

SITE BASED STORMWATER MANAGEMENT PLAN

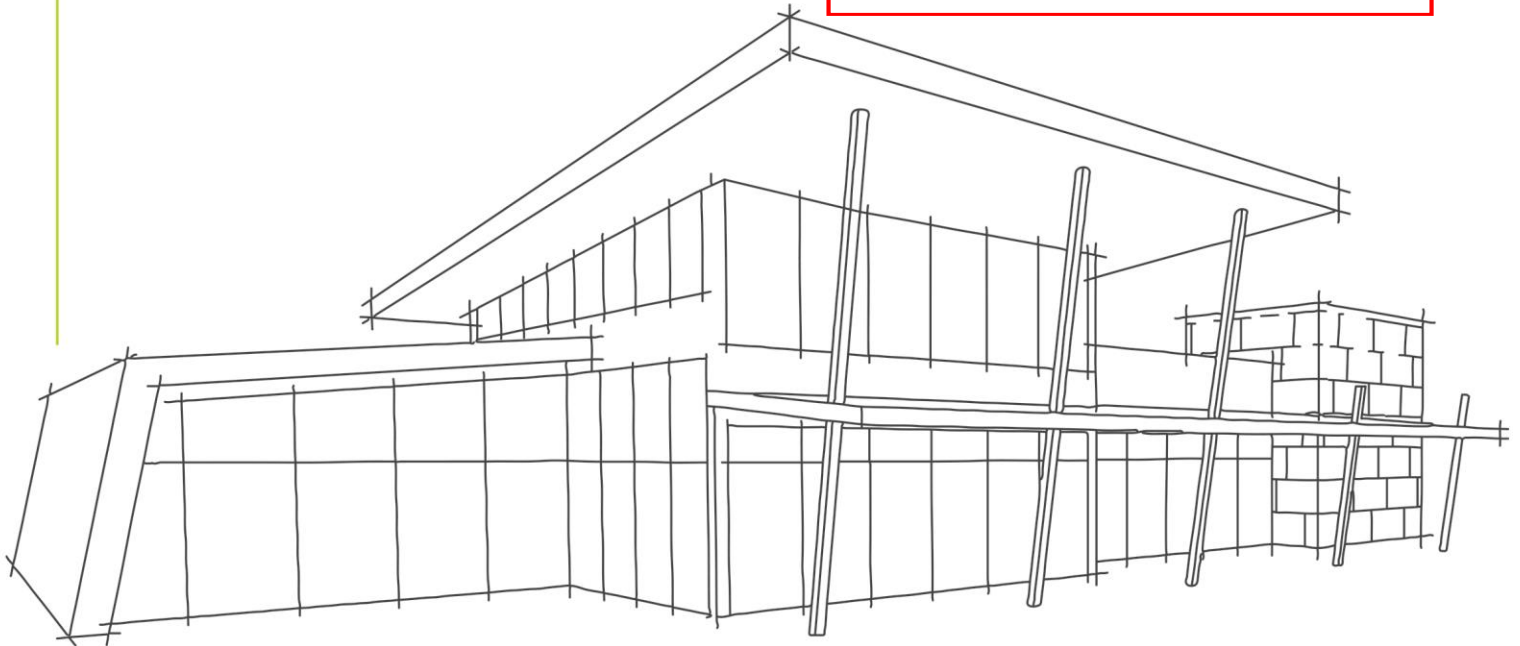
AMPOL - YARRABILBA

CNR YARRABILBA DRIVE & MILL STREET, YARRABILBA QLD 4207

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2022/1347/2

Date: 22 June 2023



CREATE • PLAN • DELIVER

PROJECT MANAGERS | PLANNERS | DESIGNERS | ENGINEERS

SITE BASED STORMWATER MANAGEMENT PLAN

Ampol - Yarrabilba

Cnr Yarrabilba Drive & Mill Street, Yarrabilba QLD 4207

CLIENT: Ampol Australia Petroleum Pty Ltd (Ampol)
ADDRESS: Cnr Yarrabilba Drive & Mill Street, Yarrabilba QLD 4207
TFA REFERENCE: 22177
TFA CONTACT: Juan Avella

Document Control

REVISION	DATE	PREPARED BY	REVIEWED BY	COMMENTS
A	17 August 2022	R. Figueiredo	J. Avella	For Review
B	20 October 2022	R. Figueiredo	J. Avella	Site Layout Updated
C	03 February 2023	B. Masuku	J. Avella	Stormwater Drainage Layout Updated
D	26 April 2023	B. Masuku	J. Avella	Stormwater Drainage Layout Updated

© TFA Group Pty Ltd, trading as Tfa Project Group

This report was constructed by Tfa Project Group (Tfa) for the sole use of the client for which the contracted services were provided. Unless required by law, copies, outputs or other information shall not be provided to a third party without our prior written consent. In no event, regardless of whether consent has been provided, do we assume any responsibility to any party to which a copy of this report or any part thereof has been made available. This report has been produced using information and assumptions identified by the client. Tfa does not take ownership or responsibility for the assumptions and information generated by this report. Any assumptions contained in this report remain the responsibility of the client. The client by accepting this report indemnifies Tfa from any actions arising from the use, application or reliance on this report. All intellectual property contained in this report remains the property of Tfa and cannot be published or reproduced in whole or in part without the express permission of Tfa.



**BRISBANE
(HEAD OFFICE)**
 166 Knapp Street
 Fortitude Valley QLD 4006
 H/O Phone: +61 7 3854 2900
 Fax: +61 7 3854 2999

SYDNEY
 Suite 315
 33 Lexington Drive
 Bella Vista NSW 2153
 NSW Phone: +61 2 8814 5219
 Australia Wide: 1300 794 300

MELBOURNE
 Suite 1401
 401 Docklands Drive
 Docklands VIC 3008
 VIC Phone: +61 3 9640 0206
 Website: www.tfa.com.au

PERTH
 Level 3
 1060 Hay Street
 West Perth WA 6005
 WA Phone: +61 8 9480 0430
 ABN: 34 612 132 233

TABLE OF CONTENTS

1.0	INTRODUCTION	5
2.0	THE SITE	6
2.1	Site Description.....	6
3.0	SITE TOPOGRAPHY AND EXISTING DRAINAGE.....	8
3.1	Description of the site current condition	8
4.0	FLOODING.....	9
4.1	Flooding information	9
5.0	PROPOSED DRAINAGE LAYOUT	10
5.1	Proposed drainage.....	10
6.0	WATER QUANTITY ASSESSMENT	11
6.1	Catchment Analysis	11
7.0	WATER QUALITY ASSESSMENT	13
7.1	Construction Phase.....	13
7.1.1	Pollutants.....	13
7.1.2	Performance objectives.....	13
7.1.3	Monitoring and maintenance.....	13
7.1.4	Responsibility and reporting.....	14
7.2	Operational Phase	14
7.2.1	Pollutants.....	14
7.2.2	Water Quality Objectives.....	14
7.3	Proposed Stormwater Treatment.....	15
7.3.1	Stormwater treatment philosophy.....	15
7.3.2	Source Controls	15
7.3.3	In Ground Proprietary Treatment Devices	15
7.4	MUSIC Modelling	15
7.4.1	Introduction.....	15
7.4.2	Music Model Setup.....	15
7.4.3	Music Modelling Results.....	17
8.0	SITE MAINTENANCE AND MANAGEMENT PROCEDURES	19
8.1	Maintenance Plans for Stormwater treatment devices	19
9.0	LIFECYCLE COSTS.....	20
10.0	CONCLUSION	21
	APPENDIX A – PROPOSED SITE LAYOUT PLAN	22

APPENDIX B – SITE SURVEY PLAN	23
APPENDIX C – CONCEPTUAL STORMWATER MANAGEMENT PLAN	24
APPENDIX D – STORMWATER TREATMENT SYSTEMS	25

APPENDICES

APPENDIX A – PROPOSED SITE LAYOUT PLAN
APPENDIX B – SITE SURVEY PLAN
APPENDIX C – CONCEPTUAL STORMWATER MANAGEMENT PLAN
APPENDIX D – STORMWATER TREATMENT SYSTEMS

FIGURES

Figure 1: Site Overview (Source: Qld Globe)	6
Figure 2: Approved Lot 2 under DEV2022/1259 (Source: Qld Planning & Survey).....	7
Figure 3: Development Flooding Information (Source: Overlay Map OM-05 ‘Flood Hazard Overlay’).....	9
Figure 4: Sub-Catchment impervious to pervious boundary areas (Queensland Globe)	11
Figure 5: Sub-Catchment Plan (Yarrabilba Precinct 3 Flood Study)	12
Figure 6: MUSIC model schematic Cnr Yarrabilba Drive & Mill Street, Yarrabilba QLD 4207 (Stage 1).....	16
Figure 7: MUSIC model schematic Cnr Yarrabilba Drive & Mill Street, Yarrabilba QLD 4207 (Stage 2).....	17

TABLES

Table 1: Details of proposed development	5
Table 2: Pollutant typically generated during the construction phase	13
Table 3: Construction phase performance criteria.....	13
Table 4: Pollutant typically generated during the operational phase.....	14
Table 5: Operational Phase water quality objectives	14
Table 6: MUSIC catchment parameters (Stage 1).....	16
Table 7: MUSIC catchment parameters (Stage 2).....	16
Table 8: Details of proprietary treatment systems as modelled in MUSIC (Stage 1)	17
Table 9: Details of proprietary treatment systems as modelled in MUSIC (Stage 2)	17
Table 10: MUSIC model treatment effectiveness (Stage 1)	18
Table 11: MUSIC model treatment effectiveness (Stage 2)	18
Table 12: Maintenance Requirements	19

1.0 INTRODUCTION

This Site Based Stormwater Management Plan (SBSMP) has been prepared by TFA Group on behalf of Ampol Australia Petroleum Pty Ltd (the applicant). The purpose of this document is to verify that stormwater quality and quantity have been considered as part of this development and do not have any adverse impact on the downstream environment as outlined in the State Planning Policy July 2017, Yarrabilba Stormwater Infrastructure Master Plan (Designflow, 2012), Yarrabilba Total Water Cycle Management Strategy (Designflow, 2012) and Queensland Urban Drainage Manual 2016.

The proposed development will be implemented in two Stages, Stage 1 and Stage 2. Both Stages will involve the construction of a Fast-Food building with drive thru facilities, car parking areas with associated driveways, walkways and landscape areas.

The SBSMP is part of the Development Approval process and addresses both the construction and operational phases of the development of stage 1. Table 1 below shows additional details of the proposed development. The proposed site layout plan is shown in **Appendix A**.

Table 1: Details of proposed development

Developer	Ampol Australia Petroleum Pty Ltd
Address	Cnr Yarrabilba Drive & Mill Street, Yarrabilba QLD 4207
Property Description	Lot 12 on SP304357
Area of Development	Overall Site Area: 10,040 m ² Development Area (Stage 1 & Stage 2): 4,737 m ² Approximate Works Area (Stage 1): 2,044 m ²
Stormwater Risk Classification	Low risk
Existing Land Use	Vacant land

2.0 THE SITE

2.1 Site Description

The overall site, formally referenced as Lot 12 on SP304357, comprises 10,040 m² in area. The site is currently vacant land and relatively level.

The subject area (approved Lot 2 under DEV2022/1259) of the overall site which will accommodate the proposed fast-food premises, has a lease area size of 4,737m². The site has two street frontages, to Yarrabilba Drive and Mill Street.

The site includes available stormwater, sewer, water and electrical / communications utilities and service points to connect into. Refer Figure 1 below and Figure 2 overleaf, which provides an aerial view of the overall site and indicates the subject site (approved Lot 2 under DEV2022/1259).



Figure 1: Site Overview (Source: Qld Globe)

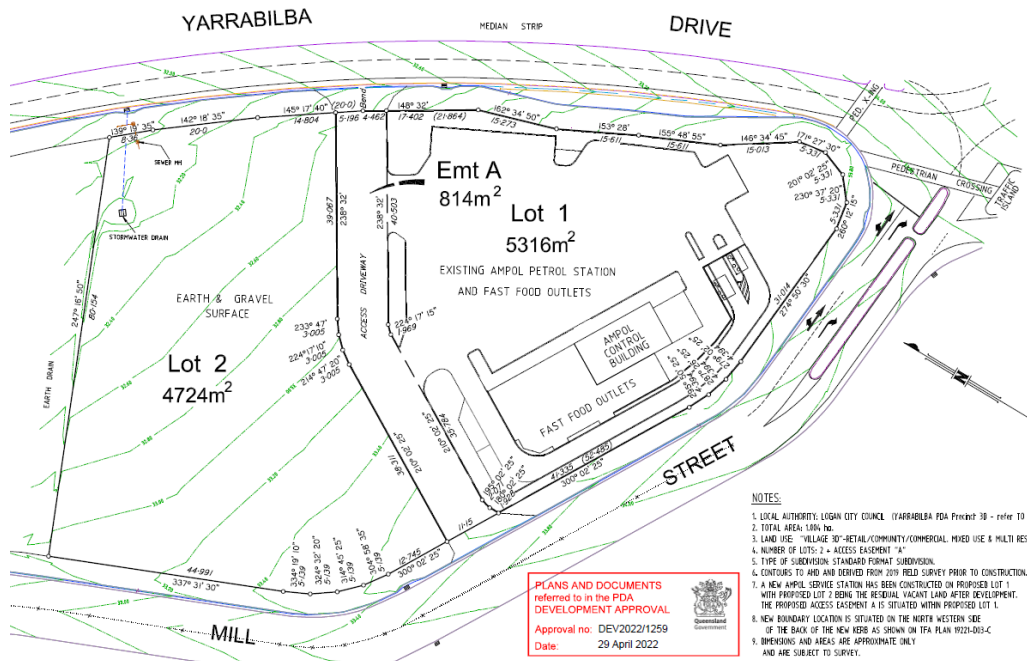


Figure 2: Approved Lot 2 under DEV2022/1259 (Source: Qld Planning & Survey)

3.0 SITE TOPOGRAPHY AND EXISTING DRAINAGE

3.1 Description of the site current condition

Refer to **Appendix B** for the survey plans provided by Queensland Planning & Survey Pty Ltd. dated the 19 December 2019, which show the condition of the site.

The development site has existing surface levels approximately between RL 34.27m AHD to RL 31.87m AHD. The ground falls from south-east to north-west. Stormwater runoff generated from the lot is captured by 1x1200 sq. gully pits, which convey flows to an existing gully pit located on Yarrabilba Drive via Ø 375 pipe. Refer to section 6.1 for the site's pre-development catchment analysis.

4.0 FLOODING

4.1 Flooding information

Based on Logan City Council Planning Scheme 2015 v8.1 Overlay Map OM-05 'Flood hazard overlay', the site is not within any flood and storm tide hazard. An extract of this overlay map is shown in Figure 3 which indicates the extension of flood events near the site. Therefore, it is anticipated that flooding will not affect the proposed buildings on this development.



Figure 3: Development Flooding Information (Source: Overlay Map OM-05 'Flood Hazard Overlay')

5.0 PROPOSED DRAINAGE LAYOUT

5.1 Proposed drainage

Overall, the existing catchment boundary has been generally maintained in the post development scenario. The proposed drainage will capture and convey stormwater runoff generated to a SPEL Vault with SPEL filters for hydrocarbon and nutrients removal. Treated flows will then be discharged to the council's stormwater network. Refer to Section 7 for the site's stormwater quality assessment.

The SPEL filters will be installed within the SPEL Vault and a licensed contractor will perform maintenance as specified by the manufacturer. For details of the SPEL Filters refer **Appendix E**.

Each individual SPEL filter cartridge can treat flows up to 2.83 L/s, therefore the runoff generated from the site will be conveyed and directed to the SPEL Vault with a concrete weir where flows above the constructed SPEL filter system will be diverted, bypassing treatment.

Treated stormwater flows from the SPEL Vault will be discharged into a manhole and directed to the lawful point of discharge. The proposed lawful point of discharge will be a new manhole constructed over the existing pipe discharge located North of the site. Refer **Appendix C** for the proposed Conceptual Stormwater Management Plan.

6.0 WATER QUANTITY ASSESSMENT

The purpose of this part of the assessment is to investigate whether there is a need to attenuate stormwater flows to negate any adverse impacts on upstream or downstream environments.

6.1 Catchment Analysis

The proposed development area (0.47 ha) is located between sub-catchments X_N16 and X_N4B as per Yarrabilba's Precinct 3 Flood Study of 2016, displayed in Figure 4 and Figure 5 below. Modelling undertaken to size the precinct's detention basins assumed both catchments will incorporate impervious areas in the order of 37% and 33% respectively.

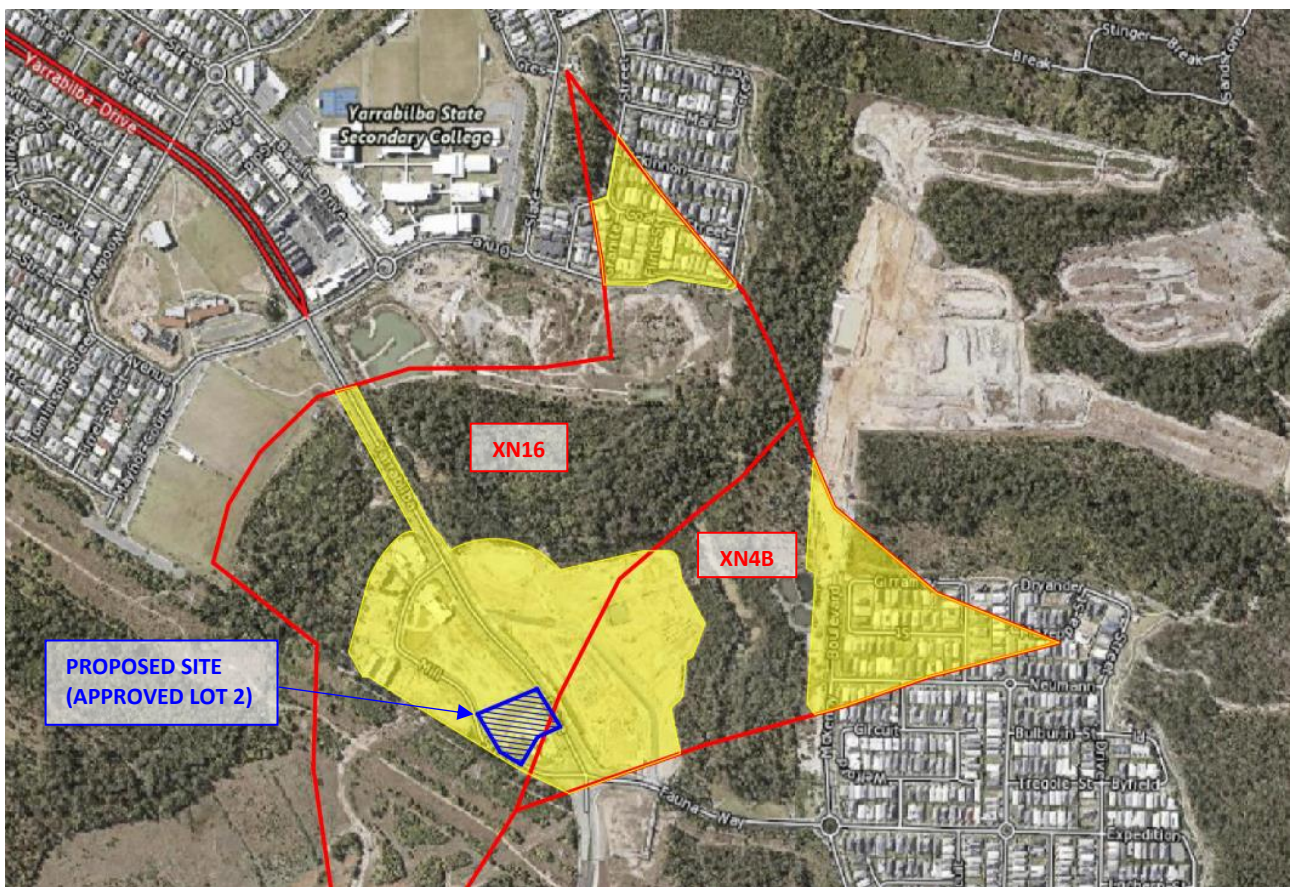


Figure 4: Sub-Catchment impervious to pervious boundary areas (Queensland Globe)

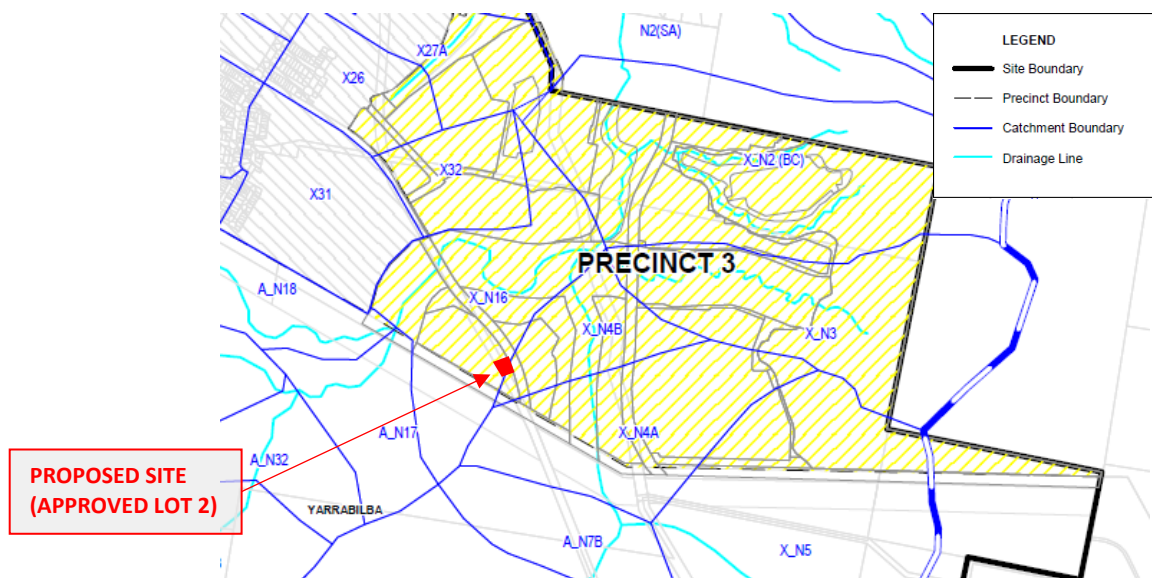


Figure 5: Sub-Catchment Plan (Yarrabilba Precinct 3 Flood Study)

Overlaying recent aerial photographs of the precinct with the approximate extent of the abovementioned sub-catchments, it can be seen that the extent of the impervious/developed areas (highlighted yellow in Figure 4 above) are approximately in line with the assumptions made in the flood modelling study. Therefore, it has been assumed that the runoff from the proposed development has already been allowed for in the overall Yarrabilba Precinct 3 stormwater quantity management and flood mitigation measures (detention basins).

7.0 WATER QUALITY ASSESSMENT

7.1 Construction Phase

Impacts on receiving waters and surrounding areas will be minimised during the construction phase with measures as outlined in this SBSMP and the Erosion and Sediment Control Plan to be developed for the Operational works.

7.1.1 Pollutants

Typical pollutants generated during the construction phase of the development are shown below in Table 2.

Table 2: Pollutant typically generated during the construction phase

Pollutant	Sources
Litter	Paper, construction packaging, food packaging, cement bags, off-cuts
Sediment	Unprotected exposed soils and stockpiles during earthworks and building
Hydrocarbons	Fuel and oil spills, leaks from construction equipment
Toxic materials	Cement slurry, asphalt prime, solvents, cleaning agents, wash-waters
pH altering substances	Acid sulphate soils, cement slurry and wash-waters

7.1.2 Performance objectives

The objectives are:

- Minimise the amount of sediment entering waterways and stormwater drains;
- Minimise or prevent environmental harm to waterways and associated ecosystems;
- Minimise localised flooding caused by sediment runoff;
- Minimise exposure of soils.

Table 3: Construction phase performance criteria

Indicator	Water Quality Objectives
pH	6.5 – 8.5
Suspended Solids	Annual Mean < 10mg/L
Oils and Grease	No visible films or odour
Litter/ Gross pollutants	No anthropogenic (man-made) materials greater than 5mm in any dimension
Dissolved oxygen	80-100% saturation

7.1.3 Monitoring and maintenance

The general requirement of monitoring during the construction phase will be:

- Work activities are restricted to designated construction areas;
- Earthworks and site clearing are undertaken in accordance with an Erosion and Sediment Control Plan;
- Erosion and sediment control devices are to be constructed/installed in accordance with an Erosion and Sediment Control Plan;

- Inspection of sediment fences, erosion and sediment control structures/devices on a weekly basis as well as after any rain event exceeding 25mm in 24hrs (major storm event);
- Stormwater discharges from the site are not having any adverse effect on the downstream environment;
- Monitoring and recording of the performance of the drainage control devices including water quality testing where required;
- Any failure in the stormwater system shall be immediately rectified to prevent uncontrolled discharge from the site;
- Any failure to the stormwater system causing damage to surroundings should implement immediate remedial work to the damaged area.

7.1.4 Responsibility and reporting

- The contractor shall be responsible for monitoring the performance of all drainage control and erosion and sediment control devices;
- Records of any failures to devices should be kept and reported to the Construction Manager;
- Regular inspections of the devices shall be reported to the Construction Manager;
- Inspections of the devices after heavy rainfall shall be reported to the Construction Manager;

7.2 Operational Phase

7.2.1 Pollutants

The key pollutants typically generated during this phase for the entire catchment are shown in Table 4.

Table 4: Pollutant typically generated during the operational phase

Pollutant	Potential Source
Litter / Gross Pollutants	Waste materials, food, food packaging etc.
Hydrocarbons	Fuel and oil spills, dispensing areas, car park
Nutrients (N & P)	Nitrogen, Phosphorus
Sediments	Aggregates bins, wind deposits and car trails
Surfactants	Detergents, cleaning agents

7.2.2 Water Quality Objectives

Based on Yarrabilba – Stormwater Infrastructure Master Plan (Designflow, 2012), which are consistent with the State Planning Policy (2017), the development is required to achieve the TN, TP and TSS pollutant reductions outlined in Table 5.

Table 5: Operational Phase water quality objectives

Pollutant	Reduction*
Total Suspended Solids	80%
Total Phosphorus	60%
Total Nitrogen	45%
Gross Pollutants >5mm	90%

**These values represent the minimum required reductions in the average annual pollutant loads generated from an unmitigated development.*

7.3 Proposed Stormwater Treatment

7.3.1 Stormwater treatment philosophy

Waterways and other aquatic environments are valued by the community for their social, cultural, economic and environmental benefits. Urban runoff, contaminated with nutrients, sediment and other pollutants adversely impacts these valued resources. Water Sensitive Urban Design (WSUD) is a holistic approach to the planning and design of urban landscapes that minimises these negative impacts. This approach is used on this project to select the treatment options that considers the civil, landscape and ecological aspects of the site.

7.3.2 Source Controls

Rubbish bins can be an effective source control for litter and are appropriate for most developments. Bins will be placed in appropriate areas (such as buildings and staff amenity) to encourage thoughtful waste disposal.

7.3.3 In Ground Proprietary Treatment Devices

In ground proprietary stormwater treatment devices are useful for treatment of stormwater on sites that are constrained by available area for stormwater treatment. These devices are installed underground and can remove a full range of pollutants from stormwater, including TSS, soluble heavy metals, oil, grease and nutrients.

7.3.3.1 Stormwater Treatment Device:

All runoff will discharge into a combined SPEL detention tank and filtration system for treatment. The SPEL SF.45-EMC-M filter system has the capacity to treat flows and achieve reduction of gross pollutants with a 2.83L/s treatment capacity (per filter) and achieves reduction of gross pollutants (GP) 91%, suspended solids (TSS) 91%, total phosphorus (TP) 75%, total nitrogen (TN) 58%. Refer to section 7.5 for the proposed development MUSIC modelling assessment. Refer to App

7.4 MUSIC Modelling

7.4.1 Introduction

The Model for Urban Stormwater Improvement Conceptualisation (MUSIC - Version 6.3) was used to assess the performance of the proposed stormwater treatment measures required to achieve statutory pollutant reduction targets for the operational phase of the project.

7.4.2 Music Model Setup

The input parameters for source node, soil behaviour and pollutant generation characteristics are based on Table A1.2 and 3.9 of MUSIC Modelling Guidelines Version 3.0 - 2018, WaterByDesign (2018). The following inputs were used:

- MUSIC Modelling Guidelines Version 3.0 - 2018, WaterbyDesign
- Queensland Urban Drainage Manual (QUDM), Second Edition 2016
- Ormeau Station No: 40863

The details of the catchments/source nodes used in the MUSIC model and the proposed treatment train modelled, for stage 1 and stage 2 are shown in Table 6 and 7 respectively.

Table 6: MUSIC catchment parameters (Stage 1)

Catchment	Total Area (m ²)	Split Catchment Area (m ²)	Land Use	% Impervious	Proposed treatment train
Proposed Development	2,044	270	Roof areas	100	SPEL SF.45-EMC-M filters SPEL Stormsacks
		1,435	Paved areas	100	
		339	Landscaped areas	0	

Table 7: MUSIC catchment parameters (Stage 2)

Catchment	Total Area (m ²)	Split Catchment Area (m ²)	Land Use	% Impervious	Proposed treatment train
Proposed Development	4,737	516	Roof areas	100	SPEL SF.45-EMC-M filters SPEL Stormsacks
		3,258	Paved areas	100	
		963	Landscaped areas	0	

The proposed stormwater treatment train modelled in MUSIC consists of a combined system of SPEL stormsacks and SPEL filters for the site. Figure 6 and 7 below shows a schematic representation of the models analysed for both stage 1 and stage 2 respectively. Table 10 and table 11 demonstrates that the pollutant load reduction objectives for the site have been achieved for Stage 1, i.e. the treatment methods proposed are adequate.

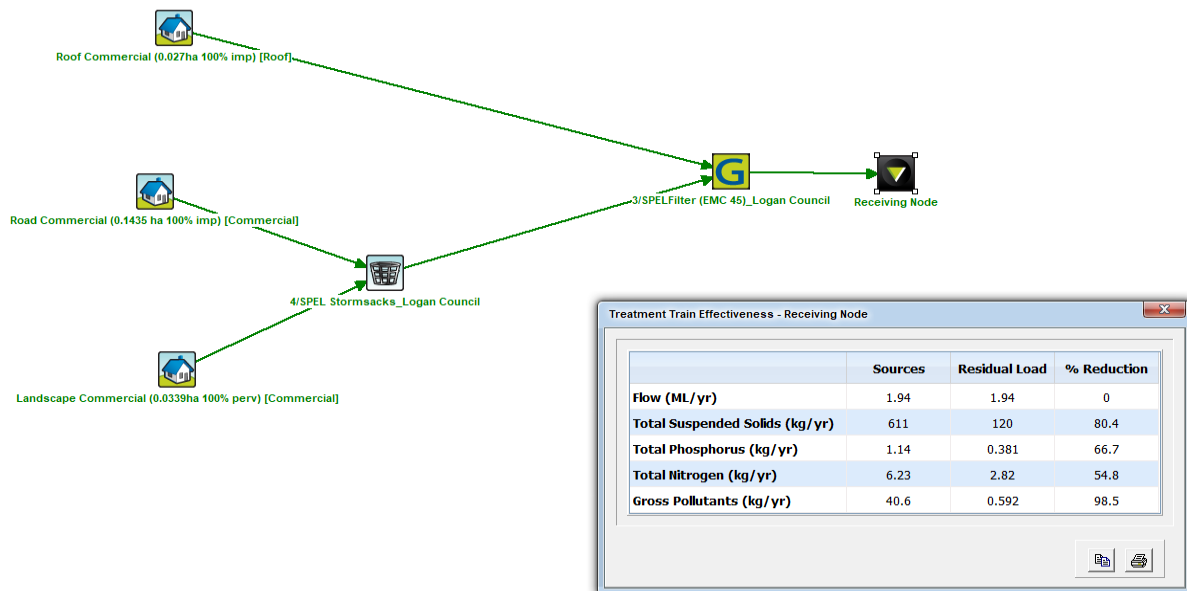


Figure 6: MUSIC model schematic Cnr Yarrabilba Drive & Mill Street, Yarrabilba QLD 4207 (Stage 1)

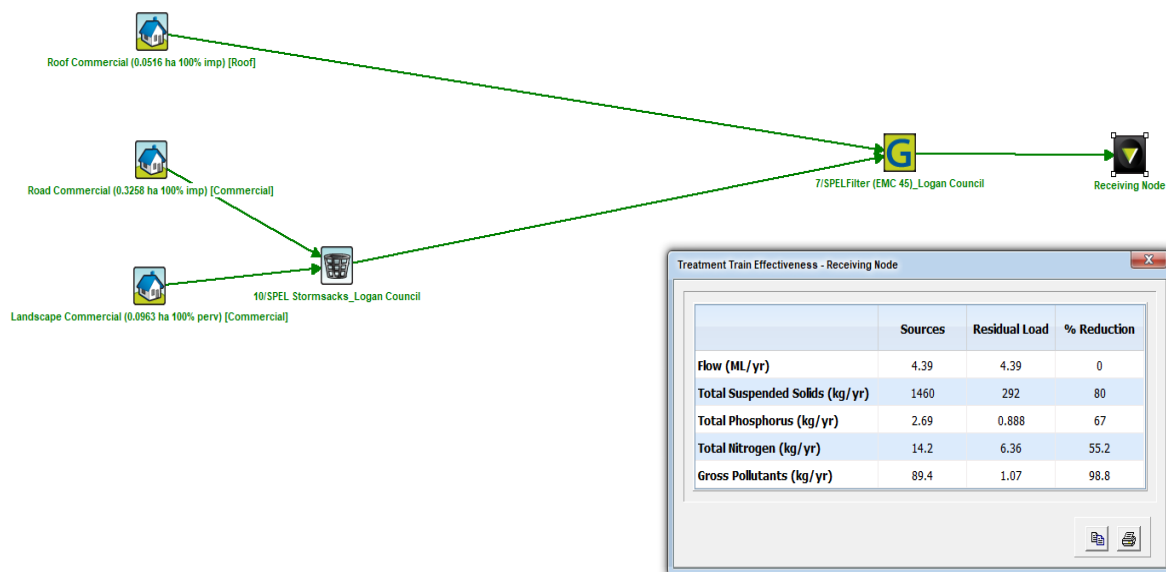


Figure 7: MUSIC model schematic Cnr Yarrabilba Drive & Mill Street, Yarrabilba QLD 4207 (Stage 2)

7.4.3 Music Modelling Results

The proposed stormwater treatment measures were modelled in MUSIC as a treatment train consisting of a SPEL SF.45-EMC-M filter system for the post-development catchment. Table 8 and 9 below show details of proprietary products modelled in MUSIC. It is to be noted that, Table 9 shows the total number of SPEL filters at the completion

Table 8: Details of proprietary treatment systems as modelled in MUSIC (Stage 1)

Catchment	System Used	Number of Units
Post-Dev.	SPEL SF.45-EMC-M filter	3
	SPEL Stormsacks	4

Table 9: Details of proprietary treatment systems as modelled in MUSIC (Stage 2)

Catchment	System Used	Number of Units
Post-Dev.	SPEL SF.45-EMC-M filter	7*
	SPEL Stormsacks	10*

* The number of SPEL filters and SPEL Stormsacks shown on Table 9, is the total at the completion of the development (Stage 1 and Stage 2).

Table 10 and 11 below, demonstrates that the pollutant load reduction objectives for the site have been achieved, i.e. the treatment methods proposed are adequate.

Table 10: MUSIC model treatment effectiveness (Stage 1)

Parameter	Required Load Reduction	Music Results	Objective Achieved
Total Suspended Solids	80.0%	80.4%	Yes
Total Phosphorus	60.0%	66.7%	Yes
Total Nitrogen	45.0%	54.8%	Yes
Gross Pollutants	90.0%	98.5%	Yes

Table 11: MUSIC model treatment effectiveness (Stage 2)

Parameter	Required Load Reduction	Music Results	Objective Achieved
Total Suspended Solids	80.0%	80.0%	Yes
Total Phosphorus	60.0%	67.0%	Yes
Total Nitrogen	45.0%	55.2%	Yes
Gross Pollutants	90.0%	98.8%	Yes

8.0 SITE MAINTENANCE AND MANAGEMENT PROCEDURES

A regular cleaning, maintenance program/contract is to be established by the site operator for emptying of rubbish bins located around the site, removal of general litter from the site, inspection of stormwater gully pits and removal of any captured litter from the pit grates.

The maintenance program will address the following:

- Inspection frequency;
- Maintenance frequency;
- Data collection/storage requirements;
- Detailed cleanout procedures.

The plan will include inspection procedures covering aspects such as equipment needs, maintenance techniques, occupational health and safety, public safety, environmental management considerations, disposal requirements of pollutants collected and access issues.

8.1 Maintenance Plans for Stormwater treatment devices

All stormwater quality improvement systems require regular maintenance in order to function adequately. Table 9 details the basic maintenance requirements for each type of stormwater quality improvements systems. A detailed maintenance schedule will be developed as part of the detailed design of the site.

Table 12: Maintenance Requirements

Control	Maintenance Requirement	Maintenance Period
Spel Filters	Inspect for any damage to filter cartridge or chamber. Remove sediment accumulated on the vault floor.	4 Months (inspect after major storm)
SPEL Stormsacks	Remove sediment and captured litter	4 Months (inspect after major storm)

For operational and maintenance guidelines refer to **Appendix E** and relevant manufacturer's documentation.

9.0 LIFECYCLE COSTS

A lifecycle cost analysis is not part of the scope of this report. All the recommended water quality treatment infrastructure lies within the development site and it shall be maintained and serviced by the owners of the development at no cost to Council.

10.0 CONCLUSION

A Site Based Stormwater Management Plan has been prepared with respect to the proposed service station and food & drink premises. The location of the site is shown on Figure 1 and the proposed development site layout is shown in **Appendix A**.

- **Stormwater Quantity**
The required “no worsening” of stormwater conditions external to the site is maintained as per the Yarrabilba Flood Study of 2016, since the proposed impervious fraction of the site is already incorporated in the impervious areas of the order of 37% and 33% for the corresponding sub-catchments. Therefore, on-site detention is NOT required.
- **Stormwater Quality- Construction Phase**
An Erosion and Sediment Control Plan aimed at minimising unacceptable impacts during the construction phase will be developed at the Operational Works stage, in accordance with Council Guidelines and Standards aiming to minimise unacceptable impacts to occur during the construction phase.
- **Stormwater Quality- Operational Phase**
Conceptual MUSIC models for the site indicated that the proposed treatment measures will achieve the statutory water quality objectives for the site. Refer section 7.4 of this report for details. The proposed treatment is shown in **Appendix C**.

This Site Based Stormwater Management Plan has demonstrated that adequate stormwater quantity and quality management principles and techniques will be employed during the construction and operational of this development to comply with the Queensland State Planning Policy 2017, Yarrabilba Stormwater Infrastructure Master Plan (DesignFlow, 2012), Yarrabilba Total Water Cycle Management Strategy (Designflow, 2012) and Queensland Urban Drainage Manual 2016. The methods proposed are considered current best management practice for a development of this type, on this site.

Yours faithfully



Butholezwe Masuku
BEng (Hons), MIEAust
Civil Engineer

For and on behalf of TfA Group

Reviewed by



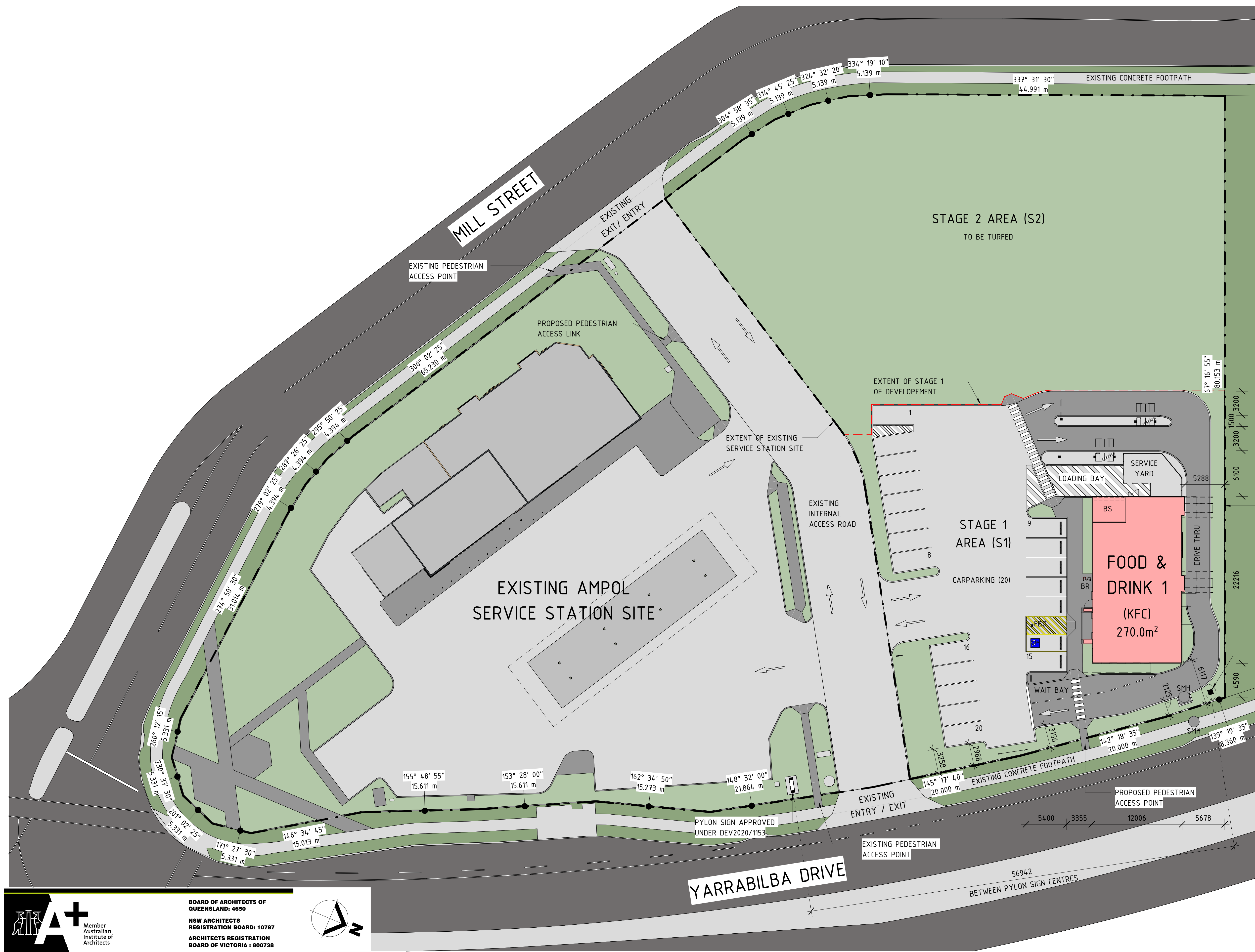
Juan Avella (RPEQ 11899)
BEng, MIEAust, CPEng, RPEQ, NER
Director Civil/Structural Engineering

For and on behalf of TfA Group

APPENDIX A – PROPOSED SITE LAYOUT PLAN

LOT 12 on SP304357

AREA: 10,040 m²
(DEVELOP. AREA 4737 m²)
LGA: LOGAN CITY COUNCIL

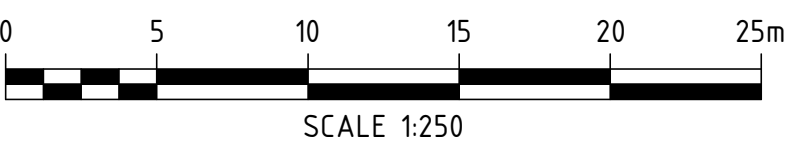


DEVELOPMENT AREA SITE COVERAGE		
S1 BUILDING	270m ²	5.7%
S1 HARDSTAND	1,435m ²	30.3%
S1 LANDSCAPING	339m ²	7.2%
S1 WALKWAYS	80m ²	1.6%
S2 LANDSCAPING	2,613m ²	55.2%
	TOTAL	4,737m² 100%

LEGEND	
BR	BIKE RACK
BS	BIN STORE
FBO	FLEXIBLE BOLLARD
SMH	SEWER MAN HOLE (EXISTING)

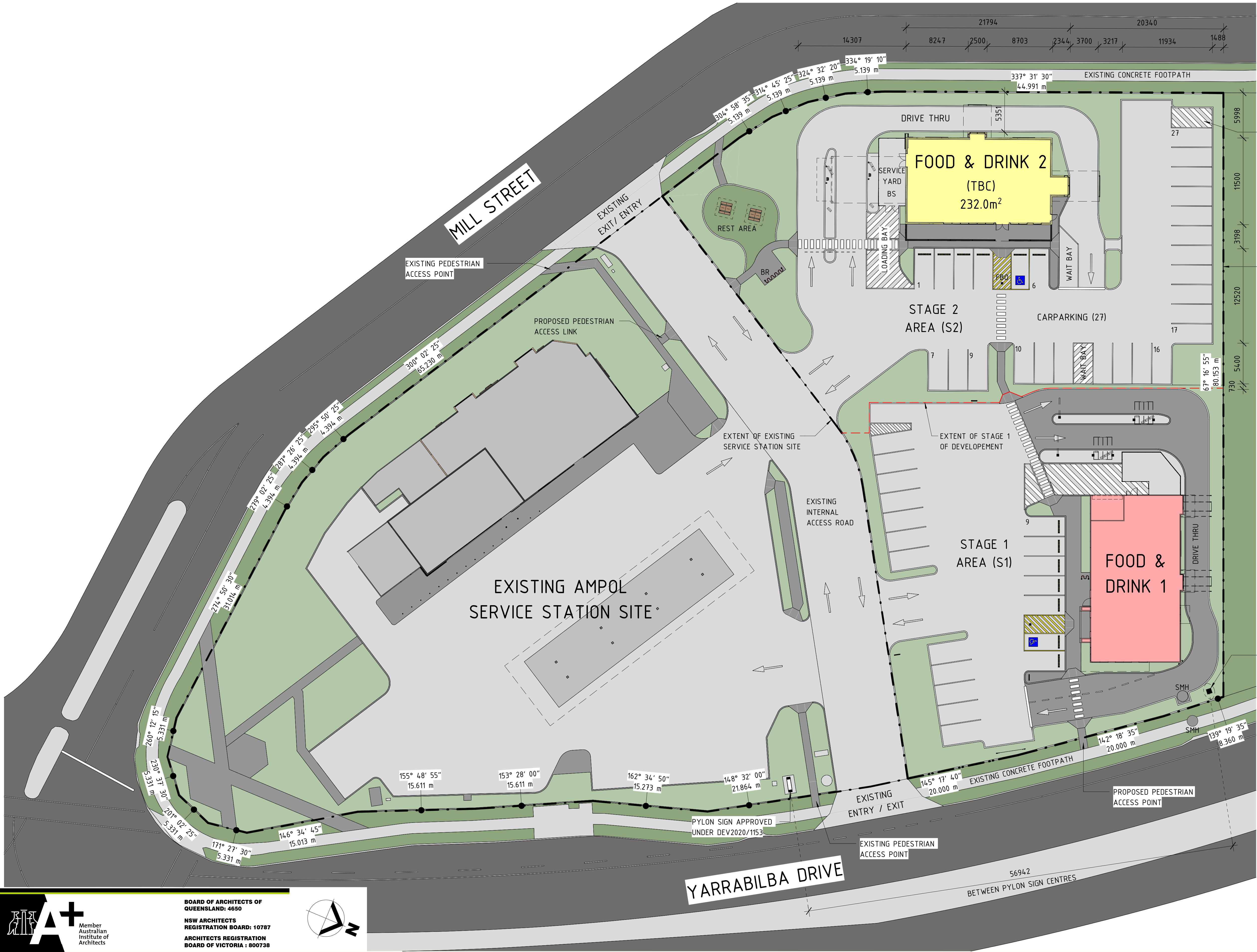
NOTES:

1. CARPARKING & ROAD AISLES TO BE IN ACCORDANCE WITH AS2890.1 & AS2890.6
2. STANDARD PARKING BAYS PROVIDED AT 5.4m x 2.6m WITH MIN. 6.6m AISLES.
3. DISABLE PARKING BAYS TO BE 5.4m x 2.4m WITH 5.4m x 2.4m SHARED BAY.
4. LINEMARKING SHOWN INDICATIVE ONLY, SUBJECT TO CHANGE AT DETAIL DESIGN BY TRAFFIC ENGINEER
5. PRELIMINARY ONLY - NOT FOR TENDER OR CONSTRUCTION



 Member Australian Institute of Architects	BOARD OF ARCHITECTS OF QUEENSLAND: 4650 NSW ARCHITECTS REGISTRATION BOARD: 10787 ARCHITECTS REGISTRATION BOARD OF VICTORIA : 800738	
PROJECT MANAGERS PLANNERS DESIGNERS ENGINEERS		
	Copyright TFA Group Pty Ltd This drawing including design & information is covered by Copyright and all rights are reserved. This document may not be copied, reproduced, retained or disclosed to any unauthorised person, either wholly or in part, without prior consent in writing from TFA Group Pty Ltd. ACN 612 132 233	DRAW NAME: PS PROFESSIONAL QUAL: SIGNATURE: Head office - Brisbane 166 Knapp Street, Fort Email: enquiry@tfa.com

PROJECT MANAGERS PLANNERS DESIGNERS ENGINEERS		DRAWING ISSUE APPROVAL		REV	DATE	BY	DESCRIPTION	CHK	APP	PROJECT DETAILS	DRAWING TITLE	STATUS				
	Copyright TFA Group Pty Ltd This drawing including design & information is covered by Copyright and all rights are reserved. This document may not be copied, reproduced, retained or disclosed to any unauthorised person, either wholly or in part, without prior consent in writing from TFA Group Pty Ltd. ACN 612 132 233	NAME: PS	DATE: 21.03.23	A	20.03.23	MAF	D.A. ISSUE			PROPOSED FOOD & DRINK OUTLETS	PROPOSED OVERALL SITE LAYOUT - STAGE 1	D.A. ISSUE				
		PROFESSIONAL QUALIFICATION:														
		SIGNATURE:														
		Head office - Brisbane Ph: 61 7 3854 2900 166 Knapp Street, Fortitude Valley QLD 4006 Australia Email: enquiry@tfa.com.au Aust Wide: 1300 794 300														
DATE CREATED: 01.08.22 ORIGINAL SCALE: 1 : 250 SHEET: A1 DO NOT SCALE THIS DRAWING. CONFIRM ALL DIMENSIONS ON SITE. <table><tr><th>DRAWING NO</th><th>REV</th></tr><tr><td>22177</td><td>D03-1 A</td></tr></table>													DRAWING NO	REV	22177	D03-1 A
DRAWING NO	REV															
22177	D03-1 A															



RPD
LOT 12 on SP304357

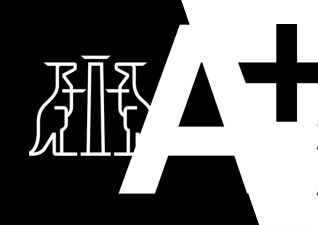
AREA: 10,040 m²
(DEVELOP. AREA 4737 m²)
LGA: LOGAN CITY COUNCIL

DEVELOPMENT AREA SITE COVERAGE		
S2 BUILDING	235m ²	5.0%
S2 HARDSTAND	1,583m ²	33.4%
S2 LANDSCAPING	685m ²	14.5%
S2 WALKWAYS	110m ²	2.3%
S1 DEVELOPMENT	2,124m ²	44.8%
TOTAL	4,737m ²	100%

LEGEND	
BR	BIKE RACK
BS	BIN STORE
FBO	FLEXIBLE BOLLARD
SMH	SEWER MAN HOLE (EXISTING)
---	BOUNDARY

- NOTES:
- CARPARKING & ROAD AISLES TO BE IN ACCORDANCE WITH AS2890.1 & AS2890.6
 - STANDARD PARKING BAYS PROVIDED AT 5.4m x 2.6m WITH MIN. 6.6m AISLES.
 - DISABLE PARKING BAYS TO BE 5.4m x 2.4m WITH 5.4m x 2.4m SHARED BAY.
 - LINEMARKING SHOWN INDICATIVE ONLY, SUBJECT TO CHANGE AT DETAIL DESIGN BY TRAFFIC ENGINEER
 - PRELIMINARY ONLY - NOT FOR TENDER OR CONSTRUCTION



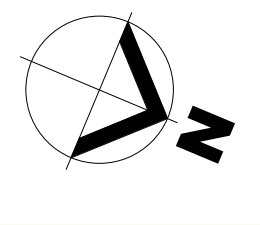


Member
Australian
Institute of
Architects

BOARD OF ARCHITECTS OF
QUEENSLAND: 4650

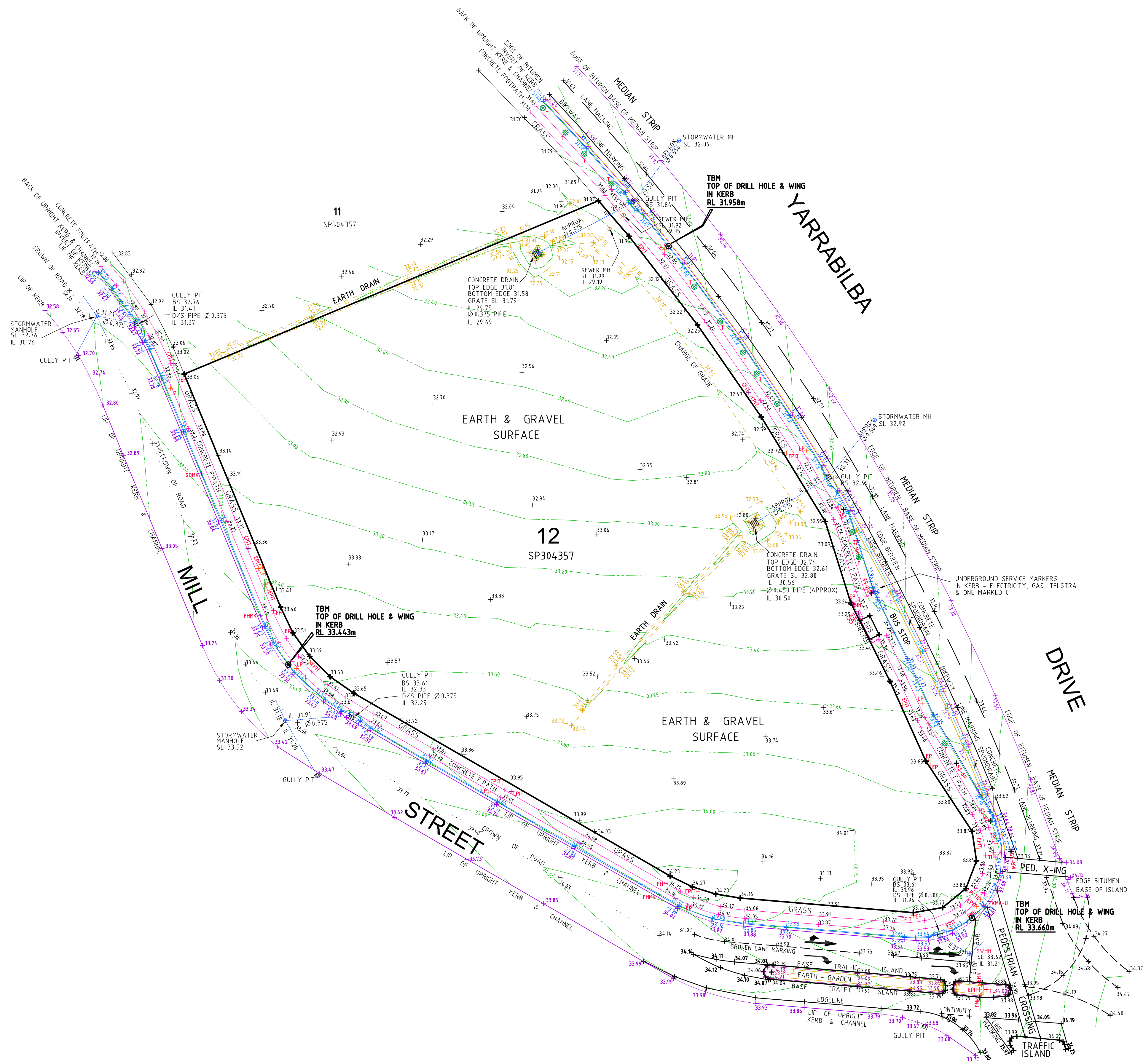
NSW ARCHITECTS
REGISTRATION BOARD: 10787

ARCHITECTS REGISTRATION
BOARD OF VICTORIA : 800738



PROJECT MANAGERS PLANNERS DESIGNERS ENGINEERS				DRAWING ISSUE APPROVAL				REV	DATE	BY	DESCRIPTION	CHK	APP	PROJECT DETAILS	DRAWING TITLE	STATUS			
 Copyright TFA Group Pty Ltd This drawing including design & information is covered by Copyright and all rights are reserved. This document may not be copied, reproduced, retained or disclosed to any unauthorised person, either wholly or in part, without prior consent in writing from TFA Group Pty Ltd. ACN 612 192 235				NAME: PS		DATE: 21.03.23		A	20.03.23	MAF	D.A. ISSUE				PROPOSED FOOD & DRINK OUTLETS for: AMPOL AUSTRALIA PETROLEUM PTY LTD at: CNR YARRABILBA DRIVE & MILL STREET, YARRABILBA, QLD, 4207	PROPOSED OVERALL SITE LAYOUT - STAGE 2	D.A. ISSUE		
				PROFESSIONAL QUALIFICATION:													DATE CREATED	ORIGINAL SCALE	SHEET
				SIGNATURE:													01.08.22	1 : 250	A1
				Head office - Brisbane Ph: 61 7 3854 2900 166 Knapp Street, Fortitude Valley QLD 4006 Australia Email: enquiry@tfa.com.au Aust Wide: 1300 794 300													DO NOT SCALE THIS DRAWING. CONFIRM ALL DIMENSIONS ON SITE.		
																DRAWING NO	REV		
																	22177	D03-2	A

APPENDIX B – SITE SURVEY PLAN



LEGEND

- BIN
- CPIT
- EMK
- EP
- EPIT
- FH
- FHMK
- FPKM
- KMK-U
- LP
- SDMK
- SS-B
- SS-B
- SS-B
- SS-BW
- SS-KL
- SS-60
- SWMH
- T
- TL
- BUS STOP RUBBISH BIN
- COMMUNICATION CABLE PIT
- ELECTRICITY KERB MARKER
- ELECTRICITY PILLAR
- ELECTRICITY PIT
- FIRE HYDRANT
- FIRE HYDRANT KERB MARKER
- KERB MARKER STAMPED 'FP'
- KERB MARKER - UNKNOWN ORIGIN
- LIGHT POLE
- KERB MARKER - SERVICES DUCT
- BUS STOP SIGN
- BUS ZONE SIGN
- PAINTED BIKEWAY SIGN ON ROAD
- KEEP LEFT SIGN
- 600MM SIGN
- STORMWATER MANHOLE
- SAPLING TREE
- TRAFFIC LIGHTS

NOTES:

- LEVELS TO A.H.D.
- LEVEL ORIGIN IS PSM No.201257 RL 34.095m AHD.
- TBM TOPS ARE SHOWN ON THE PLAN.
- CONTOURS ARE SHOWN TO 0.200m TO INDICATE THE FALL OF THE GROUND, REFER TO THE SPOT HEIGHTS SHOWN FOR ACCURATE HEIGHT INFORMATION.
- PIPE SIZES ARE APPROXIMATE DUE TO DEPTH OF STORMWATER STRUCTURES
- DEFINED FLOOD LEVEL : NOT DETERMINED
- NO FLOOD SEARCH HAS BEEN CARRIED OUT AS PART OF THIS SURVEY
- ALL SERVICES ARE TO BE LOCATED AND FIELD CHECKED BY THE RELEVANT AUTHORITY PRIOR TO ANY EXCAVATION OR CONSTRUCTION
- VISIBLE SERVICES HAVE BEEN LOCATED AND SHOWN. THE EXISTENCE OF OTHER SERVICES SHOULD BE CHECKED WITH THE RELEVANT AUTHORITY.
- BOUNDARIES SHOWN ON THIS PLAN ARE APPROXIMATE ONLY, ARE NOT TO BE RELIED UPON FOR DESIGN PURPOSES AND ARE SUBJECT TO SEPARATE IDENTIFICATION SURVEY.
- BOUNDARIES HAVE NOT BEEN MARKED BY THIS SURVEY.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SITE PHOTOS AND AS-CONSTRUCTED SEARCHES (PROVIDED).
- THE FULL DETAIL ON THIS PLAN CAN BE VIEWED IN MODEL SPACE AT 1:1000

A	20-12-2019	ORIGINAL ISSUE	JRC			
ISSUE	DATE	AMENDMENTS	DRN	CKD	APPD.	REFERENCE DRAWINGS



QUEENSLAND
PLANNING & SURVEY Pty Ltd

TOWN PLANNING, DEVELOPMENT AND SURVEY CONSULTANTS

BRISBANE OFFICE :

P.O. Box 771
Springwood, 4127.
Ph. (07) 3808 3307
FAX No. (07) 3808 9934

GOLD COAST OFFICE :

P.O. Box 294,
Ashmore City 4214
Ph. (07) 5597 2666
FAX No. (07) 5597 2688.

Email : qps@ecn.net.au

PROJECT

OVER LOT 12 ON SP304357
CORNER OF YARRABILBA DRIVE AND
MILL STREET, YARRABILBA.

PLOT
SCALE 1:1

DRAWING
SCALE 1:400 @ A1

SHEET
1 OF 1

CONTOUR AND DETAIL PLAN

JOB No.

6255/B

DWG NO

6255D0101

ISSUE

A

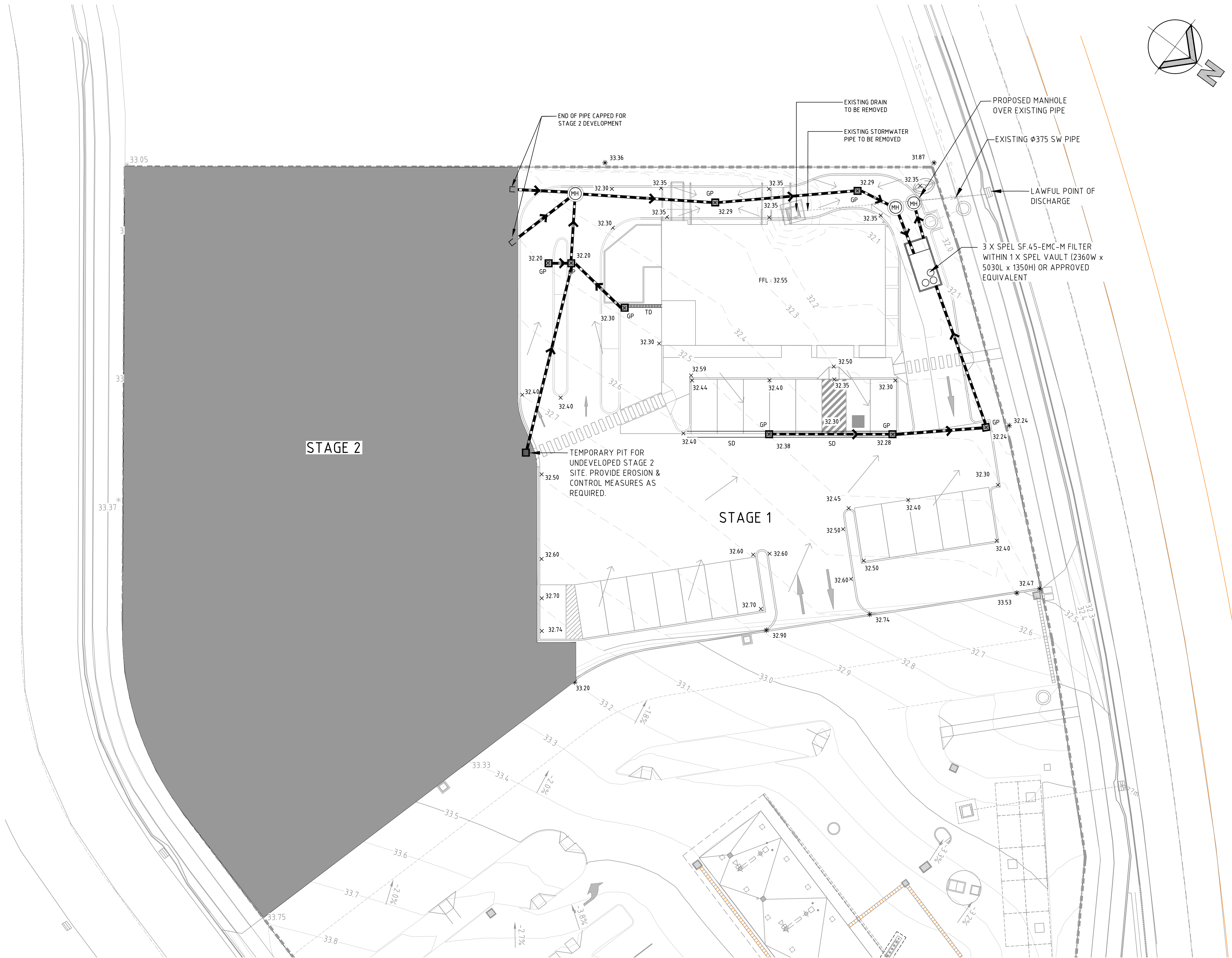
DATE

19-12-19

DRAWN

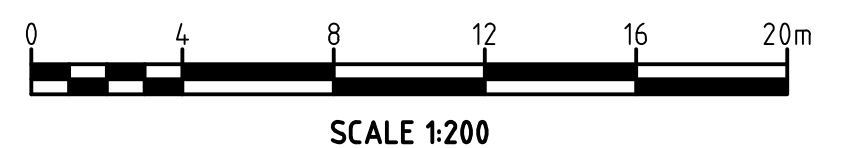
JRC

APPENDIX C – CONCEPTUAL STORMWATER MANAGEMENT PLAN

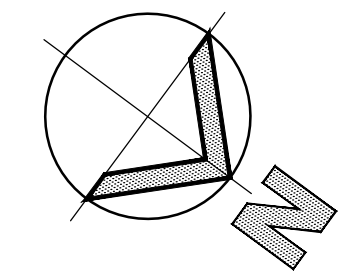


LEGEND

— 13.7 —	PROPOSED FINAL GROUND CONTOURS (0.1m INTERVALS)
- - - 13.7 - - -	EXISTING CONTOURS (0.1m INTERVALS)
— — — — —	PROPERTY BOUNDARY
— — — — —	PROPOSED STORMWATER PIPE
— — — — —	EXISTING STORMWATER DRAIN
— — — — —	EXISTING SEWER DRAIN
→	DIRECTION OF SURFACE FALL
GP	PROPOSED GULLY PIT
SD	PROPOSED SPOON DRAIN
TD	PROPOSED TRENCH DRAIN
MH	PROPOSED MANHOLE
FFL	FINAL FLOOR LEVEL
× 33.60	PROPOSED SURFACE LEVEL
* 32.47	EXISTING SURFACE LEVEL

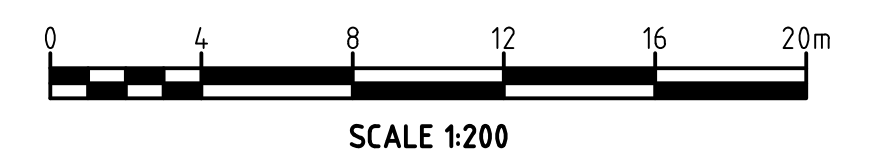
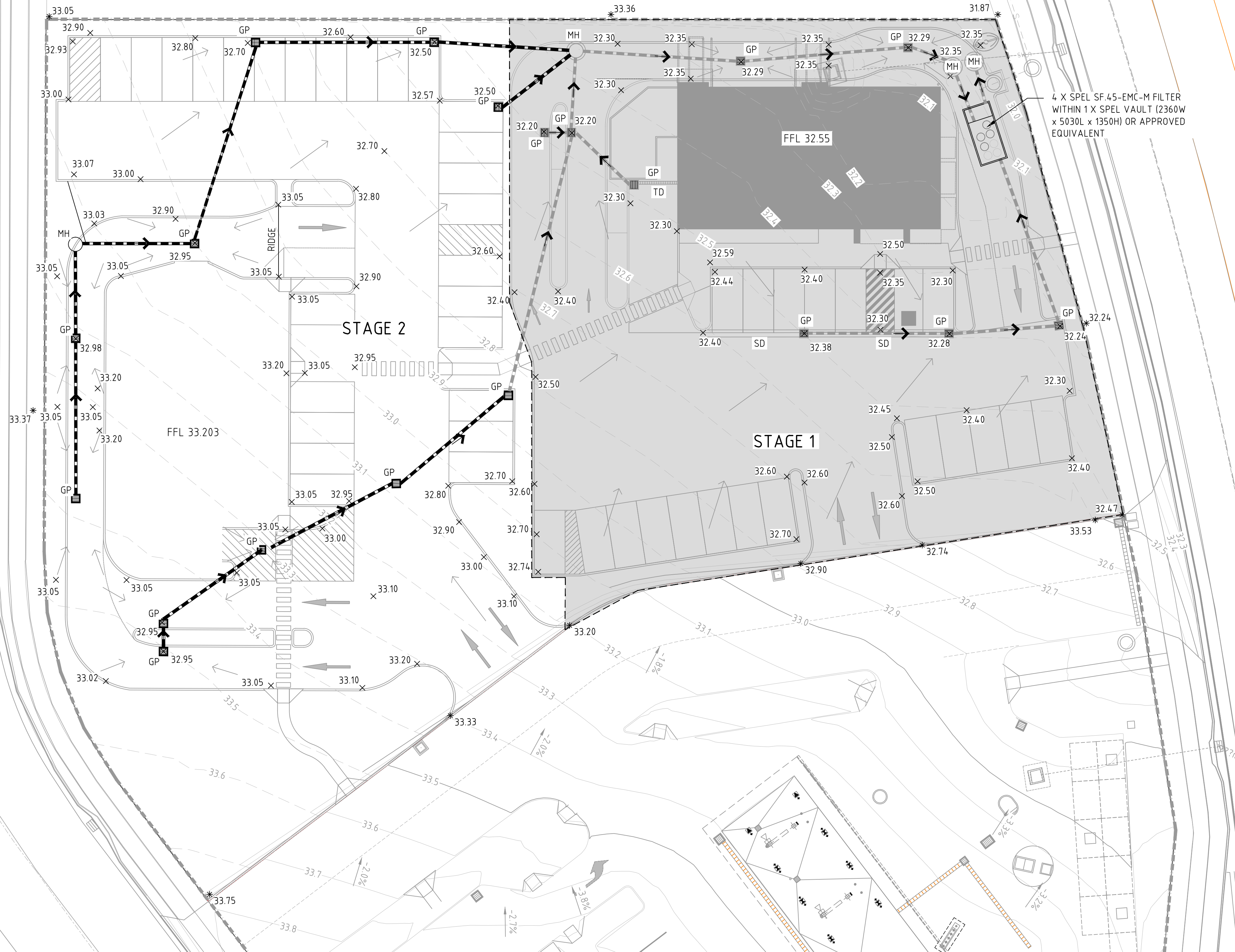


PROJECT MANAGERS PLANNERS DESIGNERS ENGINEERS				DRAWING ISSUE APPROVAL		REV	DATE	BY	DESCRIPTION	CHK	APP	PROJECT DETAILS	DRAWING TITLE	STATUS			
 Copyright Tfa Group Pty Ltd This drawing including design & information is covered by Copyright and all rights are reserved. This document may not be copied, reproduced, retained or disclosed to any unauthorised person, either wholly or in part, without prior consent in writing from Tfa Group Pty Ltd. A C N 6 1 2 1 3 2 2 3 3				NAME: JUAN AVELLA		DATE: 25.01.23		A	17.08.22	DH	D.A. ISSUE	J.A	PROPOSED FOOD & DRINK OUTLETS for AMPOL AUSTRALIA PETROLEUM PTY LTD. CNR YARRABILBA DRIVE & MILL STREET YARRABILBA, QLD 4207	CONCEPTUAL SITE STORMWATER LAYOUT STAGE 1	D.A. ISSUE		
				PROFESSIONAL QUALIFICATION: CPEng, MIEAust		RPEQ 11899		B	20.10.22	DH	SITE LAYOUT UPDATED	J.A			DATE CREATED	ORIGINAL SCALE	SHEET
				SIGNATURE:				C	25.01.23	DH	STORMWATER DRAINAGE LAYOUT UPDATED	J.A			17.08.22	1:200	A1
				Head office - Brisbane		Ph: 617 3854 2900		D	18.04.23	DH	STORMWATER DRAINAGE LAYOUT UPDATED	J.A			DO NOT SCALE THIS DRAWING. CONFIRM ALL DIMENSIONS ON SITE.		
				166 Knapp Street, Fortitude Valley		QLD 4006 Australia		Email: enquiry@tfa.com.au		Aust Wide: 1300 794 300							DRAWING NO
															22177-D18		D



LEGEND

	13.7	PROPOSED FINAL GROUND CONTOURS (0.1m INTERVALS)
	13.7	EXISTING CONTOURS (0.1m INTERVALS)
		PROPERTY BOUNDARY
		PROPOSED STORMWATER PIPE
	SW	EXISTING STORMWATER DRAIN
	S	EXISTING SEWER DRAIN
		DIRECTION OF SURFACE FALL
	GP	PROPOSED GULLY PIT
	SD	PROPOSED SPOON DRAIN
	TD	PROPOSED TRENCH DRAIN
	MH	PROPOSED MANHOLE
	FFL	FINAL FLOOR LEVEL
	× 33.60	PROPOSED SURFACE LEVEL
	* 32.47	EXISTING SURFACE LEVEL



PROJECT MANAGERS | PLANNERS | DESIGNERS | ENGINEERS



Copyright TFA Group Pty Ltd
This drawing including design &
information is covered by copyright
and all rights are reserved. This
document may not be copied,
reproduced, retained or disclosed to
any unauthorised person, either wholly
or in part, without prior consent in
writing from TFA Group Pty Ltd.
A C N 6 1 2 1 3 2 2 3 3

NAME: JUAN AVELLA DATE: 25.01.23

PROFESSIONAL QUALIFICATION: CPEng, MIEAust
RPEQ 11899

SIGNATURE:

Head office - Brisbane Ph: 617 3854 2900
166 Knapp Street, Fortitude Valley QLD 4006 Australia
Email: enquiry@tfa.com.au Aust Wide: 1300 794 300

DRAWING ISSUE APPROVAL

REV	DATE	BY	DESCRIPTION
A	24.04.23	DH	D A ISSUE

CHK APP PROJECT DETAILS

PROPOSED FOOD & DRINK OUTLETS for
AMPOL AUSTRALIA PETROLEUM PTY LTD.
CNR YARRABILBA DRIVE & MILL STREET
YARRABILBA, QLD 4207

DRAWING TITLE

CONCEPTUAL SITE
STORMWATER LAYOUT
STAGE 2

STATUS

D.A. ISSUE

DATE CREATED	ORIGINAL SCALE	SHEET
17.08.22	1:200	A1

DO NOT SCALE THIS DRAWING. CONFIRM ALL DIMENSIONS ON SITE.

DRAWING NO	REV
22177-D19	A

APPENDIX D – STORMWATER TREATMENT SYSTEMS



**Operation &
Maintenance Manual**

Spel Filter[®]

Cartridge Filter For Tertiary Stormwater Treatment



spel.com.au

Contents

Introduction..... 3

Features..... 4

Sizes 6

System Configuration.....7

Health and Safety..... 8

Maintenance frequency.....10

Maintenance Procedure11

General Cleaning12

Cartridge Recycling and Replacement13

Standard Drawings14

Site Exit & Clean Up16



Introduction

Understanding how to correctly and safely maintain the SPELFilter is essential for the preservation of the filter's condition and its operational effectiveness. The SPELFilter is a highly engineered stormwater filtration device designed to remove sediments, heavy metals, nitrogen and phosphorus from stormwater runoff.

The filters can be housed in either a concrete or fibreglass structure that evenly distributes the flow between cartridges.

Flow through the filter cartridges is gravity driven and self-regulating, which makes the SPELFilter system a low maintenance, high performance stormwater treatment device.

This Guide will provide the necessary steps that are to be taken to correctly and efficiently ensure the life of the SPELFilter product



Figure 1 - SPELFilters in a concrete chamber / vault

Features

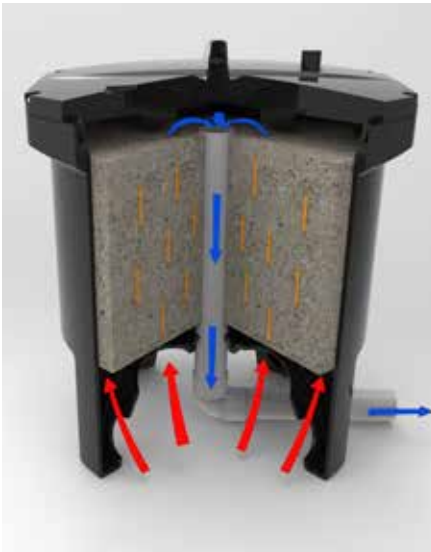


Figure 2 - Diagram of water flow through SPELFilter

The SPELFilter has a patented design that facilitates influent flow over the entire surface area of the media, providing consistent pollutant removal within a small footprint.

The SPELFilter provides highly effective media filtration using gravity flow conditions, without the need for moving parts or floating valves. This eliminates the risk of mechanical failure, such as stuck valves and seizing components during its service life. This provides highly robust treatment performance.

Hydraulic head provided by a suitably sized weir in the filter vault forces stormwater through the filter media via the inlet ports underneath the filter cartridge. Refer to the table below for minimum head required for the SPELFilter cartridges to assist in sizing the weir.

The water to be treated enters the SPELFilter cartridge via an upwards direction as the water level builds up around the SPELFilter. This 'up flow' reduces the amount of sediment that could enter the media cartridge, as the sediment is allowed to drop to the vault floor under gravity. Any remaining sediment in the water is introduced through the filter media under hydraulic pressure and is filtered.

Water is filtered through the media, where dissolved and particulate Total Nitrogen and Total Phosphorus are removed via reaction with the media, in addition to the removal of Total Suspended Solids / sediment.

SPELFilter Media Self-Backwash feature

A one-way air release valve located at the top of the filter cartridge allows air to escape as the cartridge fills up with water. This creates a siphonic flow condition as the air is completely evacuated from inside the SPELFilter cartridge. Siphonic flow conditions are maintained until such time the water level outside of the cartridge falls beneath the inlet ports underneath the filter. At this moment, the water level inside the SPELFilter cartridge is higher than the surrounding water level. The water inside the SPELFilter cartridge is then expelled upon the break of the siphon, and the water flows down and out of the inlet ports under gravity, onto the vault floor.

This is a highly effective backwash of the media and allows the expulsion of a high proportion of sediment out from the SPELFilter media. The expelled sediment can be removed either manually or with a vacuum from the vault floor.

This backwash effect allows the media to remain highly conductive and is the key to the industry leading longevity of the SPELFilter cartridge system, which does not need replacement for at least 5 years, and typically will achieve up to 6-8 years of service, subject to the SPELFilter being regularly maintained in accordance with this guideline and in accordance with the specific needs of the catchment.



Figure 3 - Typical Outlet Weir Wall

Features

Self Supporting Feet

Each SPELFilter cartridge stands on 4 feet, which negates the need for the construction of a false floor in the vault. The feet are bolted to the vault floor with the supplied stainless steel angles and M10 bolts. The feet allow a clear height from the vault floor up to the inlet ports of 240mm. The absence of a false floor allows plenty of room for backwashed sediment to evacuate from underneath the cartridges and thereby avoid blocking the inlet ports to the SPELFilter from sediment buildup. It is for this reason that SPEL recommended the sediment buildup not exceed 150mm above the vault floor, so as to avoid blocking the inlet ports of the SPELFilter. Blockage of the inlet ports due to sediment accumulation in the vault floor will cause the SPELFilter to go into bypass and be ineffective. Hence it is important to keep up to date with monitoring and maintaining the SPELFilter vault.



Figure 4 - Bolting the feet



Figure 5 - Underside of the SPELFilter showing the screened inlet ports and the connection for the outlet pipe in the middle



Figure 6 - the top of the SPELFilter showing the location of the one way air valve

Sizes

SPEL Stormwater manufactures two height cartridges for varying site constraints as shown below. Each cartridge is designed to treat stormwater at a flow rate of 1.47 Litres per second and 2.83 Litres per second for the half-height cartridge (model No. SF.15-EMC-M) and full-height cartridge (model No. SF.30-EMC-M) respectively.

	Full Height SF.30-EMC -M	Half height SF.15-EMC-M
SPELFilter total height	874mm	560mm
SPELFilter Diameter	726mm	726mm
Minimum Head required	850mm	550mm
Treatment flow rate	3 L/s	1.5 L/s
Height of inlet ports above vault floor	250mm	250mm
Filtered water collection pipe diameter	50mm	50mm

SPELFilter Full Height- SF.30-EMC-M



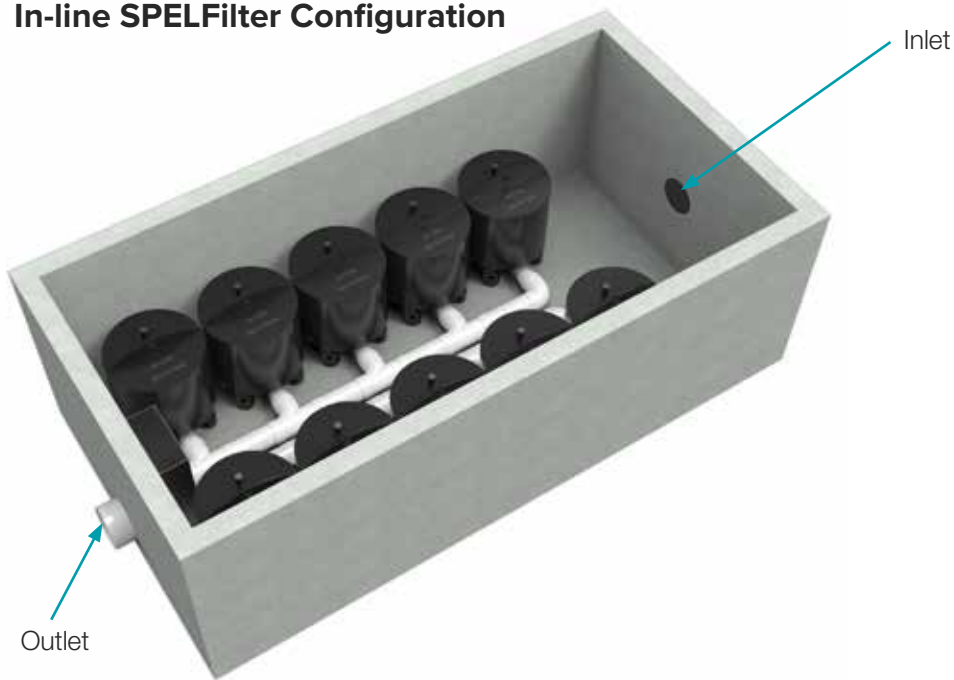
SPELFilter Half Height - SF.15-EMC-M



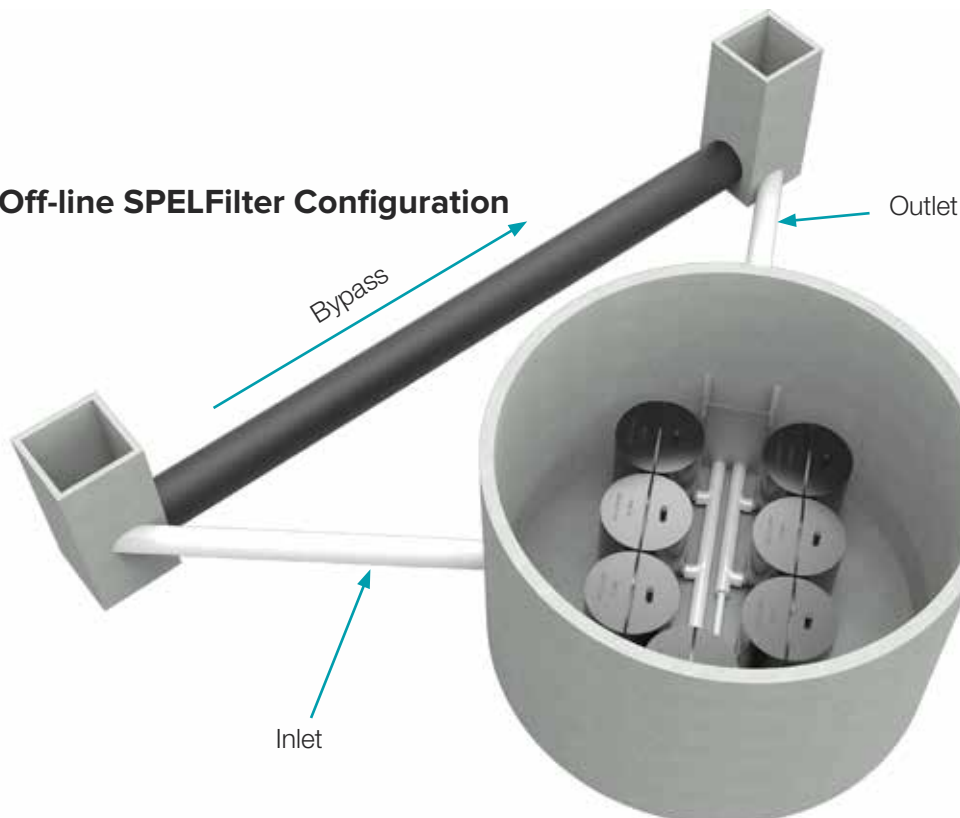
System Configuration

SPELFilter cartridges are installed in concrete or fibreglass tanks commonly referred to as 'vaults'. The vault selection and configuration are based on site characteristics and/or constraints; computational stormwater quality modelling; and selected SPELFilter models. Typical SPELFilter system configurations are shown below.

In-line SPELFilter Configuration



Off-line SPELFilter Configuration



Health and Safety

A. Personal Health & Safety

When carrying out the necessary installation operations of the SPEL Filter all contractors and staff personnel must comply with all current workplace health and safety legislation.

The below measures should be adhered to as practically as possible.

- Comply with all applicable laws, regulations and standards
- All those involved are informed and understand their obligations in respect of the workplace health and safety legislation.
- Ensure responsibility is accepted by all employees to practice and promote a safe and healthy work environment.

B. Personal Protective Equipment / Safety equipment

When carrying out the necessary installation operations of the SPEL Filter, wearing the appropriate personal protective equipment and utilising the adequate safety equipment is vital to reducing potential hazards.

Personal protective equipment / safety equipment in this application includes:

- Eye protection
- Safety apron
- Fluorescent safety vest
- Form of skin protection
- Puncture resistant gloves
- Steel capped safety boots
- Ear muffs
- Hard hat/s
- Sunscreen

C. Confined space

In the event access is required into the vault, confined space permits will be required which is not covered in this Guide. Typical equipment required for confined space entry include:

- Harness
- Gas detector
- Tripod
- Spotter

D. Traffic Control

It is not uncommon for SPEL Filter cartridges to be installed underneath trafficable areas. Minimum traffic control measures will need to be put in place in accordance with traffic control plans set out by respective local and state road authorities.



Vaults are to be treated as confined space. Entry by permit only.



Monitor weather conditions prior to operation maintenance. Do not enter a vault during an episode of heavy rain as this can create a risk of drowning.





Maintenance Frequency

The SPELFilter's design allows for a greater life span when frequently maintained. Maintenance is broken up into three categories which include: standard inspection; general cleaning; and cartridge replacement.

Standard inspection

Standard inspections are conducted at regular four-month intervals. At this time, an approved trained maintenance officer or SPEL representative shall undertake all measures outlined in Maintenance Procedure, Standard Inspection.

General Cleaning

At the end of each standard inspection, trigger measures will identify if general cleaning is required. General cleaning will need to be executed immediately during standard inspections if the following triggers are satisfied:

- Build-up of debris/pollutants within the vault greater than 150mm;
- Accumulation of debris/pollutants on the outlet chamber of the SPELFilter vault;
- After large storm events, tidal or flooding impacts at the request of the owner;

Cartridge Replacement

Stormwater treatment is dependent on the effectiveness of the SPELFilter cartridge system. As the SPELFilter ages, pollutants will inundate the cartridge and ultimately reduce the treatment flow rate. At this point, a SPELFilter flow test apparatus will be utilized to determine if replacement cartridges are required.

Based on the [site] concept modelling (MUSIC) and previous industry experience, we estimate the life of the SPELFilter to be between 6 - 8 years. As a minimum requirement, each SPELFilter cartridge should be replaced within 10 years.

The life cycle of the SPELFilter can be impacted if standard inspections and general maintenance is not undertaken in accordance with this operation and maintenance Guide. Other factors that will affect the above life cycle of the SPELFilter include:

- Installation of cartridge system during construction phase and impacted by construction sediment loads;
- Neglecting to install pre-treatment using an industry approved GPT or a surface inlet pit trash bag such as the SPEL StormSack.
- Unforeseen environmental hazards affecting the SPELFilter functionality.

Maintenance Procedures

Stormwater pollutants captured and retained by the SPELFilter system need to be periodically removed to ensure environmental values are upheld. All associated maintenance works is heavily dependent on the site's operational activities and generated stormwater pollutants. To ensure the longevity of the installed SPELFilter treatment system, it is imperative that the procedures detailed in this Guide are followed and all appropriate measures are actioned immediately.

Standard inspection

The standard inspection requires personal experience of SPEL products to visual inspection the vault and filter conditions.

Confined space requirements may not be required if a full inspection and assessment of each SPELFilter can be achieved at surface level without being deemed a confined space entry.

The standard inspection requires personal experience of SPEL products to visual inspection the vault and filter conditions.

Confined space requirements may not be required if a full inspection and assessment of each SPELFilter can be achieved at surface level without being deemed a confined space entry.

Site Inspection Procedures

1. Implement Pre-start safety measures.

Ensure that the area in which operational works are to be carried out is cordoned off, to prevent unauthorised access. Adequate safety barriers must be erected. Area in which work is to be carried out must be clean, safe and hazard free. (Refer to figure 4.)

2. Set-up Gantry Tri-pod above Manhole.

Assemble and position the gantry above the manhole safely and as practically as possible. Attach the winch or chain block to the gantry for lifting the SPEL Filters. Perform safety procedures ie. Attach harnesses etc. (if confined space).

3. Open manhole lid.

Once you have sent up the Gantry and ensured that the area is safe to operate in, you can proceed to open the manhole lid, using lid lifters.

4. Conduct Gas tests.

(If tank is classed confined space)

Once the lids have been removed to a safe distance to prevent tripping, you must then proceed to conduct gas tests. Perform necessary gas tests according to the confined space regulations.

5. Once confined space has been deemed safe to operate in, enter tank safely.

Once you have carried out the required gas test and the work area is deemed safe, you may then enter the pit via a ladder or winch system to assess the work area you will be operating in. Ensure all confined space

6. SPELFilter system assessment.

Perform a review of the SPELFilter system using the SPELFilter assessment report/checklist. Sign off and forward a copy of the report to property manager and SPEL representative.

7. Reinstate SPELFilter system and disposal.

At the completion of the site inspection, ensure the site is reinstated back to its initial state and all pollutants are removed from the site in line with pollutant disposal procedures.

8. Sign off and forward a copy of the report to property manager and SPEL representative.

General Cleaning

Vacuum out of Filter tank, removal, and disposal of pollutants at the completion of a standard inspection, general cleaning may be deemed necessary immediately or scheduled for a future date. Steps undertaken for general cleaning should be in general accordance with the procedure outlined below but not limited.

1. Implement Pre-start safety measures.

Ensure that the area in which operational works are to be carried out is cordoned off, to prevent unauthorised access. Adequate safety barriers must be erected. Area in which work is to be carried out must be clean, safe and hazard free. (Refer to figure 4.)

2. Set-up Gantry Tri-pod above Manhole.

Assemble and position the gantry above the manhole safely and as practically as possible. Attach the winch or chain block to the gantry for lifting the SPEL Filters. Perform safety procedures ie. Attach harnesses etc. (if confined space).

3. Open manhole lid.

Once you have sent up the Gantry and ensured that the area is safe to operate in, you can proceed to open the manhole lid, using lid lifters.

4. Conduct Gas tests.

(If tank is classed confined space)

Once the lids have been removed to a safe distance to prevent tripping, you must then proceed to conduct gas tests. Perform necessary gas tests according to the confined space regulations.

5. Once confined space has been deemed safe to operate in, enter tank safely.

Once you have carried out the required gas test and the work area is deemed safe, you may then enter the pit via a ladder or winch system to assess the work area you will be operating in. Ensure all confined space

6. SPELFilter system assessment.

Perform a review of the SPELFilter system using the SPELFilter assessment report/checklist.

7. Pollutant removal from tank.

Perform clean-up using a licenced vacuum truck contractor or wet/dry vacuum, depending on level of sediment built up and/or tank size.

8. Reinstate SPELFilter system and disposal.

At the completion of the site inspection, ensure the site is reinstated back to its initial state and all pollutants are removed from the site in line with pollutant disposal procedures.

9. Sign off and forward a copy of the report to property manager and SPEL representative.

Cartridge Recycling and Replacement

SPELFilter cartridges can be swapped out for new cartridges. The spent SPELFilter cartridges can be collected from site and sent to SPEL Stormwater's facilities – where the spent media will be removed from the cartridge in factory conditions and disposed of in accordance with environmental regulations.

The SPELFilter cartridge will be recharged with new media – thereby recycling and repurposing the cartridge.

SPEL Filter replacement procedures may vary depending on the configuration of the SPEL Filters, the type of vault and engineers' specs. Replacement instructions for manhole SPEL Filter systems and precast vault SPEL Filter systems are contained in this section.

At the completion of a standard inspection, SPEL Filter replacement may be deemed necessary immediately or scheduled for a future date. Steps undertaken for cartridge replacement should be in general accordance with the procedure outlined below but not limited.

1. Implement Pre-start safety measures.

Ensure that the area in which operational works are to be carried out is cordoned off, to prevent unauthorised access. Adequate safety barriers must be erected. Area in which work is to be carried out must be clean, safe and hazard free.

2. Set-up Gantry Tri-pod above Manhole.

Assemble and position the gantry above the manhole safely and as practically as possible. Attach the winch or chain block to the gantry for lifting the SPEL Filters. Perform safety procedures ie. Attach harnesses etc. (if confined space).

3. Open manhole lid.

Once you have sent up the Gantry and ensured that the area is safe to operate in, you can proceed to open the manhole lid, using lid lifters.



4. Conduct Gas tests. (If tank is classed confined space)

Once the lids have been removed to a safe distance to prevent tripping, you must then proceed to conduct gas tests. Perform necessary gas tests according to the confined space regulations.

5. Once confined space has been deemed safe to operate in, enter tank safely.

Once you have carried out the required gas test and the work area is deemed safe, you may then enter the pit via a ladder or winch system to assess the work area you will be operating in. Ensure all confined space procedures are followed.

6. Remove exhausted cartridges.

Disconnect all internal pipe work from inside the vault. Un-bolt anti-floatation measures and remove cartridges from the vault using Gantry Tri-pod method.

7. Pollutant removal.

Using a wet/dry vacuum or sucker truck, suck out all the residual pollutant from the vault.

8. Install pipework and SPEL Filters.

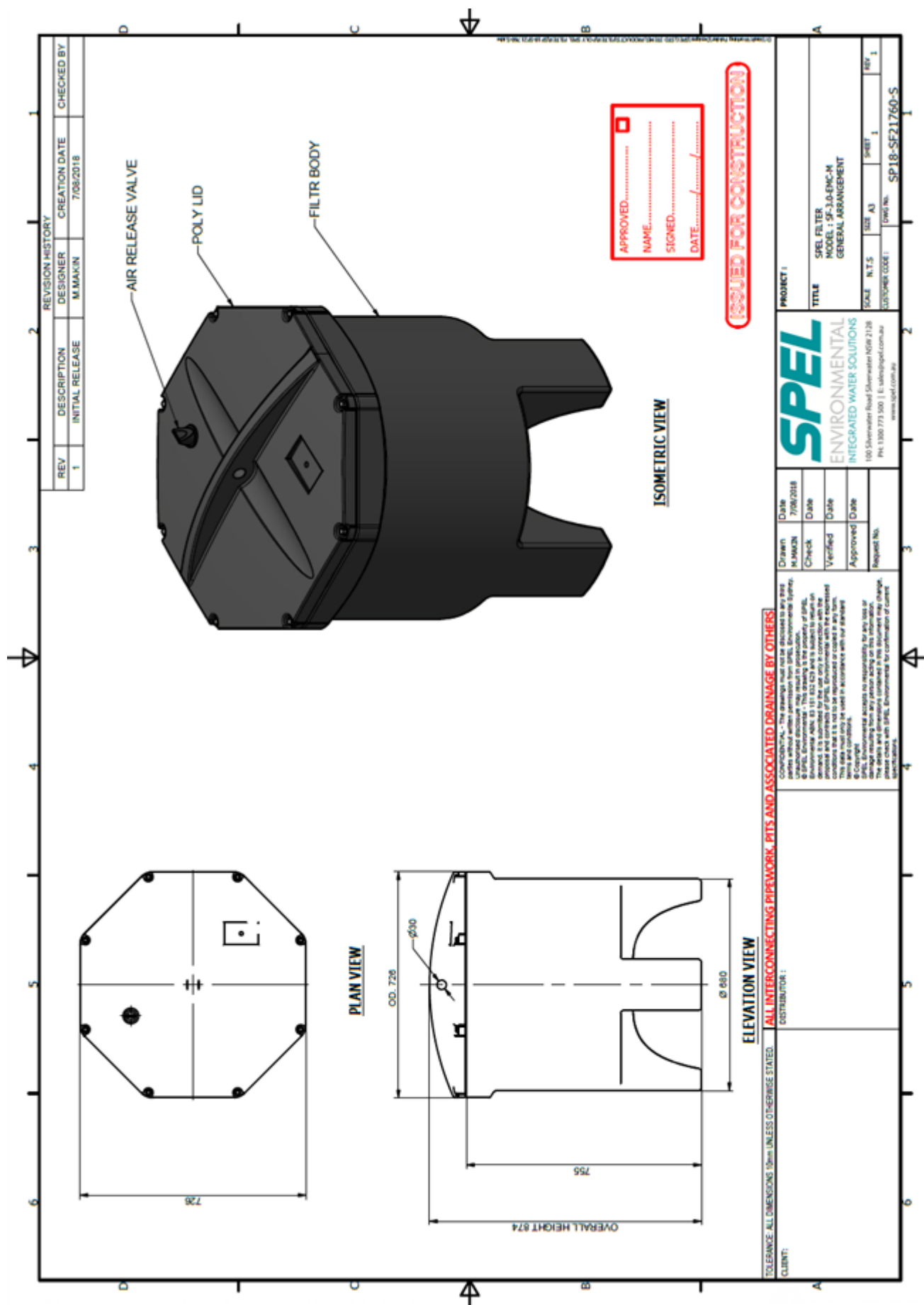
Please refer to the below standard install diagrams for the SPEL Filters. Then refer to your site specific drawings, as site requirements may require something different to the standard layout. Lower filters into tank, position into place, connect filter outlet pipework with the supplied fittings.

9. Install anti-floatation system.

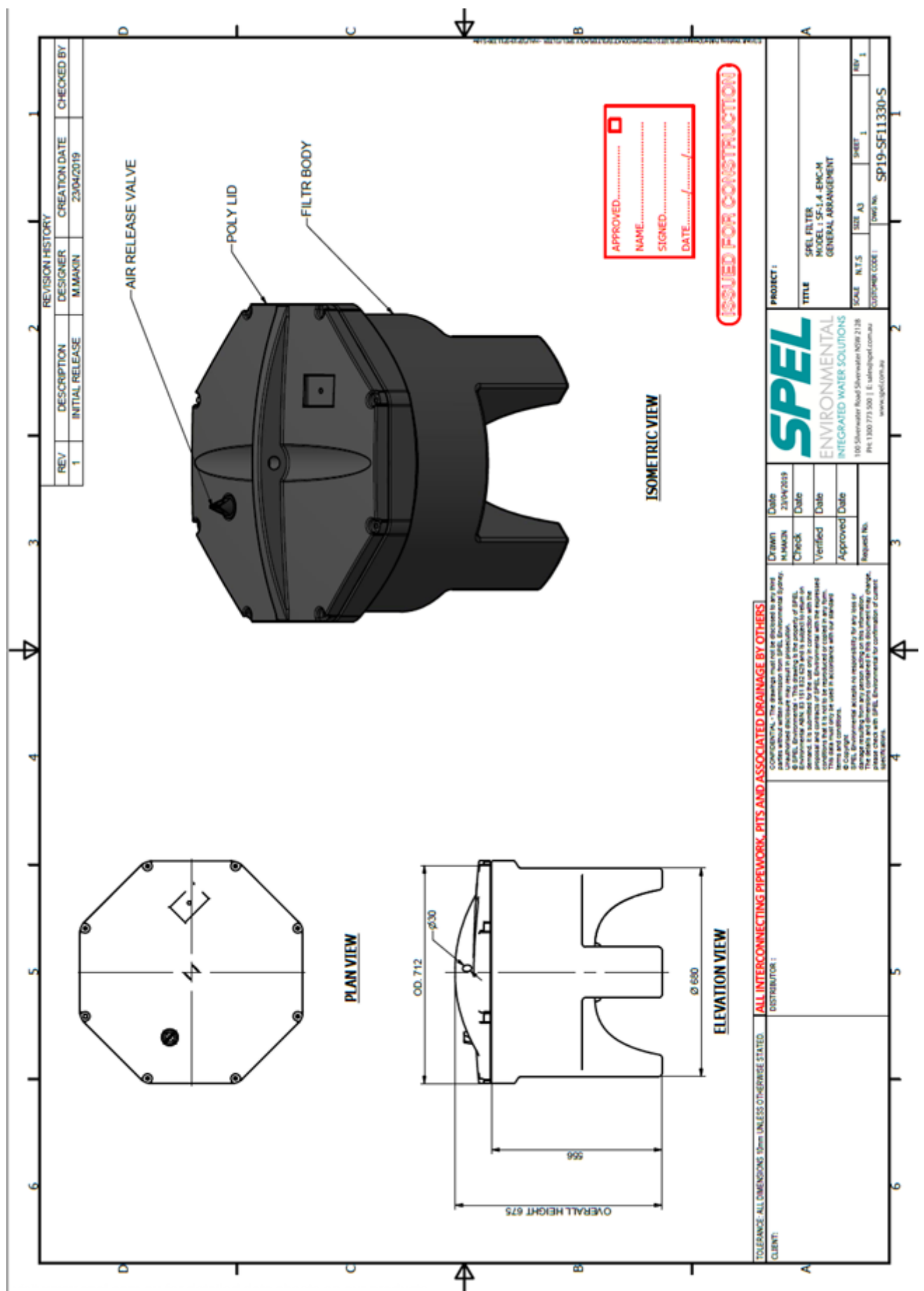
Please refer to the detailed drawings showing how the Anti – Floatation (Anchor) bars are to be installed.

10. Sign off and forward a copy of the report to property manager and SPEL representative.

14



Standard Drawings - Half Height



Site Exit & Clean Up

At the end of the scheduled maintenance, approved contractors or SPEL maintenance crew are required to reinstate the site to pre-existing conditions. Steps included but limited to are:

- Ensure all access covers are securely inserted back into their frames;
- Remove and dispose collected pollutants from the site in accordance with local regulator authorities;
- Retrieve all traffic control measures and maintenance tools; and
- Return all exhausted and/or damaged SPEL products to SPEL Stormwater to begin recycling program.





spelstormwater
joy in water

100 Silverwater Rd, Silverwater NSW 2128 Australia

Phone: (02) 8705 0255

Fax: (02) 8014 8699

Email: sales@spel.com.au

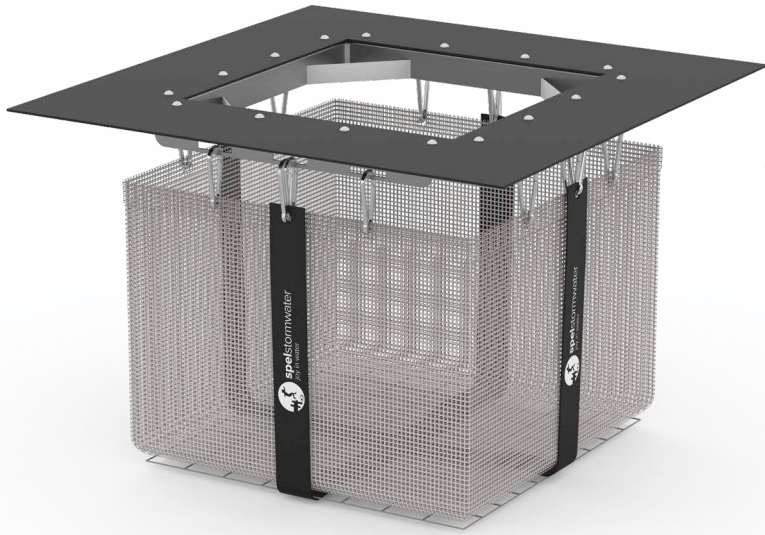
spel.com.au

SPEL Stormwater accepts no responsibility for any loss or damage resulting from any person acting on this information. The details and dimensions contained in this document may change, please check with SPEL Stormwater for confirmation of current specifications.

SPEL Stormsack

At Source Gross Pollutant Trap





APPLICATIONS

- Council storm drain retrofits
- Commercial / retail / residential
- Litter prone urban areas
- Scrap metal / solid waste / oil storage
- Part of treatment train
- Construction sediment / erosion



BENEFITS

- Can be modelled in MUSIC in conjunction with bio-retention
- Low cost gross pollutant capture
- Quick & easy installation
- Simple maintenance
- At source capture
- Adjusts to custom pit sizes

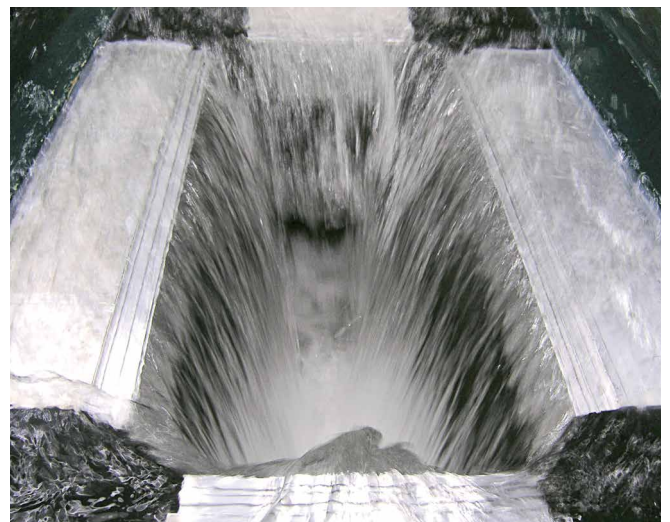
The SPEL Stormsack is specifically designed for the capture of gross pollutants: sediment, litter, and oil and grease. Ideally suited for storm drain retrofits, the SPEL Stormsack's unique design allows maintenance to be performed using conventional vacuum suction equipment.

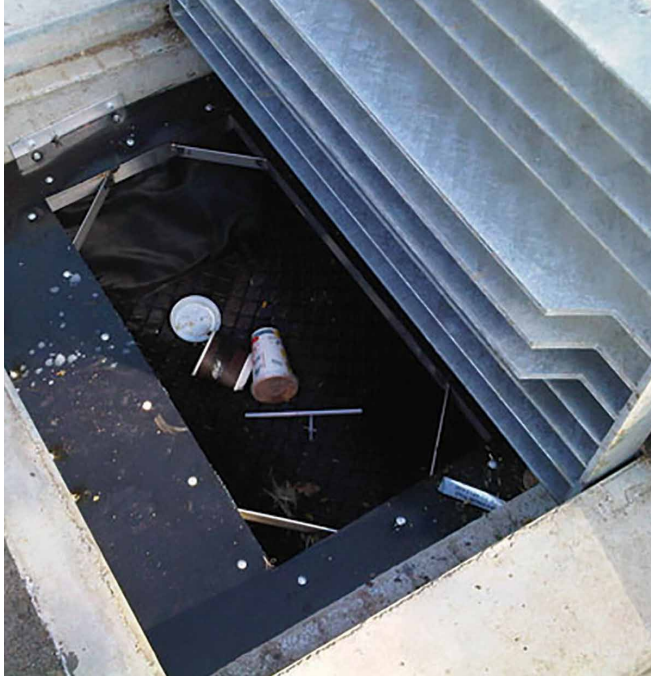
SPEL Stormsack filtration solutions are highly engineered water quality devices that are deployed directly in the stormwater system to capture contaminants close the surface for ease of maintenance. Easily retrofitted into new or existing structures, SPEL Stormsack filtration technology is a decentralized approach to stormwater treatment that essentially repurposes traditional site infrastructure and customizes it to meet specific site water quality goals. In this way, it satisfies important objectives of today's LID (Low Impact Development) criteria.

From an operations perspective, catch basins with SPEL Stormsack filters are also easier and quicker to clean out because pollutants are trapped just under the grate.

The SPEL Stormsack was introduced to the Australian market in 2012 and field testing is underway at several locations in South-east Queensland. Laboratory testing has shown capture of 99.99% of gross pollutants up to the bypass flow rate.* Further results will be provided as they become available.

Recommended minimum clearance from bottom of SPEL Stormsack to inside bottom of vault is 50mm. Typical frame adjustability range of 127mm in each direction.





HOW IT WORKS

This technology is a post developed stormwater treatment system. The SPEL Stormsack provides effective filtration of solid pollutants and debris typical of urban runoff, while utilising the existing or new storm drain infrastructure. The Stormsack is designed to rest on the flanges of conventional catch basin frames and is engineered for most hydraulic and cold climate conditions.

Installation procedures shall include removing the storm grate, cleaning the ledge of debris and solids, measuring catch basin clear opening and adjusting flanges to rest on grate support ledge. Install SPEL Stormsack with splash guard under curb opening so the adjustable flanges are resting on the grate support ledge. Install corner filler pieces. Reinstall storm grate directly on support flanges rise shall be no more than 3mm.

Maintenance: Typically the SPEL Stormsack is serviceable from the street level, and therefore maintenance does not require confined space entry into the catch basin structure. The unit is designed to be maintained in place with a vacuum hose attached to a sweeper or a vactor truck. Use only SPEL replaceable parts.

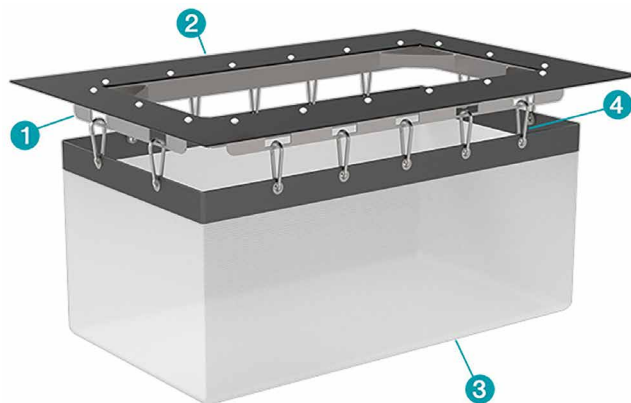
FEATURES

Pollutant	Efficiency
Gross Pollutants (GP)	100%
Total Suspended Solids (TSS)	61%
Total Phosphorus (TP)	28%
Total Nitrogen (TN)	45%

*Contact Spel to confirm approved performance for the project LGA

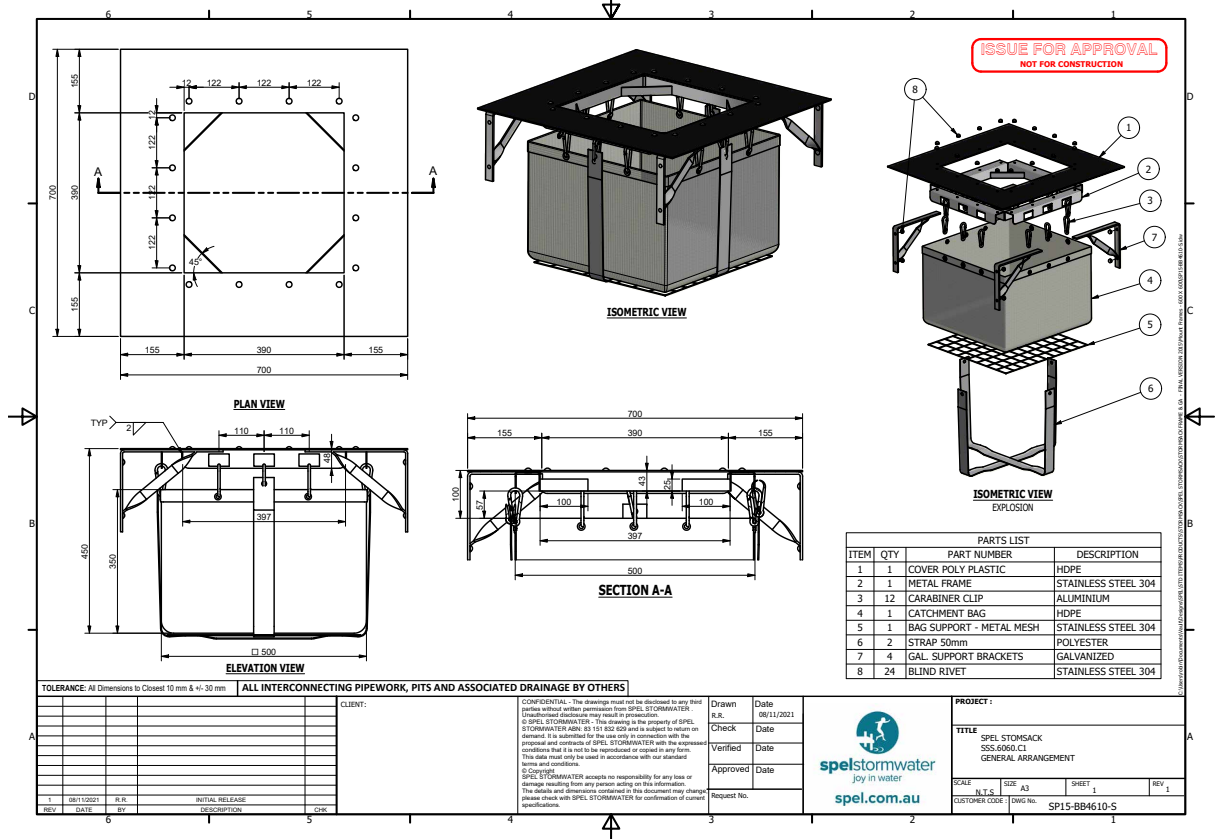
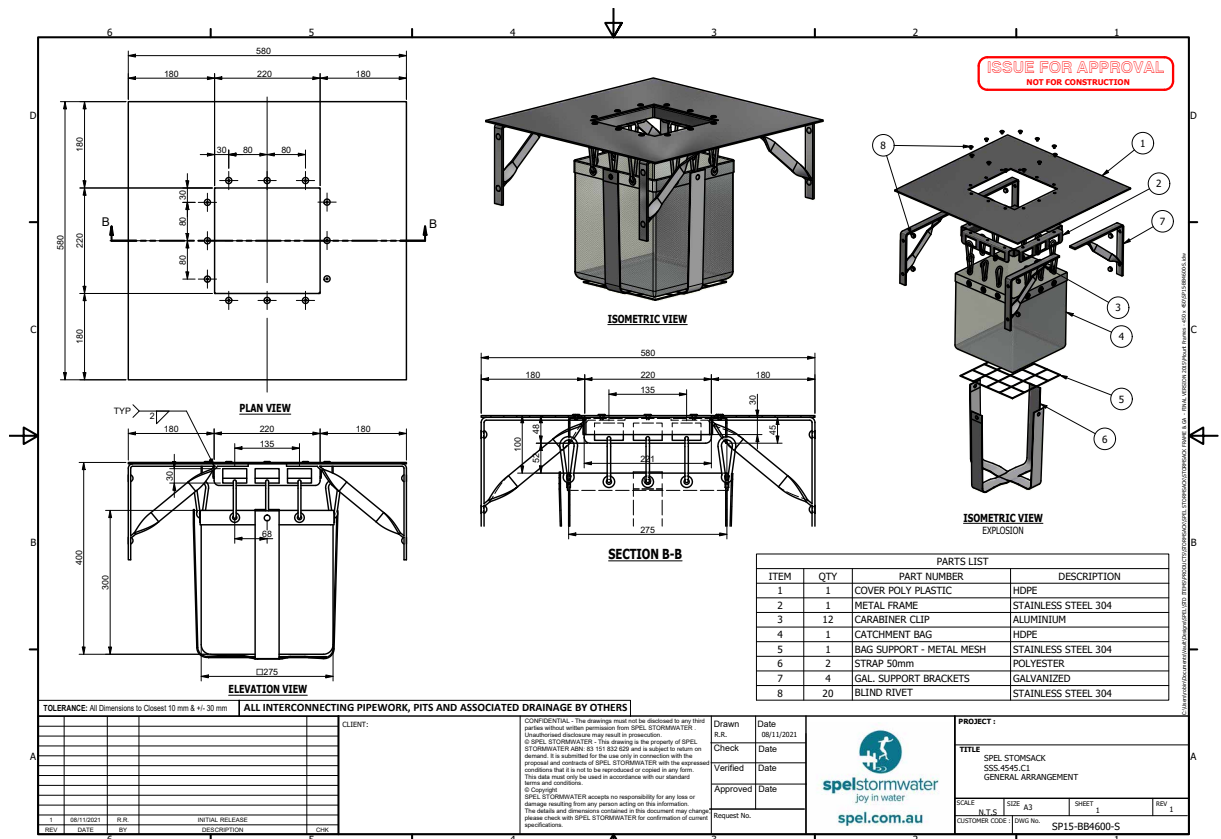
Application	Regulatory Issue	Target Pollutants
Council Storm Drain Retrofits	At-source litter capture	Sediment, Litter, O&G
Commercial/Retail/Residential	Stormwater Compliance	Sediment, Litter, O&G
Litter Prone Urban Areas	Cost effective litter control	Litter $\geq$ 5 mm
Scrap Metal/Solid Waste/Oil Storage/Etc	Industrial Multi-Sector General Permit	Gross Pollutants, O&G
Part of Treatment Train	Council Stormwater Quality Improvement Targets	Sediment, Litter, O&G
Construction Sediment/Erosion	Sediment Control Plan	Sediment/Erosion Control

Features	
1.	1. Ultra-Durable Aluminium Frame - Available in 450x450mm, 600x600mm, 600x900mm and 900x900mm sizes - Custom pit arrangements upon request
2.	Black Poly Surround riveted to Frame Can be cut to suit on site
3.	Reinforced Stormsack Bag - Bag has sewed eyelets - Square bottom design for even distribution
4.	Karabiners attach Bag to Frame for easy service & replacement
5.	Aluminium Support Angles & Fixings

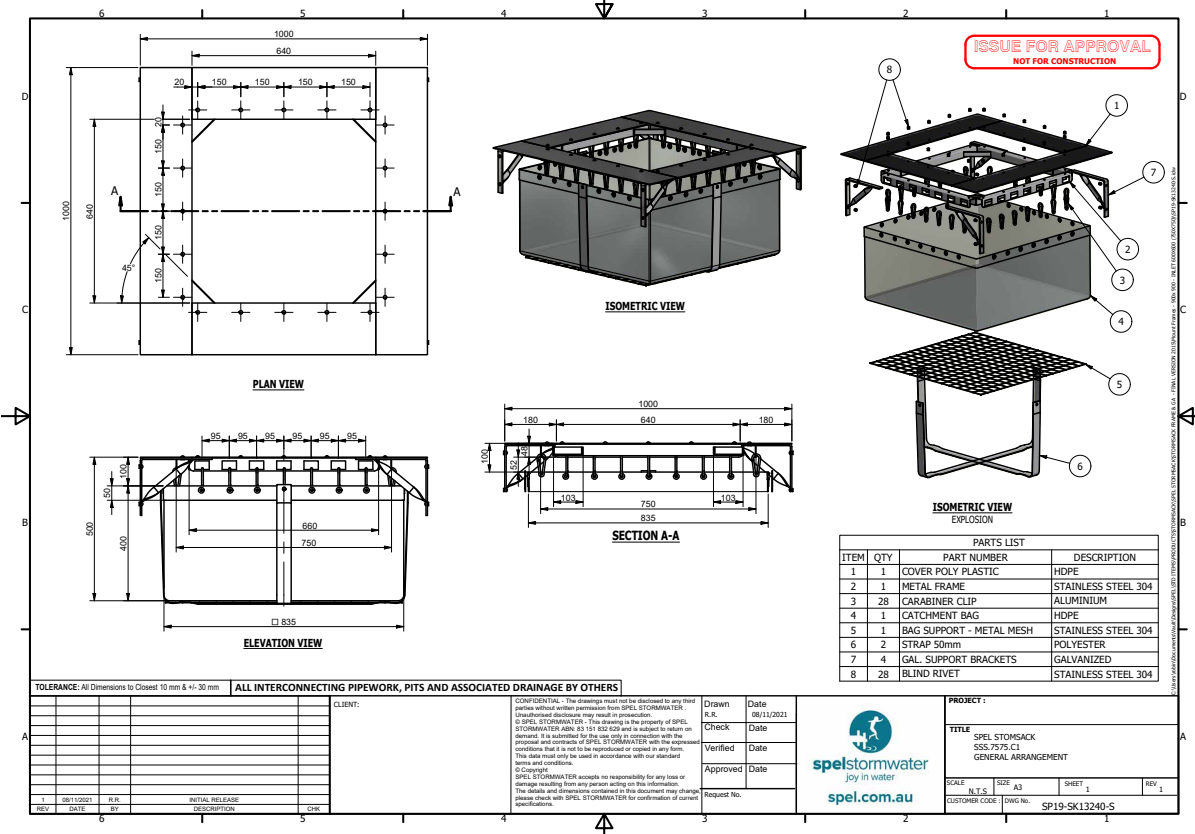
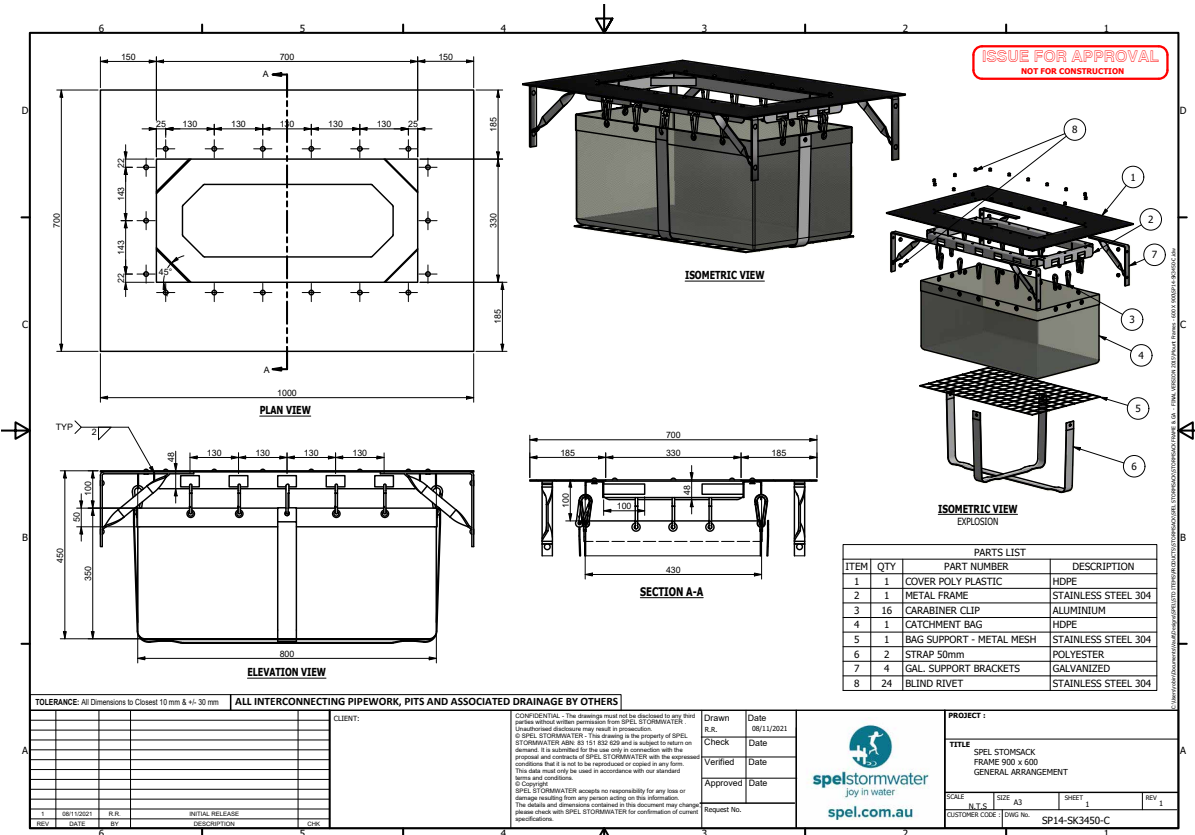


Standard SPEL Stormsack to suit Pit Sizes
450x450mm
600x600mm
900x600mm
900x900mm

Custom sizes (i.e. 1200x900mm) can be manufactured on short lead times



TECHNICAL DRAWINGS



6 1 5 1 4 2 3
2 1

REVISION HISTORY				
REV	DESCRIPTION	DESIGNER	CREATION DAT	CHECKED BY
1	INITIAL RELEASE	M.MAKIN	15/10/2015	

DETAIL 'A'

SECTION VIEW

DETAIL 'A'

NOTE: BY USING THE STORMSACK THE GRATE WILL BE APPROX. 3-5mm HIGHER

TOLERANCE: ALL DIMENSIONS 10mm UNLESS OTHERWISE STATED.

CLIENT:

CONFIDENTIAL - The drawings must not be disclosed to any third parties without written permission from SPEL Environmental Systems. Unauthorized disclosure may result in prosecution.

© SPEL Environmental - This drawing is the property of SPEL Environmental ABN 83 151 852 820 and is subject to return on demand. It is submitted for the sole use in connection with the proposal and contracts of SPEL Environmental with the expressed condition that it is not to be reproduced or copied in any form. The data must only be used in accordance with our standard terms and conditions.

© Copyright SPEL Environmental accepts no responsibility for any loss or damage resulting from any person acting on this information. The details and dimensions contained in this document may change, please check with SPEL Environmental for confirmation of current specifications.

Drawn M.MAKIN Date 15/10/2015

Check Date

Verified Date

Approved Date

Request No.

spelstormwater

joy in water

spel.com.au

PROJECT :

TITLE SPEL STORMSACK INSTALLATION GUIDE GRATED PIT

SCALE: N.T.S. SIZE: A3 SHEET: 1 REV: 1

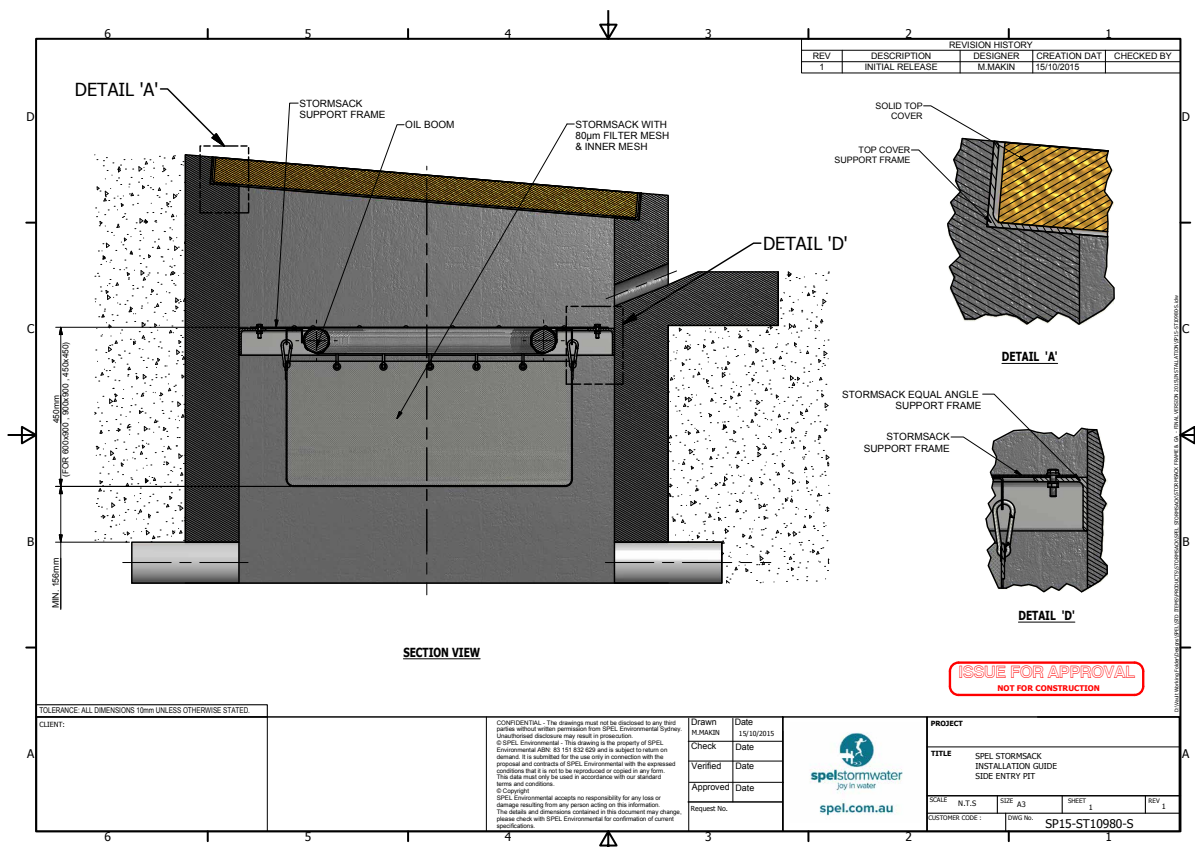
CUSTOMER CODE: [] DWS NO: **SP15-ST10970-S**

ISSUE FOR APPROVAL
NOT FOR CONSTRUCTION

6 5 4 3 2 1
1 2

A
B
C
D

© 2015 SPEL Environmental Systems Pty. Ltd. All Rights Reserved. SPEL Environmental Systems Pty. Ltd. is a registered company in Australia. SPEL Environmental Systems Pty. Ltd. is a registered company in Australia. SPEL Environmental Systems Pty. Ltd. is a registered company in Australia.

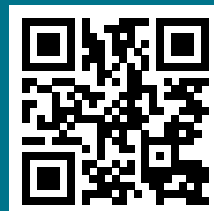


SPEL Stormsack

At Source Gross Pollutant Trap

NSW HEAD OFFICE 100 Silverwater Rd, Silverwater NSW 2128 PO Box 7138, Silverwater NSW 1811 P: +61 2 8705 0255 P: 1300 773 500 E: nsw.sales@spel.com.au	QLD MAIN OFFICE 130 Sandstone Pl, Parkinson QLD 4115 P: +61 7 3271 6960 P: 1300 773 500 E: qld.sales@spel.com.au QLD SUNSHINE COAST BRANCH 19-27 Fred Chaplin Circuit, Bells Creek, QLD 4551 P: 1300 773 500 E: qld.sales@spel.com.au	VIC & TAS OFFICE 897 Wellington Rd Rowville VIC 3178 P: +61 3 5274 1336 P: 1800 810 139 E: sales@spel.com.au VIC GEELONG BRANCH 70 Technology Close, Corio, P: +61 3 5274 1336 P: 1800 810 139 E: sales@spel.com.au
SA OFFICE 9 Hampden Road, Mount Barker SA 5251 P: 1300 773 500 E: sales@spel.com.au	WA OFFICE 2 Modal Crescent Canning Vale WA 6155 P: +61 8 9350 1000 P: 1800 335 550 E: sales@spel.com.au	NZ OFFICE AUCKLAND 100 Montgomerie Road Airport Oaks P: +64 9 276 9045 E: sales@spel.com.au
NZ OFFICE WANGANUI 43 Heads Road Wanganui New Zealand P: +64 6 349 0088 E: sales@spel.com.au	NZ OFFICE WELLINGTON 41 Raiha St Porirua Wellington New Zealand P: +64 4 239 6006 E: sales@spel.com.au	PHILIPPINES OFFICE METRO MANILA Unit 2210 Lumiere Residences Pasig Boulevard, Pasig City P: +61 2 8705 0255 P: 1300 773 500 E: sales@spel.com.au
SINGAPORE OFFICE 512 Chai Chee Lane, #06-04 Bedok Industrial Estate, Singapore 469028 P: +61 2 8705 0255 P: 1300 773 500 E: sales@spel.com.au	UK OFFICE UNITED KINGDOM Lancaster Rd Shrewsbury SY1 3NQ UK P: +44 (0)1743 445200 E: sales@spel.com.au	USA OFFICE CLEVELAND 4548 Industrial Parkway Cleveland, Ohio 44135 P: +61 2 8705 0255 P: 1300 773 500 E: sales@spel.com.au

We believe clean water is a right not a privilege and we work to ensure a joy in water experience for you with your children and grandchildren.



spelstormwater
joy in water

100 Silverwater Rd, Silverwater NSW 2128 Australia

Phone: (02) 8705 0255

Email: sales@spel.com.au

spel.com.au

SPEL Stormwater accepts no responsibility for any loss or damage resulting from any person acting on this information. The details and dimensions contained in this document may change, please check with SPEL Stormwater for confirmation of current specifications.

SPELVault

Modular precast detention system



spelstormwater
joy in water

spel.com.au



APPLICATIONS

- Residential
- Commercial
- Industrial
- Retail sites
- Subdivisions
- Urban infrastructure

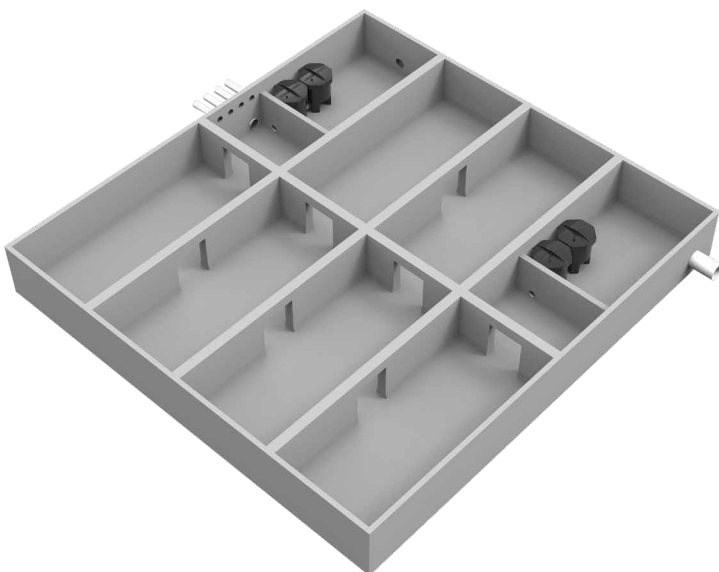
FEATURES

A modular precast detention system that has the proven strength & durability of concrete, is simple & fast to install, and easily accessible for maintenance.

The SPELVault can be arranged in a modular configuration to achieve small to very large onsite detention (OSD) requirements with flexibility in footprint design.

It is a robust solution for SW detention typically installed under carparks in commercial premises, or the common driveways in multi-unit developments. The SPELVault is selected for its easy access for maintenance, strong traffic rating, simple installation protocol and ability for large volumes to be installed in a single day and truck trafficable immediately.

- Flexibility in footprint design for optimum layouts
- Flexible heights to suit site levels
- Truck trafficable. Delivered to site cured to 50MPa. The tanks can be installed, backfilled and trafficable immediately, maintaining sites accessibility.
- Modules do not rely on stone backfill for stormwater storage or support, so there are smaller excavations and less spoil to dispose of compared to other systems.
- Units are delivered to site to meet clients cranes and are generally installed immediately. This is no onsite storage of modules required so on-site space is optimised.
- SPELVault filter cartridges can be design into this system so water quality outcomes can be achieved without additional separate tanks.



COMPARISON

Stormwater Detention Tanks Comparison: SPEL Vault/Megavault Vs Block & Slab

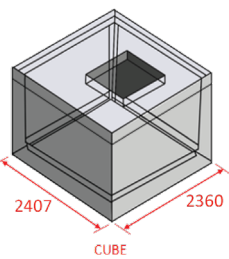


OSD SYSTEMS	SPEL VAULT / MEGAVAULT	BLOCK & SLAB
STRUCTURALLY SOUND	Yes. Engineer Certified. Truck trafficable. Form 15 provided at no cost.	Yes. Engineering design may still have to be completed and may be an additional cost with time implications.
SPEED OF INSTALL FOR THE BUILDER & DEVELOPER	Quick. 100-150kL achievable in a day. Only really needs 1-2 persons to install not including the crane operator and dogman.	Slower. As the build involves more trades (base concreter, blockworker, bondek installation, tanking, FSL pour) there is a greater chance of blow-outs on the build schedule. The increased construction time compared to a fast precast install also increases the exposure to delays from poor weather.
ONSITE EFFICIENCY GAINS	As the tank is manufactured off-site in a quick to install modular system, onsite efficiencies are gained as there is not an open excavation for extended periods and project management of multiple trades over an extended period is not required.	No benefit. Project management of multiple trades over an extended period is required. Increased safety risk management and increased risk to delays to construction. Spacial impacts of a large excavation also impeded productivity negatively especially critical on tight sites.
SAFETY	Less trades, less people involved onsite with the build and less time with an open excavation. Capacities up to 240kL have the potential to be achieved in a day = increased safety benefits.	Increased time with an open excavation with more sub-contractors involved, more time on safety plans and inductions and increased project manager involvement and supervision required. Reo bars sticking up. Increased construction waste to deal with. Greater risk exposure and increased cost to manage.
ENVIRONMENTAL IMPACT	Minimal construction waste onsite. Decreased open excavation time, decreased risk of silt release.	Increased construction waste onsite to deal with. Pallets from blocks. Pallets from steel. Increased risk of silt release with extended open excavation times. Concrete truck wash-outs.
QUALITY	Tanks constructed in a factory. Quality assured practices ensure tanks delivered to site meet rigorous quality standards.	Tanks constructed onsite = increased risk of defects and quality issues.



SIZES & CAPACITIES

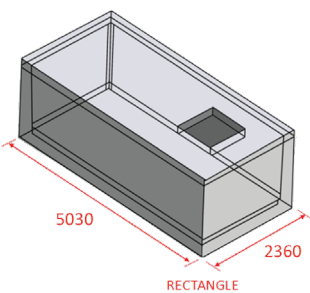
NOTE: Internal heights only provided as tank lid thickness is dependant on traffic rating & soil/slab cover. Visit our website to download plans and drawings.



CUBE

2407mm long x 2360mm wide

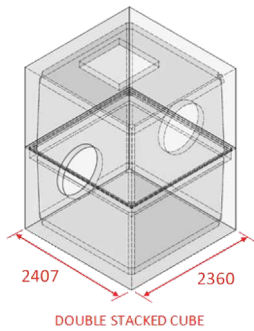
INTERNAL HEIGHT	CAPACITY kL
900	4.085
950	4.371
1000	4.550
1100	5.018
1150	5.252
1200	5.488
1250	5.723
1300	5.959
1350	6.196
1464	6.737



RECTANGLE

5030mm long x 2360mm wide

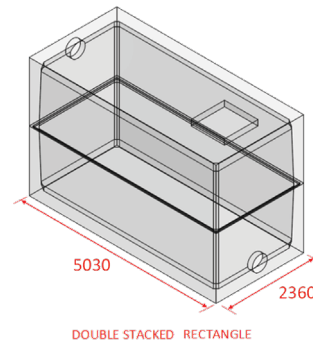
INTERNAL HEIGHT	CAPACITY kL
900	9.064
950	9.577
1000	10.090
1100	11.119
1150	11.635
1200	12.152
1250	12.669
1300	13.187
1350	13.706
1464	14.892



DOUBLE STACKED CUBE

2407mm long x 2360mm wide

BASE SECTION INTERNAL HEIGHT	TOP SECTION INTERNAL HEIGHT	INTERNAL HEIGH	CAPACITY kL
884	916	1800	8.170
934	916	1850	8.456
984	916	1900	8.635
984	966	1950	8.921
984	1016	2000	9.100
1134	916	2050	9.337
1184	916	2100	9.573
1184	966	2150	9.859
1184	1016	2200	10.038
1334	916	2250	10.281
1334	966	2300	10.567
1439	916	2355	10.703
1439	966	2405	10.989
1438	1016	2455	11.168
1334	1166	2500	11.448
1439	1116	2555	11.636
1439	1166	2605	11.870
1439	1216	2655	12.106
1439	1266	2705	12.341
1439	1316	2755	12.577
1439	1366	2805	12.814
1439	1471	2910	13.388



DOUBLE STACKED RECTANGLE

5030mm long x 2360mm wide

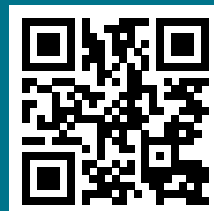
BASE SECTION INTERNAL HEIGHT	TOP SECTION INTERNAL HEIGHT	INTERNAL HEIGH	CAPACITY kL
884	916	1800	18.128
934	916	1850	18.640
984	916	1900	19.154
984	966	1950	19.666
984	1016	2000	20.180
1134	916	2050	20.699
1184	916	2100	21.215
1184	966	2150	21.728
1184	1016	2200	22.241
1334	916	2250	22.770
1334	966	2300	23.283
1439	916	2355	23.858
1439	966	2405	24.372
1438	1016	2455	24.885
1334	1166	2500	25.341
1439	1116	2555	25.915
1439	1166	2605	26.431
1439	1216	2655	26.915
1439	1266	2705	27.466
1439	1316	2755	27.984
1439	1366	2805	28.493
1439	1471	2910	29.596

SPELVault

Modular precast detention system

NSW HEAD OFFICE 100 Silverwater Rd, Silverwater NSW 2128 PO Box 7138, Silverwater NSW 1811 P: +61 2 8705 0255 P: 1300 773 500 E: nsw.sales@spel.com.au	QLD MAIN OFFICE 130 Sandstone Pl, Parkinson QLD 4115 P: +61 7 3271 6960 P: 1300 773 500 E: qld.sales@spel.com.au QLD SUNSHINE COAST BRANCH 19-27 Fred Chaplin Circuit, Bells Creek, QLD 4551 P: 1300 773 500 E: qld.sales@spel.com.au	VIC & TAS OFFICE 897 Wellington Rd Rowville VIC 3178 P: +61 3 5274 1336 P: 1800 810 139 E: sales@spel.com.au VIC GEELONG BRANCH 70 Technology Close, Corio, P: +61 3 5274 1336 P: 1800 810 139 E: sales@spel.com.au
SA OFFICE 9 Hampden Road, Mount Barker SA 5251 P: 1300 773 500 E: sales@spel.com.au	WA OFFICE 2 Modal Crescent Canning Vale WA 6155 P: +61 8 9350 1000 P: 1800 335 550 E: sales@spel.com.au	NZ OFFICE AUCKLAND 100 Montgomerie Road Airport Oaks P: +64 9 276 9045 E: sales@spel.com.au
NZ OFFICE WANGANUI 43 Heads Road Wanganui New Zealand P: +64 6 349 0088 E: sales@spel.com.au	NZ OFFICE WELLINGTON 41 Raiha St Porirua Wellington New Zealand P: +64 4 239 6006 E: sales@spel.com.au	PHILIPPINES OFFICE METRO MANILA Unit 2210 Lumiere Residences Pasig Boulevard, Pasig City P: +61 2 8705 0255 P: 1300 773 500 E: sales@spel.com.au
SINGAPORE OFFICE 512 Chai Chee Lane, #06-04 Bedok Industrial Estate, Singapore 469028 P: +61 2 8705 0255 P: 1300 773 500 E: sales@spel.com.au	UK OFFICE UNITED KINGDOM Lancaster Rd Shrewsbury SY1 3NQ UK P: +44 (0)1743 445200 E: sales@spel.com.au	USA OFFICE CLEVELAND 4548 Industrial Parkway Cleveland, Ohio 44135 P: +61 2 8705 0255 P: 1300 773 500 E: sales@spel.com.au

We believe clean water is a right not a privilege and we work to ensure a joy in water experience for you with your children and grandchildren.



spelstormwater
joy in water

100 Silverwater Rd, Silverwater NSW 2128 Australia

Phone: (02) 8705 0255

Email: sales@spel.com.au

spel.com.au

SPEL Stormwater accepts no responsibility for any loss or damage resulting from any person acting on this information. The details and dimensions contained in this document may change, please check with SPEL Stormwater for confirmation of current specifications.