STORMWATER ENGINEEERING REPORT & SITE BASED STORMWATER MANAGEMENT PLAN MAROOCHYDORE CITY CENTRE

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2018/993

Date: 14 February 2019

Queensland Government

PROJECT NO. 18529

SOUTH SEA ISLANDER WAY MAROOCHYDORE QLD 4555 November 2018

Revision	Date	Description	Author	Approved	Signed
Draft	16/11/2018	Issue For Review	LC	PJC	
A	19/11/2018	Issue For Approval	PJC	PJC	
B	22/01/2019	Revised Issue For Approval	PJC	PJC	

1 INTRODUCTION

1.1 Objectives & Description of proposed development

Infinitec Solutions has been commissioned to undertake the Stormwater Engineering Report and Site Based Stormwater Management Plan for the proposed Maroochydore CBD Town Centre site at South Sea Islander Way MAROOCHYDORE.

Street Address	South Sea Islander Way MAROOCHYDORE QLD 4558
RP Description	Lot 120 on SP305312
Total Site Area	1250 m2
Proposed Use	Multi Use Complex
Local Authority	EDQ

Based on the requirements of the EDQ and the Queensland Urban Drainage Manual (QUDM), the objectives of this study is to:

- Make an assessment of the pre and post development stormwater conditions and discharges from the site to ensure that there is no adverse impacts on either the adjoining properties or the existing stormwater infrastructure
- Determine the impact (if any) of local and regional flooding on the project site
- Identify the lawful point of discharge from the site
- Based on best engineering practices, develop a strategy to manage the quantity and quality of the stormwater leaving the site.

It is understood that a Development Application will be submitted to EDQ for the purposes of obtaining approval to redevelop land. The development proposal is for a proposed City Centre mutli-use building complex. Refer attached Appendices for drawings, locality plan and details.

1.2 Study team

All aspects of this proposal have been considered by Infinitec Solutions Pty Ltd & ASTPD.

1.3 Risk classification for the site

The proposed development will require only minor earthworks to fill the site to achieve the required pavement levels and grades. Prior to the start of construction erosion and sediment control measures will be installed in accordance with the preliminary design drawings included in this report.

The erosion and sediment control measures will be maintained throughout the construction period until suitable ground cover is achieved.

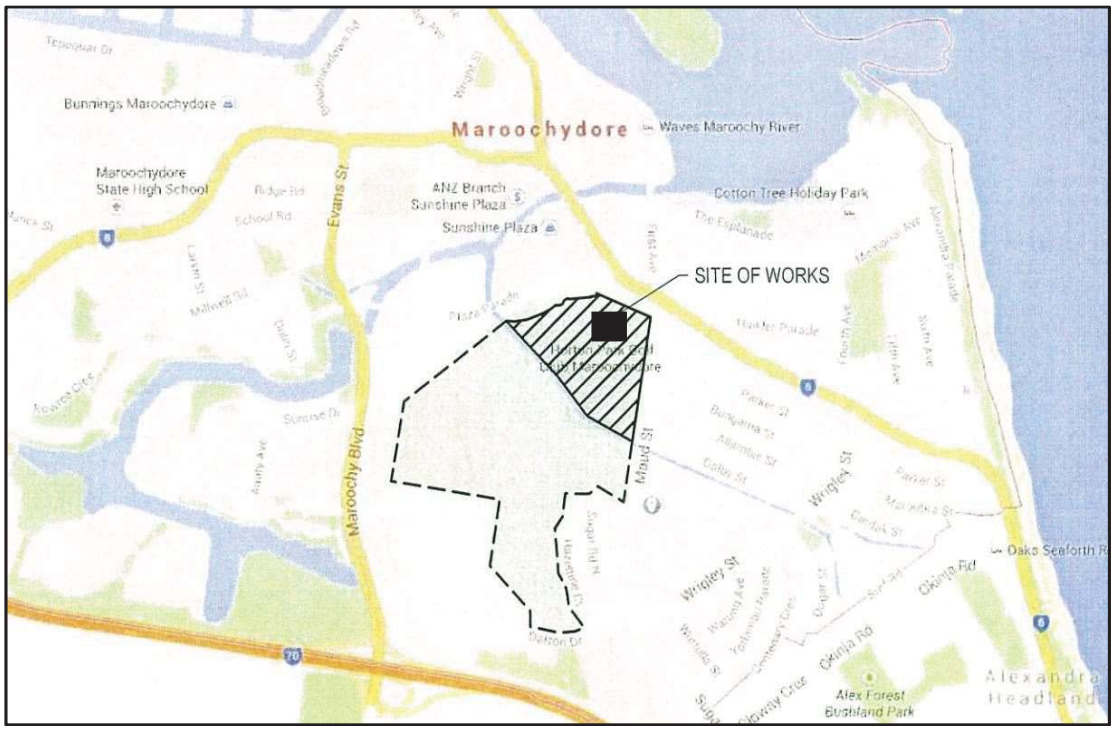
The construction contractor will be responsible for ensuring that soil and debris does not leave the site and is not deposited on external roads due to the proposed earthworks and construction activity.

ESC measures will have to be designed, installed & maintained in accordance with the SCRC Erosion & Sediment Control Manual.

2 SITE CHARACTERISTICS

2.1 Location

The site is located at South Sea Islander Way MAROOCHYDORE QLD 4558. Please refer to locality plan below.



SITE LOCATION MAP

2.2 Topography

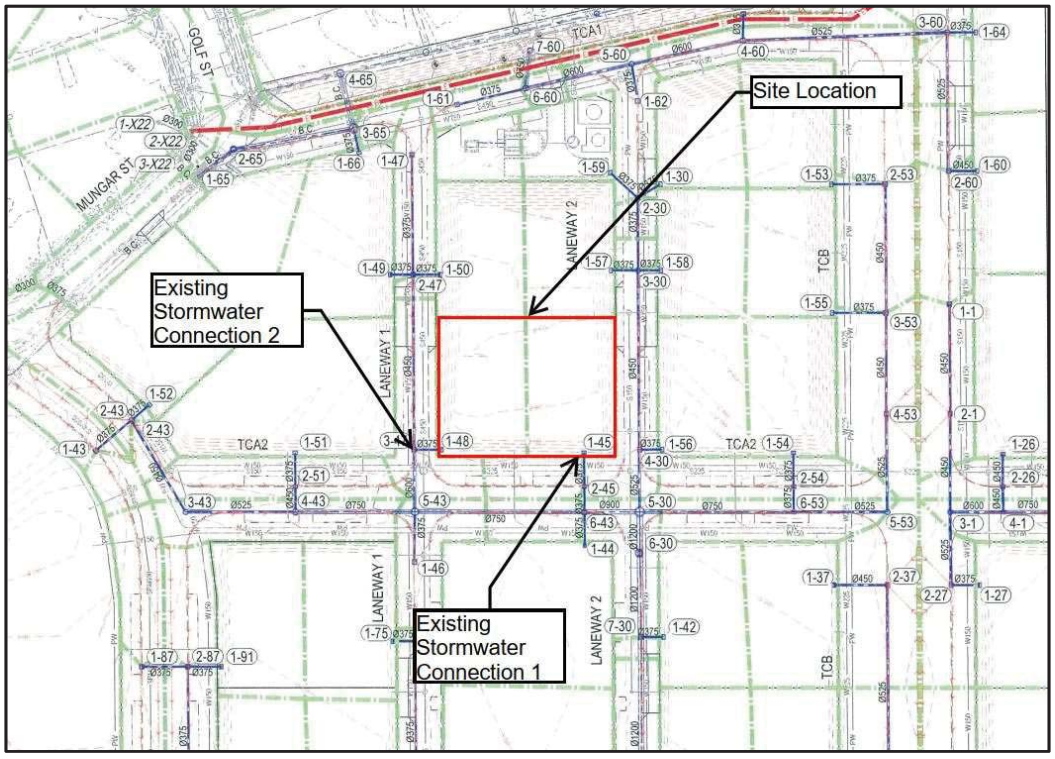
The site grades down from a maximum elevation of approximately RL 3.75 to the perimeter to a minimum elevation of approximately RL2.62 in the north-eastern central boundary.

2.3 Site survey plan

Detailed survey has been completed and relevant contours and details are shown in the attached survey plan, Dwg. No. 8112DET, prepared by Skyline Surveyors.

2.4 Drainage patterns

The site currently drains away from the perimeter boundaries to the north via overland flow, although existing piped stormwater connections are provided in the Southwest and Southeast corners. A graphical representation of the stormwater flow paths is shown in the figure below.



SUBDIVISION LAYOUT PLAN

2.5 Existing land use

The site is currently is vacant undeveloped land.

2.6 Proposed land use

The proposed use is for the construction of a new commercial building. Refer attached site plan prepared by the Architect.

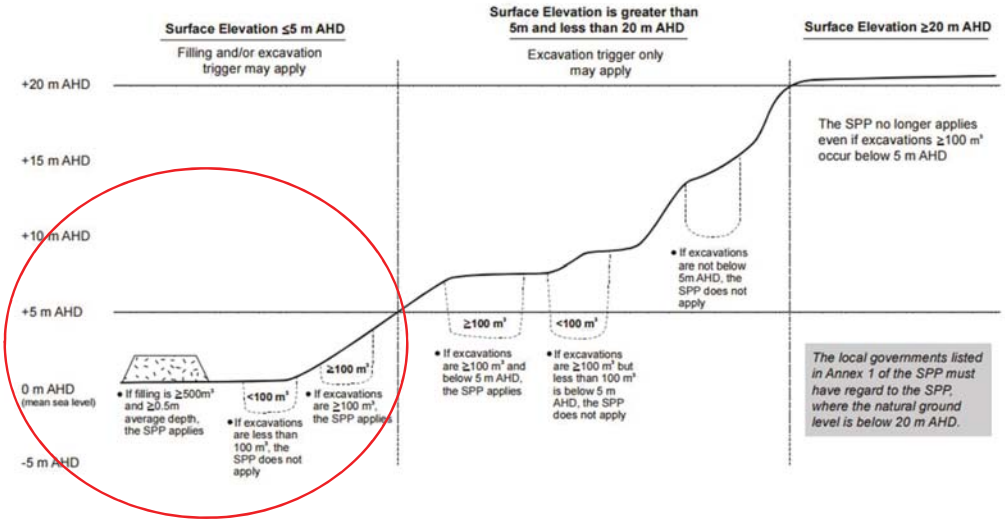
2.7 Soils

A detailed geotechnical investigation will be carried out by other companies.

Sunshine Coast is currently listed in Table 4: Acid sulphate soils-affected local government areas in State Planning Policy July 2017(SPP 2017), indicating that this development application may require compliance with the SPP 2017 acid sulphate soils development objectives.

This policy also states that developments below 20.0m AHD that involve a Material Change of Use or operational works, involving: (a) excavating or otherwise removing 100 cubic metres or more of soil or sediment, or (b) filling of land with 500 cubic metres or more of material with an average depth of 0.5 metres or more and are required to be assessed against the SPP 2017 acid sulphate soils

development objectives. The figure below (Adapted from SPP Water Quality State Interest Guideline 2017) provides a visual aid to determining assessable development.



Areas and Development to which SPP 2017 Applies

2.8 Watercourses

The site is partially located within a low risk future climate riverine flooding area as shown by the SCC Flood hazard area map below.

SCC Flood Hazard Area

A Flood Report is not proposed for this development as the regional flooding was resolved as part of the previous site subdivisions prepared by Cardno.

2.9 Vegetation within the waterway corridor

Not applicable to this project report.

3 DATA

3.1 Previous waterway related studies

Sunshine Coast Council has not assigned flood level information for this property for building or development purposes.

3.2 Hydrology and Hydrological data

Not applicable to this project report.

3.3 Water quality / stream health data

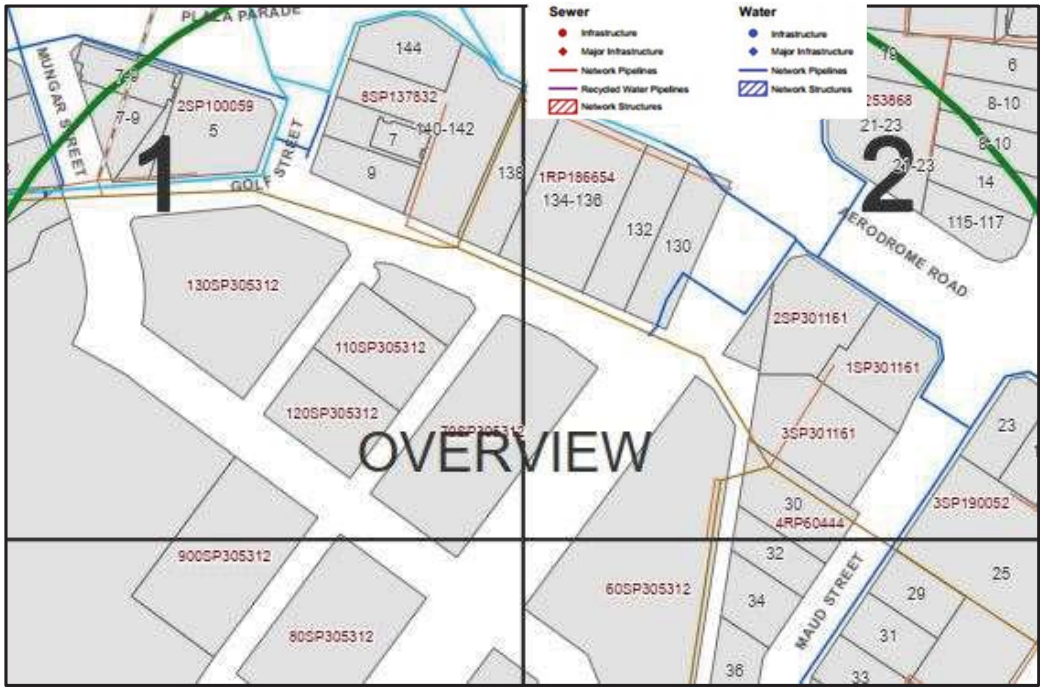
Does not form part of this report.

3.4 Description of Existing Sewer Infrastructure

We are in receipt of Unity Water Dial Before You Dig (DBYD) Map dated 12/11/18.

The existing site is currently vacant. There is an existing Unity Water (UW) sewer main and property connection to the site that has been installed as part of the site subdivision.

Approval from Unity Water will be required for future proposed property connections or modifications.



Unity Water DBYD Map

3.5 Description of Existing Water Infrastructure

We are in receipt of Unity Water Dial Before You Dig (DBYD) Map dated 12/11/18.

The existing site is currently vacant. There is an existing UW water main and property connection to the site that has been installed as part of the site subdivision.

Approval from Unity Water will be required for future proposed property connections or modifications.

4 WATER QUANTITY (HYDROLOGY & HYDRAULICS)

4.1 Methodology adopted

The proposed development is in a new subdivision which has been designed for the developed catchment. The site is serviced by 2No 375 dia RCP to the boundary which has satisfactory capacity to service the proposed 1250sqm impervious areas. No stormwater detention is proposed for the site.

4.2 Detailed drainage plan

The lawful point of discharge of stormwater will be the existing stormwater network which was recently installed as part of the subdivision & precinct master plan.

Please refer to the attached detailed drainage plan prepared by Infinitec Solutions for more detail. This plan incorporates the elements of the stormwater management plan.

5 WATER QUALITY

5.1 Pollutants and concern

The State Planning Policy July 2017 applies for stormwater quality management and management of new or expanded non-tidal artificial waterways applies to development that is outlined below.

SPP2017 PART E: INTERIM DEVELOPMENT ASSESSMENT REQUIREMENTS. STATE INTEREST – WATER QUALITY	YES / NO
Material change of use for urban purposes that involves a land area greater than 2500 square metres that:	
will result in an impervious area greater than 25 per cent of the net developable area	NO
will result in six or more dwellings	NO
Reconfiguring a lot for urban purposes that involves a land area greater than 2500 square metres and will result in six or more lots	NO
Operational works for urban purposes that involve disturbing more than 2500 square metres of land	NO

As the development does not have one or more applicable items in the above Table, the State Planning Policy is not applicable and compliance are not expected by the local government authority.

However, stormwater quality treatment is required by EDQ as advised in the pre-lodgement meeting.

To achieve the above State Planning Policy outcomes the development is to:

- avoid or minimise development impacts arising from altered stormwater quality and flow by providing for development and construction activities in accordance with acceptable design objectives
- avoid or minimise development impacts of waste water (other than contaminated stormwater) on water quality objectives
- avoid or minimise development impacts arising from the creation or expansion of non-tidal artificial waterways such as urban lakes

Development:

- avoids or otherwise minimises adverse impacts on the environmental values of receiving waters, arising from:
  (a) altered stormwater quality or flow, and
  (b) wastewater (other than contaminated stormwater and sewage), and
  (c) the creation or expansion of non-tidal artificial waterways, and
- complies with the SPP code: Water quality (Appendix 9.6).

The proposed development will comply with the State Planning Policy and a copy of the Code is attached in the appendices.

5.2 Treatment

Site:
The catchments are to discharge to a SPEL filter system, or similar, located exterior to the detention tanks as shown on the preliminary engineering plans.

The proposed SPEL system will be entirely contained within private property.

Installation and Maintenance of the proposed SPEL system will be conducted by suitably experienced contractors in accordance with the SPEL guidelines. Refer to appendices for installation and maintenance guidelines.

MUSIC Model Catchment:

Roof, pedestrian trafficable pavements and landscaped areas are to be drained to the proposed stormwater treatment system.

5.3 Receiving waters, Environmental Values and Water Quality Objectives

Water quality parameters and the proposed limits applicable to the proposed site have been selected in accordance with South East Queensland Healthy Waterways Partnership's Water by Design WSUD Technical Design Guidelines for South East Queensland Version 1 (2006) and MUSIC Modelling Guidelines for South East Queensland Version (2010).

It is proposed that best practice stormwater treatment be used and therefore it is required to be demonstrated that achieve the following load reduction targets:

Pollutant Types	Water Quality Objective (WQO)
Total Suspended Solids (TSS)	80% reduction of average annual load
Total Phosphorus (TP)	60% reduction of average annual load
Total Nitrogen(TN)	45% reduction of average annual load
Litter/gross pollutants	90% reduction of average annual load

5.4 Model selection

The software program Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 6, was used was used to assess pollutant generation and the performance of the stormwater treatment measures for the proposed development. Selection and testing of stormwater management options was undertaken in accordance with MUSIC Modelling Guidelines prepared by Water by Design (2010).

5.5 Stormwater Quantity

The proposed development is located within a recently completed subdivision, the existing stormwater network has been designed to cater for a developed catchment, with the site being serviced by 2 No 375dia connections to the property. No detention is proposed for the site.

5.6 Modelling assumptions

The parameters used as the MUSIC Rainfall-Runoff Parameters are shown below in the table below, and where derived from Table 3.7 of the MUSIC Modelling Guidelines prepared by Water by Design (2010).

5.7 MUSIC Results

The proposed solution involved using no storm sacks. The results of the MUSIC analysis are listed below.

Treatment Train Effectiveness - Receiving Node

	Sources	Residual Load	% Reduction
Flow (ML/yr)	1.74	1.74	0
Total Suspended Solids (kg/yr)	51.2	10.2	80.1
Total Phosphorus (kg/yr)	0.302	0.111	63.3
Total Nitrogen (kg/yr)	5.49	2.99	45.5
Gross Pollutants (kg/yr)	39.6	0	100

The split catchment parameters used as the MUSIC Pollutant Export Parameters are shown in the table below, and were derived from Table 3.8 of the MUSIC Modelling Guidelines prepared by Water by Design (2010).

Flow Type	Surface Type	TSS log_{10} Values		TSS log_{10} Values		TSS log_{10} Values	
	Commercial	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Baseflow Parameters	Roof	N/A	N/A	N/A	N/A	N/A	N/A
	Road	0.78	0.39	-0.60	0.50	0.32	0.30
	Ground	0.78	0.39	-0.60	0.50	0.32	0.30
Stormflow Parameters	Roof	1.30	0.38	-0.89	0.34	0.37	0.34
	Road	2.43	0.38	-0.30	0.34	0.37	0.34
	Ground	1.92	0.38	-0.39	0.34	0.37	0.34

Source Node MUSIC Pollutant Export Parameters

The treatment node parameters used in the MUSIC model were provided by SPEL. These treatment nodes were modified in accordance with SPEL. Contact SPEL for design & confirmation details.

5.6 Modelling results

Using the MUSIC software, it was determined that the water quality objectives for the proposed development where met as shown in the table below:

Pollutant Types	Pre-Development	Post-Development	Reduction (%)	Complying With WQO
Total Suspended Solids (kg/yr)	51.2	10.2	80.1	✓
Total Phosphorus (kg/yr)	0.302	0.111	63.3	✓
Total Nitrogen (kg/yr)	5.49	2.99	45.5	✓
Litter/gross pollutants (kg/yr)	39.6	0	100	✓

Water Quality Treatment Results

As shown by the above results, the proposed stormwater treatment train adopts best practice stormwater treatment and will achieve the required Water Quality Objectives.

6 STORMWATER MANAGEMENT OPTIONS

6.1 Selection and assessment of water quantity controls

Any proposed development has the potential to cause an increase in peak discharges due to the changes to the fractions impervious and the slight reductions in times of concentration. The desired outcome of this report is to ensure that these elements have been assessed and managed to determine the possible impacts on the downstream drainage infrastructure and neighbouring properties.

All aspects of the stormwater quantities have been adequately managed with outcomes that exceed the expectation of Council and all relevant guidelines. This has been achieved through the following outcomes:

- Ensure that the legal point of discharge is identified and confirm the acceptability to receive the proposed discharges
- Ensure that the site layout and design is suitable to cater for the major design event
- Ensure that any changes to peak discharges are managed through the use of detention basins on site and discharge volumes are controlled with appropriately selected devices.

6.2 Selection and assessment of water quality controls (SQBMP's)

The proposed development has the potential to cause a reduction in runoff water quality due to the changes in the land use. The desired outcome of this report is to ensure that these elements have been assessed and managed to determine the possible impacts on the downstream drainage infrastructure and neighbouring properties.

All aspects of the stormwater quality have been adequately managed with outcomes that exceed the expectation of Council and all relevant guidelines. This has been achieved through the installation of best practice stormwater quality treatment devices.

6.3 Integration with waterway corridor

Not Applicable to this project.

6.4 Conclusions & Recommended Stormwater Management Strategy

The final recommendations for Stormwater Quantity from this report include:

1. The proposed lawful points of discharge are to the existing stormwater connections.
2. The site layout and levels shall be in accordance with the attached plans to ensure that both the Minor and Major design events are catered for.

With the above recommendations implemented, Infinitec Solutions has demonstrated that the proposed treatment train generally adopts best practice stormwater quality techniques as required by State Planning Policy July 2017 – Water Quality and will therefore achieve an appropriate level of stormwater quality treatment for the proposed development site.

7 MAINTENANCE PLANS

7.1 Inspections forms and plans

As part of the detailed design and documentation phase, a set of maintenance plans and controls will be put in place for the owners and operators of the premises to provide clarity in the obligations of each of the parties.

The SPEL treatment devices are to be maintained in accordance with the manufacturers operations and maintenance guidelines attached in the appendices. Refer to SPEL's website for installation and maintenance details.

7.2 Responsibilities for maintenance of structural controls

Maintenance of the stormwater treatment systems is to be the responsibility of the property owner.

8 ASSET HAND OVER

8.1 Process and timing for asset handover to council

Not Applicable to this project.

9 ATTACHMENTS

9.1 **Proposed Site Plan**

9.2 **Preliminary Erosion and Sediment Control layout Plan 18529-P001**

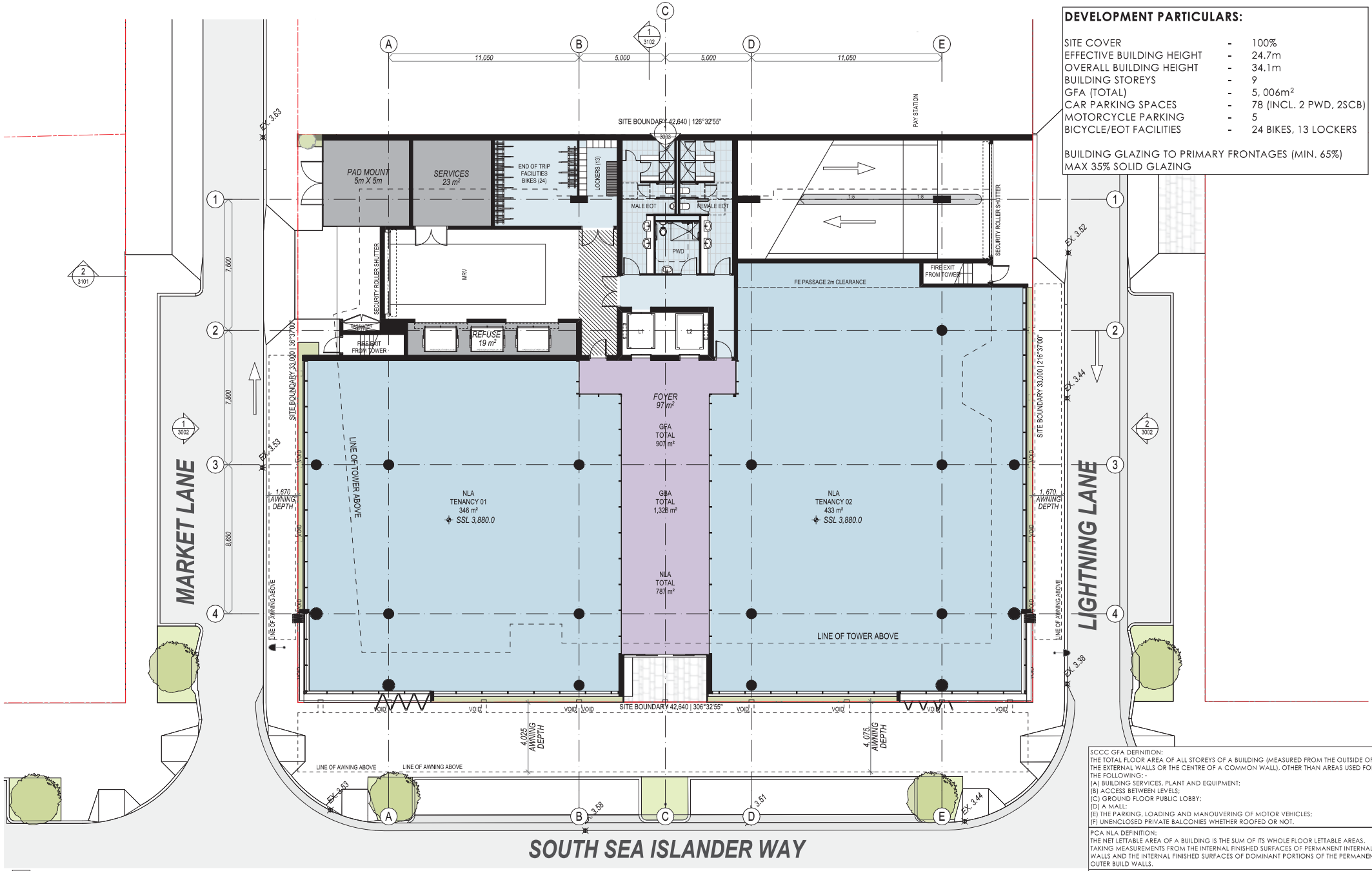
9.3 **Preliminary Services Layout Plan 18529-P002**

9.4 **Preliminary Civil Details 18529-P003**

9.5 **Survey Plan - Skyline Surveys**

9.6 **State Planning Policy Code - Water Quality**

9.7 **SPEL Filter Device Installation and Maintenance Documentation**



DEVELOPMENT PARTICULARS:

SITE COVER	-	100%
EFFECTIVE BUILDING HEIGHT	-	24.7m
OVERALL BUILDING HEIGHT	-	34.1m
BUILDING STOREYS	-	9
GFA (TOTAL)	-	5, 006m²
CAR PARKING SPACES	-	78 (INCL. 2 PWD, 2SCB)
MOTORCYCLE PARKING	-	5
BICYCLE/EOT FACILITIES	-	24 BIKES, 13 LOCKERS

BUILDING GLAZING TO PRIMARY FRONTAGES (MIN. 65%)
MAX 35% SOLID GLAZING

SCCC GFA DEFINITION:
THE TOTAL FLOOR AREA OF ALL STOREYS OF A BUILDING (MEASURED FROM THE OUTSIDE OF THE EXTERNAL WALLS OR THE CENTRE OF A COMMON WALL), OTHER THAN AREAS USED FOR THE FOLLOWING: -
(A) BUILDING SERVICES, PLANT AND EQUIPMENT;
(B) ACCESS BETWEEN LEVELS;
(C) GROUND FLOOR PUBLIC LOBBY;
(D) A MALL;
(E) THE PARKING, LOADING AND MANOUVERING OF MOTOR VEHICLES;
(F) UNENCLOSED PRIVATE BALCONIES WHETHER ROOFED OR NOT.

PCA NLA DEFINITION:
THE NET LETTABLE AREA OF A BUILDING IS THE SUM OF ITS WHOLE FLOOR LETTABLE AREAS, TAKING MEASUREMENTS FROM THE INTERNAL FINISHED SURFACES OF PERMANENT INTERNAL WALLS AND THE INTERNAL FINISHED SURFACES OF DOMINANT PORTIONS OF THE PERMANENT OUTER BUILD WALLS.

GROSS BUILDING AREA:
MEASURED FROM ALL EXTERNAL WALLS EXCLUDING ANY SLAB PROJECTIONS, INCLUDES BALCONIES.

1 - FLOOR PLAN - GROUND FLOOR
SCALE 1:100 @ A1
SCALE 1:200 @ A3

SCALE 1:100 @ A1
SCALE 1:200 @ A3

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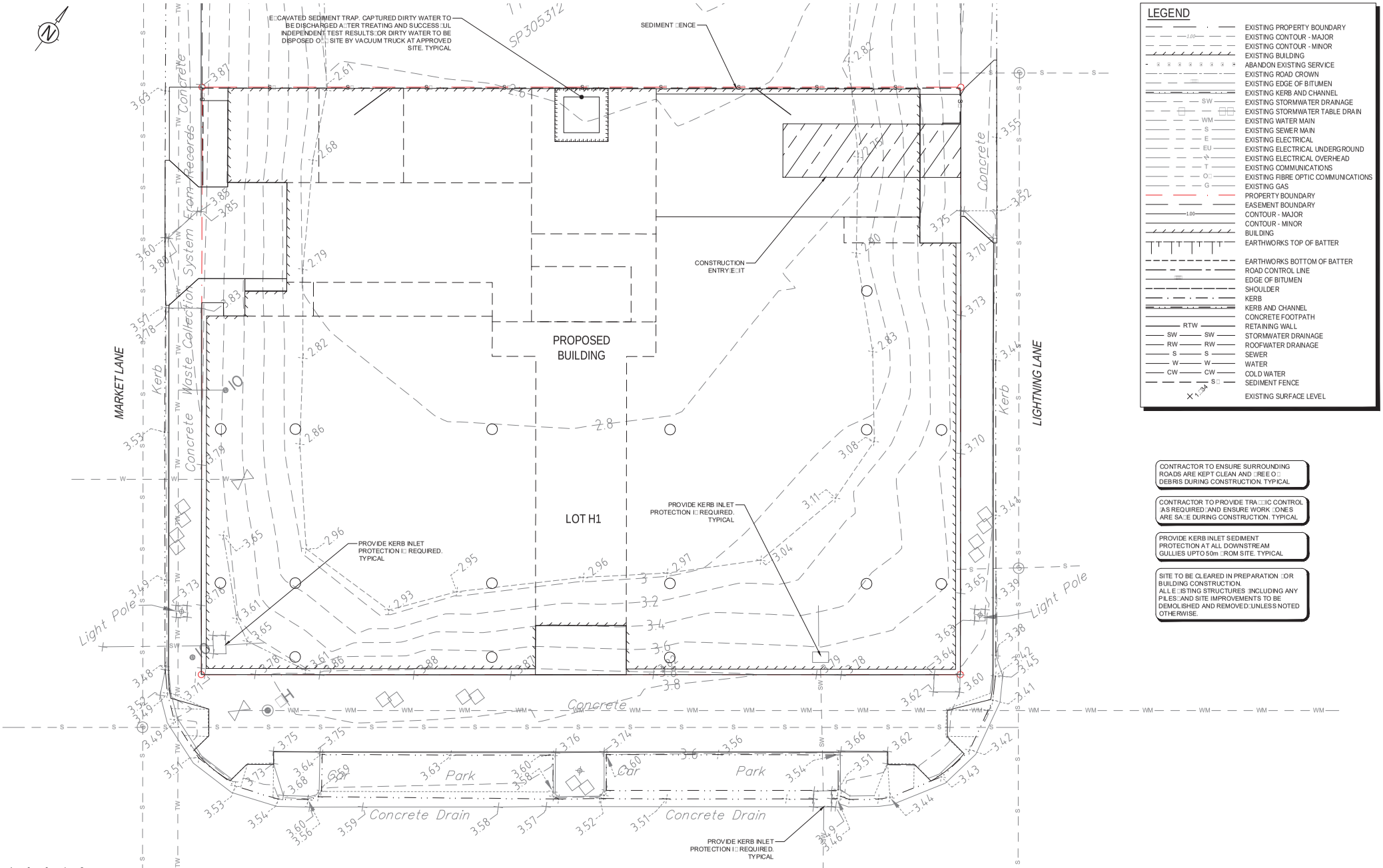
ISSUE	PURPOSE	DATE	D.	C.	A.
05	FOR INFORMATION	15/11/2018	MR	CT	MT
04	FOR INFORMATION	15/10/2018	JS	CT	JS
03	FOR INFORMATION	11/10/2018	JS	CT	MT
02	FOR INFORMATION	03/10/2018	MR	CT	MT
01	PRELIMINARY MEETING	05/07/2018	MR	CT	MT

STATUS

SUN CENTRAL MAROOCHYDORE
LOT 120 SP305312 SUN CENTRAL, MAROOCHYDORE, MAROOCHYDORE
CLIENT - EVANSLONG

DRAWING TITLE
FLOOR PLAN - GROUND FLOOR

JOB No	DRAWING No	ISSUE
5479	SD2007	05



LAYOUT PLAN
SCALE 1:100

NOT FOR CONSTRUCTION

Rev	Description		Date
A	ORIGINAL ISSUE	AvT	15.11.18

DO NOT SCALE FROM DRAWING

Author horizontal information is to AMG
Author vertical information is to AHD

Client: evansbuilt

infinitec
GROUND FLOOR 30 LUTWYCHE ROAD WINDSOR QLD 4030
P: 07 3857 8577 www.infinitec.com.au

Drawn	SC
Checked	PC
Signed	
RPEQ	

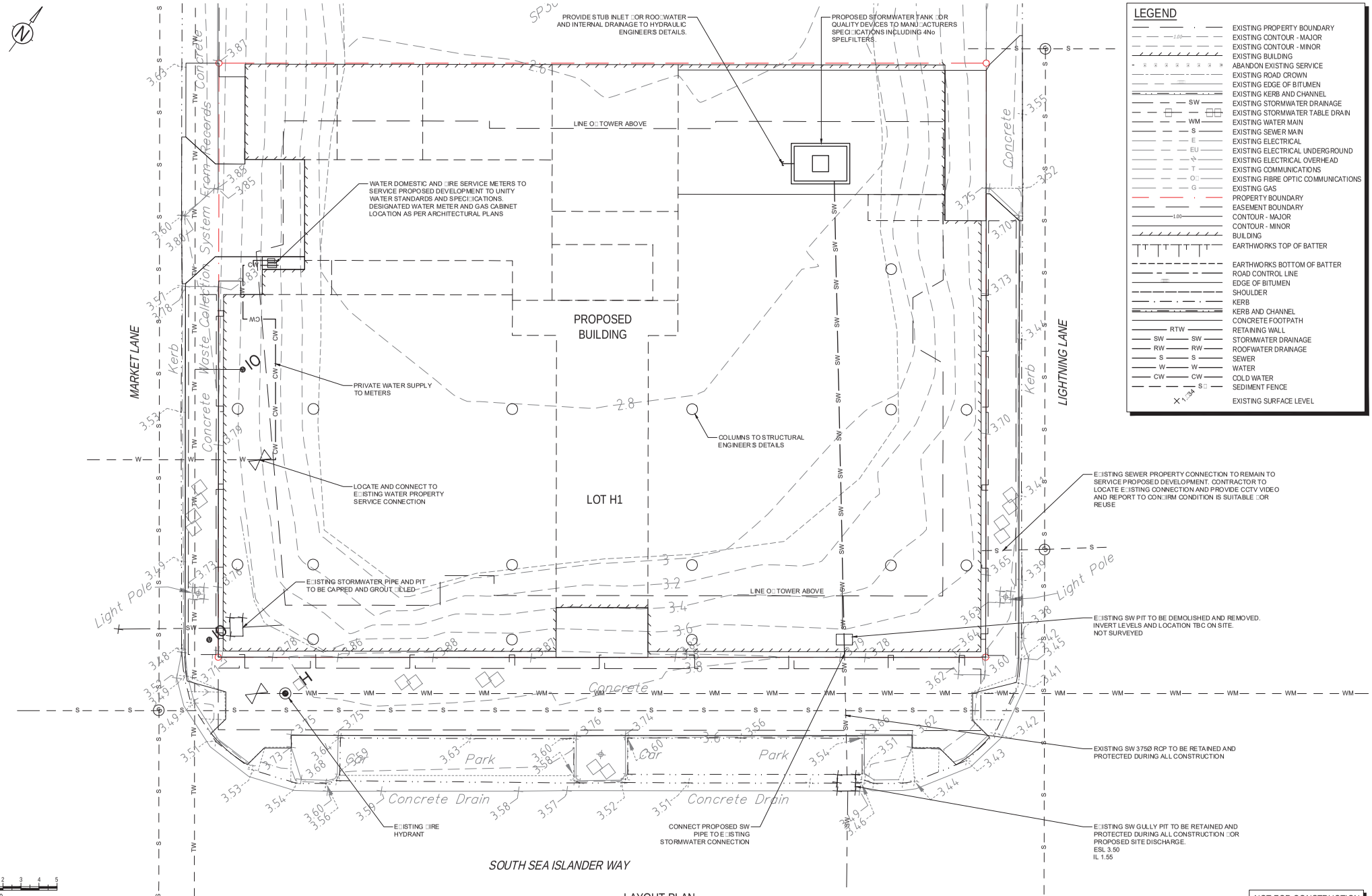
Project: LOT H1 SUN CENTRAL MAROOCHYDORE QLD 4558

Title: EROSION AND SEDIMENT CONTROL LAYOUT PLAN

Drawing Number: 185 9 P001

Scale: AS SHOWN

Rev: A



0 1 2 3 4 5
SCALE 1:100
scales quoted apply to original drawing scale

LAYOUT PLAN
SCALE 1:100

NOT FOR CONSTRUCTION

a □hori□onta □in□ormation is to AMG
a □vertica □in□ormation is to AHD

Rev	Description		Date
A	ORIGINAL ISSUE	AvT	15.11.18

DO NOT SCALE □ROM DRAWING

Client: evansbuilt

infinitec
GROUND □LOOR□□30 LUTWYCHE ROAD□WINDSOR QLD 4030
P: 07 3857 8577 www.in□initec.com.au

Drawn	SC	
Checked	PC	
Signed		
RPEQ		

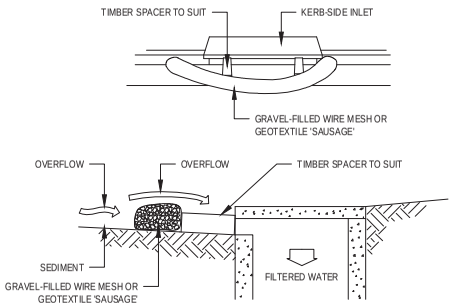
Project: LOT H1 SUN CENTRAL MAROOCHYDORE QLD 4558

Title: PRELIMINARY SERVICES LAYOUT PLAN

Drawing Num□er: 185□9□P00□

Scale: AS SHOWN

Rev: A



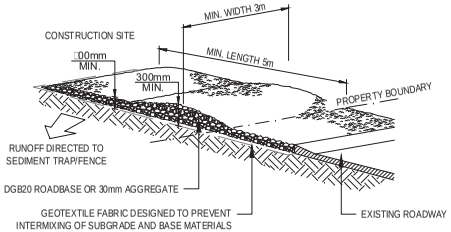
NOTE: THIS PRACTICE ONLY TO BE USED WHERE SPECIFIED IN AN APPROVED SWMP/ESCP.

CONSTRUCTION NOTES

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

MESH AND GRAVEL INLET FILTER

NOT TO SCALE

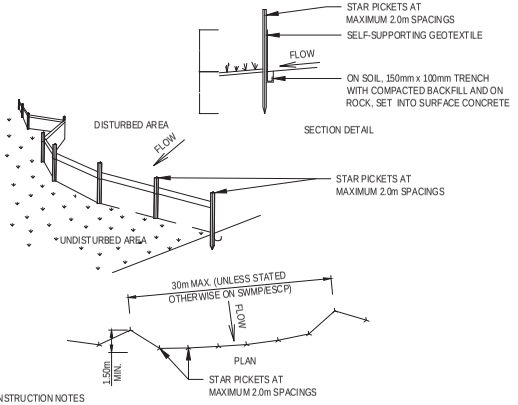


CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15m LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3m WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMP IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE

TEMPORARY CONSTRUCTION ENTRY/EXIT

NOT TO SCALE

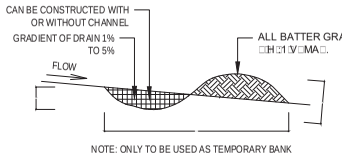


CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50L/s IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 1.5m LONG STAR PICKETS INTO GROUND AT 2.5m INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT FENCE

NOT TO SCALE



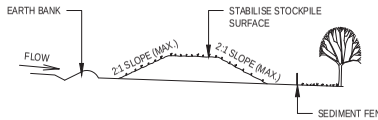
NOTE: ONLY TO BE USED AS TEMPORARY BANK WHERE MAXIMUM UPSLOPE LENGTH IS 80m.

CONSTRUCTION NOTES

1. BUILD WITH GRADIENTS BETWEEN 1 PERCENT AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

DIVERSION BANK (LOW FLOW)

NOT TO SCALE



CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2 (PREFERABLY 5) METRES FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2 METRES IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES 1 TO 2 METRES DOWNSLOPE.

STOCKPILE

NOT TO SCALE

NOT FOR CONSTRUCTION

Rev	Description		Date
A	ORIGINAL ISSUE	AvT	15.11.18

a□hori□onta□ in□ormation is to AMG
a□vertica□ in□ormation is to AHD
DO NOT SCALE □ROM DRAWING

Client: evansbuilt

infinitec
GROUND □LOOR□□30 LUTWYCHE ROAD□WINDSOR QLD 4030
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Drawn	SC
Checked	PC
Signed	
RPEQ	

Project: LOT H1 SUN CENTRAL MAROOCHYDORE QLD 4558

Title: PRELIMINARY CIVIL DETAILS

Drawing Num□er: 185□9□P003

Scale: AS SHOWN

Rev: A

Scale 1:250 – Lengths are in Metres.

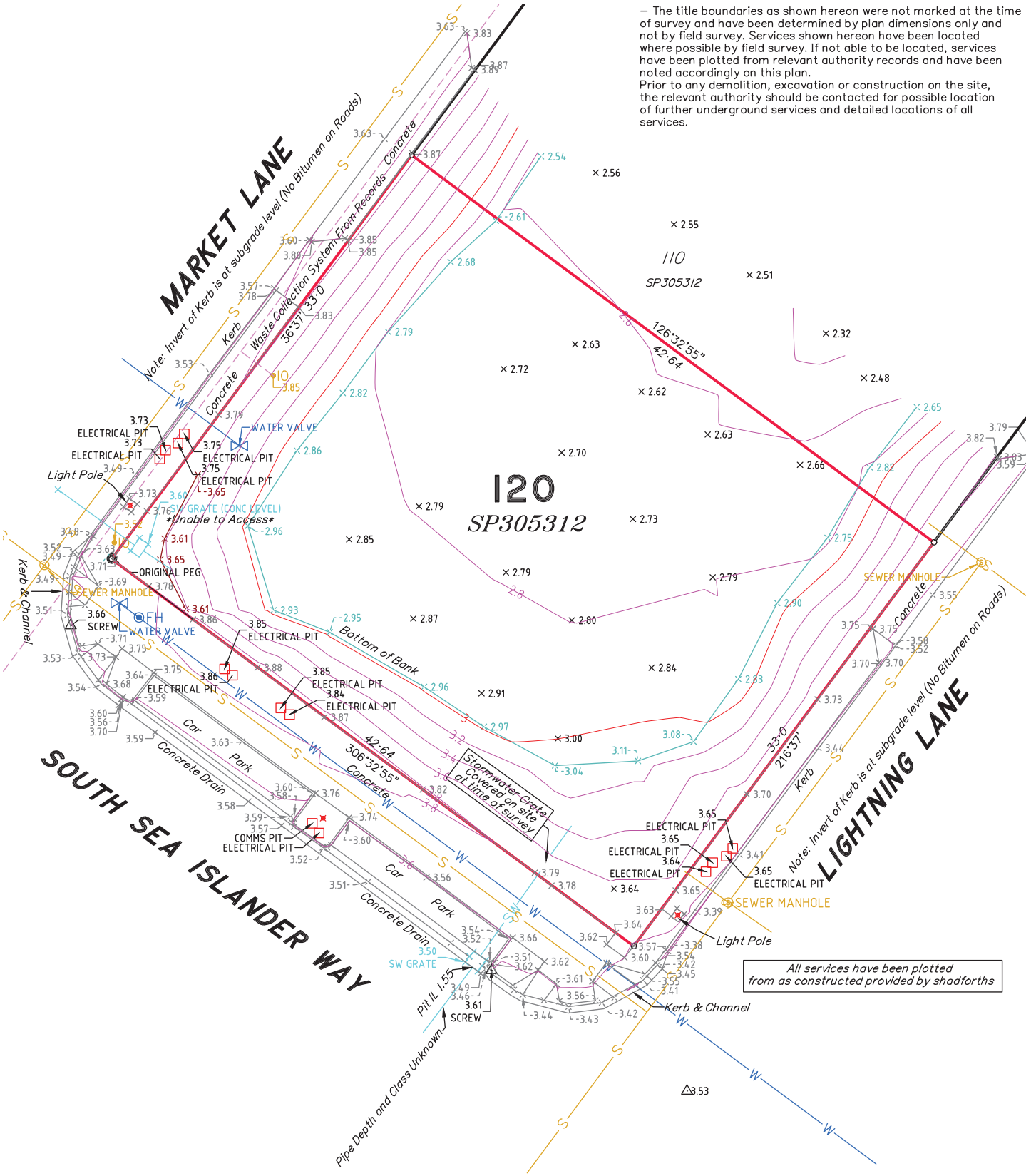
2 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36

Notes:

– Levels are to AHD Derived from PSM134531

– The levels shown were taken on the surveyed date and may not represent the Local Authority's definition of Natural Ground Level. Please contact this office for a quote or further advice.

– The title boundaries as shown hereon were not marked at the time of survey and have been determined by plan dimensions only and not by field survey. Services shown hereon have been located where possible by field survey. If not able to be located, services have been plotted from relevant authority records and have been noted accordingly on this plan.
Prior to any demolition, excavation or construction on the site, the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.



0 50mm 100mm 150mm

Client: EVANS LONG

CONTOUR AND DETAIL SURVEY

Over Lot 120 on SP305312

South Sea Islander Way, Maroochydore

Local Government: S.C.R.C Locality: MAROOCHYDORE

Plan No: 8112 DET Scale: 1:250@A3

Prepared By: JP Date: 02.11.18

Skyline Surveyors

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N

South Sea Islander Way, Maroochydore QLD

State Planning Policy
Performance Outcome Criteria and Acceptable Outcomes

SPP code: Water quality

	Performance outcomes	Acceptable outcomes	Solution
1	**PO1** The development is planned and designed considering the land use constraints of the site for achieving stormwater design objectives.	**AO1.1** A site stormwater quality management plan (SQMP) is prepared, **and**: a. is consistent with any local area stormwater management planning, **and** b. provides for achievable stormwater quality treatment measures meeting design objectives listed below in Table A (construction phase) and Table B (post construction phase), or current best practice environmental management, reflecting land use constraints, such as: • erosive, dispersive and/or saline soil types • landscape features (including landform) • acid sulfate soil and management of nutrients of concern • rainfall erosivity. *Editor's note: Local area stormwater management planning may include Urban Stormwater Quality Management Plans, or Catchment or waterway management plans, Healthy Waters Management Plans, Water Quality Improvement Plans, Natural Resource Management Plans.*	**SO1.1** A site stormwater quality management plan has been prepared for this development that is consistent with any local area stormwater management planning and provides for achievable stormwater quality treatment measures.
2	**PO2** Development does not discharge wastewater to a waterway or off site unless demonstrated to be best-practice environmental management for that site.	**AO2.1** A wastewater management plan (WWMP) is prepared by a suitably qualified person and addresses: a. wastewater type, **and** b. climatic conditions, **and** c. water quality objectives (WQOs), **and** d. best-practice environmental management, **and**	**SO2.1** A site stormwater quality management plan has been prepared for this development that is consistent with any local area stormwater management planning and provides for achievable stormwater quality treatment measures.

	Performance outcomes	Acceptable outcomes	Solution
		AO2.2 The WWMP provides that wastewater is managed in accordance with a waste management hierarchy that: a. avoids wastewater discharges to waterways, **or** b. if wastewater discharge to waterways cannot practicably be avoided, minimises wastewater discharge to waterways by re-use, recycling, recovery and treatment for disposal to sewer, surface water and groundwater.	
3	**PO3** Any non-tidal artificial waterway is located in a way that is compatible with the land use constraints of the site for protecting water environmental values in existing natural waterways.	**AO3.1** If the proposed development involves a non-tidal artificial waterway: a. environmental values in downstream waterways are protected, **and** b. any groundwater recharge areas are not affected, **and** c. the location of the waterway incorporates low lying areas of a catchment connected to an existing waterway, **and** d. existing areas of ponded water are included, **and** **AO3.2** Non-tidal artificial waterways are located: a. outside natural wetlands and any associated buffer areas, **and** b. to minimise disturbing soils or sediments, **and** c. to avoid altering the natural hydrologic regime in acid sulfate soil and nutrient hazardous areas.	**SO3.1** Not applicable as a waterway is not proposed for this development.
4	**PO4** Any non-tidal artificial waterway is located in a way that is compatible with existing tidal	**AO4.1** Where a non-tidal artificial waterway is located adjacent to, or is connected to, a tidal waterway by means of a	**SO4.1** Not applicable as a waterway is not proposed for this

	Performance outcomes	Acceptable outcomes	Solution
	waterways.	weir, lock, pumping system or similar: a. there is sufficient flushing or a tidal range of >0.3m, **or** b. any tidal flow alteration does not adversely impact on the tidal waterway, **or** c. there is no introduction of salt water into freshwater environments.	development.
5	**PO5** Stormwater does not discharge directly to a non-tidal artificial waterway without treatment to manage stormwater quality management.	**AO5.1** Any non-tidal artificial waterway is designed and managed for any of the following end-use purposes: a. amenity including aesthetics, landscaping and recreation, **or** b. flood management, **or** c. stormwater harvesting as part of an integrated water cycle management plan, **or** d. aquatic habitat, **and** **AO5.2** The end-use purpose of any non-tidal artificial waterway is designed and operated in a way that protects water environmental values.	**SO5.1** A site stormwater quality management plan has been prepared for this development that is consistent with any local area stormwater management planning and provides for achievable stormwater quality treatment measures.
6	**PO6** Construction activities for the development avoid or minimise adverse impacts on stormwater quality.	**AO6.1** An erosion and sediment control plan (ESCP) demonstrates that release of sediment-laden stormwater is avoided for the nominated design storm, and minimised when the nominated design storm is exceeded, by addressing design objectives listed below in Table A (construction phase) or local equivalent, for: a. drainage control, **and** b. erosion control, **and** c. sediment control, **and** d. water quality outcomes, **and**	**SO6.1** An erosion and sediment control plan has been prepared for this development that will address the design objectives.

	Performance outcomes	Acceptable outcomes	Solution
		AO6.2 Erosion and sediment control practices (including any proprietary erosion and sediment control products) are designed, installed, constructed, operated, monitored and maintained, and any other erosion and sediment control practices are carried out in accordance with local conditions and appropriate recommendations from a suitably qualified person, **or** **AO6.3** The ESCP demonstrates how stormwater quality will be managed in accordance with an acceptable regional or local guideline so that target contaminants are treated to a design objective at least equivalent to Acceptable Outcome AO6.1.	
7	**PO7** Operational activities for the development avoid or minimises changes to waterway hydrology from adverse impacts of altered stormwater quality and flow	**AO7.1** Development incorporate stormwater flow control measure to achieve the design objectives set out below in and Table B (post construction phase). The operational phases for the development comply with design objectives in Table B (post construction phase), or current best practice environmental management, including management of frequent flows, and peak flows.	**SO7.1** A site stormwater quality management plan has been prepared for this development that is consistent with any local area stormwater management planning and provides for achievable stormwater quality treatment measures.
8	**PO8** Any treatment and disposal of waste water to a waterway accounts for: • the applicable water quality objectives for the receiving waters, and • adverse impact on ecosystem health or receiving waters, and • in waters mapped as being of high ecological	**AO8.1** Implement the WWMP prepared in accordance with AO2.1.	**SO8.1** A site stormwater quality management plan has been prepared for this development that is consistent with any local area stormwater management planning and provides for achievable stormwater quality treatment measures.

	Performance outcomes	Acceptable outcomes	Solution
	value, the adverse impacts of such releases and their offset.		
9	**PO9** Wastewater discharge to a waterway is managed in a way that maintains ecological processes, riparian vegetation, waterway integrity, and downstream ecosystem health.	**AO9.1** Wastewater discharge waterways is managed to avoid or minimize the release of nutrients of concern so as to minimize the occurrence, frequency and intensity of coastal algal blooms, **and** **AO9.2** Development in coastal catchments avoids or minimises and appropriately manages soil disturbance or altering natural hydrology, **and** **AO9.3** Development in coastal catchments: a. avoids lowering groundwater levels where potential or actual acid sulfate soils are present, **and** b. manages wastewaters so that: i. the pH of any wastewater discharged is maintained between 6.5 and 8.5 to avoid mobilisation of acid, iron, aluminium, and metals, **and** ii. holding times of neutralised wastewaters ensures the flocculation and removal of any dissolved iron prior to release, **and** iii. visible iron floc is not present in any discharge, **and** iv. precipitated iron floc is contained and disposed of, **and** v. wastewater and precipitates that cannot be contained and treated for discharge on site are removed and disposed of through tradewaste or another lawful method.	**SO9.1** Not applicable as a waterway is not proposed for this development.

	Performance outcomes	Acceptable outcomes	Solution
10	**P10** Any non-tidal artificial waterway is managed and operated by suitably qualified persons to achieve water quality objectives in natural waterways.	**A10.1** Any non-tidal artificial waterway is designed, constructed and managed under the responsibility of a suitably qualified registered professional engineer, Queensland (RPEQ) with specific experience in establishing and managing artificial waterways, **and** **A10.2** Monitoring and maintenance programs adaptively manage water quality in any non-tidal artificial waterway to achieve relevant water-quality objectives downstream of the waterway, **and** **A10.3** Aquatic weeds are managed in any non-tidal artificial waterway to achieve a low percentage of coverage of the water surface area (less than 10%). Pests and vectors (such as mosquitoes) are managed through avoiding stagnant water areas, providing for native fish predators, and any other best practices for monitoring and treating pests, **and** **A10.4** Any non-tidal artificial waterway is managed and operated by a responsible entity under agreement for the life of the waterway. The responsible entity is to implement a deed of agreement for the management and operation of the waterway that: a. identifies the waterway, **and** b. states a period of responsibility for the entity, **and** c. states a process for any transfer of responsibility for the waterway, **and** d. states required actions under the agreement for monitoring the water quality of the waterway and	**S10.1** A site stormwater quality management plan has been prepared for this development that is consistent with any local area stormwater management planning and provides for achievable stormwater quality treatment measures.

	Performance outcomes	Acceptable outcomes	Solution
		receiving waters, **and** e. states required actions under the agreement for maintaining the waterway to achieve the outcomes of this code and any relevant conditions of a development approval, **and** f. identifies funding sources for the above, including bonds, infrastructure charges or levies.	

South Sea Islander Way, Maroochydore QLD

State Planning Policy
Performance Outcome Criteria and Acceptable Outcomes

Table A: Construction phase—stormwater management design objectives

Application

Applies to all climatic regions.

Issue	Design Objectives	
Drainage Control	Temporary drainage works	1. Design life and design storm for temporary drainage works: • Disturbed area open for <12 months—1 in 2-year ARI event • Disturbed area open for 12–24 months—1 in 5-year ARI event • Disturbed area open for > 24 months—1 in 10-year ARI event 2. Design capacity excludes minimum 150 mm freeboard 3. Temporary culvert crossing—minimum 1 in 1-year ARI hydraulic capacity
Erosion Control	Erosion control measures	1. Minimise exposure of disturbed soils at any time 2. Divert water run-off from undisturbed areas around disturbed areas 3. Determine the erosion risk rating using local rainfall erosivity, rainfall depth, soil-loss rate or other acceptable methods 4. Implement erosion control methods corresponding to identified erosion risk rating
Sediment Control	Sediment control measures Design storm for sediment control basins Sediment basin dewatering	1. Determine appropriate sediment control measures using: • potential soil loss rate, or • monthly erosivity, or • average monthly rainfall 2. Collect and drain stormwater from disturbed soils to sediment basin for design storm event: • design storm for sediment basin sizing is 80th% five-day event or similar 3. Site discharge during sediment basin dewatering: • TSS < 50 mg/L TSS, and • Turbidity not >10% receiving waters turbidity, and • pH 6.5–8.5
Water quality	Litter and other waste, hydrocarbons and other contaminants	1. Avoid wind-blown litter; remove gross pollutants 2. Ensure there is no visible oil or grease sheen on released waters 3. Dispose of waste containing contaminants at authorised facilities
Waterway stability and flood flow management	Changes to the natural waterway hydraulics and hydrology	1. For peak flow for the 1-year and 100-year ARI event, use constructed sediment basins to attenuate the discharge rate of stormwater from the site

Table B: Post construction phase—stormwater management design objectives

Application

(a) Applies to western Queensland and Cape York/ Far North Queensland, for population centres greater than 25,000 persons, and
(b) For all other climatic regions with population centres greater than 3000 persons.

Please refer to water quality objectives table in main report for data applicable to this application. Please refer to Table B of SPP (2013) for complete data set.

Table 9.4.6.3.1 Performance outcomes and acceptable outcomes for assessable development

	Performance outcomes	Acceptable outcomes	Solution
1	**PO1** Development design, including but not limited to layout, scale, intensity and staging, is based on a thorough assessment of: - a. site characteristics; b. potential environmental risks; and c. the likely effectiveness and limitations of available erosion and sediment control and stormwater drainage measures to achieve protection of the environmental values of water and the functioning of stormwater infrastructure, both during and post construction.	**AO1** No acceptable outcome provided.	**SO1** The development has been designed within the limitations of the site and the surrounding environment.
2	**PO2** Development is provided with a stormwater drainage system which: - a. incorporates allowance for climate change; and b. ensures the development is adequately drained, and stormwater is managed and lawfully discharged without altering stormwater drainage characteristics external to the *site*.	**AO2.1** Development is provided with a stormwater drainage system which is designed and constructed in accordance with the standards specified in the Planning scheme policy for development works. **AO2.2** The stormwater drainage system connects to a lawful point of discharge in accordance with the Planning scheme policy for development works. **AO2.3** Stormwater flows discharged from the development are either within the capacity of the downstream	**SO2.1** Development complies with the planning scheme policy **SO2.2** Development complies with the planning scheme policy **SO2.3** Development causes no worsening

	Performance outcomes	Acceptable outcomes	Solution
		drainage system such that non-worsening occurs or are mitigated to pre-development characteristics. **AO2.4** Development provides for the management of stormwater to incorporate appropriate allowance for climate change impacts (including rainfall intensity and sea level rise), in accordance with the Planning scheme policy for development works.	**SO2.4** Development complies with the planning scheme policy
3	**PO3** Development is provided with stormwater conveyance channels which use natural channel design principles to convey external catchment stormwater through development and support landscape, passive recreation and ecological values.	**AO3.1** Development is provided with stormwater conveyance channels designed in accordance with the standards specified in the Planning scheme policy for development works. **AO3.2** Landscape and ecological features (e.g. plant species and habitat types) used in stormwater conveyance channels are complementary to the local context, including natural waterways. **AO3.3** Bank and bed stability and planting densities result in a stable channel over the long term and minimal potential for invasive weed growth.	**S3.1** Not applicable to this development **S3.2** Not applicable to this development **S3.3** Not applicable to this development
4	**PO4** Stormwater infrastructure is designed to minimize maintenance costs and the requirement for specialized equipment or maintenance techniques.	**AO4** Stormwater infrastructure is designed and constructed in accordance with the standards specified in the Planning scheme policy for development works.	Not applicable to this development

South Sea Islander Way, Maroochydore QLD

Stormwater Management Code
Performance Outcome Criteria and Acceptable Outcomes

	Performance outcomes	Acceptable outcomes	Solution
5	**PO5** Development avoids stormwater inflow and infiltration to the sewer infrastructure network.	**AO5** No acceptable outcome provided	No stormwater will be discharged to the sewer system from the development
6	**PO6** Development prevents increased channel bed and bank erosion in waterways by limiting changes in flow rate and flow duration within receiving waters.	**AO6** Stormwater discharges are mitigated to achieve the waterway stability objective specified in the Planning scheme policy for development works.	Development complies with the planning scheme policy
7	**PO7** Development protects in-stream ecology by maintaining pre- development low flow discharge regimes.	**AO7** Frequent stormwater discharges are captured and managed to achieve the frequent flow management objective specified in the Planning scheme policy for development works.	Development complies with the planning scheme policy
8	**PO8** Development ensures adequate surface and sub-surface water to maintain the environmental values of water dependent ecosystems, including downstream in stream and off stream aquatic, riparian, wetland and terrestrial ecosystems.	**AO8** Stormwater harvesting (excluding roof water harvesting) and the location and form of stormwater discharge points do not compromise the pre-development hydrology of receiving waters.	Not applicable to this development
9	**PO9** Development protects or enhances the environmental values and water quality objectives of receiving waters or buffer areas within or downstream of a site.	**AO9.1** Stormwater discharges achieve the pollutant load reduction objectives specified in the Planning scheme policy for development works.	**S9.1** Stormwater quality devices have been proposed as outlined in the stormwater management plan. Stormwater discharge quality meet the requirements and pollutant load reduction objectives specified in the planning scheme policy.

Stormwater Management Code
Performance Outcome Criteria and Acceptable Outcomes

	Performance outcomes	Acceptable outcomes	Solution
		AO9.2 Where a development includes or adjoins a constructed waterbody or a buffer to a waterway or wetland, the pollutant load reduction targets are met prior to the discharge entering that buffer or waterbody	**S9.2** Not applicable to this development
10	**PO10** Treatment systems that use natural processes and materials are integrated into the development, wherever practicable, taking into account the whole of life cycle cost to enhance biodiversity and landscape benefits.	**AO10.** No acceptable outcome provided.	Not applicable to this development
11	**PO11** Treatment systems are designed to eliminate or minimise health, safety and aesthetic hazards.	**AO11** Risks associated with insect breeding, odour and public safety are minimised by designing treatment systems in accordance with the Planning scheme policy for development works	Proposed stormwater treatment minimises risk. Bioretention system parameters are set out in the stormwater management plan
12	**PO12** Treatment systems are designed to minimise maintenance, renewal and adaptation costs and the requirement for specialised equipment or maintenance techniques.	**AO12** Design achieves acceptable maintenance, renewal and adaptation costs for the project life in accordance with the Planning scheme policy for development works.	Proposed development including the associated stormwater treatment system has been designed in accordance with the planning scheme policy

	Performance outcomes	Acceptable outcomes	Solution
13	**PO13** Development provides for stormwater capture, in addition to roof water capture.	**AO13** Stormwater harvesting systems are designed in accordance with the standards specified in the Planning scheme policy for development works.	Not applicable to this development
14	**PO14** Stormwater capture for the purpose of substituting for potable water use does not create a health, safety or aesthetic hazard.	**AO14.1** Stormwater harvesting systems are designed in accordance with the standards specified in the Planning scheme policy for development works. **AO14.2** Water quality treatment is designed, established and monitored to human health standards appropriate for the intended use.	Not applicable to this development
15	**PO15** Stormwater harvesting systems are designed to minimize maintenance costs and the requirement for specialized equipment or maintenance techniques and are provided with an ongoing funding source	**AO15.1** For systems that are to be dedicated to *Council* as public assets, there is an overriding community benefit resulting from the stormwater harvesting system. **AO15.2** A detailed operations and maintenance budget is prepared for the project life and financial assurances are in place to operate and maintain the system for the project life.	Not applicable to this development

	Performance outcomes	Acceptable outcomes	Solution
16	**PO16** Construction methods and materials minimize environmental impacts and minimize the risk of asset failure.	**AO16.1** Construction methods are undertaken in accordance with the standards specified in the Planning scheme policy for development works. **AO16.2** Construction timing is co-ordinated with civil and other landscape works to minimise risks to stormwater *infrastructure* and the environment.	**S16.1** Not applicable to this development **S16.2** Not applicable to this development
17	**PO17** Vegetated stormwater management systems proposed to be dedicated as public assets are established and maintained during the maintenance period to ensure optimal *vegetation* growth and that the functional elements of the system achieve the design function at the end of the maintenance period.	**AO17** Establishment and maintenance of stormwater management systems is undertaken in accordance with the standards specified in the Planning scheme policy for development works.	Stormwater treatment system will be established and maintained in accordance with the planning scheme policy
18	**PO18** Constructed waterbodies which are proposed to be dedicated as public assets are avoided, unless there is an overriding need in the public interest.	**AO18** Where a constructed waterbody is proposed to be dedicated as a public asset, an overriding need for the waterbody is demonstrated in accordance with the requirements of the Planning scheme policy for development works.	Not applicable to this development

	Performance outcomes	Acceptable outcomes	Solution
19	**PO19** Constructed waterbodies are designed and constructed to achieve environmental values and water quality objectives which correlate to their intended function, use and receiving waters.	**AO19** Constructed waterbodies are designed and constructed in accordance with standards specified in the Planning scheme policy for development works.	Not applicable to this development
20	**PO20** Constructed waterbodies are designed, constructed and established to minimise maintenance and decommissioning costs and the requirement for specialised maintenance equipment and techniques, and are provided with an on-going funding source.	**AO20** A detailed maintenance and decommissioning costing is prepared for the project life in accordance with the Planning scheme policy for development works and financial assurances are in place to provide for maintenance for the project life and, if required, decommissioning.	Not applicable to this development
21	**PO21** Constructed waterbodies are not used as stormwater quality treatment devices.	**AO21** Stormwater discharges achieve the pollutant load reduction objectives specified in the Planning scheme policy for development works, prior to entering the constructed waterbody.	Not applicable to this development
22	**PO22** Constructed waterbodies support landscape, passive recreation and ecological values, and do not pose a health, safety or aesthetic risk.	**AO22** Constructed waterbodies are designed and constructed in accordance with the standards specified in the Planning scheme policy for development works.	Not applicable to this development

South Sea Islander Way, Maroochydore QLD

Stormwater Management Code

Performance Outcome Criteria and Acceptable Outcomes

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DEVELOPMENTS CONSTRUCTIONS SOLUTIONS INTERNATIONAL

South Sea Islander Way, Maroochydore QLD

Sunshine Coast Regional Council - Works, services and infrastructure code
Performance Outcome Criteria and Acceptable Outcomes

Works, services and infrastructure code

	Performance outcomes		Acceptable outcomes		Solution
1	**PO1**	Air emissions, noise or lighting arising from construction activities and works do not adversely impact on surrounding areas.	**AO1.1** **AO1.2** **AO1.3** **AO1.4** **AO1.5**	Dust emissions do not extend beyond the boundary of the *site*. Air emissions, including odours, are not detectable at the boundary of the *site*. Works are only carried out between 7:00am to 6:00pm Monday to Saturday inclusive. Noise generating equipment is enclosed, shielded or acoustically treated in a manner which ensures the equipment does not create environmental harm Outdoor lighting complies with *AS4282-1997 Control of the Obtrusive Effects of Outdoor Lighting*.	Air emissions, noise or lighting arising from construction activities and works on site will be minimized and will not impact surrounding properties or environment.
	PO2	Construction activities and works provide for: - (a) the protection of the aesthetic and ecological values of retained *vegetation*; and impacts on fauna to be minimised.	**AO2.1**	The health and stability of retained *vegetation* is maintained or enhanced during construction activities by: - (a) clearly marking *vegetation* to be retained with temporary fencing and flagging tape; (b) installing temporary barrier fencing around the outer drip line and critical root zone of the *vegetation*; (c) preventing any filling, excavation, stockpiling, storage of chemicals, fuel or machinery within the fenced protection area; (d) using low impact construction techniques in the vicinity of *vegetation* to minimise interference with the *vegetation*; and (e) removing all declared noxious weeds and environmental weeds from the *site*.	Not applicable to this development

South Sea Islander Way, Maroochydore QLD

Sunshine Coast Regional Council - Works, services and infrastructure code
Performance Outcome Criteria and Acceptable Outcomes

	Performance outcomes		Acceptable outcomes		Solution
			AO2.2 **AO2.3**	All works carried out in the vicinity of retained *vegetation* comply with *AS4970 Protection of Trees on Development Sites* and *AS4687 Temporary Fencing and Hoarding*. Where construction activities will result in adverse impacts upon fauna and/or the clearing and/or removal of fauna habitat: - (a) a suitably qualified professional fauna spotter and catcher undertakes a fauna management report, pre-clearing inspections and is present for all clearing activities; (b) all vacant hollows and nests are relocated or rendered unusable to prohibit fauna return during clearing works; (c) all fauna is suitably relocated or humanely dealt with during the pre- clearing inspections or during clearing; and 'offset' nesting hollows/nest boxes are provided in adjoining *vegetation* at least 1 month prior to the clearing,	The development will comply with Ao2.2 and 2.3.
	PO3	*Vegetation* cleared from a *site* is disposed of in a manner that: - (a) maximises reuse and/or recycling; and minimizes impacts on public health and safety.	**AO3**	Where *vegetation* is cleared, vegetation waste is appropriately disposed of in the following order of preference: - (a) milling for commercial timber products, landscaping or firewood; (b) on-site chipping or mulching; (c) transportation off-site and disposal in an approved green waste disposal facility; and use for forest floor habitat in adjoining bushland and revegetation areas.	Any clearing which takes place on site will maximize reuse or recycling and will minimize risk.
	PO4	Construction activities and works are managed such that all reasonable and practicable measures are taken to protect the environmental values of	**AO4**	Development is located, designed and constructed in accordance with an erosion and sediment control plan, prepared in accordance with the requirements specified	No construction on site currently proposed. All service trenching etc will be done in accordance with the planning scheme policy

South Sea Islander Way, Maroochydore QLD

Sunshine Coast Regional Council - Works, services and infrastructure code
Performance Outcome Criteria and Acceptable Outcomes

	Performance outcomes		Acceptable outcomes		Solution
	PO5	Construction activities and works are undertaken such that existing utilities, road and drainage *infrastructure*: - (a) continue to function efficiently; and can be accessed by the relevant authority for maintenance purposes.	**AO5.1** **AO5.2**	Existing utilities, road and drainage *infrastructure* are protected or relocated in accordance with the standards specified in the **Planning scheme policy for development works.** The costs of any alterations or repairs to utilities, road and drainage *infrastructure* are met by the applicant.	Existing ultilies andservices will be protected during subdivision works
	PO6	Traffic and parking generated during construction activities and works is managed to minimize impacts on the amenity of the surrounding area.	**AO6**	No acceptable outcome provided.	Traffic impacts will be minimized during construction. Use of main roads by large site vehicles will be minimized.
	PO7	Construction activities and works provide for: - (a) minimisation of waste material; (b) separation of recyclable material; (c) storage of waste and recyclable material; and (d) collection of waste and recyclable material; in a manner that minimizes adverse impacts on the amenity and safety of surrounding areas.	**AO7**	No acceptable outcome provided.	Development will be completed in accordance with the planning scheme policy. Site works will be done such that risk is minimized.
	PO8	Development is provided with *infrastructure*, services and utilities appropriate to its setting and commensurate with its needs.	**AO8.1** **AO8.2**	Where development is located in an *urban zone*, appropriate connection is provided to reticulated sewerage, water supply, stormwater drainage, electricity, gas (where available in the street) and telecommunications services at no cost to the *Council*, including provision by way of dedicated road, public reserve or as a minimum by way of easements to ensure continued access is available to these services in accordance with the standards specified in the Planning scheme policy for development works, or where applicable, the requirements of the service provider. Where development is located in a *non- urban zone* and reticulated sewerage is not available, an on-site	Adequate services and utilities will be provided as part of the subdivision works

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DEVELOPMENTS CONSTRUCTIONS SOLUTIONS INTERNATIONAL

	Performance outcomes		Acceptable outcomes		Solution
			AO8.3	treatment and disposal system is provided that complies with the requirements of the *Plumbing and Drainage Act 2003.* Where development is located in a *non- urban zone* and reticulated water supply is not available, development is provided with appropriate on-site rainwater collection in accordance with the relevant use code.	
	PO9	*infrastructure*, services and utilities *infrastructure*, services and utilities that are planned, designed and constructed in a manner which: - (a) ensures appropriate capacity to meet the current and planned future needs of the development; (b) is integrated with and efficiently extends existing networks; (c) minimises risk to life and property; (d) avoids, or where avoidance is not practicable minimises and mitigates, adverse impacts on *ecologically important areas*; (e) minimises risk of environmental harm; (f) achieves acceptable maintenance, renewal and adaptation costs; (g) can be easily and efficiently maintained; (h) minimises potable water demand and wastewater production; (i) ensures the ongoing construction or operation of the development is not disrupted; (j) where development is staged, each stage is fully serviced before a new stage is released; (k) ensures adequate clearance zones are maintained between utilities and dwellings to protect residential amenity and health;	**AO9.1**	*Infrastructure is* planned, and appropriate	Infrastructure is planned and appropriate. Development has been designed inaccordance with the planning scheme policy and SCRC codes and requirements.

	Performance outcomes		Acceptable outcomes		Solution
		(l) preserves visual amenity in key areas (i.e. in centres or along scenic routes); and minimises interference with the passage of pedestrians in areas of high pedestrian traffic.that are planned, designed and constructed in a manner which:- (m) ensures appropriate capacity to meet the current and planned future needs of the development; (n) is integrated with and efficiently extends existing networks; (o) minimises risk to life and property; (p) avoids, or where avoidance is not practicable minimises and mitigates, adverse impacts on *ecologically important areas*; (q) minimises risk of environmental harm; (r) achieves acceptable maintenance, renewal and adaptation costs; (s) can be easily and efficiently maintained; (t) minimises potable water demand and wastewater production; (u) ensures the ongoing construction or operation of the development is not disrupted; (v) where development is staged, each stage is fully serviced before a new stage is released; (w) ensures adequate clearance zones are maintained between utilities and dwellings to protect residential amenity and health; (x) preserves visual amenity in key areas (i.e. in centres or along scenic routes); and minimizes interference with the passage of pedestrians in areas of high pedestrian traffic.			

South Sea Islander Way, Maroochydore QLD

Sunshine Coast Regional Council - Works, services and infrastructure code
Performance Outcome Criteria and Acceptable Outcomes

	Performance outcomes		Acceptable outcomes		Solution
	PO10	Building or operational work near or over the *Council's* stormwater *infrastructure* and/or sewerage and water *infrastructure*: - (a) protects the *infrastructure* from physical damage; and allows ongoing necessary access for maintenance purposes.	**AO10**	Building or operational work near or over the *Council's* stormwater *infrastructure* and/or sewerage and water *infrastructure* complies with the **Planning scheme policy for development works** and the requirements of the water and sewerage service provider.	Exising infrastructure will be protected during subdivision works
	PO11	*Filling or excavation*: - (a) does not cause environmental harm; (b) does not impact adversely on visual amenity or privacy; (c) maintains natural landforms as far as possible; (d) provides for remediated soil conditions to support the successful establishment of landscapes; and is stable in both the short and long term.	**AO11**	Development provides that: - (a) on sites: - (i) with a *slope* of 15% or more, or as identified in the **Planning scheme policy for development works**, the extent of excavation (cut) and fill does not involve a total change of more than 1.5 metres relative to the *natural ground level* at any point; or (ii) in other areas, the extent of excavation (cut) and fill does not involve a total change of more than 1.0m relative to the *natural ground level* at any point; (b) no part of any cut or fill batter is within 1.5 metres of any property boundary, except cut and fill involving a change in ground level of less than 200mm that does not necessitate the removal of any *vegetation*; (c) retaining walls are no greater than 1.0 metre high; (d) retaining walls are constructed a minimum 150mm from property boundaries; (e) all stored material is: - (i) contained wholly within the *site*; (ii) located in a single manageable area that does not exceed 50m^2; and (iii) located at least 10 metres from any property boundary; (f) topsoil is harvested, stockpiled, remediated and	Not applicable to this development.

	Performance outcomes		Acceptable outcomes		Solution
				reused in a manner that supports achievement of site specific vegetation performance objectives; and any batter or retaining wall is structurally adequate.	
	PO12	*Filling or excavation* does not result in any contamination of land or water or pose a health or safety risk to users and neighbours of the *site*.	**AO12**	Development provides that: - (a) no contaminated material is used as fill; (b) for excavation, no contaminated material is excavated or contaminant disturbed; and (c) waste materials are not used as fill, including: - (i) commercial waste; (ii) construction/demolition waste; (iii) domestic waste; (iv) garden/vegetation waste; and industrial waste.	Not applicable to this development.
	PO13	The location and extent of filling *or excavation* is consistent with the intended use of the *site*.	**AO13**	The extent of filling *or excavation is* in accordance with an existing development approval for a material change of use,	Not applicable to this development.
	PO14	*Filling or excavation* does not prevent or create difficult access to the property.	**AO14**	Driveways are able to be constructed and maintained in accordance with the requirements of the **Planning scheme policy for development works**.	Not applicable to this development.
	PO15	*Filling or excavation does* not cause significant impacts through truck movements, dust or noise, on the amenity of the locality in which the works are undertaken or along routes taken to transport the material.	**AO15**	*Filling or excavation* is undertaken in accordance with the requirements of the **Planning scheme policy for development works**.	Not applicable to this development.
	PO16	The transportation of materials in association with *filling or excavation* activities minimises adverse impacts on the road system.	**AO16**	Material is transported in accordance with the requirements of the **Planning scheme policy for development works**.	Not applicable to this development.

Model Number

Job Number

SPEL Filter

INSTALLATION MANUAL

www.spel.com.au

SPEL ENVIRONMENTAL
INTEGRATED WATER SOLUTIONS

Contents

Introduction

CHAPTER 1

Understanding how to correctly and safely install the SPEL Filter is essential for the preservation of the filter's condition and its operational effectiveness.

The SPEL Filter is a highly engineered Stormwater filtration device designed to remove fine sediments, heavy metals, nitrogen and phosphorus from stormwater runoff.

The SPEL Filter relies on a spiral wound media filter cartridge. The Filters can be housed in either a concrete or fiberglass structure that evenly distributes the flow between cartridges. Flow through the filter cartridges is gravity driven and self-regulating, which makes the SPEL Filter system a low maintenance, high performance stormwater treatment device.

This manual will provide the necessary steps that are to be taken to correctly and efficiently install the SPEL Filter product.

Figure 1. SPEL Filter Specifications

CHAPTER 2

SPEL Filter Vault Types

There are three vault types, which the SPEL Filter can be installed into:

1. Precast Vault: Monolithically poured concrete vault (Base and walls)
2. Cast in place vault: Custom designed for site.
3. Fiberglass Vault: Must be made by an approved supplier.

Spel Filter Install Prerequisets:

- Vault must be clean from all debris, etc.
- Vault must be easily accessible.
- 900 x 900mm Lid must be installed correctly and operational.
- Structure of the tank must be safe and hazard free.

Figure 2. SPEL Filter install

Health and Safety

CHAPTER 3

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. If classed as confined space

- Harness
- Gas detector
- Tripod
- Spotter

Figure 3. Safety Materials

CHAPTER 4

Materials Required To Install Spel Filters

When installing the SPEL Filter, having the necessary tools and equipment is vital to efficiently and effectively installing the SPEL Filters.

Tools that will be required include:

- PVC Pipe Primer
- PVC Pipe Cement
- Hammer Drill
- Hammer
- Hole saw
- Battery / Power Drill
- Hack Saw
- Ratchet Kit
- Shovel
- Tripod
- Winch/Chain block for lowering Filters into vault
- Ladder
- Sikaflex Gun

Items/products that will be included:

- SPEL Filter/s
- Weir wall & Fixings
- Energy Dissipater (if required)
- Pipework & Fittings
- Fixings
- Anti - Floatation brackets

Figure 4. SPEL Filter install set-up

SPEL Filter Installation

CHAPTER 5

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

Custom SPEL Filter systems may have particular installation issues that will be addressed during the design.

INSTALLATION OF A SPEL FILTER SYSTEM PROCEEDURE

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 procedures are followed.

6. Set up weir wall over outlet pipe and energy dissipater over inlet pipe (if required).

When installing the weir wall you must ensure that it is securely bolted to the tank wall and completely sealed. Centre the aluminium weir over the outlet pipe and fix weir to tank wall with the supplied fixings. Then use Sikaflex to seal around the edge of the weir and filter outlet pipework.

7. 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.

8. Install anti – floatation bars.

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

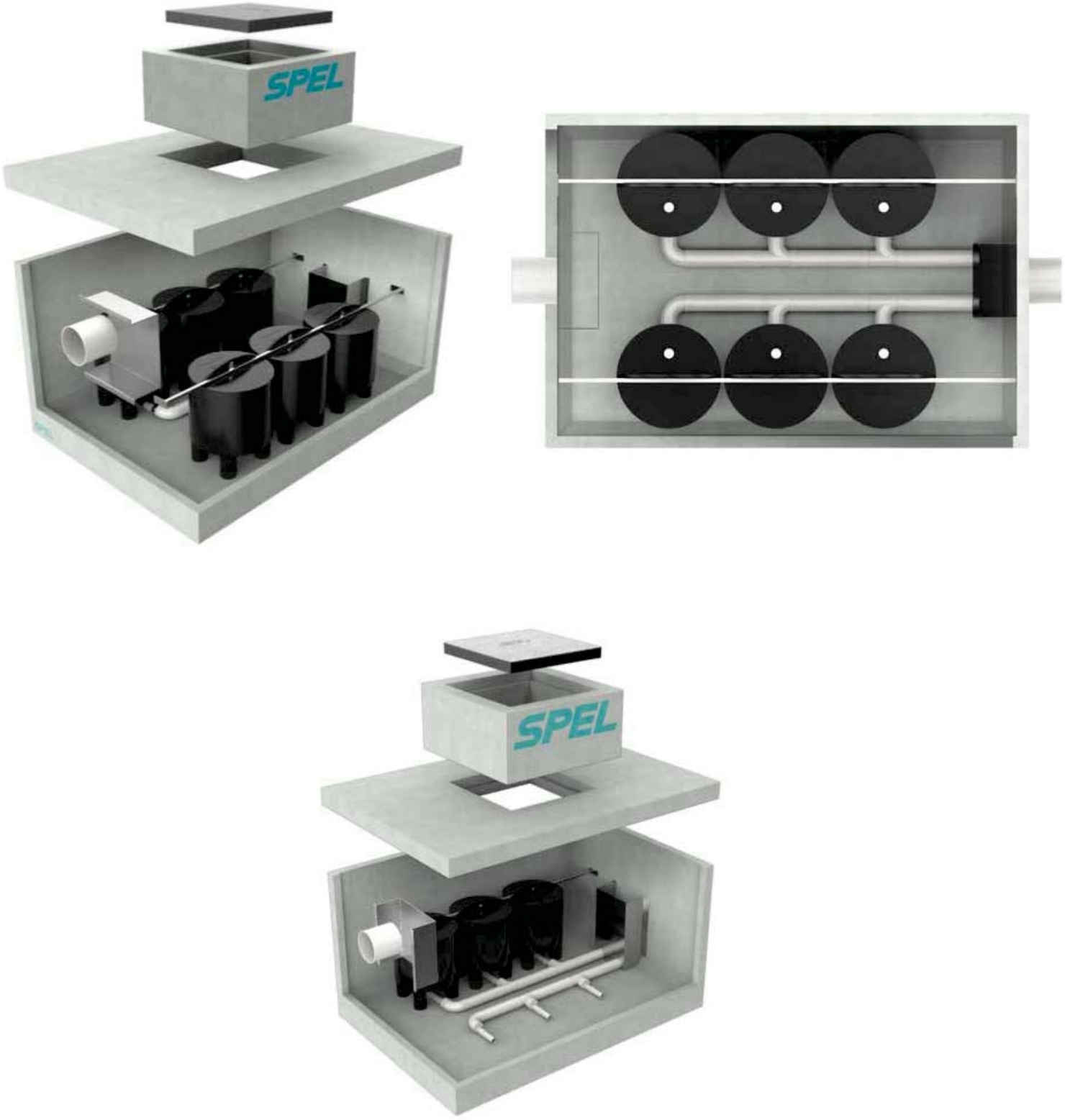

Figure 5. Standard install with PVC Outlet pipework

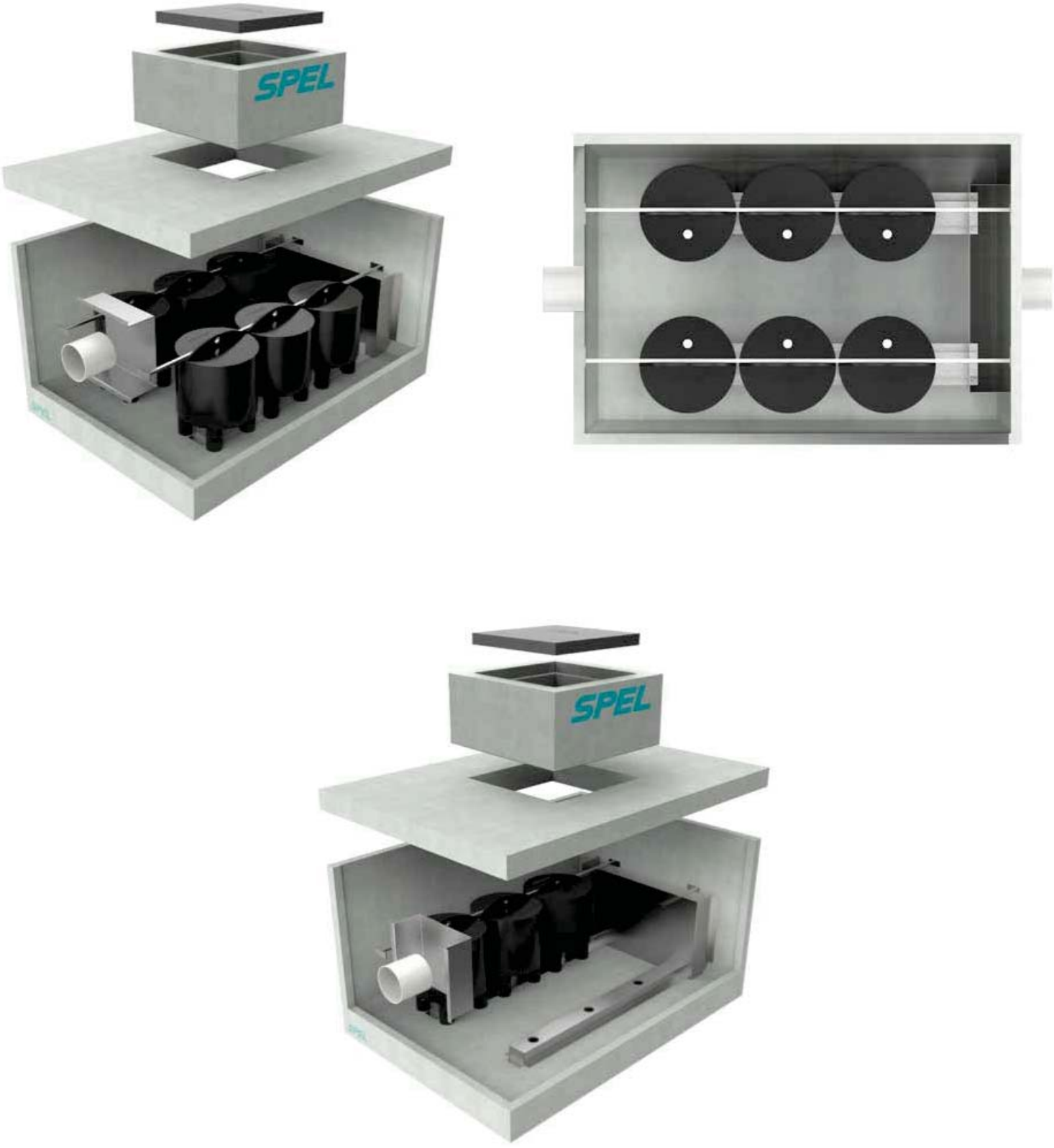

Figure 6. Standard install with Channel system Outlet pipework

Figure 7. Standard install with Channel system Outlet pipework

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