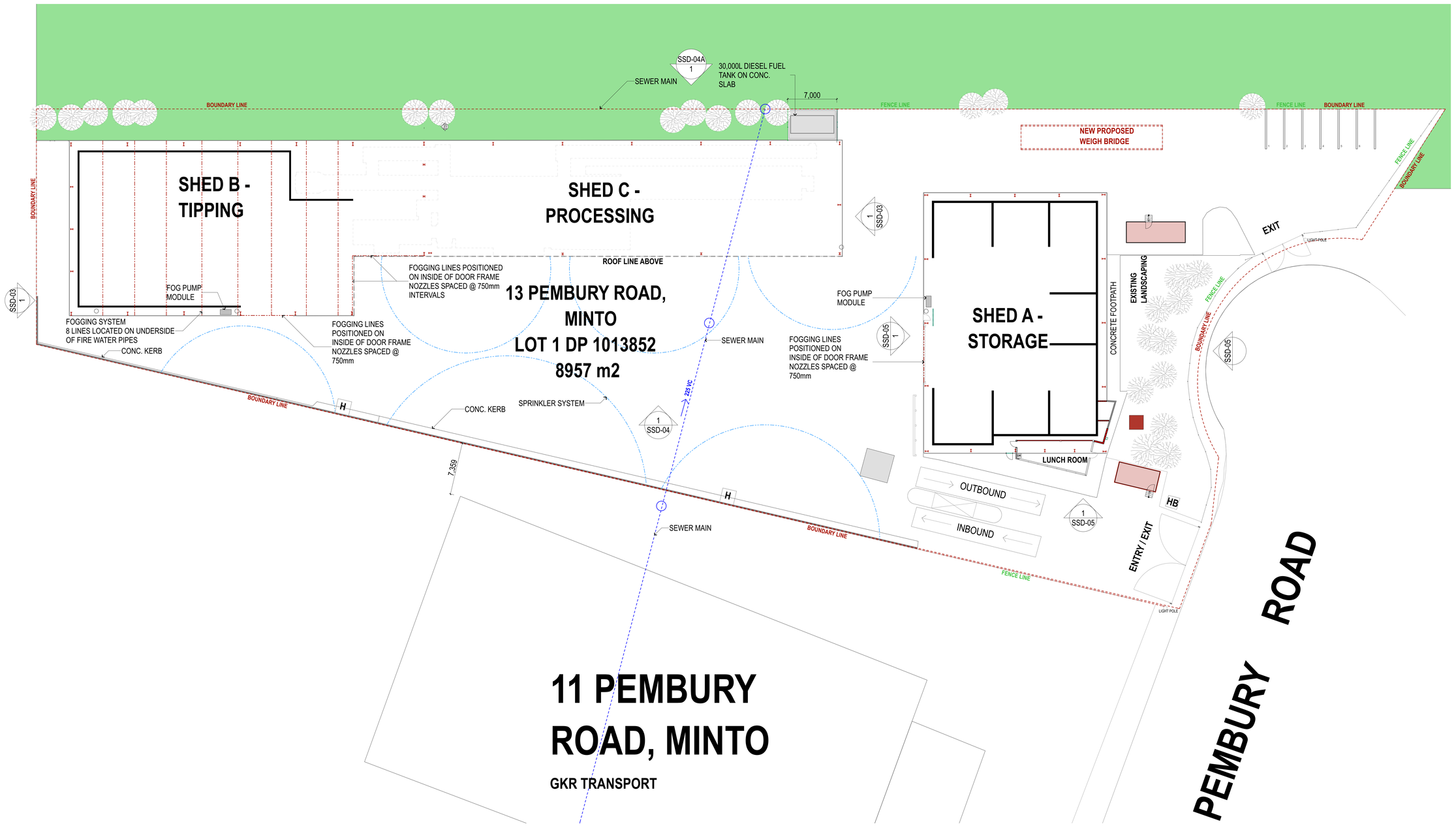
11 REFERENCES

DECC, 2009, Guide to Licensing, Under the Protection of the Environment Operations Act, 1997, Part B, Department of Environment and Climate Change NSW, June 2009

DME, 1996, Geological Survey of NSW Department of Minerals and Energy, Geological Series Sheet Wollongong 56-9, Edition 2, 1966

Stormwater 360, 2016, http://www.stormwater360.com.au/products/stormwater-management/filtration/prod/stormfilter, accessed 21 December 2016

COOLFOG SYSTEM



1
-

SPRINKLER & FOGGING LOCATION PLAN
1:200

N

LEGEND:

SPRINKLER SYSTEM -

FOGGING SYSTEM -

SKYLIFE PROPERTIES

General Notes
The Builder shall check all dimensions and levels on site prior to construction.
Notify any errors, discrepancies or omissions to the architect.
Drawings shall not be used for construction purposes until issued for construction.
Do not scale drawings.
All boundaries and contours subject to survey

Client
SKYLIFE PROPERTIES

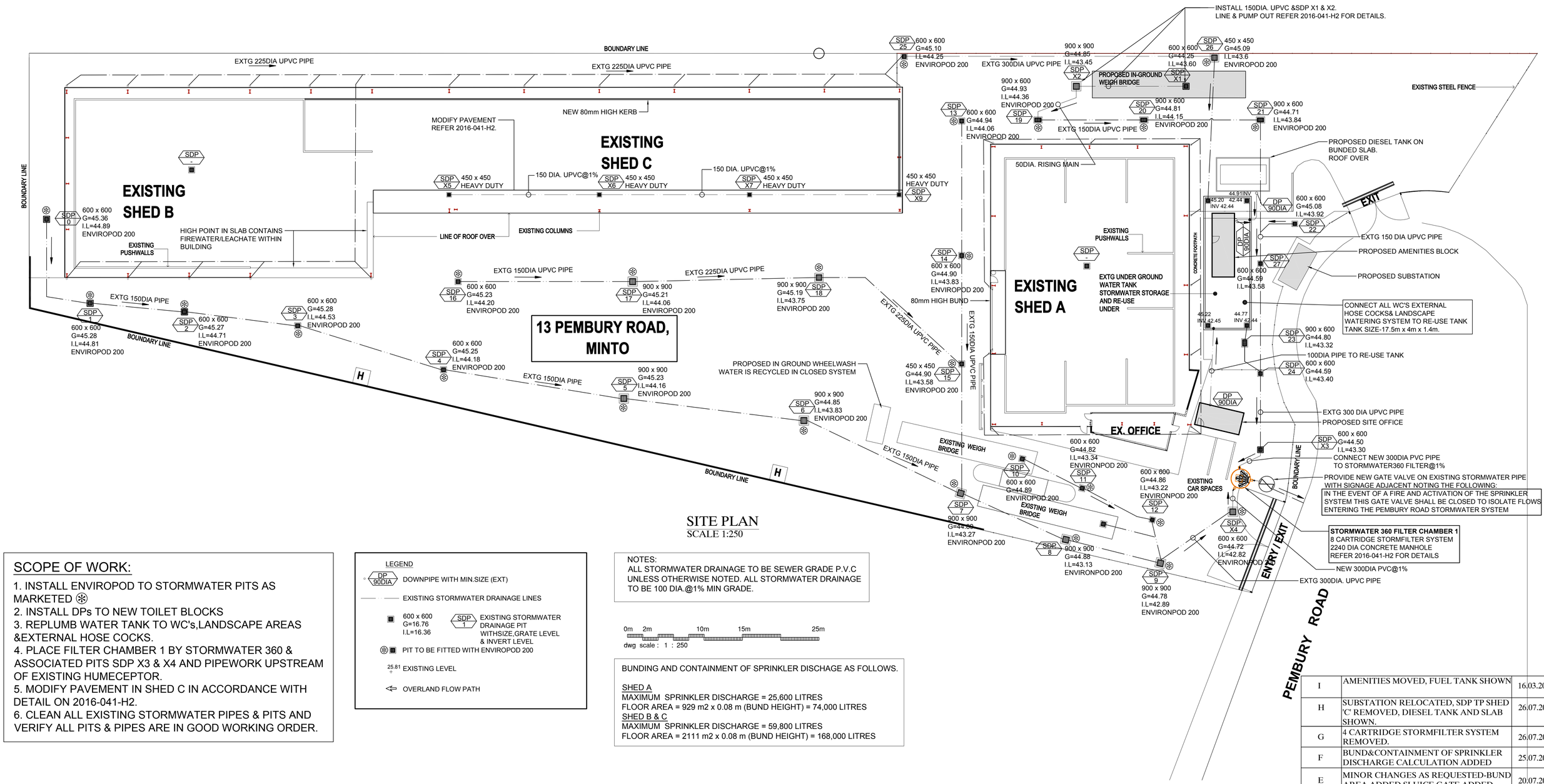
Project Name
MINTO

Drawing Title:
SPRINKLER & FOGGING SYSTEM

Scale: 1:200@A0	**Date:** 6/07/2016
Status: SSD	**Drawn By:**
Paper: A0	**Checked By:**
Project No.: MI1004	**Drawing No.:** SSD-07 **Rev** B3

Plot Date: 6/07/2016

PROPOSED STORMWATER SYSTEM



SITE PLAN
SCALE 1:250

SCOPE OF WORK:

1. INSTALL ENVIROPOD TO STORMWATER PITS AS MARKETED ⊛
2. INSTALL DPs TO NEW TOILET BLOCKS
3. REPLUMB WATER TANK TO WC's,LANDSCAPE AREAS &EXTERNAL HOSE COCKS.
4. PLACE FILTER CHAMBER 1 BY STORMWATER 360 & ASSOCIATED PITS SDP X3 & X4 AND PIPEWORK UPSTREAM OF EXISTING HUMECEPTOR.
5. MODIFY PAVEMENT IN SHED C IN ACCORDANCE WITH DETAIL ON 2016-041-H2.
6. CLEAN ALL EXISTING STORMWATER PIPES & PITS AND VERIFY ALL PITS & PIPES ARE IN GOOD WORKING ORDER.

LEGEND

- DP 90DIA — DOWNPIPE WITH MIN.SIZE (EXT)
- EXISTING STORMWATER DRAINAGE LINES
- 600 x 600 G=16.76 I.L=16.36
- SDP 1 — EXISTING STORMWATER DRAINAGE PIT WITHSIZE,GRATE LEVEL & INVERT LEVEL
- ⊛ PIT TO BE FITTED WITH ENVIROPOD 200
- 25.81 + — EXISTING LEVEL
- OVERLAND FLOW PATH

NOTES:
ALL STORMWATER DRAINAGE TO BE SEWER GRADE P.V.C UNLESS OTHERWISE NOTED. ALL STORMWATER DRAINAGE TO BE 100 DIA.@1% MIN GRADE.

0m 2m 10m 15m 25m
dwg scale : 1 : 250

BUNDING AND CONTAINMENT OF SPRINKLER DISCHAGE AS FOLLOWS.

SHED A
MAXIMUM SPRINKLER DISCHARGE = 25,600 LITRES
FLOOR AREA = 929 m2 x 0.08 m (BUND HEIGHT) = 74,000 LITRES
SHED B & C
MAXIMUM SPRINKLER DISCHARGE = 59,800 LITRES
FLOOR AREA = 2111 m2 x 0.08 m (BUND HEIGHT) = 168,000 LITRES

STORMWATER NOTES.

1. All pipes and stormwater structures shall be in strict accordance with relevant S.A.A. Codes for materials,workmanship and to rules and regulations of the local Council.
2. The drawings are diagrammatic and setouts shall be checked with the Architectural drawings.
3. All levels and dimensions shall be checked on site prior to start of construction.
4. Pipe materials indicated may be altered provided they comply with the requirements of the relevant authorities.
5. Gutter and downpipes shall be in strict accordance with AS2179&AS2180. Gutters shall have a minimum effective cross sectional area of 9300mm sq(125QUOD GUTTER or similar)with 100 dia. downpipe unless otherwise noted on plans.
6. Stormwater pipes up to and including 300 dia. shall be PVC pipes,sewer grade conforming to AS1260 and installed in accordance with AS3500.3 and related reference documents.
7. All existing services to be located prior to the commencement of construction.Any cost incurred for adjustments and/or relocation of services to be borne by the applicant.
8. Provide unrestricted overland flowpaths from all pits and drain to detention tank inlet grates.
9. On-site stormwater detention reduces flooding by providing temporary storage of stormwater during storms. After the storm,the stored water is slowly released,normally through a control orifice. System incorporating a High Early Discharge first fill the HED section, then overflow into the storage and later flow-back into HED through a one-way line.During light rain,no storage occurs.During extreme rainfall,the detention system will fill and could overflow.A typical storage system will quickly fill but take several hours to empty. Submersion during this period will not affect most grass,plants or trees.
10. Councils require that on-site detention systems be inspected during construction to enable a final Hydraulic Certificate and Work as Executed details to be supplied upon completion. Councils require that concrete works (tank bases, lids, retaining walls etc;) are inspected before pouring and a Structural Engineers Certificate is issued on completion.
11. These details are subject to approval by Council and possibly other authorities.Do not continue or commit to any works until these details are approved. Advise Design Engineer of any special conditions imposed or design variations made to the details. Any alterations (however minor) must be authorised by the Design Engineer.
12. Conditions found during construction that conflict with these details shall be reported to the Design Engineer. If in doubt, ask. Design sizes, levels, heights and depths must not be varied without approval.
13. All works are to be completed before the Final Certificate will be issued. Tanks are to be clear of all formwork, builder's rubbish and silt. The outline and sump drain is to be clear. All pits and grates are to be completed and shall be free of building material and spoil. All downpipes are to be connected. Landscape works including driveways, kerbs and drive trench grates shall be installed. Orifices, screens, step irons and tank grate locks are to be correctly fitted.Surface detention areas are to be turfed.
14. Maintenance of the on-site stormwater detention system is the responsibility of the Owner. A complete set of these details shall be provided to the present owner. The details should be passed on to subsequent owners. It is important that these systems are not modified without approval. Do not enter any pit or tank where there is risk of inadequate ventilation or buildup of noxious odours, gases, or leakage of any volatile or toxic contaminations into the chamber. Obtain professional assistance if any of these conditions occur.
15. Maintenance and cleaning is required as follows. Remove and flush clean the trash screen. Hose out the tank base and remove accumulated debris. Flush the discharge-line clear. This must be done to Council's time requirements and as all Council's vary it is the responsibility of the Owner to find out Council's requirements.
16. Orifice plates shall be fabricated from 3mm thick stainless steel, with a circular hole machined to 1/2mm. Plates shall be fixed flush using four stainless steel expansion or chemical anchors. If required by Council, the orifice plate shall also be epoxy fixed. Unless otherwise detailed, plates shall be fixed on the centreline of the outlet.
17. Screen mesh shall be Lysaght's expanded metal, type RH3030, and shall not be hot dipped galvanised after fabrication. The screen shall have elongated mesh openings set horizontal, and the projecting mesh lines pointing down and facing upstream. Screens shall be provided with a suitable handle located on the top upstream face of the screen (for removal and, for flat screens, to define the screen orientation). All screens shall be removable by hand without the use of tools. Fixing brackets shall be stainless or galvanised mild-steel type. Bracket anchors shall be stainless steel. When installed, the maximum edge gap shall be 3mm + or - 3mm.
18. One-way flaps shall be Rocla Floodgate type. Flaps shall be located clear of inlets, screens and step irons and must not prevent the screen from being removed.
19. Concrete shall be 20 MPa for footings and tank bases, and 25 MPa for suspended tank lid slabs. Mesh reinforcement shall be lapped one square plus 25mm and bar reinforcement shall be lapped 500mm.
20.Permanent (non-structural) formwork shall be Lysaght's Bondek, any grade,or equal.
21. Tanks may be in-situ or precast. Note that falls, sumps and the position and depth to orifice plates or discharge control pipe is critical: both for hydraulic and health reasons. Overflow and access grates also provide light and ventilation requirements of various Authorities. Provide step irons to all tanks over 1200 depth.
22. Tank risers should be in-situ concrete. Risers shall have the same clear internal size as the tank access opening. Provide step irons to risers as specified.
23. Individual-rung step irons to tank, tank risers and deep pits shall be an approved type (galvanised steel or high impact plastic)complying with AS 1657. Fix rungs permanently and securely by drilling and epoxy grouting. Provide the specified number of step-irons, equally spaced vertically between 250mm and 350mm, with alternate rungs offset 200mm.
24. Grates and frame units shall be hinged and childproof, using either a spring loaded bolt or a bolt and lug locking system (padlocks are not permitted). Theframes shall be securely attached to the tank or riser, or built into an in-situ slab.
25. Grates shall be class A (light duty) in paths and lawns: class B (medium duty) in residential vehicular areas: and class C (heavy duty) in public roadways.

Amendment		Date
I	AMENITIES MOVED, FUEL TANK SHOWN	16.03.2017
H	SUBSTATION RELOCATED, SDP TP SHED 'C' REMOVED, DIESEL TANK AND SLAB SHOWN.	26.07.2016
G	4 CARTRIDGE STORMFILTER SYSTEM REMOVED.	26.07.2016
F	BUND&CONTAINMENT OF SPRINKLER DISCHARGE CALCULATION ADDED	25.07.2016
E	MINOR CHANGES AS REQUESTED-BUND AREA ADDED,SLUICE GATE ADDED	20.07.2016
D	NOTES REGARDING SPRINKLER ADDED	11.07.2016
C	FILTER CHAMBER ADDED	23.06.2016
B	WEIGHT BRIDGE RELOCATED	06.06.2016
A	APPROVED FOR CDC	03.06.2016

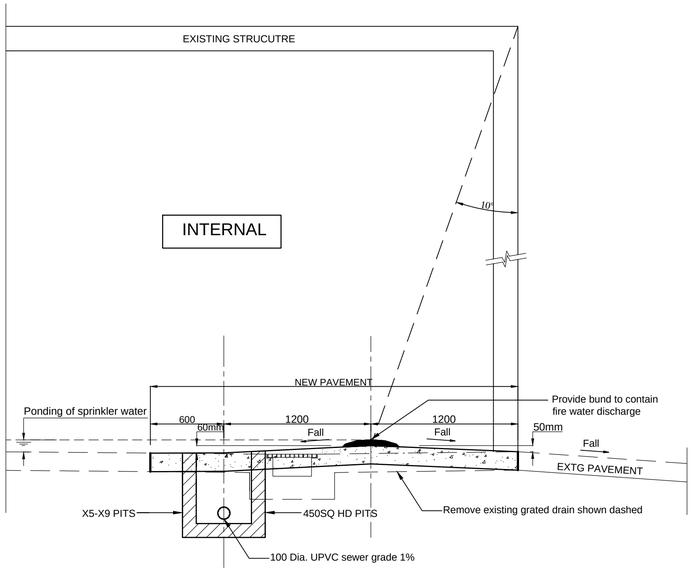
PROPOSED ALTERATIONS & ADDITIONS TO EXISTING FACTORY AT 13 PEMBURY RD, MINTO

BURGESS, ARNOTT & GRAVA PTY LTD
CONSULTING CIVIL, STRUCTURAL & HYDRAULIC ENGINEERS
61A THE CENTRE FORESTVILLE P.O. BOX 69 FORESTVILLE 2087
Ph. 9451 4411 Fax. 9975 2274
email rob@gravaconsulting.com.au

STORMWATER PLAN

Checked	Scale @ A1	Date	Drawing No.
R. GRAVA	AS SHOWN	MAY 2016	2016-041-H1
Approved		Chartered Engineer	Drawing 1 in set of 2 Drawing size A1

Figure 6b



SECTION THROUGH ENTRY TO SHED C

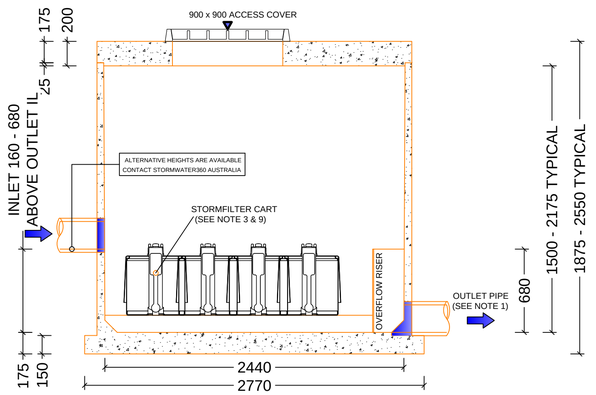
GENERAL NOTES

1. INLET AND OUTLET PIPING SHALL BE SPECIFIED BY SITE CIVIL ENGINEER (SEE PLANS) AND PROVIDED BY CONTRACTOR. STORMFILTER IS PROVIDED WITH OPENINGS AT INLET AND OUTLET LOCATIONS.
2. IF THE PEAK FLOW RATE, AS DETERMINED BY THE SITE CIVIL ENGINEER, EXCEEDS THE PEAK HYDRAULIC CAPACITY OF THE PRODUCT, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED. PLEASE CONTACT STORMWATER360 AUSTRALIA FOR OPTIONS.
3. THE FILTER CARTRIDGE(S) ARE SIPHON-ACTUATED AND SELF-CLEANING. THE ACTUAL NUMBER SHALL BE SPECIFIED BY THE SITE CIVIL ENGINEER ON SITE PLANS OR IN DATA TABLE BELOW. PRECAST STRUCTURE TO BE CONSTRUCTED BY STORMWATER360 AUSTRALIA IN ACCORDANCE WITH AS3600.
4. SEE STORMFILTER DESIGN TABLE FOR REQUIRED HYDRAULIC DROP. FOR SHALLOW, LOW DROP OR SPECIAL DESIGN CONSTRAINTS, CONTACT STORMWATER360 AUSTRALIA FOR DESIGN OPTIONS.
5. ALL WATER QUALITY PRODUCTS REQUIRE PERIODIC MAINTENANCE AS OUTLINED IN THE O&M GUIDELINES. PROVIDE MINIMUM CLEARANCE FOR MAINTENANCE ACCESS.
6. STRUCTURE AND ACCESS COVERS DESIGNED TO MEET AUSTROADS T44 LOAD RATING WITH 0.0m TO 2.0m FILL MAXIMUM (CLASS D).
7. THE STRUCTURE THICKNESSES SHOWN ARE FOR REPRESENTATIONAL PURPOSES AND VARY REGIONALLY.
8. ANY BACKFILL DEPTH, SUB-BASE, AND OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY SITE CIVIL ENGINEER.
9. CARTRIDGE HEIGHT IS 690mm FOR FILETER CHAMBER 1(SHOWN). CARTRIDGE HEIGHT AND ASSOCIATED DESIGN PARAMETERS PER STORMFILTER DESIGN TABLE.
10. STORMFILTER BY STORMWATER360 AUSTRALIA: PHONE: 1300 354 722 OR www.stormwater360.com.au

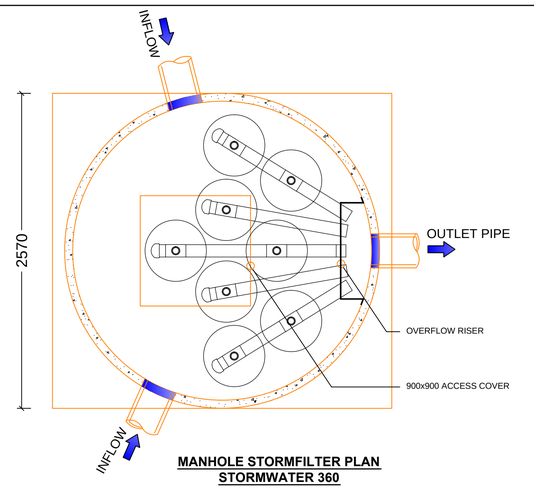
STORMFILTER DESIGN TABLE

- STORMFILTER TREATMENT CAPACITY VARIES BY NUMBER OF FILTER CARTRIDGES INSTALLED AND BY REGION SPECIFIC INTERNAL FLOW CONTROLS. CONVEYANCE CAPACITY IS RATED AT 80L/S.
- THE STANDARD CONFIGURATION IS SHOWN. ACTUAL CONFIGURATION OF THE SPECIFIED STRUCTURE(S) PER CIVIL ENGINEER WILL BE SHOWN ON SUBMITTAL DRAWING(S).
- ALL PARTS PROVIDED AND INTERNAL ASSEMBLY BY STORMWATER360 AUSTRALIA UNLESS OTHERWISE NOTED.

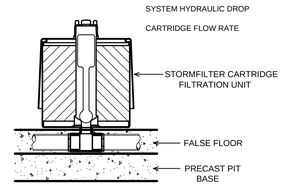
CARTRIDGE HEIGHT	690		460		310	
SYSTEM HYDRAULIC DROP (H - REQ'D. MIN.)	930		700		550	
TREATMENT BY MEDIA SURFACE AREA L/S/m2	1.4	0.7	1.4	0.7	1.4	0.7
CARTRIDGE FLOW RATE (L/s)	1.42	0.71	0.95	0.47	0.63	0.32



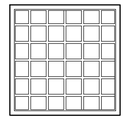
MANHOLE STORMFILTER SECTION STOMRWATER 360



MANHOLE STORMFILTER PLAN STORMWATER 360

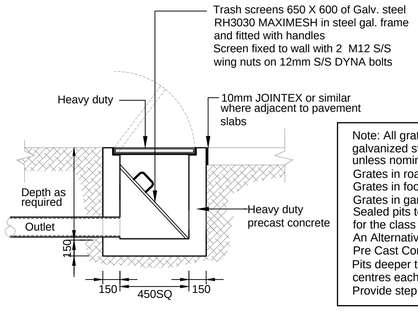


STORMFILTER CARTRIDGE DETAIL



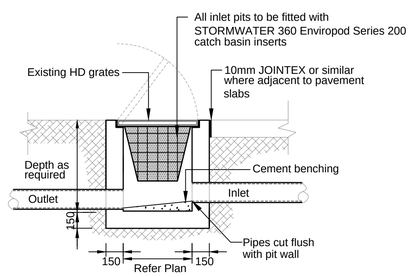
900x900 ACCESS COVER

DETAIL-STORMWATER 360 FILTER CHAMBER-1
8 CARTRIDGE STORMFILTER SYSTEM
2240DIA. CONCRETE MANHOLE



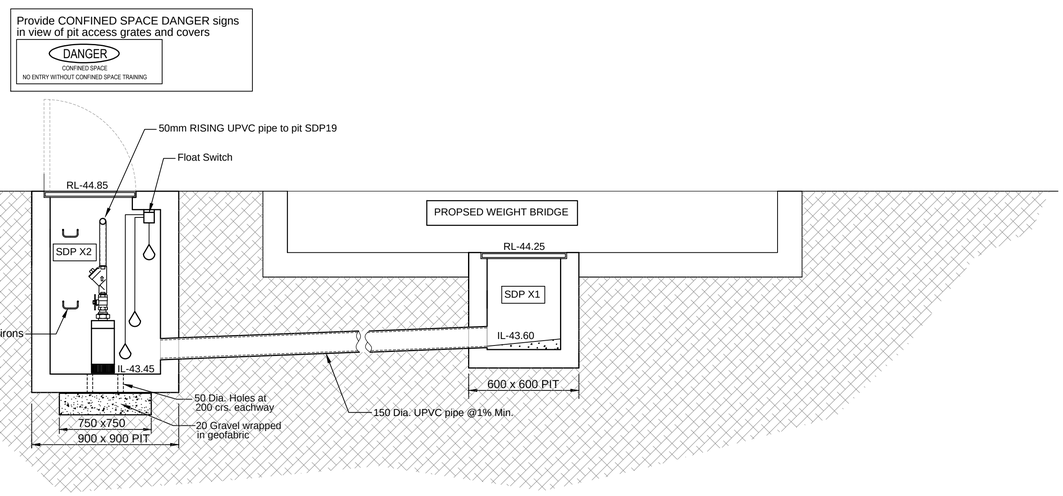
Note: All grates to be hinged galvanized steel with galvanized steel frames and fitted with lock down clips unless nominated on plan as sealed pit.
Grates in roads and driveways to be class C
Grates in footpaths and light traffic areas to be class B
Grates in gardens and landscape to be class A
Sealed pits to be provided with gas tight cast iron covers for the class loadings shown above.
An Alternative approved Pre-Cast F.R.C. or
Pre Cast Concrete pit may be used.
Pits deeper than 1200 reinforce walls with N12 at 300 centres eachway all round.
Provide step irons to pits deeper than 1200

TYPICAL HD PIT DETAIL FOR PITS X5-X9

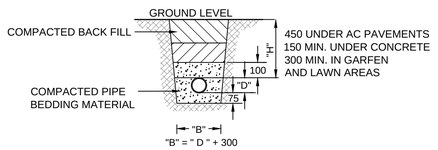


TYPICAL PIT DETAIL U.O.N-WITH OR WITHOUT ENVIROPOD

All Pits Existing



SCTION THROUGH WEIGHT BRIDGE TO PUMP OUT SDP X1-X2



FOR MATERIAL REFER AS 2566

TYPICAL SECTION OF STORMWATER DRAIN

Amendment		Date
E	4 CARTRIDGE STORMFILTER SYSTEM REMOVED	26.07.2016
D	SPRINKLER VALVE ADDED	11.07.2016
C	FILTER CHAMBER ADDED	23.06.2016
B	WEIGHT BRIDGE RELOCATED	06.06.2016
A	APPROVED FOR CDC	03.06.2016

PROPOSED ALTERATIONS & ADDITIONS TO EXISTING FACTORY FACILITY AT 13 PEMBURY RD,MINTO

BURGESS, ARNOTT & GRAVA PTY LTD
CONSULTING CIVIL, STRUCTURAL & HYDRAULIC ENGINEERS
61A THE CENTRE FORESTVILLE P.O. BOX 69 FORESTVILLE 2087
Ph. 9451 4411 Fax. 9975 2274
email rob@gravaconsulting.com.au

STORMWATER DETAILS

Checked	Scale @ A1	Date	Drawing No.
R. GRAVA	AS SHOWN	MAY 2016	2016-041-H2
Approved		Chartered Engineer	Drawing 2 in set of 2
			Drawing size A1