59 Solomon Ave, Loganholme QLD 4129

Engineering Report & Stormwater Management Plan

June 2022

Project No.: 21411

Revision No.: A

CIVIL & STRUCTURAL ENGINEERING | DESIGN | MANAGEMENT

vT CONSULTING ENGINEERS

Contents

Document Status:

REVISION	PREPARED BY	REVIEWED BY	DATE
A	S. Carroll	A. van Tonder	08/06/2022

1. Introduction

vT Consulting Engineers has been commissioned by Devalign to prepare this engineering services report and stormwater management plan. The development is located at 59 Solomon Ave, Loganholme QLD 4129. The site locality is illustrated in Figure 1.1. This report is being submitted to support the Development Approval for the proposed residential subdivision development for Logan City Council's consideration.

The following report will detail civil engineering requirements for the development.

Street Address	59 Solomon Ave, Loganholme QLD 4129
Real Property Description	10 RP 116425
Total Site Area	2785m^2
Proposed Use	Proposed Townhouse Development
Local Authority	Logan City Council

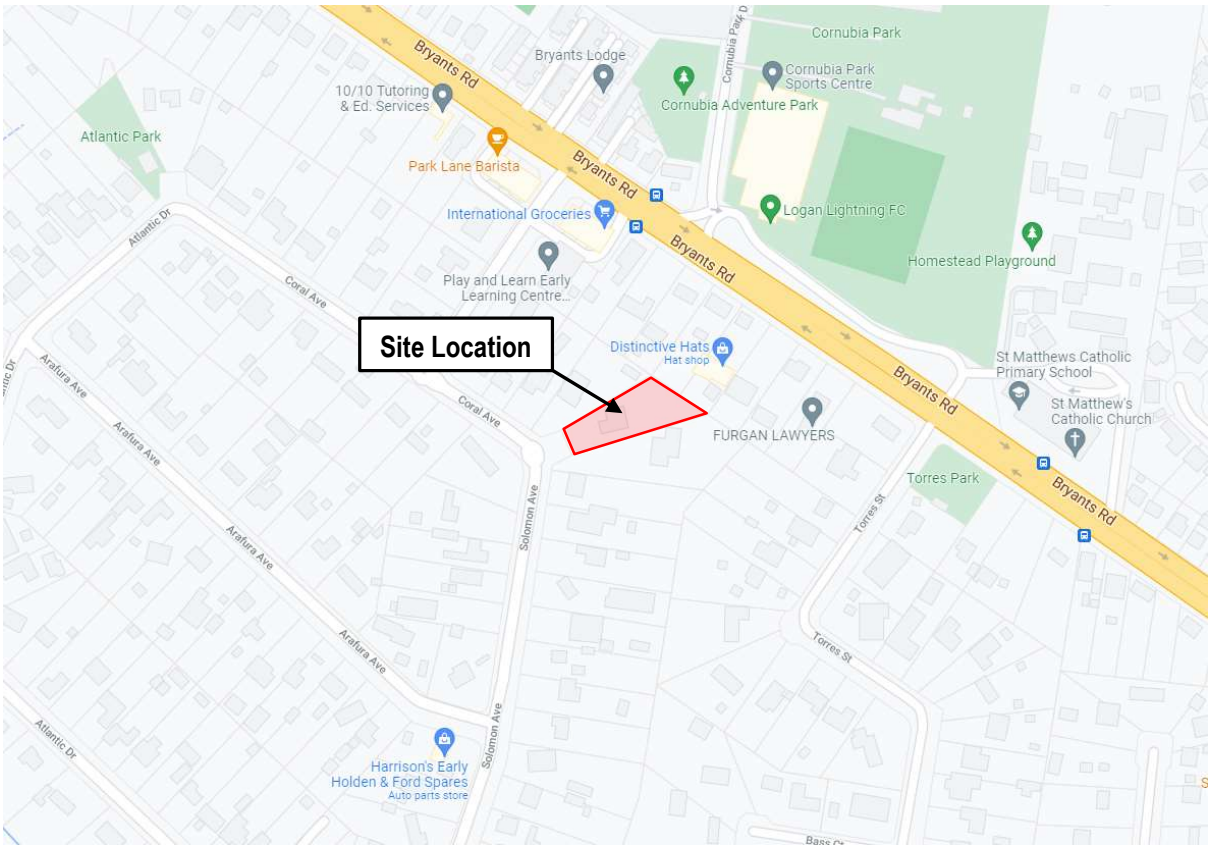

Figure 1.1 Site Layout Plan (Google Maps)

a. Existing Topography

The levels on the site range from approximately RL13.64 in the south west corner to RL11.89 in the north east corner of the site. The site is situated in a residential area, fronting Solomon Avenue and is bounded by residential properties on all other sides.

b. Existing Land Use

The property is occupied by a large single residential dwelling at the front of the block with a pool at the rear. The rest of the site is predominately grassed with a few trees and shrubs.

The existing house and structures are to be demolished and removed.

c. Proposed Land Use

It is proposed to development multiple townhouses with a shared access driveway, internal carparking and vehicle access from Solomon Avenue.

Refer attached Appendix A for proposed layout plans and details.

2. Erosion and Sediment Control

Using the International Erosion Control Association's (IECA) Erosion Hazard Assessment Procedure AustIECA, 2016a), we believe the proposed development site represents an erosion risk as trigger values were equalled or exceeded and resulted in a total score of 19 (Refer Appendix B for Erosion Hazard Assessment Form). IECA requires that a preliminary Erosion and Sediment Control Plan (ESCP) be submitted to the local government for approval during the planning phase if the development obtains a total point score of 17 or greater or when any trigger value is scored or exceeded.

The construction contractor is responsible for ensuring that soil and debris does not leave the site as well as the confines of the construction zone and is not deposited on external roads or existing in-use areas due to the proposed earthworks and construction activity.

Acid Sulphate Soils

The local council is listed in the Glossary (Acid Sulphate soil affected area) in State Planning Policy July 2017, indicating that this development application may require compliance with the State Planning Policy July 2017 acid sulphate soils development objectives.

Acid sulphate soil testing is typically conducted in areas with reduced levels of less than 5.0m Australian Height Datum (AHD) as stated in State Planning Policy July 2017. This policy also states that developments below 20.0m AHD that involve a Material Change of Use or operational works are required to be assessed against the State Planning Policy July 2017 acid sulphate soils development objectives. As the lowest point on this site is an approximate level of RL 11.89, we believe that there is a possibility of acid sulphate soil being present and therefore testing would be likely.

Figure 2.1 provides a visual aid to determining assessable development.

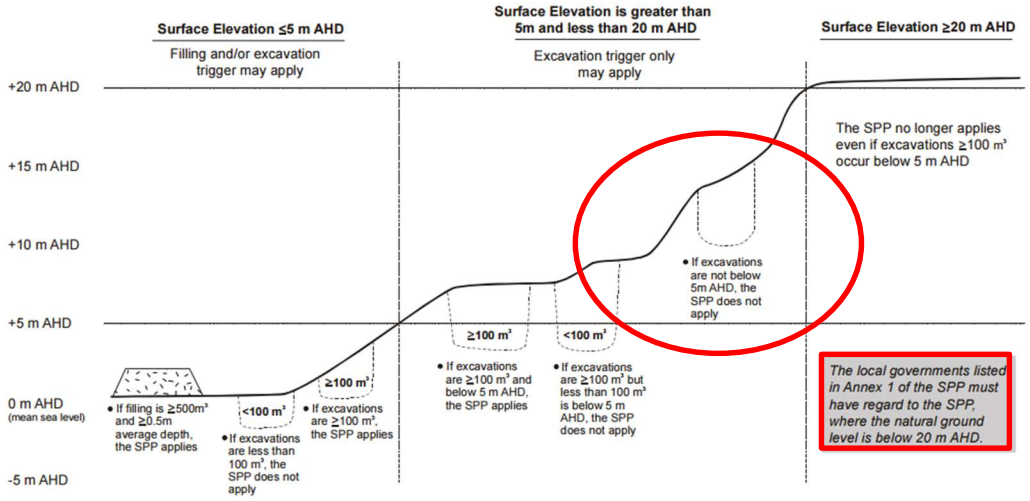

Figure 2.1 Acid Sulphate Soils assessment diagram (Adapted from SPP Water Quality State Interest Guideline 2016)

As the proposed excavations are not expected to be below RL5.0m AHD, the State Planning Policy does not apply.

The requirements for Acid Sulphate Testing will be confirmed by a geotechnical engineer prior to the detailed design stage of this proposed development.

Land Disturbing Activities

Important causes/issues of erosion for this site would consist of the following:

- Precipitation and consequent run-off
- Stripping and removal of topsoil
- Removal of fill
- Other earthwork operations
- Heavy vehicle use on site
- Wind erosion

The proposed development is a short construction period which will be programmed so that the shortest period of time elapses between ground cover removal and restoration.

Erosion and Sediment Control Measures

Sediment control filter fabric will be securely placed around the downstream boundaries of the construction site. This will ensure sediment is trapped before being released into the catchment. Refer Appendix C.

An ESC measure will be provided at any vehicular access points to the site. Construction and maintenance details are given in Appendix C. A temporary construction entrance will be provided from the adjacent roads for access during construction.

A filter sock sediment trap will be utilized on all downstream stormwater inlets. Refer Appendix C for construction and maintenance details.

No clearing will be undertaken unless preceded or accompanied by installation of adequate run-off and sediment control measures, as described above.

Following practical completion of the project a minimum of 70% coverage of all soil with ground cover (i.e. topsoiling and seeding) will be provided within 30 calendar days.

During the demolition and construction phases, spraying of water will be used with care to act as a dust suppression method.

Monitoring and Maintenance Programs

Water discharge from the site will adhere to a total suspended solid content of less than 50 milligrams per litre and a pH range of between 6.5 and 8.5 at all times. If the pH of the flocculated water is not achieved, then pH adjustments will be required. This could possibly be done by a dosing of lime.

Site personnel will inspect all erosion and control measures at least at the following frequencies:

- Daily during construction works,
- Weekly when construction works are not happening,
- Within 24 hours of expected rain, and
- Within 18 hours of an impacting rainfall event.

All erosion and sediment control measures that have an order of efficiency below 75% will be corrected by the end of that working day.

3. Earthworks

For the purpose of this proposed development earthworks will be conducted for constructing the new proposed building platforms. Excavation on site will be required for the service trenches. Any excess cut will need to be removed from the site by the contractor. Earthworks fill will be required for the proposed driveway and building slab areas on site to achieve the minimum floor levels for flood immunity.

A geotechnical report will be prepared for the site during the detailed design stage.

Refer attached Appendix A for proposed layout plans and details.

4. Roadworks

The proposed development fronts onto Solomon Avenue. A new shared crossover will be provided as shown on the proposed layout plans. External roadworks are not proposed.

Refer attached Appendix A for proposed layout plans and details.

5. Stormwater Drainage

a. Existing Stormwater Drainage

Existing site stormwater falling on the site generally sheet flows towards the eastern boundary corner to an existing stormwater drainage corridor via neighbouring lots following existing contours. Figure 5.1 below shows the existing stormwater drainage in the area of the site.

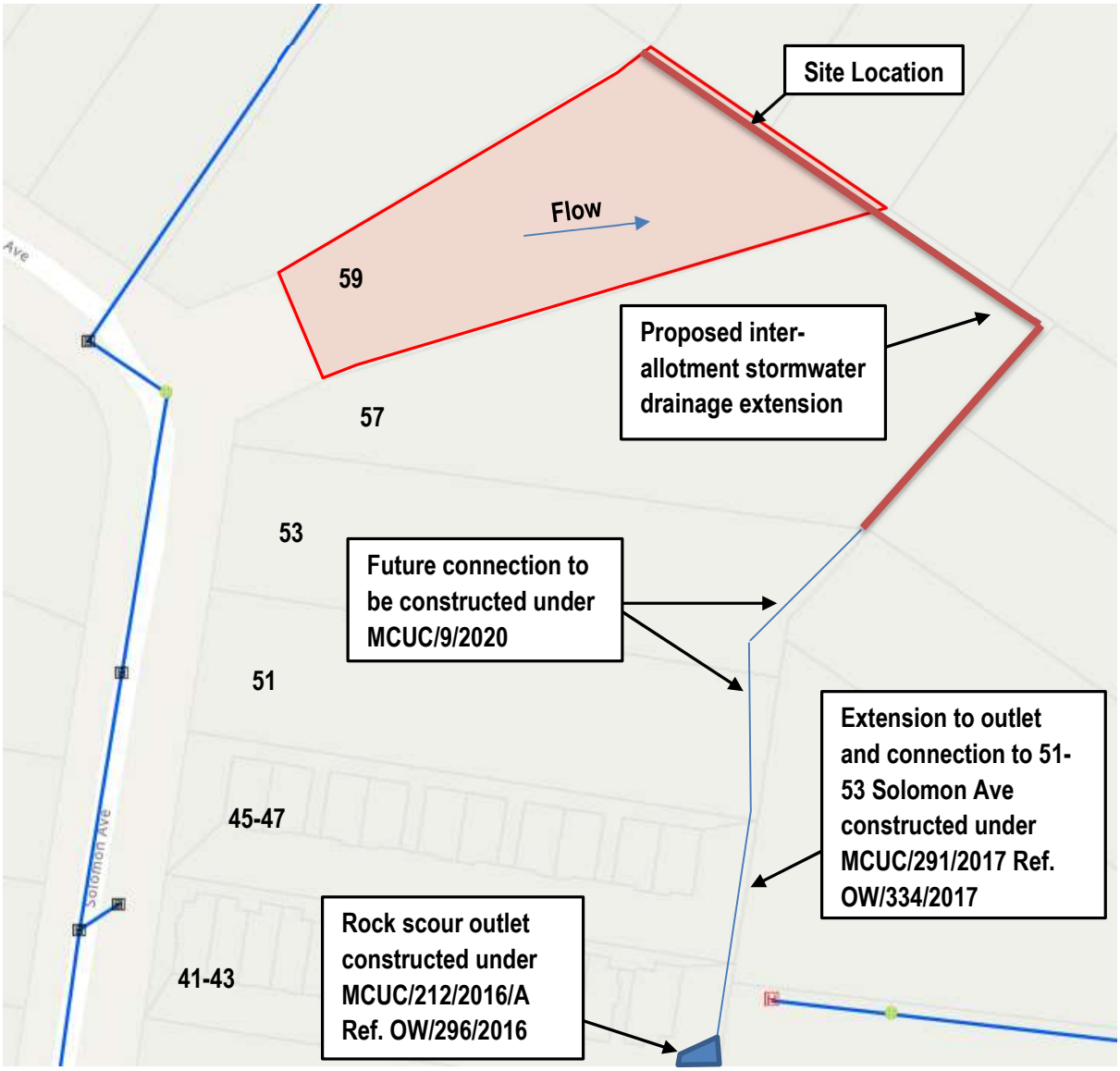

Figure 5.1 Logan City Council Stormwater Layout Map - ArcGIS

b. Proposed Stormwater Drainage

It is proposed that new inter-allotment stormwater drainage infrastructure will be constructed from 59 Solomon Avenue to future stormwater drainage infrastructure within 53 Solomon Avenue through 57 Solomon Avenue. A future connection stub will be provided for upstream properties. Please refer to Figure 5.1.

Refer to attached Appendix A for proposed layout plans and details.

c. Stormwater Quality Management

State Planning Policy

The State Planning Policy (SPP) applies for stormwater quality management and management of new or expanded non-tidal artificial waterways applies to development that is outlined below in Table 5.1.

SPP 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 2500m^2 that:	
will result in an impervious area greater than 25% of the net developable area	N/A
Will result in 6 or more dwellings	N/A
Reconfiguring a lot for urban purposes that involves a land area greater than 2500m^2 and will result in six or more lots:	YES
Operational works for urban purposes that involve disturbing more than 2500m^2 of land	YES

Table 5.1 Water Quality Objectives

The proposed development does trigger any applicable items in the above Table 5.1, therefore the SPP is applicable and compliance is expected by the local government authority.

As noted in the Pre-lodgement Meeting Minutes (PLM No. PLM/341/2021, meeting date 23rd September 2021), a monetary contribution for stormwater quality in lieu of on-site treatment is available to the site at a rate of $54,000 per ha. It is proposed to utilise the monetary contribution for this development to achieve the required stormwater quality design objectives. Based on the site's area of 2785m^2, the anticipated contribution payment is expected to be $15,039 for the specified rate above.

d. Stormwater Quantity Management

The proposed development will have a larger impervious area than the existing site and will require a stormwater detention system to mitigate the effects of the additional runoff. The stormwater runoff from the development site will discharge into the proposed detention basin to ensure non-worsening effects on surrounding properties.

The site is located within the Torres Street Catchment Area as identified in Figure 3.6.1.3.2, within Schedule 6.2.5 Infrastructure of the Logan Planning Scheme 2015. Section 3.6.1.3 of the Logan Planning Scheme 2015 further specifies that on site flood detention for development within the Torres Street Catchment Area is required to achieve no increase in the flood events anywhere upstream of the Beenleigh-Redland Bay Road for the 1% AEP flood event in accordance with the following:

- Detention volume (m^3) = 0.02 x IA(m^2);
- Outlet pipe diameter (m) determined from the following equation:

$$D \leq \sqrt{\frac{4 \times (0.0708 \times TC - 0.0211 \times IA)}{600\sqrt{2} \times 9.81 \times H}}$$

Where:

IA = Additional Impervious area created by the development (m^2)
TC = Impervious area discharging into the tank (m^2). MIN. 40% of total development area
D = Outlet pipe diameter (m)
H = Maximum flood storage depth above the outflow (m)

The development has a total area of 2785m^2 and an existing impervious area of 720m^2 Approx. The proposed development will contain an impervious area of 1840m^2 that will discharge to the detention tank, therefore the impervious area of the site will be increased by 1120m^2. Calculations of the proposed detention tank and outlet pipe size has been undertaken in accordance with the equations above and is summarised below:

$$Detention\ volume\ (m^3) = 0.02 \times IA$$
$$= 0.02 \times 1120m^2$$
$$= 22.4m^3$$

Where:

IA = 1120 m^2
TC = 1840 m^2
H = 1m (adopted tank depth, excluding 100mm MIN. freeboard)

$$D \leq \sqrt{\frac{4 \times (0.0708 \times TC - 0.0211 \times IA)}{600\sqrt{2} \times 9.81 \times H}}$$

$$D \leq \sqrt{\frac{4 \times (0.0708 \times 1840 - 0.0211 \times 1120)}{600\sqrt{2} \times 9.81 \times 1}}$$

$$D \leq 0.401m$$

As per above, a 375mm diameter outlet is to be adopted and a detention basin volume of **22.4m^3** plus freeboard is required in accordance with the Logan Planning Scheme specifications.

The above detention calculation does not allow for orifice control or an assessment of existing and developed flows to confirm the development does not increase the site's peak flows. XP Storm has been used to assess the existing and peak flow scenario of the site, using an alternative detention basin size determined via computer modelling, subject to Logan City Council's approval.

XP Storm is a software package for dynamic modelling of urban stormwater systems, river systems and floodplains. XP Storm was used to determine the required detention storage volume to ensure that the developed flow is equal to or less than the pre-development flow. The Laurensen method was used for determining the volume of runoff within the XP Storm model. Figure 5.2 shows the pre-development stormwater flows for various storm events. For clarity, only the maximum storm events for each return period are shown.

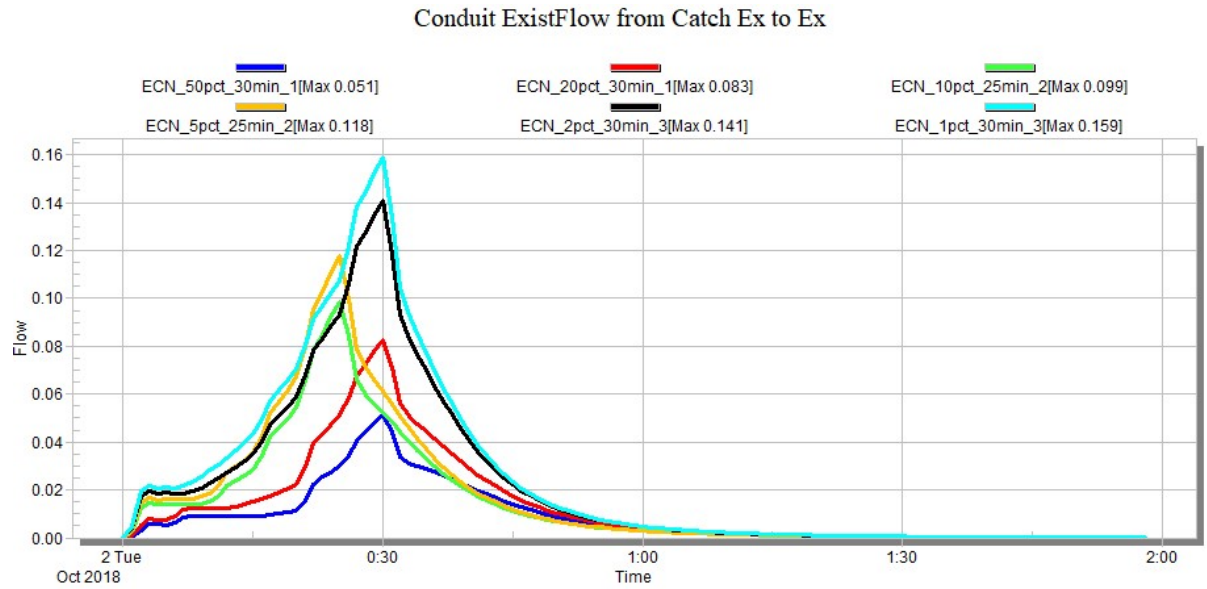

Figure 5.2 Existing stormwater flows for various storm events

As a check for the XP Storm model, the Rational Method was used as outlined in the Queensland Urban Drainage Manual, to determine the peak flow rate corresponding to the minor and major storm events for the existing conditions. It should be noted that the Rational Method was not used in the calculation of detention volumes but rather as a check that the peak flow outputs in the XP Storm model were feasible.

Table 5.2 below shows the peak stormwater discharge from the development site for existing conditions.

Runoff Coefficient (C_{10}) - Undeveloped:	0.70	t_c =	8	min.

PARAMETERS							
ARI		2yr	5yr	10yr	20yr	50yr	100yr
Rainfall Intensity	mm/hr	110	150	177	202	236	261
Frequency Factor	$f_{y=}$	0.85	0.95	1.00	1.05	1.15	1.20
Undeveloped C	C_u=	0.60	0.67	0.70	0.74	0.81	0.84

FLOWS							
Undeveloped Flow	$Q_d=Q_i=$ C*I*A l/s	50.6	77.2	95.9	114.9	147.0	169.6

Table 5.2 Peak Discharge using Rational Method

Comparing the results from Figure 5.2 and Table 5.2, the relationship is good between the XP Storm and Rational method results and therefore the XP Storm model output is acceptable.

Settings within the XP Storm models are shown in Tables 5.3. Results summaries are shown in Tables 5.4.

PARAMETER	DETENTION TANK
Detention Volume (m^3)	12.70
Base Area (m^2)	12.50
Minor Orifice Area (m^2)	0.0227 (0.17m dia)
Major Orifice IL Above Minor Orifice IL (m)	0.56
Major Orifice Area (m^2)	0.1018 (0.36m dia)

Table 5.3 Detention Parameters

EVENT	PRE-DEVELOPMENT (l/s)	POST-DEVELOPMENT (l/s)
2yr	51	51
5yr	83	76
10yr	99	92
20yr	118	112
50yr	141	136
100yr	159	159

Table 5.4 Pre- and Post-Development outlet flows

The detention basin was sized using the XP Storm model, the results of which are shown in Figures 5.3.

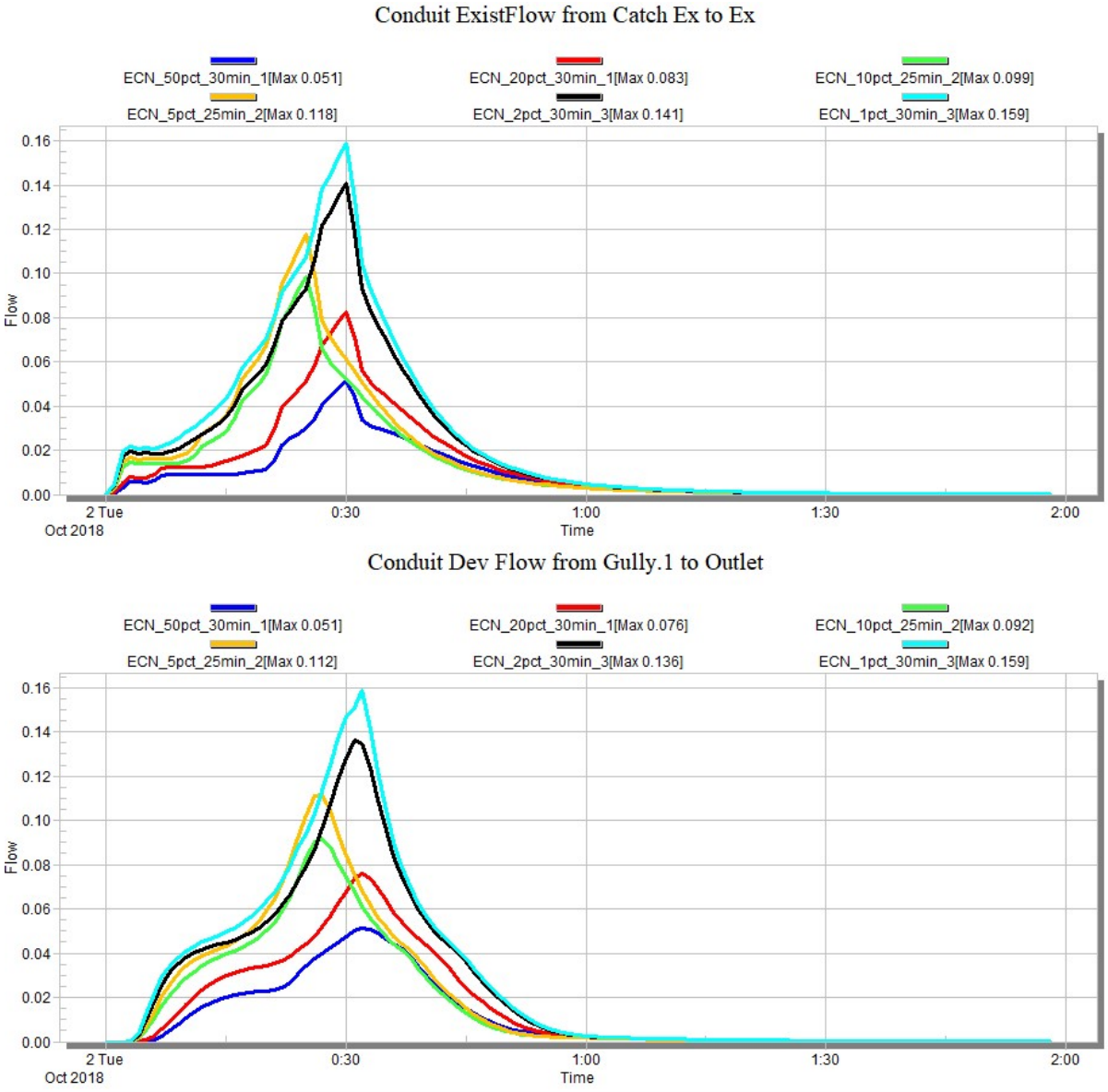

Figure 5.3 Undeveloped vs. Developed stormwater flows for various storm events

Figure 5.3 shows comparisons of the 2yr, 5yr, 10yr, 20yr, 50yr and 100yr flow events for pre- and post-development scenarios using a detention basin volume of 12.70m^3 plus freeboard.

As the above XP Storm results demonstrates a detention basin design that prevents worsening of peak flows by the development. A **12.70m^3** detention basin plus freeboard and a 375mm diameter outlet is proposed, subject to Logan City Council's approval.

e. Maintenance

Construction Phase Management Plan

Potential construction phase impacts include the following:

- Sedimentation and erosion
- Management of contaminated soils and materials on the site Construction Material (such as cement)

General

The objective of the Construction Phase Management Plan is to comply with the requirements of the Queensland Environmental Protection Act 1994 and Environmental Protection (Water) Policy 2009 so that the environmental values of effected receiving waters are maintained or enhanced. In essence the purpose of the Plan is to prevent polluted stormwater being discharged to the local waterways.

Performance Indicators

The management is not being effective when any of the following occur during the construction phase of the project.

- The required water quality objectives are not achieved,
- Contaminated water is released off site.

Construction Phase Management of Sedimentation and Erosion

Existing vegetation from site will be removed in stages as required to reduce the likelihood of surface erosion. A sediment and siltation fence will be erected around the property boundary to ensure that sediment is not washed off site and onto adjacent properties or roads. Entry and exit from the site will be restricted to a single stabilised location to minimise the rise of onsite transport of silt sediment or mud. It is anticipated that a layer of crushed rock will provide the necessary stabilisation of the access route. If required a specific bunded wash down area will be provided for the cleaning of plant before leaving the site and all wash down waste water will be collected. In the event that debris or sediment leaves the site it will be cleaned.

Management of Imported Materials

Any material imported to the site including construction materials will be stockpiled in a location where it cannot contaminate the stormwater system or stormwater runoff.

Complaint Response

The contractor will erect signage at the entrance to the works with contact information, including afterhours contact numbers. The contractor will properly deal with all complaints.

Monitoring and Reporting

All sediment and erosion control devices will be checked daily and after rainfall events by the construction site supervisor. Defective or full devices will be cleaned and repaired as required. Regular inspections and maintenance of the storm water system will be carried out

by the property owner. The civil components (structural and erosion) are to be assessed by a suitably qualified engineer as required.

Stormwater Treatment Systems

The design, installation and ongoing maintenance of the stormwater treatment systems is to be in accordance with the manufacturers specifications and in accordance with the service station operator maintenance guidelines and procedures.

It remains the service provider and user's responsibility to maintain the treatment and site in accordance with the current State Planning Policy and legislation requirements.

Lifecycle cost assessment

There will be no abnormal capital or recurrent costs for the proposed stormwater strategy.

6. Flood Planning and Overland Flow

Figure 6.1 below shows the extent of flooding in relation to the site. From the Council's flood overlay, flooding has been identified at the rear of the site and is predominately contained within the eastern boundary corner. The LCC Flood Level Report does not provide a defined flood level. Flood modelling has been undertaken by Storm Water Consulting Pty Ltd for the development and advice has been provided regarding minimum Finished Floor Levels for the proposed units. The habitable floor level is to be 0.5m above the defined flood level. Units 11 and 12 are proposed to be constructed on a suspended floor to minimise impacts to existing flooding conditions on the east of the site.

Please refer to Appendix D for a copy of the LCC Flood Level Report for 59 Solomon Avenue, Loganholme QLD 4129.

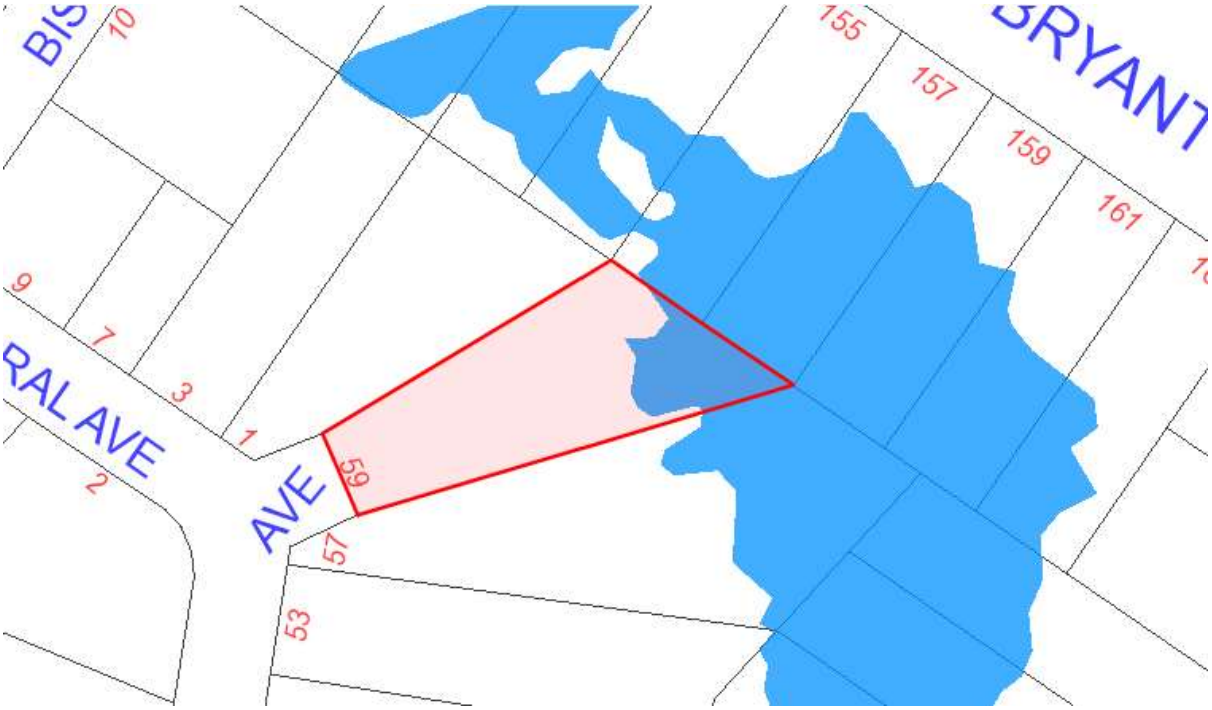

Figure 6.1 Logan City Council Interactive Mapping – Flood Planning Areas

a. Structural Impacts

The development design will be structurally adequate to resist loads associated with flooding. Loads associated with flooding will be considered by the structural engineer during detailed design.

7. Sewer Reticulation

There is existing sewer infrastructure along the north eastern boundary of the site as shown by the DBYD Logan Water Sewer and Water infrastructure plan below in Figure 7.1. It is proposed to construct a DN150 sewer property connection to service the site from the south eastern corner to Logan Water and SEQ Codes and standards.

For more details refer to the engineering plans in Appendix A.

Internal house drainage design for this proposed development will be by others.

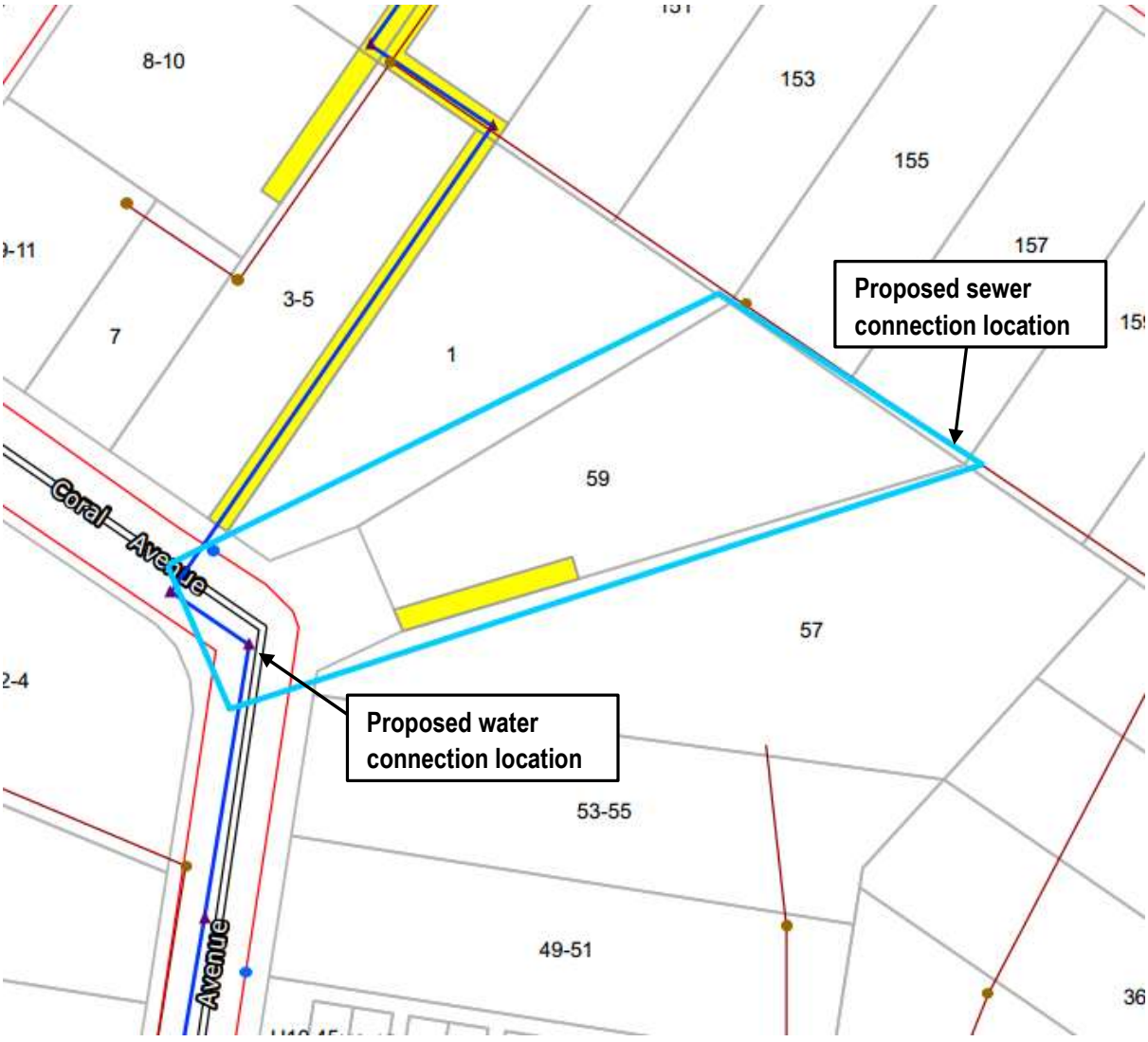

Figure 7.1 Logan Water DBYD sewer and reticulated water infrastructure plan

8. Water Reticulation

There is existing water infrastructure within Solomon Avenue and a water connection servicing the site from the southwestern corner. It is proposed to remove and abandon the

existing water service and establish a new connection to service the proposed development from the west. Please refer to Figure 7.1.

For more details refer to the engineering plans in Appendix A.

The Internal water supply design for this proposed development will be by others.

9. Electrical and Telecommunication

The electrical supply and communications supply for this proposed development will be by others.

10. Safety in Design

At the time of preparing this report, it is considered that there is no atypical safety in design issues for a project of this type and use. Typical issues to be reviewed include but are not limited to construction activities, falls, confined spaces, excavations and hazardous materials.

A full review of and preparation of a Safety In Design report will be conducted during the detailed design of the project by the project design engineer. The ongoing implementation, review and amendments to the Safety in Design register is to be by the property owner or users.

11. Development Codes

The following applicable Local Codes have been completed to address the proposed development and are included in Appendix E:

- LCC Filling and Excavation Code
- LCC Infrastructure Code
- LCC Servicing, Access, and Parking Code

12. Conclusions

vT Consulting Engineers has undertaken a preliminary review of civil engineering services required for the proposed development located at 59 Solomon Ave, Loganholme QLD 4129.

Based on all the findings outlined in this report, vT Consulting Engineers believes that, should the recommendation contained within the report be implemented, there are no significant engineering issues in relation to this development.

13. References

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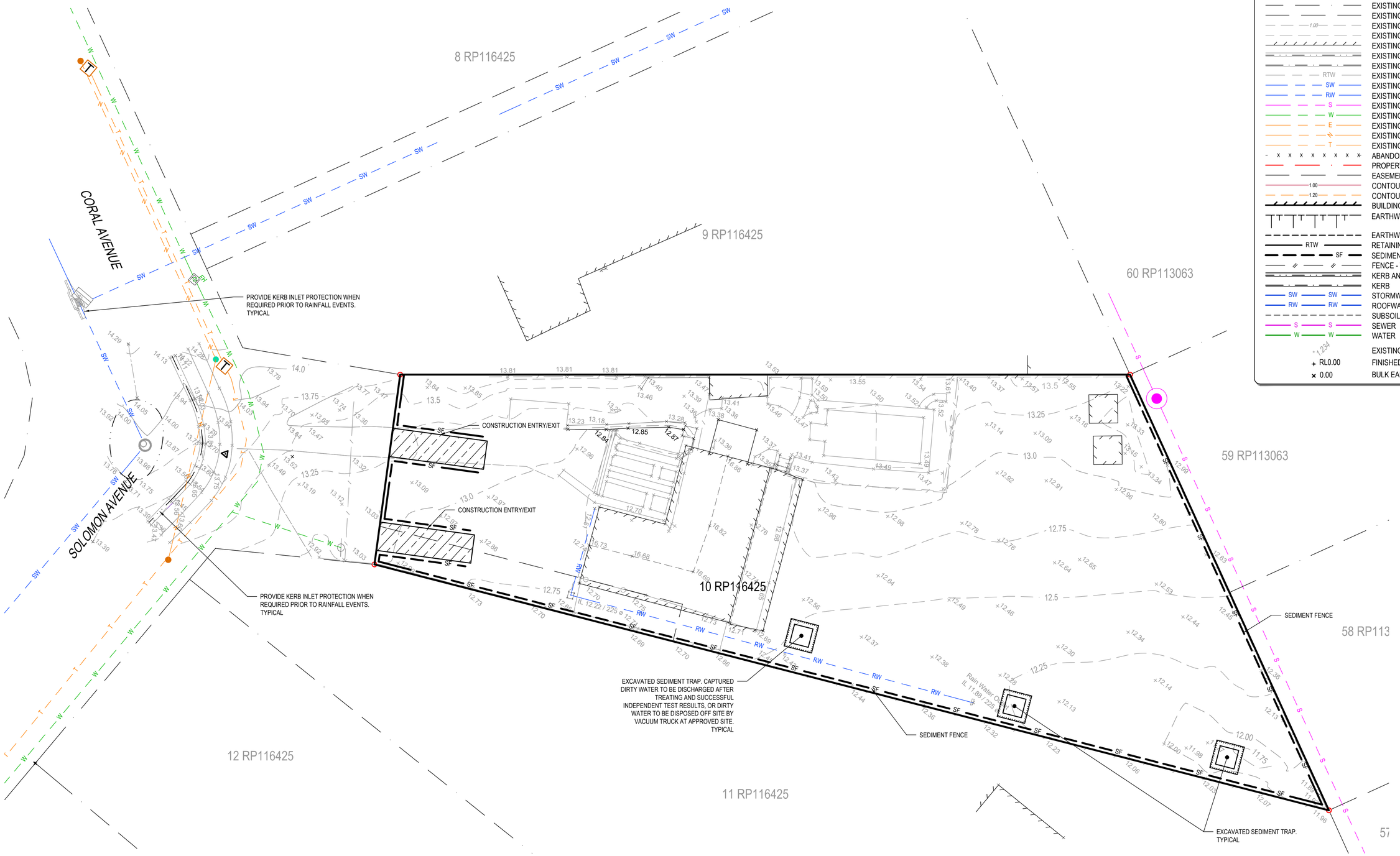
Appendix A - Proposed Preliminary Design Drawings



LEGEND

- EXISTING PROPERTY BOUNDARY
- EXISTING EASEMENT BOUNDARY
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR
- EXISTING BUILDING
- EXISTING KERB AND CHANNEL
- EXISTING KERB
- EXISTING RETAINING WALL
- EXISTING STORMWATER DRAINAGE
- EXISTING ROOFWATER DRAINAGE
- EXISTING SEWER
- EXISTING WATER
- EXISTING ELECTRICAL
- EXISTING ELEC. OVERHEAD
- EXISTING COMMUNICATIONS
- ABANDON EXISTING SERVICE
- PROPERTY BOUNDARY
- EASEMENT BOUNDARY
- CONTOUR - MAJOR
- CONTOUR - MINOR
- BUILDING
- EARTHWORKS TOP OF BATTER
- EARTHWORKS BOTTOM OF BATTER
- RETAINING WALL
- SEDIMENT FENCE
- FENCE - TYPE 1
- KERB AND CHANNEL
- KERB
- STORMWATER DRAINAGE
- ROOFWATER DRAINAGE
- SUBSOIL DRAIN
- SEWER
- WATER
- EXISTING SURFACE LEVEL (ESL)
- + RL0.00 FINISHED SURFACE LEVEL (FSL)
- × 0.00 BULK EARTHWORKS LEVEL (BEL)

LAYOUT PLAN

SCALE 1:200

0 2 4 6 8 10

SCALE 1:200

REV.	DATE:	AMENDMENT:	BY:	APP.
A	06.08.22	ORIGINAL ISSUE	TQ	AvT

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CLIENT: DEVALIGN

SCALE: AS SHOWN	DRAWN: TQ
SHEET SIZE: A1	DESIGN: TQ
DATUM: AHD	CHECKED: ---
APPROVED:	

PROJECT: RESIDENTIAL DEVELOPMENT
59 SOLOMON AVENUE LOGANHOLME QLD 4129

JOB No.: 21411

DRAWING TITLE: PRELIMINARY EROSION AND SEDIMENT CONTROL LAYOUT PLAN

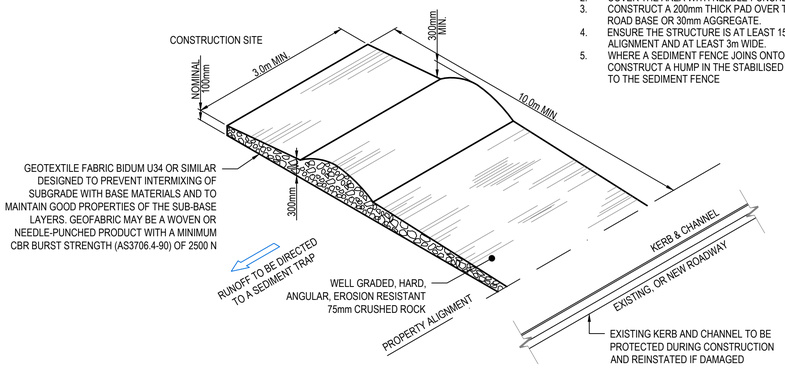
DRAWING No.: P100 PRELIMINARY

REV.: A

PLOTTED: 08.06.2022

CONSTRUCTION ENTRY/ EXIT NOTES

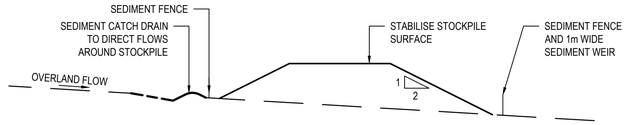
1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15m LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3m WIDE.
5. WHERE A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



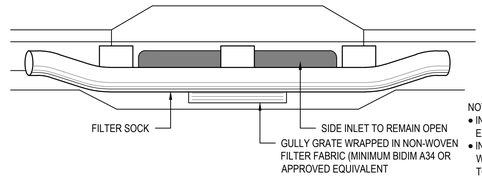
TYPICAL CONSTRUCTION ENTRY/ EXIT
NOT TO SCALE

STOCKPILE 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.

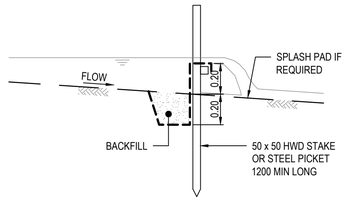


TYPICAL STOCKPILE
NOT TO SCALE

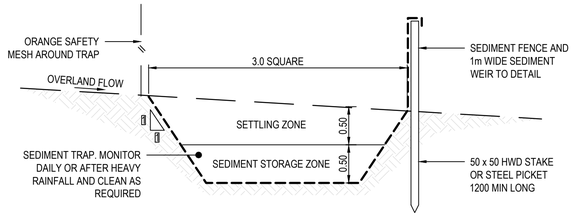


NOTE:
- INLET SEDIMENT TRAP TO BE PLACED ON ALL EXISTING INLETS WITHIN 50m OF SITE
- INLET SEDIMENT TRAP MAY BE OMITTED WHERE IT CAUSES A SAFETY HAZARD, BUT IS TO BE PROVIDED PRIOR TO A RAINFALL EVENT

TYPICAL KERB INLET SEDIMENT TRAP
NOT TO SCALE



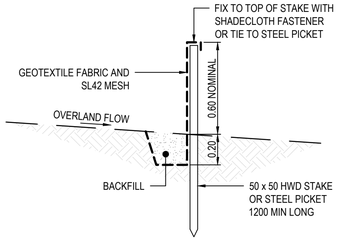
TYPICAL SEDIMENT TRAP WEIR SECTION
NOT TO SCALE



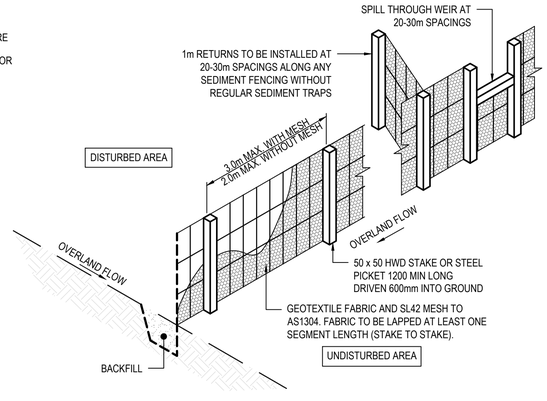
TYPICAL EXCAVATED SEDIMENT TRAP SECTION
NOT TO SCALE

SEDIMENT FENCE NOTES

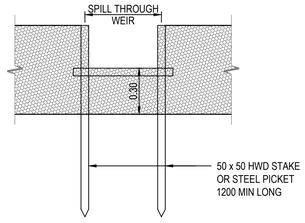
1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50L/s IN THE DESIGN 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 INTERVALS 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.



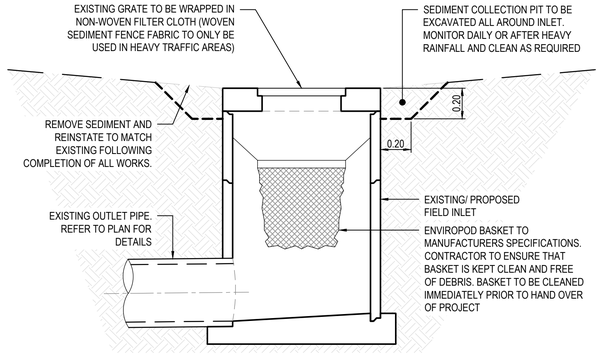
TYPICAL SEDIMENT FENCE SECTION
NOT TO SCALE



TYPICAL SEDIMENT FENCE ELEVATION
NOT TO SCALE



TYPICAL SEDIMENT WEIR ELEVATION
NOT TO SCALE



TYPICAL FIELD INLET SEDIMENT TRAP
NOT TO SCALE

REV.	DATE:	AMENDMENT:	BY:	APP:
A	06.08.22	ORIGINAL ISSUE	TQ	AvT

vT CONSULTING ENGINEERS
A: PO Box 26, Carina QLD 4152
E: admin@vtce.com.au
Ph: 1300 185 737
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CLIENT: DEVALIGN

SCALE:	AS SHOWN	DRAWN:	TQ
SHEET SIZE:	A1	DESIGN:	TQ
DATUM:	AHD	CHECKED:	---
		APPROVED:	

PROJECT: RESIDENTIAL DEVELOPMENT
59 SOLOMON AVENUE LOGANHOLME QLD 4129

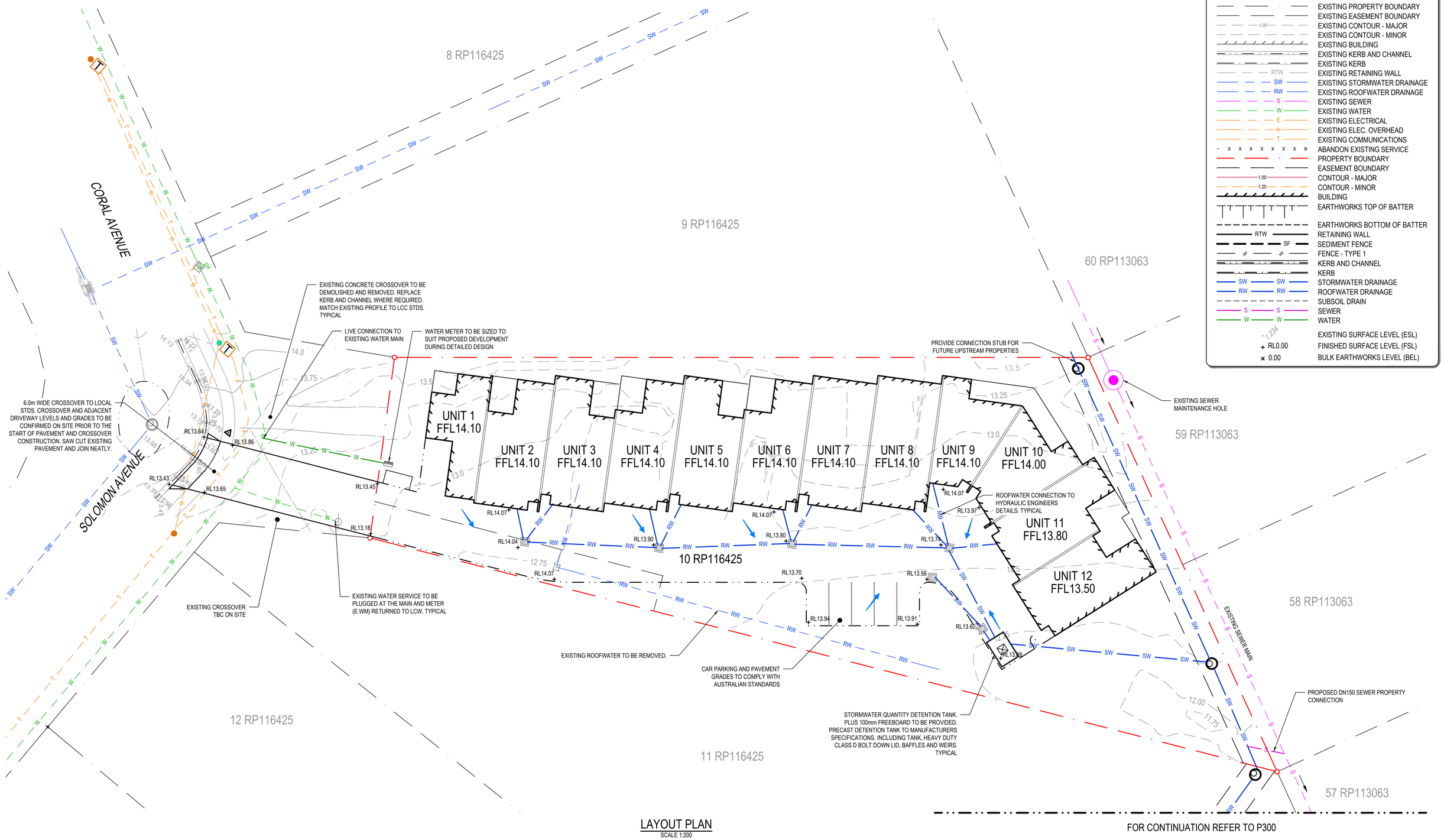
JOB No.: 21411

DRAWING TITLE: PRELIMINARY EROSION AND SEDIMENT CONTROL DETAILS

DRAWING No.: P110 PRELIMINARY

REV.: A

PLOTTED: 08.06.2022



LEGEND

- EXISTING PROPERTY BOUNDARY
- EXISTING EASEMENT BOUNDARY
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR
- EXISTING BUILDING
- EXISTING KERB AND CHANNEL
- EXISTING KERB
- EXISTING RETAINING WALL
- EXISTING STORMWATER DRAINAGE
- EXISTING ROOFWATER DRAINAGE
- EXISTING SEWER
- EXISTING WATER
- EXISTING ELECTRICAL
- EXISTING ELEC. OVERHEAD
- EXISTING COMMUNICATIONS
- ABANDON EXISTING SERVICE
- PROPERTY BOUNDARY
- EASEMENT BOUNDARY
- CONTOUR - MAJOR
- CONTOUR - MINOR
- BUILDING
- EARTHWORKS TOP OF BATTER
- EARTHWORKS BOTTOM OF BATTER
- RETAINING WALL
- SEDIMENT FENCE
- FENCE - TYPE 1
- KERB AND CHANNEL
- KERB
- STORMWATER DRAINAGE
- ROOFWATER DRAINAGE
- SUBSOIL DRAIN
- SEWER
- WATER
- EXISTING SURFACE LEVEL (ESL)
- + RL0.00 FINISHED SURFACE LEVEL (FSL)
- × 0.00 BULK EARTHWORKS LEVEL (BEL)

LAYOUT PLAN

SCALE 1:200

0 2 4 6 8 10

SCALE 1:200

REV.	DATE:	AMENDMENT:	BY:	APP:
A	06.08.22	ORIGINAL ISSUE	TQ	AvT

vT CONSULTING ENGINEERS
A: PO Box 26, Carina QLD 4152
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CLIENT: DEVALIGN

SCALE:	AS SHOWN	DRAWN:	TQ
SHEET SIZE:	A1	DESIGN:	TQ
DATUM:	AHD	CHECKED:	---
		APPROVED:	

PROJECT: RESIDENTIAL DEVELOPMENT
59 SOLOMON AVENUE LOGANHOLME QLD 4129

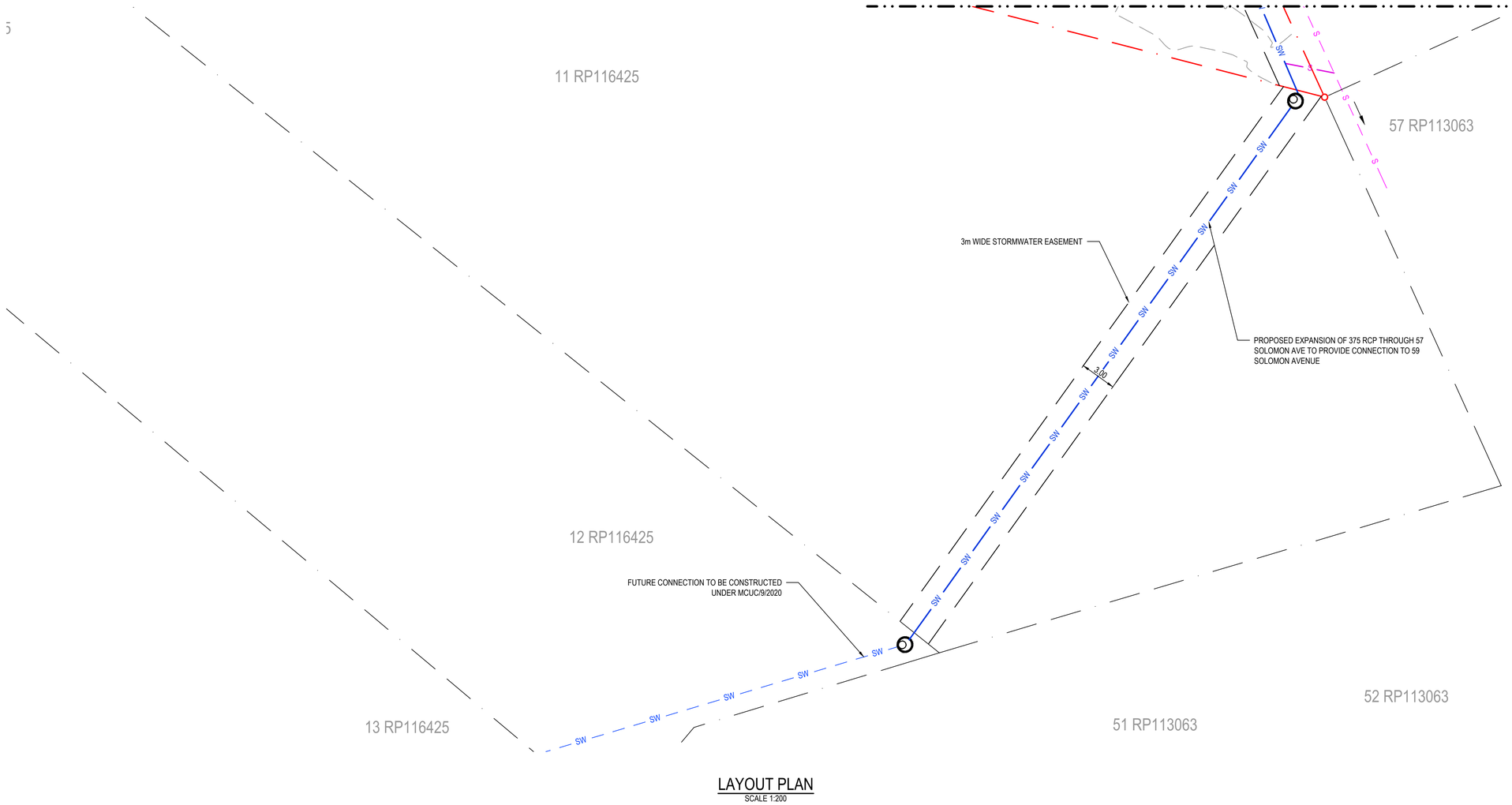
JOB No.: 21411

DRAWING TITLE: PRELIMINARY SERVICES LAYOUT PLAN

DRAWING No.: P200 PRELIMINARY

REV.: A

PLOTTED: 08.06.2022



LAYOUT PLAN
SCALE 1:200

LEGEND

- EXISTING PROPERTY BOUNDARY
- EXISTING EASEMENT BOUNDARY
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR
- EXISTING BUILDING
- EXISTING KERB AND CHANNEL
- EXISTING KERB
- EXISTING RETAINING WALL
- EXISTING STORMWATER DRAINAGE
- EXISTING ROOFWATER DRAINAGE
- EXISTING SEWER
- EXISTING WATER
- EXISTING ELECTRICAL
- EXISTING ELEC. OVERHEAD
- EXISTING COMMUNICATIONS
- ABANDON EXISTING SERVICE
- PROPERTY BOUNDARY
- EASEMENT BOUNDARY
- CONTOUR - MAJOR
- CONTOUR - MINOR
- BUILDING
- EARTHWORKS TOP OF BATTER
- EARTHWORKS BOTTOM OF BATTER
- RETAINING WALL
- SEDIMENT FENCE
- FENCE - TYPE 1
- KERB AND CHANNEL
- KERB
- STORMWATER DRAINAGE
- ROOFWATER DRAINAGE
- SUBSOIL DRAIN
- SEWER
- WATER
- EXISTING SURFACE LEVEL (ESL)
- + RL0.00 FINISHED SURFACE LEVEL (FSL)
- × 0.00 BULK EARTHWORKS LEVEL (BEL)

SCALE 1:200

REV.	DATE:	AMENDMENT:	BY:	APP:
A	08.06.22	ORIGINAL ISSUE	TQ	AvT

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CLIENT: DEVALIGN

SCALE: AS SHOWN | DRAWN: TQ
SHEET SIZE: A1 | DESIGN: TQ
DATUM: AHD | CHECKED: ---
APPROVED:

PROJECT: RESIDENTIAL DEVELOPMENT
59 SOLOMON AVENUE LOGANHOLME QLD 4129

DRAWING TITLE: PRELIMINARY SERVICES LAYOUT PLAN

JOB No.: 21411

DRAWING No.: P300 PRELIMINARY

REV.: A

PLOTTED: 08.06.2022

Appendix B - Erosion and Sediment Control Hazard Assessment Form

Erosion Hazard Assessment Form

Condition	Points	Score	Trigger value
AVERAGE SLOPE OF DISTURBANCE AREA [1]			
• not more than 3% [3% . 33H:1V]	0		
• more than 3% but not more than 5% [5% = 20H:1V]	1		
• more than 5% but not more than 10% [10% = 10H:1V]	2	2	**4**
• more than 10% but not more than 15% [15% . 6.7H:1V]	4		
• more than 15%	6		
SOIL CLASSIFICATION GROUP (AS1726) [2]			
• GW, GP, GM, GC	0		
• SW, SP, OL, OH	1	**3**	
• SM, SC, MH, CH	2		
• ML, CL, or if *imported fill* is used, or if soils are untested	3		
EMERSON (DISPERSION) CLASS NUMBER [3]			
• Class 4, 6, 7, or 8	0		
• Class 5	2	**4**	**6**
• Class 3, (default value if soils are untested)	4		
• Class 1 or 2	6		
DURATION OF SOIL DISTURBANCE [4]			
• not more than 1 month	0		
• more than 1 month but not more than 4 months	2	**4**	**6**
• more than 4 months but not more than 6 months	4		
• more than 6 months	6		
AREA OF DISTURBANCE [5]			
• not more than 1000 m^2	0		
• more than 1000 m^2 but not more than 5000 m^2	1	**1**	**4**
• more than 5000 m^2 but not more than 1 ha	2		
• more than 1 ha but not more than 4 ha	4		
• more than 4 ha	6		
WATERWAY DISTURBANCE [6]			
• No disturbance to a watercourse, open drain or channel	0		
• Involves disturbance to a constructed open drain or channel	1	**2**	**2**
• Involves disturbance to a natural watercourse	2		
REHABILITATION METHOD [7] Percentage of area (relative to total disturbance) revegetated by seeding without light mulching (i.e. worst-case revegetation method).			
• not more than 1%	0		
• more than 1% but not more than 5%	1	**0**	
• more than 5% but not more than 10%	2		
• more than 10%	4		
RECEIVING WATERS [8]			
• Saline waters only	0	**0**	
• Freshwater body (e.g. creek or freshwater lake or river)	2		
SUBSOIL EXPOSURE [9]			
• No subsoil exposure except of service trenches	0	**2**	
• Subsoils are likely to be exposed	2		
EXTERNAL CATCHMENTS [10]			
• No external catchment	0		
• External catchment diverted around the soil disturbance	1	**0**	
• External catchment not diverted around the soil disturbance	2		
ROAD CONSTRUCTION [11]			
• No road construction	0	**0**	
• Involves road construction works	2		
pH OF SOILS TO BE REVEGETATED [12]			
• more than pH 5.5 but less than pH 8	0	**1**	
• other pH values, or if soils are untested	1		
Total Score [13]		**19**	

Explanatory notes

Requirements: Specific issues or actions required by the proponent.

Warnings: Issues that should be considered by the proponent.

Comments: General information relating to the topic.

[1] **REQUIREMENTS:**
For sites with an average slope of proposed land disturbance greater than 10%, a preliminary ESCP must be submitted to the regulatory authority for approval during planning negotiations.

Proponents must demonstrate that adequate erosion and sediment control measures can be implemented on-site to effectively protect downstream environmental values.

If site or financial constraints suggest that it is not reasonable or practicable for the prescribed water quality objectives to be achieved for the proposal, then the proponent must demonstrate that alternative designs or construction techniques (e.g. pole homes, suspended slab) cannot reasonably be implemented on the site.

WARNINGS:
Steep sites usually require more stringent drainage and erosion controls than flatter grade sites.

COMMENTS:
The steeper the land, the greater the need for adequate drainage controls to prevent soil and mulch from being washed from the site.

[2] **REQUIREMENTS:**
If the actual soil K-factor is known from soil testing, then the Score shall be determined from Table 1.

If a preliminary ESCP is required during planning negotiations, then it must be demonstrated that adequate space is available for the construction and operation of any major sediment traps, including the provision for any sediment basins and their associated embankments and spillways. It must also be demonstrated that all reasonable and practicable measures can be taken to divert the maximum quantity of sediment-laden runoff (up to the specified design storm) to these sediment traps throughout the construction phase and until the contributing catchment is adequately stabilised against erosion.

WARNINGS:
The higher the point score, the greater the need to protect the soil from raindrop impact and thus the greater the need for effective erosion control measures. A point score of 2 or greater will require a greater emphasis to be placed on revegetation techniques that do not expose the soil to direct rainfall contact during vegetation establishment, e.g. turfing and *Hydromulching*.

COMMENTS:
Table 2 provides an *indication* of soil conditions likely to be associated with a particular Soil group based on a statistical analysis of soil testing across NSW. This table provides only an initial estimate of the likely soil conditions.

The left-hand-side of the table provides an indication of the type of sediment basin that will be required (Type C, F or D). The right-hand-side of the table provides an indication of the likely erodibility of the soil based on the Revised Universal Soil Loss Equation (RUSLE) K-factor.

Table 3 provides some general comments on the erosion potential of the various soil groups.

Table 1 – Score if soil K-factor is known

	RUSLE soil erodibility K-factor			
	K < 0.02	**0.02<K<0.04**	**0.04<K<0.06**	**K > 0.06**
Score	0	1	2	3

Table 2 – Statistical analysis of NSW soil data [1]

Unified Soil Class System	Likely sediment basin classification (%)			Probable soil erodibility K-factor (%) [2]			
	Dry	Wet		Low	Moderate	High	Very High
	Type C	Type F	Type D	K < 0.02	0.02<K<0.04	0.04<K<0.06	K > 0.06
GM	30	**58**	12	12	**51**	26	12
GC	**42**	33	25	13	**71**	17	0
SW	40	**48**	12	**49**	39	12	0
SP	**53**	32	15	**76**	18	5	1
SM	21	**67**	12	26	**48**	25	1
SC	26	**50**	24	16	**64**	18	2
ML	5	**63**	32	4	35	**45**	16
CL	9	**51**	39	12	**56**	19	13
OL	2	**80**	18	34	**61**	5	1
MH	12	41	**48**	15	19	**41**	25
CH	5	44	**51**	39	**43**	11	7

Notes: [1] Analysis of soil data presented in Landcom (2004).

[2] Soil erodibility based on Revised Universal Soil Loss Equation (RUSLE) K-factor.

Unified Soil Classification System (USCS)

GW Well graded gravels, gravel-sand mixtures, little or no fines
GP Poorly graded gravels, gravel-sand mixture, little or no fines
GM Silty gravels, poorly graded gravel-sand-silt mixtures
GC Clayey gravels, poorly graded gravel-sand-clay mixtures
SW Well graded sands, gravelly sands, little or no fines
SP Poorly graded sands, gravelly sands, little or no fines
SM Silty sands, poorly graded sand-silt mixtures
SC Clayey sands, poorly graded sand-clay mixtures
ML Inorganic silts & very fine sands, rock flour, silty or clayey fine sands with slight plasticity
CL Inorganic clays, low–medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
OL Organic silts and organic silt-clays of low plasticity
MH Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
CH Inorganic clays of high plasticity, fat clays
OH Organic clays of medium to high plasticity

Table 3 – Typical properties of various soil groups [1]

Soil Groups	Typical properties [2]
GW, GP	• Low erodibility potential.
GM, GC	• Low to medium erodibility potential. • May create turbid runoff if disturbed as a result of the release of silt and clay particles.
SW, SP	• Low to medium erodibility potential.
SM, SC	• Medium erodibility potential. • May create turbid runoff if disturbed as a result of the release of silt and clay particles.
MH, CH	• Highly variable (low to high) erodibility potential. • Will generally create turbid runoff if disturbed.
ML, CL	• High erodibility potential. • Tendency to be dispersive. • May create some turbidity in runoff if disturbed.

Note: [1] After Soil Services & NSW DLWC (1998).
[2] Any soil can represent a high erosion risk if the binding clays or silts are unstable.

Table 4 provides **general** guidelines on the suitability of various soil groups to various engineering applications.

Table 4 – Engineering suitability based on Unified Soil Classification [1]

Unified Soil Class	USC Group	Embankments		Fill	Slope stability	Untreated roads
		Water retaining	Non water retaining			
Well graded gravels	GW	Unsuitable	Excellent	Excellent	Excellent	Average
Poorly graded gravel	GP	Unsuitable	Average	Excellent	Average	Unsuitable
Silty gravels	GM	Unsuitable	Average	Good	Average	Average
Clayey gravels	GC	Suitable	Average	Good	Average	Excellent
Well graded sands	SW	Unsuitable	Excellent	Excellent	Excellent	Average
Poorly graded sands	SP	Unsuitable	Average	Good	Average	Unsuitable
Silty sands	SM	Suitable [2]	Average	Average	Average	Poor
Clayey sands	SC	Suitable	Average	Average	Average	Good
Inorganic silts	ML	Unsuitable	Poor	Average	Poor	Unsuitable
Inorganic clays	CL	Suitable [2]	Good	Average	Good	Poor
Organic silts	OL	Unsuitable	Unsuitable	Poor	Unsuitable	Unsuitable
Inorganic silts	MH	Unsuitable	Poor	Poor	Poor	Unsuitable
Inorganic clays	CH	Suitable [2]	Average	Unsuitable	Average	Unsuitable
Organic clays	OH	Unsuitable	Unsuitable	Unsuitable	Unsuitable	Unsuitable
Highly organic soils	Pt	Unsuitable	Unsuitable	Unsuitable	Unsuitable	Unsuitable

Notes: [1] Modified from Hazelton & Murphy (1992)
[2] Suitable only after modifications to soil such as compaction and/or erosion protection

[3] If the soils have not been tested for Emerson Class, then adopt a score of 4.

REQUIREMENTS:
Works proposed on sites containing Emerson Class 1 or 2 soils have a very high pollution potential and must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the authority) during planning negotiations.

WARNINGS:
Class 3 and 5 soils disturbed by cut and fill operations or construction traffic are highly likely to discolour stormwater (i.e. cause turbid runoff). Chemical stabilisation will likely be required if these soils are placed immediately adjacent to a retaining wall. Any disturbed Class 1, 2, 3 and 5 soils that are to be revegetated must be covered with a non-dispersive topsoil as soon as possible (unless otherwise agreed by the regulatory authority).

Class 1 and 2 soils are highly likely to discolour (pollute) stormwater if exposed to rainfall or flowing water. Treatment of these soils with gypsum (or other suitable substance) will most likely be required. These soils should not be placed directly behind a retaining wall unless it has been adequately treated (stabilised) or covered with a non-dispersible soil.

[4] The duration of disturbance refers to the total duration of soil exposure to rainfall up until a time when there is at least 70% coverage of all areas of soil.

REQUIREMENTS:
All land developments with an expected soil disturbance period greater than 6 months must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the authority) during planning negotiations.

COMMENTS:
Construction periods greater than 3 months will generally experience at least some significant storm events, independent of the time of year that the construction (soil disturbance) occurs.

[5] **REQUIREMENTS:**
Development proposals with an expected soil disturbance in excess of 1ha must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the regulatory authority) during planning negotiations.

The area of disturbance refers to the total area of soil exposed to rainfall or dust-producing winds either as a result of:

(a) the removal of ground cover vegetation, mulch or sealed surfaces;
(b) past land management practices;
(c) natural conditions.

WARNINGS:
A *Sediment Basin* will usually be required if the disturbed area exceeds 0.25ha (2500m^2) within any sub-catchment (i.e. land flowing to one outlet point).

COMMENTS:
For soil disturbances greater than 0.25ha, the revegetation phase should be staged to minimise the duration for which soils are exposed to wind, rain and concentrated runoff.

[6] **REQUIREMENTS:**
All developments that involve earthworks or construction within a natural watercourse (whether that watercourse is in a natural or modified condition) must submit a conceptual ESCP to the regulatory authority for review and/or approval (as required by the regulatory authority) during planning negotiations.

Permits and/or licences may be required from the State Government, including possible submission of the ESCP to the relevant Government department.

[7] **REQUIREMENTS:**
No areas of soil disturbance shall be left exposed to rainfall or dust-producing winds at the end of a development without an adequate degree of protection and/or an appropriate action plan for the establishment of at least 70% cover.

COMMENTS:
Grass seeding without the application of a light mulch cover is considered the least favourable revegetation technique. A light mulch cover is required to protect the soil from raindrop impact, excessive temperature fluctuations, and the loss of essential soil moisture.

[8] **COMMENTS:**
All receiving waters can be adversely affected by unnatural quantities of sediment-laden runoff. Freshwater ecosystems are generally more susceptible to ecological harm resulting from the inflow of fine or dispersible clays than saline water bodies. The further inland a land disturbance is, the greater the potential for the released sediment to cause environmental harm as this sediment travels towards the coast.

For the purpose of this clause it is assumed that all sediment-laden runoff will eventually flow into saline waters. Thus, sediment-laden discharges that flow first into freshwater are likely to adversely affect both fresh and saline water bodies and are therefore considered potentially more damaging to the environment.

This clause does **not** imply that sediment-laden runoff will not cause harm to saline waters.

[9] **COMMENTS:**
This clause refers to subsoils exposed during the construction phase either as a result of past land practices or proposed construction activities. The exposure of subsoils resulting from the excavation of minor service trenches should not be considered.

[10] **WARNINGS:**
The greater the extent of external catchment, the greater the need to divert up-slope stormwater runoff around any soil disturbance.

COMMENTS:
The ability to separate “clean” (i.e. external catchment) stormwater runoff from “dirty” site runoff can have a significant effect on the size, efficiency and cost of the temporary drainage, erosion, and sediment control measures.

[11] **REQUIREMENTS:**
Permission must be obtained from the owner of a road reserve before placing any erosion and sediment control measures within the road reserve.

WARNINGS:
Few sediment control techniques work efficiently when placed on a road and/or around roadside stormwater inlets. Great care must be taken if sediment control measures are located on a public roadway, specifically:

- safety issues relating to road users;
- the risk of causing flooding on the road or within private property.

The construction of roads (whether temporary or permanent) will usually modify the flow path of stormwater runoff. This can affect how "dirty" site runoff is directed to the sediment control measures.

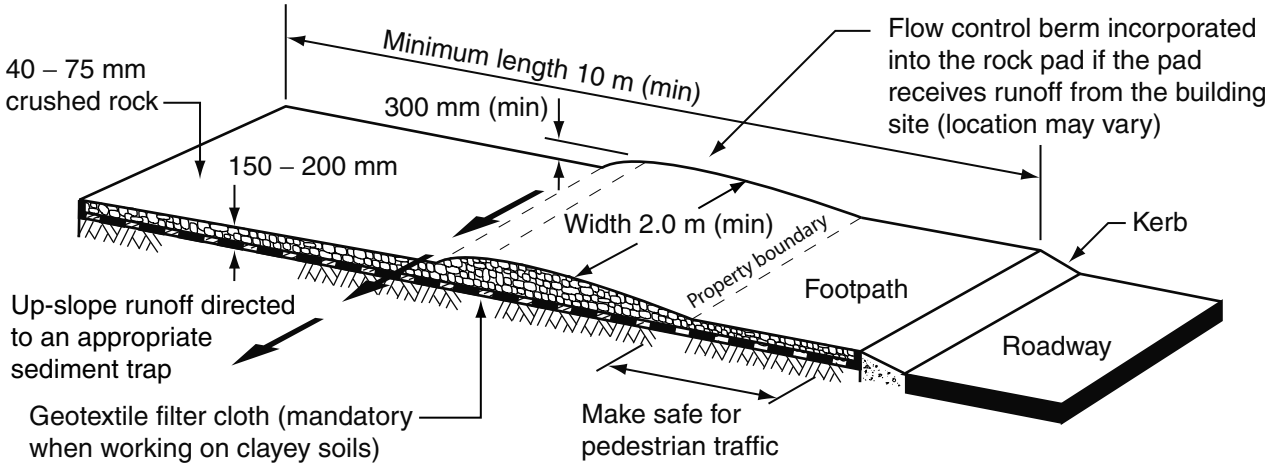
COMMENTS:
"On-road" sediment control devices are at best viewed as secondary or supplementary sediment control measures. Only in special cases and/or on very small projects (e.g. kerb and channel replacement) might these controls be considered as the "primary" sediment control measure.

[12] **WARNINGS:**
Soils with a pH less than 5.5 or greater than 8 will usually require treatment in order to achieve satisfactory revegetation. Soils with a pH of less than 5 (whether naturally acidic or in acid sulfate soil areas) may also limit the choice of chemical flocculants (e.g. Alum) for use in the flocculation of *Sediment Basins*.

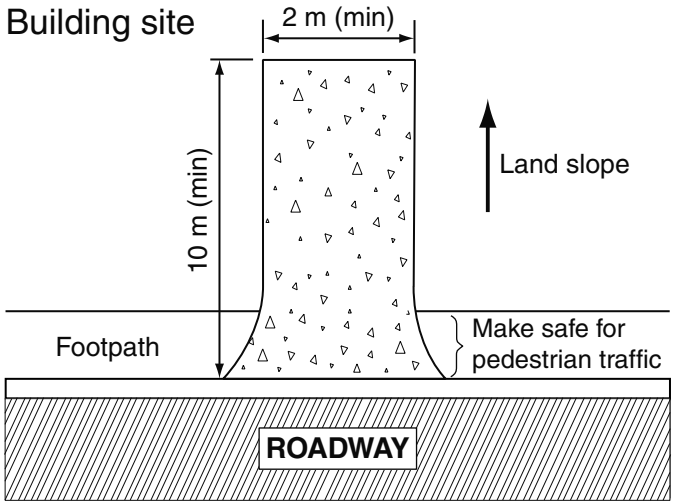
[13] **REQUIREMENTS:**
A preliminary ESCP must be submitted to the local government for approval during the planning phase for any development that obtains a total point score of 17 or greater or when any trigger value is scored or exceeded.

Appendix C - IECA (Australasia) Standard Drawings

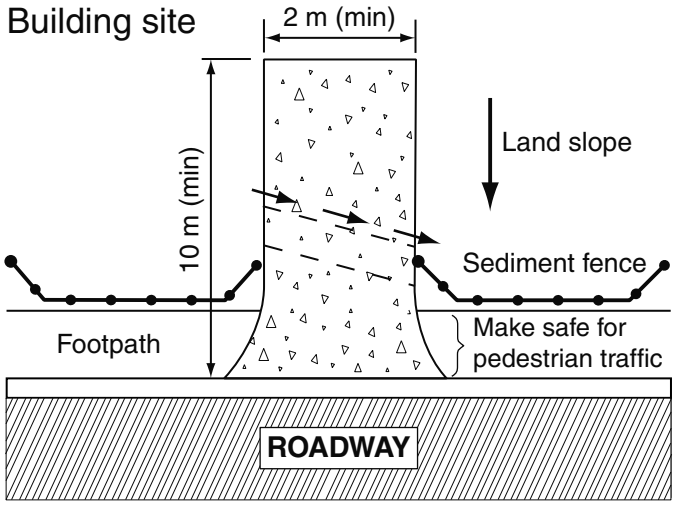
Available from: http://www.austieca.com.au/publications/book-6-standard-drawings



(a) Rock entry/exit pad for building sites



(b) Rock pad sloping away from road



(c) Rock pad sloping towards the road

CONSTRUCTION NOTES:

MATERIALS

ROCK: WELL GRADED, HARD, ANGULAR, EROSION RESISTANT ROCK, NOMINAL DIAMETER OF 40 TO 75mm.

FOOTPATH STABILISING AGGREGATE: 25 TO 50mm GRAVEL OR AGGREGATE (IF REQUIRED).

GEOTEXTILE FABRIC: HEAVY-DUTY, NEEDLE-PUNCHED, NON-WOVEN FILTER CLOTH ('BIDIM' A24 OR EQUIVALENT).

INSTALLATION

1. INSPECT ALL SITE ENTRY AND EXIT POINTS PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER RUNOFF-PRODUCING RAINFALL, OR OTHERWISE AT FORTNIGHTLY INTERVALS.

2. IF SAND, SOIL, SEDIMENT OR MUD IS TRACKED OR WASHED ONTO THE ADJACENT SEALED ROADWAY, THEN SUCH MUST BE PHYSICALLY REMOVED, FIRST USING A SQUARE-EDGED SHOVEL, AND THEN A STIFF-BRISTLED BROOM, AND THEN BY A MECHANICAL VACUUM UNIT, IF AVAILABLE.

3. IF NECESSARY FOR SAFETY REASONS, THE ROADWAY SHALL ONLY BE WASHED CLEAN AFTER ALL REASONABLE EFFORTS HAVE BEEN TAKEN TO SHOVEL AND SWEEP THE MATERIAL FROM THE ROADWAY.

4. WHEN THE VOIDS BETWEEN THE ROCK BECOMES FILLED WITH MATERIAL AND THE EFFECTIVENESS OF THE ROCK PAD IS REDUCED TO A POINT WHERE SEDIMENT IS BEING TRACKED OFF THE SITE, A NEW 100mm LAYER OF ROCK MUST BE ADDED AND/OR THE ROCK PAD MUST BE EXTENDED.

5. ENSURE ANY ASSOCIATED DRAINAGE CONTROL MEASURES (e.g. FLOW CONTROL BERM) ARE MAINTAINED IN ACCORDANCE WITH THEIR DESIRED OPERATIONAL CONDITION.

6. DISPOSE OF SEDIMENT AND DEBRIS IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

Drawn:	Date:		
GMW	May-10	Rock Pads for Building Sites	ESC-01

MATERIALS

FABRIC (LIGHT TRAFFIC AREAS):
HEAVY-DUTY, NEEDLE-PUNCHED, NON-WOVEN FILTER CLOTH ('BIDIM' A34 OR EQUIVALENT).

FABRIC (HEAVY TRAFFIC AREAS):
POLY-PROPYLENE, POLYAMIDE, NYLON, POLYESTER, OR POLYETHYLENE WOVEN OR NON-WOVEN REINFORCED FABRIC. THE FABRIC WIDTH SHOULD BE AT LEAST 700mm, WITH A MINIMUM UNIT WEIGHT OF 140g/m^2. FABRICS SHOULD CONTAIN ULTRAVIOLET INHIBITORS AND STABILISERS TO PROVIDE A MINIMUM OF 6 MONTHS OF USEABLE CONSTRUCTION LIFE (ULTRAVIOLET STABILITY EXCEEDING 70%).

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND DIMENSIONAL DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, DIMENSIONS OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. ENSURE THAT THE INSTALLATION OF THE SEDIMENT TRAP WILL NOT CAUSE UNDESIRABLE SAFETY OR FLOODING ISSUES.

3. SELECT THE APPROPRIATE FABRIC FOR THE SITE CONDITIONS.

4. WRAP THE FABRIC AROUND OR OVER THE STORMWATER INLET GRATE IN SUCH A MANNER THAT PREVENTS ANY WATER ENTERING THE STORMWATER INLET WITHOUT PASSING THROUGH THE FABRIC.

5. ENSURE ALL OTHER FLOW ENTRY POINTS ARE COVERED WITH FABRIC SUCH THAT WATER CANNOT ENTER THE STORMWATER INLET WITHOUT PASSING THROUGH A SUITABLE FILTER.

6. TAKE ALL NECESSARY MEASURE TO MINIMISE SAFETY OR FLOODING RISK CAUSED BY OPERATION OF THE SEDIMENT TRAP.

MAINTENANCE

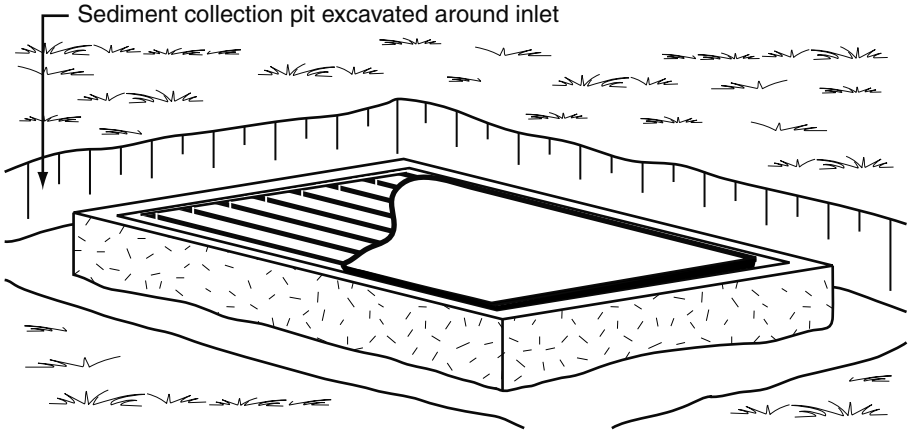
1. INSPECT THE BARRIER AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT AND MAKE REPAIRS AS NEEDED TO THE SEDIMENT TRAP.

2. REMOVE COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

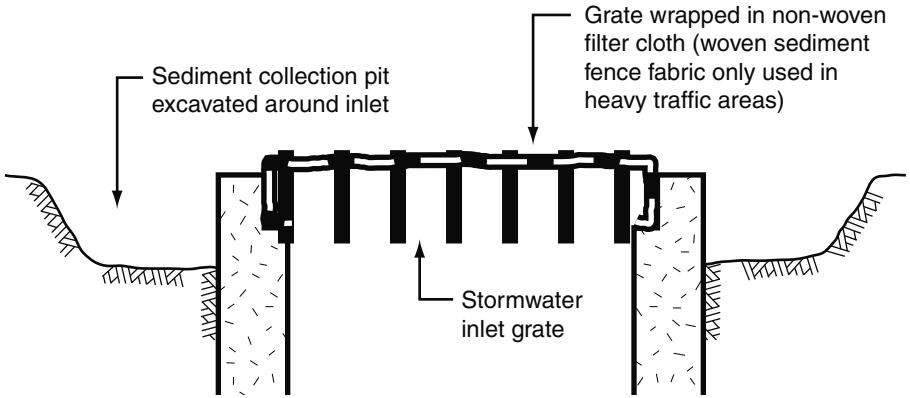
3. REPLACE THE FABRIC IF IT IS TORN OR DAMAGED.

4. SEDIMENT DEPOSITS SHOULD BE REMOVED IMMEDIATELY IF THEY REPRESENT A SAFETY RISK.

REMOVAL
1. WHEN THE UP-SLOPE DRAINAGE AREA HAS BEEN STABILISED, REMOVE ALL MATERIALS INCLUDED DEPOSITED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.



(a) Fabric wrap drop inlet protection with trench



(b) Typical details of excavated sediment collection trench

Drawn:	Date:		
GMW	May-10	Grated Stormwater (Field) Inlet Sediment Trap	ESC-02

MATERIALS

SOCKS: MINIMUM 200mm DIAMETER SYNTHETIC OR BIODEGRADABLE TUBES MANUFACTURED FROM NON-WOVEN OR COMPOSITE FABRIC SUITABLE FOR THE 'FILTRATION' OF COARSE SEDIMENTS.

FILL MATERIAL: STRAW, CANE MULCH, COMPOSTED MATERIAL (AS4454), COARSE SAND, OR CLEAN AGGREGATE.

STAKES: MINIMUM 25 x 25mm TIMBER.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, DIMENSIONS OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. ENSURE THE SOCKS ARE PLACED INDIVIDUALLY OR COLLECTIVELY (AS A SINGLE SEDIMENT TRAP) SUCH THAT:
(i) LEAKAGE AROUND OR UNDER THE SOCKS IS MINIMISED;
(ii) ADJOINING SOCKS ARE TIGHTLY BUTTED OR OVERLAPPED AT LEAST 450mm;
(iii) THE SURFACE AREA OF POTENTIAL WATER PONDING UP-SLOPE OF EACH SEDIMENT TRAP IS MAXIMISED;
(iv) TO THE MAXIMUM DEGREE PRACTICAL, ALL SEDIMENT-LADEN WATER WILL PASS THROUGH THE FORMED POND BEFORE FLOWING OVER THE DOWN-SLOPE END OF THE SEDIMENT TRAP.

3. WHEN PLACED ACROSS THE INVERT OF MINOR DRAINS, ENSURE THE SOCKS ARE PLACED SUCH THAT:
(i) THE CREST OF THE DOWNSTREAM SOCK IS LEVEL WITH THE CHANNEL INVERT AT THE IMMEDIATE UPSTREAM SOCK (IF ANY);
(ii) EACH SOCK EXTENDS UP THE CHANNEL BANKS SUCH THAT THE CREST OF THE SOCK AT ITS LOWEST POINT IS LOWER THAN GROUND LEVEL AT EITHER END OF THE SOCK.

4. IF STAKES ARE REQUIRED TO ANCHOR THE SOCKS, THEIR SPACING DOES NOT EXCEEDING 1.2m OR SIX TIMES THE SOCK DIAMETER (WHICHEVER IS THE LESSER). A MAXIMUM STAKE SPACING OF 0.3m APPLIES WHEN USED TO FORM CHECK DAMS.

MAINTENANCE

1. INSPECT ALL FILTER SOCKS PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF PRODUCING STORMS OR OTHERWISE AT WEEKLY INTERVALS.

2. REPAIR OR REPLACE DAMAGED SOCKS.

3. THE BULK OF THE SEDIMENT COLLECTED BEHIND THE FILTER SOCKS SHOULD BE REMOVED BY SHOVEL AFTER EACH STORM EVENT.

4. REMOVE COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

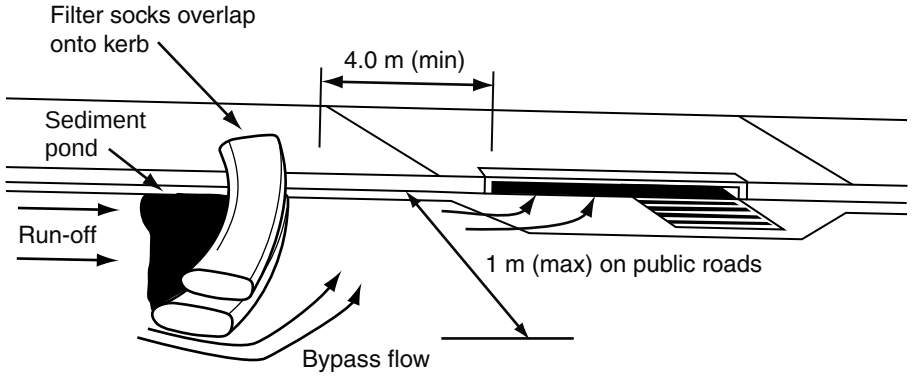
REMOVAL

1. ALL SAND, SOIL, SEDIMENT OR MUD MUST BE PHYSICALLY REMOVED FROM SEALED SURFACES, FIRST USING A SQUARE-EDGED SHOVEL, AND THEN A STIFF-BRISTLED BROOM, AND THEN BY A MECHANICAL VACUUM UNIT, IF AVAILABLE.

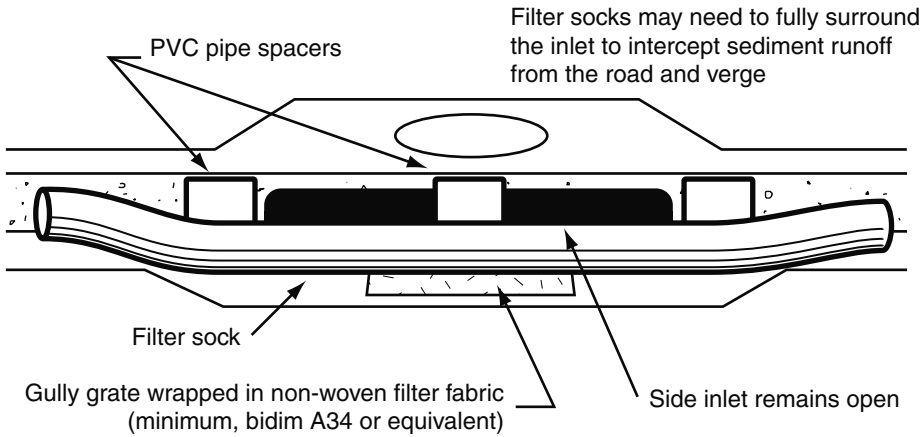
2. IF NECESSARY FOR SAFETY REASONS, THE SEALED SURFACE SHALL ONLY BE WASHED CLEAN AFTER ALL REASONABLE EFFORTS HAVE BEEN TAKEN TO SHOVEL AND SWEEP THE MATERIAL FROM THE SURFACE.

3. DISPOSE OF COLLECTED SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

4. ALL SYNTHETIC (PLASTIC) MESH OR OTHER NON READILY BIODEGRADABLE MATERIAL MUST BE REMOVED FROM THE SITE ONCE THE SLOPE OR DRAIN IS STABILISED, OR THE SOCKS HAVE DETERIORATED TO A POINT WHERE THEY ARE NO LONGER PROVIDING THEIR INTENDED DRAINAGE OR SEDIMENT CONTROL FUNCTION.

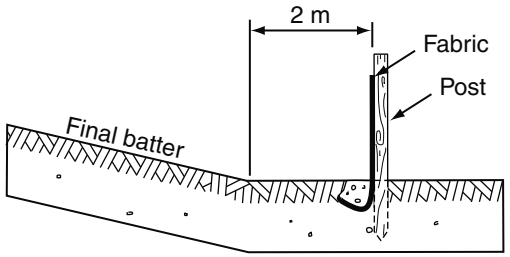


(a) On-grade kerb inlet sediment trap

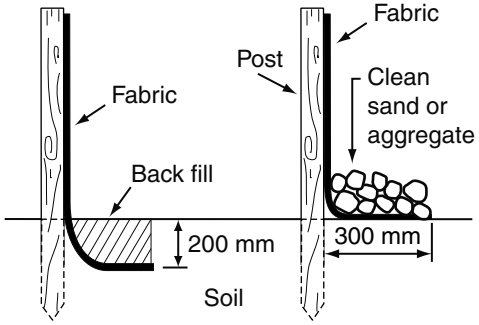


(b) Sag inlet sediment trap

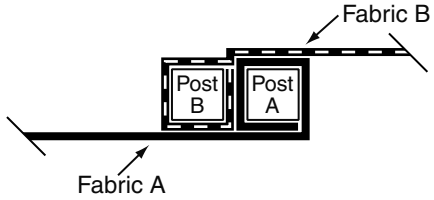
Drawn:	Date:		
GMW	Dec-09	Kerb Inlet Sediment Traps	ESC-03



(a) Location of fence relative to base of slope

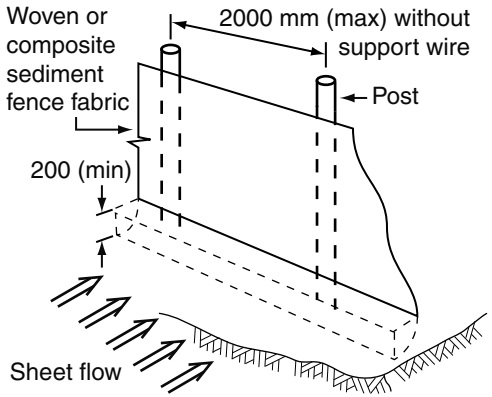


(b) Anchoring base of fabric

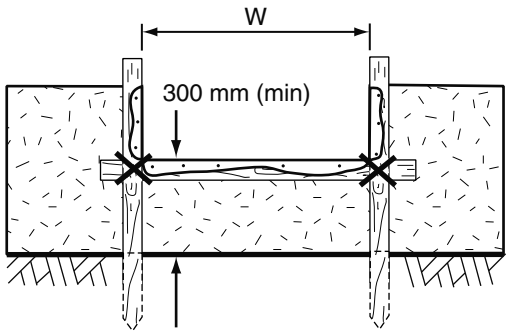


Fabric to fold around each stake one full turn.
Stake B to be drive tightly against Stake A.
The tops of both stakes to be secured with wire.

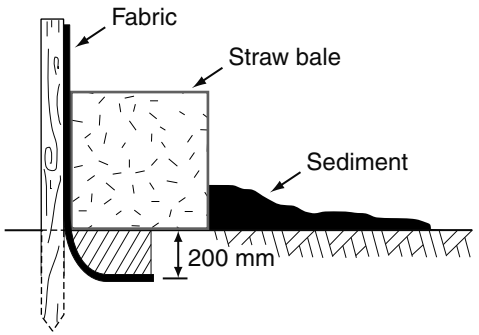
(c) Joining fabric - Method 1



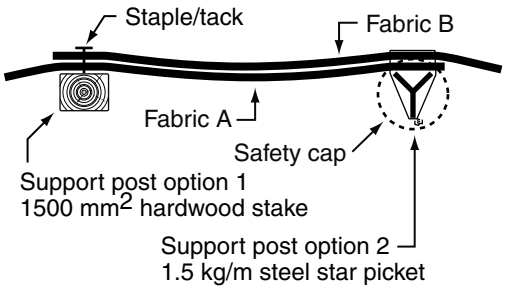
(d) Installation without backing support



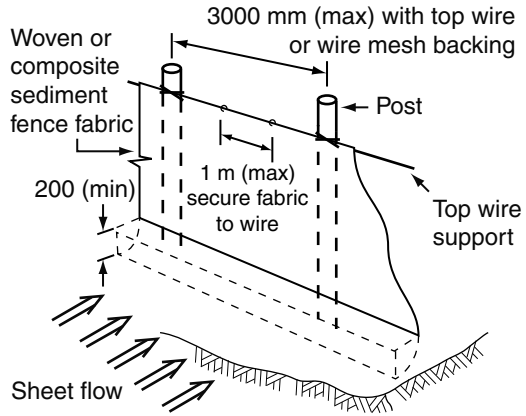
(e) Spill-through weir



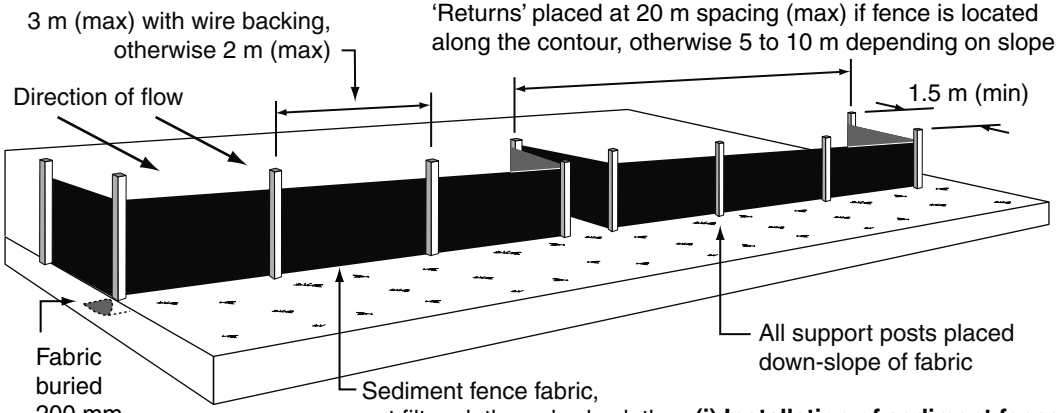
(f) Placement of up-slope straw bale



(g) Joining fabric - Method 2



(h) Installation with top wire support



(i) Installation of sediment fence

Notes:

1. Sediment fence to be installed along a line of constant ground elevation wherever practical.
2. Both end of the sediment fence to extend up the slope at least 1m.
3. Support post to be spaced a maximum 2m unless the fence is supported by a top wire or wire mesh backing, in which case 3m maximum spacing.
4. Fence 'returns' shall be installed at maximum 20m spacing if fence is installed along the contour, otherwise 5 to 10m maximum spacing.
5. Minimum 4 staples or tie wires per stake.

Drawn:	Date:		
GMW	Dec-09	Sediment Fence	ESC-04

MATERIALS

FABRIC: POLYPROPYLENE, POLYAMIDE, NYLON, POLYESTER, OR POLYETHYLENE WOVEN OR NON-WOVEN FABRIC, AT LEAST 700mm IN WIDTH AND A MINIMUM UNIT WEIGHT OF 140g/m^2. ALL FABRICS TO CONTAIN ULTRAVIOLET INHIBITORS AND STABILISERS TO PROVIDE A MINIMUM OF 6 MONTHS OF USEABLE CONSTRUCTION LIFE (ULTRAVIOLET STABILITY EXCEEDING 70%).

FABRIC REINFORCEMENT: WIRE OR STEEL MESH MINIMUM 14-GAUGE WITH A MAXIMUM MESH SPACING OF 200mm.

SUPPORT POSTS/STAKES: 1500mm^2 (MIN) HARDWOOD, 2500mm^2 (MIN) SOFTWOOD, OR 1.5kg/m (MIN) STEEL STAR PICKETS SUITABLE FOR ATTACHING FABRIC.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND REQUIRED TYPE OF FABRIC (IF SPECIFIED). IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, FABRIC TYPE, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. TO THE MAXIMUM DEGREE PRACTICAL, AND WHERE THE PLANS ALLOW, ENSURE THE FENCE IS LOCATED:
(i) TOTALLY WITHIN THE PROPERTY BOUNDARIES;
(ii) ALONG A LINE OF CONSTANT ELEVATION WHEREVER PRACTICAL;
(iii) AT LEAST 2m FROM THE TOE OF ANY FILLING OPERATIONS THAT MAY RESULT IN SHIFTING SOIL/FILL DAMAGING THE FENCE.

3. INSTALL RETURNS WITHIN THE FENCE AT MAXIMUM 20m INTERVALS IF THE FENCE IS INSTALLED ALONG THE CONTOUR, OR 5 TO 10m MAXIMUM SPACING (DEPENDING ON SLOPE) IF THE FENCE IS INSTALLED AT AN ANGLE TO THE CONTOUR. THE 'RETURNS' SHALL CONSIST OF EITHER:
(i) V-SHAPED SECTION EXTENDING AT LEAST 1.5m UP THE SLOPE; OR
(ii) SANDBAG OR ROCK/AGGREGATE CHECK DAM A MINIMUM 1/3 AND MAXIMUM 1/2 FENCE HEIGHT, AND EXTENDING AT LEAST 1.5m UP THE SLOPE.

4. ENSURE THE EXTREME ENDS OF THE FENCE ARE TURNED UP THE SLOPE AT LEAST 1.5m, OR AS NECESSARY, TO MINIMISE WATER BYPASSING AROUND THE FENCE.

5. ENSURE THE SEDIMENT FENCE IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE FENCE, AND THE UNDESIRABLE DISCHARGE OF WATER AROUND THE ENDS OF THE FENCE.

6. IF THE SEDIMENT FENCE IS TO BE INSTALLED ALONG THE EDGE OF EXISTING TREES, ENSURE CARE IS TAKEN TO PROTECT THE TREES AND THEIR ROOT SYSTEMS DURING INSTALLATION OF THE FENCE. DO NOT ATTACH THE FABRIC TO THE TREES.

7. UNLESS DIRECTED BY THE SITE SUPERVISOR OR THE APPROVED PLANS, EXCAVATE A 200mm WIDE BY 200mm DEEP TRENCH ALONG THE PROPOSED FENCE LINE, PLACING THE EXCAVATED MATERIAL ON THE UP-SLOPE SIDE OF THE TRENCH.

8. ALONG THE LOWER SIDE OF THE TRENCH, APPROPRIATELY SECURE THE STAKES INTO THE GROUND SPACED NO GREATER THAN 3m IF SUPPORTED BY A TOP SUPPORT WIRE OR WEIR MESH BACKING, OTHERWISE NO GREATER THAN 2m.

9. IF SPECIFIED, SECURELY ATTACH THE SUPPORT WIRE OR MESH TO THE UP-SLOPE SIDE OF THE STAKES WITH THE MESH EXTENDING AT LEAST 200mm INTO THE EXCAVATED TRENCH. ENSURE THE MESH AND FABRIC IS ATTACHED TO THE UP-SLOPE SIDE OF THE STAKES EVEN WHEN DIRECTING A FENCE AROUND A CORNER OR SHARP CHANGE OF DIRECTION.

10. WHEREVER POSSIBLE, CONSTRUCT THE SEDIMENT FENCE FROM A CONTINUOUS ROLL OF FABRIC. TO JOIN FABRIC EITHER:
(i) ATTACH EACH END TO TWO OVERLAPPING STAKES WITH THE FABRIC FOLDING AROUND THE ASSOCIATED STAKE ONE TURN, AND WITH THE TWO STAKES TIED TOGETHER WITH WIRE; OR
(ii) OVERLAP THE FABRIC TO THE NEXT ADJACENT SUPPORT POST.

11. SECURELY ATTACH THE FABRIC TO THE SUPPORT POSTS USING 25 X 12.5mm STAPLES, OR TIE WIRE AT MAXIMUM 150mm SPACING.

12. SECURELY ATTACH THE FABRIC TO THE SUPPORT WIRE/MESH (IF ANY) AT A MAXIMUM SPACING OF 1m.

13. ENSURE THE COMPLETED SEDIMENT FENCE IS AT LEAST 450mm, BUT NOT MORE THAN 700mm HIGH. IF A SPILL-THOUGH WEIR IS INSTALLED, ENSURE THE CREST OF THE WEIR IS AT LEAST 300mm ABOVE GROUND LEVEL.

14. BACKFILL THE TRENCH AND TAMP THE FILL TO FIRMLY ANCHOR THE BOTTOM OF THE FABRIC AND MESH TO PREVENT WATER FROM FLOWING UNDER THE FENCE.

ADDITIONAL REQUIREMENTS FOR THE INSTALLATION OF A SPILL-THROUGH WEIR

1. LOCATE THE SPILL-THROUGH WEIR SUCH THAT THE WEIR CREST WILL BE LOWER THAN THE GROUND LEVEL AT EACH END OF THE FENCE.

2. ENSURE THE CREST OF THE SPILL-THROUGH WEIR IS AT LEAST 300mm THE GROUND ELEVATION.

3. SECURELY TIE A HORIZONTAL CROSS MEMBER (WEIR) TO THE SUPPORT POSTS/ STAKES EACH SIDE OF THE WEIR. CUT THE FABRIC DOWN THE SIDE OF EACH POST AND FOLD THE FABRIC OVER THE CROSS MEMBER AND APPROPRIATELY SECURE THE FABRIC.

4. INSTALL A SUITABLE SPLASH PAD AND/OR CHUTE IMMEDIATELY DOWN-SLOPE OF THE SPILL-THROUGH WEIR TO CONTROL SOIL EROSION AND APPROPRIATELY DISCHARGE THE CONCENTRATED FLOW PASSING OVER THE WEIR.

MAINTENANCE

1. INSPECT THE SEDIMENT FENCE AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY.

2. REPAIR ANY TORN SECTIONS WITH A CONTINUOUS PIECE OF FABRIC FROM POST TO POST.

3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED OR SPECIFIED.

4. IF THE FENCE IS SAGGING BETWEEN STAKES, INSTALL ADDITIONAL SUPPORT POSTS.

5. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 1/3 THE HEIGHT OF THE FENCE.

6. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

7. REPLACE THE FABRIC IF THE SERVICE LIFE OF THE EXISTING FABRIC EXCEEDS 6-MONTHS.

REMOVAL

1. WHEN DISTURBED AREAS UP-SLOPE OF THE SEDIMENT FENCE ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE FENCE MUST BE REMOVED.

2. REMOVE MATERIALS AND COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

Drawn:	Date:		
GMW	May-10	Sediment Fence	ESC-05

Appendix D - Logan City Council Flood Level Report

Flood Level Report

The Logan City Council Flood Level Report is provided to support planning and development in accordance with the current version of the Logan Planning Scheme 2015. This report summarises the relevant information for the Flood Hazard overlay code and applicable flood planning levels. The content of this report should be considered along with all other applicable planning and development requirements.
This tool is not designed to give information on the risk of flooding for the purposes of preparing for potential flooding that may affect your home or business. For information on disaster preparedness please visit Council's Disasters and Emergencies webpage.

FLOOD HAZARD INFORMATION ADVICE

Logan City Council is currently in the process of re-modelling flood hazard across the city. The purpose of re-modelling flood hazard enables Council to get a better understanding of flood risk to the community, Council infrastructure and for disaster preparedness. Council will also apply State policies and National standards on flooding to the modelling. The extent of the flood hazard overlay shown on the Logan Planning Scheme Flood hazard overlay map OM-05.00 is likely to change substantially as a result of this re-modelling, namely additional areas that are not currently mapped as affected by flood hazard will be mapped as affected by flood hazard, and areas currently mapped as being subject to flood hazard may be the subject of greater flood hazard. Once endorsed Council will use this new flood modelling to update the Logan Planning Scheme flood hazard overlay and update the Defined Flood Levels for development. In the meantime, all persons planning to undertake development in the city are strongly encouraged to contact Council's Rivers and Catchment Engineering Program (phone 07 3412 3412) to establish the status of the re-modelling and to determine how it may impact their land.

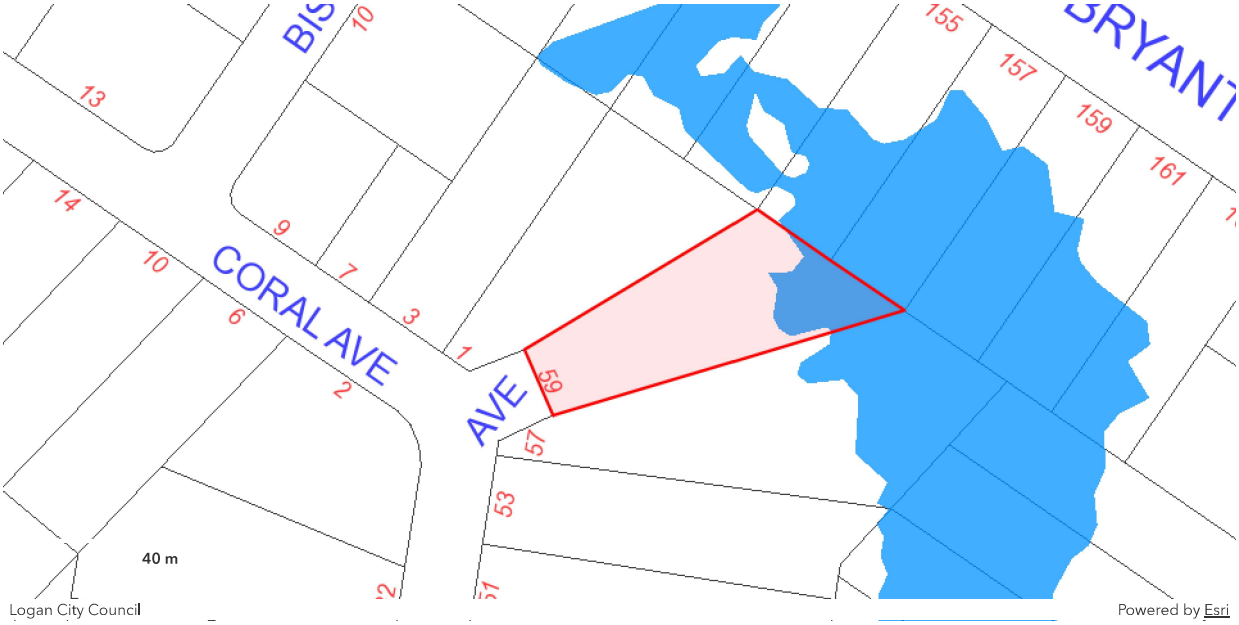
Property Details

Address:	59 Solomon Avenue LOGANHOLME QLD 4129		
Lot/Plan:	Lot 10 RP 116425	**Property Key:**	201519
Property Size:	2,785 m ^{2} (survey plan area)	**Division:**	10
Zone and precinct:	Low-Medium Density Residential - (No precinct due to local plan)		

Planning and Development Triggers

The Flood Hazard Overlay from the Logan Planning Scheme 2015 is displayed. If the selected property is impacted/affected, the Flood Level Report will provide information about flood levels. For further information please contact Council by emailing Council@logan.qld.gov.au or phoning (07) 3412 5282.

Flood Hazard Overlay Code Applies	This property has been identified in a natural hazard area for flooding. The Flood Hazard overlay code is triggered for planning and development purposes.



Ground Level Information

Minimum Ground Level	11.9m AHD
Maximum Ground Level	13.7m AHD
Source	2013 Digital Elevation Model (5 metre grid)

Design Flood Level Information

The design flood level information below provides water surface levels for a range of typical planning and development design standards. The flood planning level for most development in the Flood Hazard overlay area is the Defined Flood Event. The design flood level information should be considered in conjunction with the Logan Planning Scheme 2015. These flood levels are provided to assist in planning and design and have been sourced from Council's adopted flood modelling and flood study at this location. The flood study has been based on the best available information at the time of completing the study. The flood levels are measured in metres Australian Height Datum (mAHD), where mean sea level is approximately zero (0) mAHD.

N/A = not available

Design Event	**1 % AEP** Defined Flood Level	**2 % AEP**	**5 % AEP**	**10 % AEP** *	**20 % AEP** *
Flood Level (m AHD)	N/A	N/A	N/A	N/A	N/A
Flood Study					

Note: It is possible that some design flood level information may not be available (shown as 'N/A'). If design flood information is not available, please contact Council on (07) 3412 3412 or via email at Council@logan.qld.gov.au. It may be necessary for you to engage a suitably qualified Registered Professional Engineer of Queensland (RPEQ) to obtain the necessary information or seek advice related to your proposed building or development.

* Where design flood event levels have been sourced from a study completed before 2017, these %AEP's may be approximate.

Flood Hazard Triggers

It is possible for one or more sources of flooding to occur, especially where a property is near a creek or waterway. These flooding sources can include riverine, creek and overland flow flooding which can each behave differently and impact how a building or development is designed. All flood hazard triggers should be considered when designing and planning with flooding in mind.

Creek Flooding	This property has been identified as being at risk of flooding from a local creek or waterway. Planning and development must consider risk to people and property, natural floodplain characteristics and access outcomes during a creek flood event.

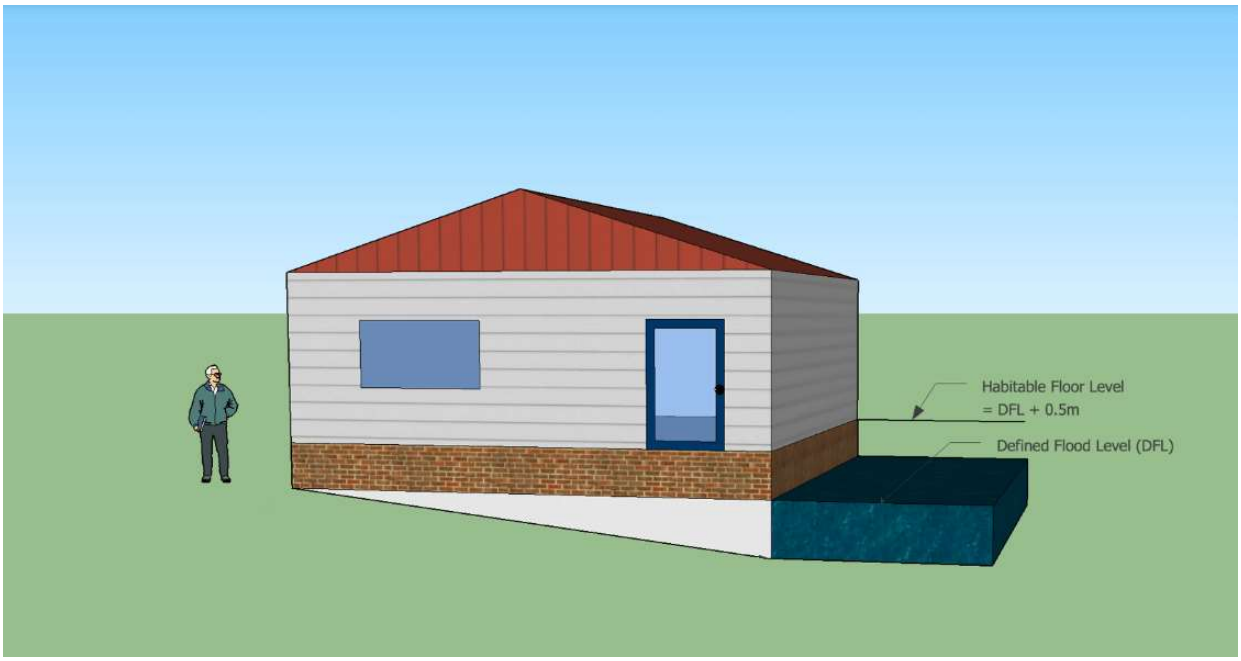
Where to next?

This Flood Level Report is designed to support the implementation of the Logan Planning Scheme 2015. The planning scheme helps Council to safely manage population growth, plan for a sustainable future and guide the way land is used and developed across the city.

Building a house?

A house located in a Flood Hazard overlay area must have a finished habitable floor level a minimum of 500mm above the defined flood event (as shown below).

A building permit, is required prior to commencing construction on most types of domestic or commercial build works. These can be sought from a private building certifier who will assess whether the proposed work complies with the relevant legislation, regulations and standards. You can access more information on the building works process from Council at Planning & Building.



Lodging a development application?

For further advice regarding planning approval for a subdivision or material change of use, or operational works please visit the Development in Logan webpage or contact a Council planner on (07) 3412 5269.

Buying or selling?

Regulation of planning and development is just one way that we can help to make our city flood resilient. If you are looking to buy or sell a property it is important to consider the risk of flooding and how you can be prepared for potential flooding which may affect your property, business and neighbourhood. Being resilient is a shared responsibility, and Council has developed a range of information on flooding to assist all members of the community to be better prepared for severe weather and flooding. For information on all hazards, including flooding, please visit Council's Disasters and Emergencies website.

Please note:

All possible steps have been undertaken to ensure the information presented in this report is accurate at the time of generation. Changes to the topography and condition of the local creeks and waterways may have an impact on flooding. Over time, Council may undertake further technical studies to maintain the understanding of flooding across the city, and update the information available.

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Appendix E - Logan City Council Development Codes

Filling and Excavation Code

9.4.2.3 Criteria for assessment

Part A–Criteria for self-assessable and assessable development

Table 9.4.2.3.1–Filling and excavation code: self-assessable and assessable development

Performance outcomes	Acceptable outcomes	Response
Protection of natural processes and ecosystems		
PO1 The discharge of sediments and pollutants from filling or excavation does not adversely affect a waterway or the stormwater network.	**AO1** The discharge of sediments and pollutants to a waterway or stormwater network complies with part 3.3—Filling and excavation standards in planning scheme policy 5—infrastructure.	Filling and excavation will be carried out in accordance with planning scheme policy 5 and the erosion and sediment control plan to ensure sediments and pollutants from filling or excavation do not adversely affect waterways or the stormwater network.
PO2 Topsoil and spoil stockpiled on the premises do not adversely affect natural processes and ecosystems.	**AO2** Topsoil and spoil is stockpiled to comply with part 3.3–Filling and excavation standards in planning scheme policy 5–Infrastructure.	Topsoil and spoil will be stockpiled and contained in accordance with Planning Scheme Policy 5 to ensure there are no adverse effects on natural processes and ecosystems.
PO3 Filling is carried out using stable, solid and clean earth, free of organic and putrescible waste, rubbish and refuse material.	**AO3** Filling complies with part 3.3–Filling and excavation standards in planning scheme policy 5–Infrastructure.	Fill material used will be stable, solid and clean earth free of organic and putrescible waste, rubbish and refuse material.
Protection of existing and planned infrastructure		

Performance outcomes	Acceptable outcomes	Response
PO4 Filling or excavation works do not adversely affect infrastructure, including any services.	**AO4** Filling or excavation works comply with part 3.3– Filling and excavation standards in planning scheme policy 5– Infrastructure.	Filling and excavation on site will be designed and completed such that works do not adversely affect infrastructure, including any services.
Protection and enhancement of personal health and safety and premises		
PO5 Filling or excavation works do not adversely affect personal health and safety.	**AO5** Filling or excavation works comply with part 3.3– Filling and excavation standards in planning scheme policy 5– Infrastructure.	Proposed filling and excavation on site will not adversely affect personal health and safety.
Surface water flow		
PO6 Surface water drainage does not cause any of the following: a) Ponding on any premises; or b) A hazard or adversely affect personal health and safety and premises; or c) Diversion or concentration of flow from or onto adjoining premises or infrastructure.	**AO6** Surface water drainage complies with part 3.3– Filling or excavation standards in planning scheme policy 5– Infrastructure.	Any proposed cut or fill on the site will not cause ponding, safety hazard or diversion or concentration of flow onto adjoining properties. Surface water drainage will comply with Planning Scheme Policy 5.
Batters		

Performance outcomes	Acceptable outcomes	Response
PO7 A batter: a) Does not adversely affect the natural physical processes and ecosystems; b) Protects existing and planned infrastructure; c) Is safe, stable and easily maintained; d) Is landscaped to enhance visual amenity.	**AO7** A batter is designed and constructed to comply with the standards specified in section 3.3.6– Batters and retaining walls in planning scheme policy 5–Infrastructure.	All proposed batters will be designed and constructed in accordance with Planning Scheme, Policy 5.
Retaining Walls		
PO8 A retaining wall: a) Is not constructed of timber and are not located on existing or proposed lot boundaries, or movement networks; b) Does not adversely affect the natural physical processes and ecosystems; c) Is located to avoid conflict with adjoining premises; d) Is located such that existing and planned infrastructure is not adversely affected; e) Protects the visual amenity of adjoining premises or a public open space; f) Is located within the premises that is being filled; g) Is located within the premises that is cut and is designed to take any surcharge loading allowable on the uphill lot; h) Is safe and stable; i) Enables easy access for maintenance.	**AO8** A retaining wall is designed and constructed to comply with the standards specified in section 3.3.6.2–Retaining walls in planning scheme policy 5–Infrastructure.	All proposed retaining walls will be designed and constructed in accordance with Planning Scheme Policy 5.

Performance outcomes	Acceptable outcomes	Response
Filling of a dam		
PO9 The filling of a dam: a) Does not adversely affect the natural physical processes and ecosystems; b) Creates a safe and stable surface; c) Is integrated into the landscape.	**AO9** The filling of a dam complies with part 3.3–Filling and excavation standards in planning scheme policy 5–Infrastructure.	Not applicable to this development

Infrastructure Code

9.4.3.3 Criteria for assessment

Part A–Criteria for self-assessable and assessable development

Table 9.4.3.3.1–Infrastructure code: self-assessable and assessable development

Performance outcomes	Acceptable outcomes	Response
Provision, design, construction and location of infrastructure		
PO1 Development is demonstrated to be capable of being serviced by necessary infrastructure.	**AO1** Reports, plans and drawings are provided in accordance with part 2 of planning scheme policy 5–Infrastructure.	Development will be serviced by necessary infrastructure as shown on the design drawings prepared by vTCE.
PO2 Development: a) provides necessary infrastructure to service the development; b) provides that the design, construction and location of necessary infrastructure: i. protects existing and planned infrastructure networks; ii. services proposed development; iii. integrates with existing and planned infrastructure networks; iv. delivers a standard of service that is efficient and equitable; v. minimises the cost to the community for the life of the infrastructure by providing a suitable design life, ease of maintenance and ease of replacement; vi. protects personal health, safety and premises; vii. protects environmental values.	**AO2** Development: a) in a water supply service area connects to the water network in accordance with the SEQ Water Supply and Sewerage Design and Construction Code; b) not in a water supply service area provides a tank with a minimum storage capacity of 45,000 litres; c) in a sewerage supply service area connects to the waste water network in accordance with the SEQ Water Supply and Sewerage Design and Construction Code; d) not in a sewerage supply service area complies with part 1 of the Queensland Plumbing and Wastewater Code; e) provides stormwater infrastructure in accordance with part 3.6 of planning scheme policy 5–Infrastructure; f) provides a movement network infrastructure in accordance with part 3.4 of planning scheme policy 5–Infrastructure; g) provides parks in accordance with part 3.12 of planning scheme policy 5–Infrastructure; h) provides road lighting in accordance with part 3.5 of planning scheme policy 5– Infrastructure; i) provides electricity reticulation in accordance with part 3.8 of planning scheme policy 5–Infrastructure;	Development: a) connects to the water network in accordance with the SEQ Water Supply and Sewerage Design and Construction Code. b) not applicable c) connects to the waste water network in accordance with the SEQ Water Supply and Sewerage Design and Construction Code d) not applicable e) provides stormwater infrastructure in accordance with part 3.6 of planning scheme policy 5–Infrastructure; f) provides a movement network infrastructure in accordance with part 3.4 of planning scheme policy 5–Infrastructure g) provides parks in accordance with part 3.12 of planning scheme policy 5–Infrastructure; h) provides road lighting in accordance with part 3.5 of planning scheme policy 5–Infrastructure; i) provides electricity reticulation in accordance with part 3.8 of planning scheme policy 5–Infrastructure;

Performance outcomes	Acceptable outcomes	Response
	j) provides gas and telecommunications reticulation in accordance with part 3.9 of planning scheme policy 5–Infrastructure. k) is consistent with the general planning layouts in part 7.2 of Planning scheme policy 5 - Infrastructure. Editor's note - The delivery of any part of a network identified in the plans for trunk infrastructure is governed by Part 4 - Local government infrastructure plan.	j) provides gas and telecommunications reticulation in accordance with part 3.9 of planning scheme policy 5–Infrastructure. k) Proposed development is consistent with the general planning layouts in part 7.2 of the Planning scheme policy 5 – Infrastructure, where it is applicable.
Location of development		
PO3 Development is located to protect existing and planned infrastructure networks.	**AO3** Development is located outside: a) planned widening of a road or a new road identified in Table 7.3.1.1–Road encroachment maps of planning scheme policy 5—Infrastructure; b) planned public transport network identified on Figure 3.4.1.3.1—Public transport network in planning scheme policy 5— Infrastructure; c) a planned cycle network identified on Figure 3.4.1.2.1–Cycle network in planning scheme policy 5–Infrastructure; d) a planned park network identified in PIP map 09.00 Plan for trunk park infrastructure in Schedule 3–Priority infrastructure plans and mapping.	Development is located to protect existing and planned infrastructure network.
Fire fighting		
PO4 Development in a water service area accessed by common private title provides: a) fire hydrant infrastructure; b) unimpeded access for emergency services vehicles. Editor's note - The term common private title refers to areas such as access roads in community title developments or strata title unit access, which are private and under group or body corporate control.	**AO4** Development in a water service area involving a material change of use or reconfiguring a lot where, or to be, accessed by common private title ensures that fire hydrant placement and technical requirements for streets and access ways are in accordance with: a) Australian Standard (AS) 2419.1 - 2005 Fire hydrant installations; b) QFES: Fire Hydrant and vehicle access guidelines for residential, commercial and industrial lots.	Development provides necessary fire hydrant infrastructure and unimpeded access for emergency services vehicles.

Performance outcomes	Acceptable outcomes	Response
PO5 Development not in a water service area provides sufficient water storage with adequate pressure, volume and flow to service development for firefighting purposes.	**AO5** Development: a) Is connected to a reticulated water supply scheme that has sufficient flow and pressure characteristics for firefighting purposes at all times with a minimum pressure and flow of 10 liters per second at 200kPa; or b) has an on-site water storage in accordance with Table 9.4.3.3.2—Water storage for firefighting, dedicated or retained for firefighting purposes that is made of fire resistant materials and is: i. a separate tank; or ii. a reserve section in the bottom part of the main water supply tank water tank. Editor's note - The requirement in AO5 is: - in addition to the requirement for potable water supply/storage in AO2 in Table 9.4.3.3.1 - Infrastructure code: accepted development (subject to requirements) and assessable development; - reflected in AO5 in Table 8.2.3.3.1 - Bushfire hazard overlay code: accepted development (subject to requirements) and assessable development.	Not applicable to this development.
Disposal of trade waste		
PO6 The disposal of trade waste in a sewerage supply service area does not adversely affect the sewerage network.	**AO6** The disposal of trade waste in a sewerage supply service area complies with the sewer admission standards in section 3.2.6– Sewer admission standards in planning scheme policy 3– Environmental management.	Not applicable to this development.

Performance outcomes	Acceptable outcomes	Response
Roof water drainage and surface water drainage		
PO7 Development provides stormwater infrastructure for the drainage of the premises so as not to cause any of the following: a) ponding of stormwater on the premises; b) a hazard to personal health and safety; c) damage to premises; d) an increased risk of flooding to premises within the catchment.	**AO7** Development complies with the standards for stormwater infrastructure specified in part 3.6 of planning scheme policy 5–Infrastructure.	Proposed stormwater infrastructure will not cause any adverse hydraulic impacts or actionable nuisance to surrounding properties nor will it create a health and safety hazard.
Natural flow of surface water		
PO8 Development provides that the natural flow of surface water is: a) not altered so as to cause a risk to personal health and safety or damage to property; b) not increased in intensity, velocity or frequency; c) not concentrated onto adjoining premises.	**AO8** Development complies with the standards for stormwater infrastructure specified in part 3.6 of planning scheme policy 5–Infrastructure.	Development will not affect the natural flow of surface water so as to cause a risk to personal health and safety or damage to property nor an increase in intensity, velocity or frequency. The development will not cause surface water to be concentrated onto adjoining properties.

Performance outcomes	Acceptable outcomes	Response
Water sensitive urban design		
PO9 Development which provides stormwater infrastructure incorporates water sensitive urban design principles having regard to: a) protecting existing natural features and ecological processes; b) protecting the natural hydrologic behavior of catchments; c) protecting the existing natural flow and water quality regimes of waterways; d) protecting water quality of surface and ground waters; e) minimising demand on the water network; f) minimising sewage discharges to the natural environment; g) integrating water into the landscape to enhance visual and ecological values.	**AO9** Development complies with the standards for stormwater infrastructure specified in part 3.6 of planning scheme policy 5–Infrastructure.	Development incorporates water sensitive urban design principles and complies with the standards for stormwater infrastructure specified in part 3.6 of planning scheme policy 5–Infrastructure.
Movement network		
PO10 The projected traffic levels for a use do not adversely affect the planned standards of service for a road or intersection.	**AO10** Development does not cause or contribute to projected traffic levels: a) exceeding the maximum vehicle trips per day in Table 3.4.1.4.2 in planning scheme policy 5–Infrastructure; or b) exceeding the maximum control delays through intersections in peak periods in Table 3.4.1.4.3 in planning scheme policy 5—Infrastructure.	The projected traffic levels for the development will not adversely affect the planned standards of service in the area of the development.
Integrated movement concept report		
PO11 Development which generates more than 3,000 vehicle trips per average weekday is designed to integrate the movement network to minimize the transportation costs required to service the use.	**AO11** Development which generates more than 3,000 vehicle trips per average weekday provides an integrated movement concept report which integrates the planning of the movement network in accordance with part 2 and 3 of planning scheme policy 5–Infrastructure.	Not applicable to this development.

Performance outcomes	Acceptable outcomes	Response
Land use and transport integration		
PO12 Development within 400 metres of existing or future public passenger transport facilities where the total site area is 5,000m^2 or more: a) supports a road hierarchy which facilitates efficient, safe and accessible bus services connecting to existing and future public passenger transport facilities; b) enhances connectivity between existing and future public passenger transport facilities and other transport modes; c) optimizes the walkable catchment to existing and future public passenger transport facilities; d) provides for direct and safe access to and use of existing or future public passenger transport facilities. Note – SPP code: Land use and transport integration in Appendix 4 of the state planning policy provides guidance to achieve this outcome.	**AO11** No acceptable outcome provided.	Not applicable to this development.

Servicing, Access and Parking Code

9.4.7.3 Criteria for assessment

Part A–Criteria for self-assessable and assessable development

Table 9.4.7.3.1–Service, access and parking code: self-assessable and assessable development

Performance outcomes	Acceptable outcomes	Response
Provision of parking spaces for vehicles		
PO1 Vehicle parking, loading and servicing and pick up/set down areas are provided that satisfy the expected demand for the number and type of vehicles likely to be generated by a use having regard to: a) the particular circumstances of the premises including the: i. nature, intensity and hours of operation of the use; ii. desirability of providing a car park and attracting vehicles to the premises; iii. maximum number of employees and customers to be on the premises at any one time; iv. size, levels and dimensions of the premises; v. the proximity of the premises to an existing or future Parking station, other available car park or public transport facility.	**AO1** Vehicle parking, vehicle washing, loading and servicing and pick up/set down areas are provided: (a) for a use listed in Table 9.4.7.3.2–Vehicle parking and servicing, to comply with columns 2 to 5 of Table 9.4.7.3.2–Vehicle parking and servicing; (b) for a use not listed in Table 9.4.7.3.2–Vehicle parking and servicing, in accordance with a car parking assessment report to be provided to the local government and prepared in accordance with Part 2 of planning scheme policy 5–Infrastructure.	Vehicle parking, loading and servicing and pick up/set down areas are provided that satisfy the expected demand for the number and type of vehicles likely to be generated by the proposed development.
PO2 Development with a security gate provides accessible visitor vehicle parking in front of the security gate.	**AO2** Development with a security gate provides visitor vehicle parking that complies with Table 9.4.7.3.4– Visitor parking spaces for uses incorporating a security gate.	Not applicable to this development.
PO3 A car park not being a Parking station provides free and unobstructed access for the use by employees and visitors during the normal hours of operation of the use.	**AO3** A use, other than a Residential activity or a Parking station, provides vehicle parking that: a) is kept, used and maintained exclusively for car parking;	On site car parking will have unobstructed access during normal business hours.

Performance outcomes	Acceptable outcomes	Response
	b) is accessible to all employees and visitors c) During the normal hours of operation of the use with no encumbrance, fee or charge; d) does not have a gate, door or similar device that restricts vehicular access by employees or visitors.	
Provision of motorcycle parking		
PO4 Motorcycle parking is provided that is safe and functional.	**AO4** Motorcycle parking is provided to comply with section 2.4.7 of AS2890.1:2004–Parking facilities– Off street car parking.	Motorcycle parking will be provided in accordance with section 2.4.7 of AS2890.1:2004
Provision of bicycle parking		
PO5 Bicycle parking facilities are provided that: (a) satisfy the likely demand for bicycle parking; (b) are functional; (c) are located close to a pedestrian entry to a building.	**AO5** Bicycle parking facilities comply with: (a) the rate specified in column 7 of Table 9.4.7.3.2–Vehicle parking and servicing; (b) AS2890.3–1993–Bicycle parking facilities.	Bicycle parking will be provided in accordance with AS2890.3–1993
Provision of vehicle manoeuvring area		
PO6 Development provides a safe and functional vehicle manoeuvring area.	**AO6** Development provides a vehicle manoeuvring area that: (a) accommodates the design vehicle specified in Table 9.4.7.3.5–Design vehicle for a manoeuvring area; (b) complies with section 3.4.4.10–Manoeuvring areas of planning scheme policy 5– Infrastructure.	Development will provide a manoeuvring area which accommodates the specified design vehicle.
Vehicle washing bay		
PO7 A vehicle washing bay does not cause environmental harm.	**AO7** A vehicle washing bay provides that run off is discharged to: (a) a grassed area or permeable landscape area; or (b) the sewerage system.	Vehicle washing bay will not cause environmental harm. A SPEL stormwater system is proposed for the development as well as a Fox Environmental Diversion Valve system for the wash down area.

Performance outcomes	Acceptable outcomes	Response
Car park access		
PO8 Vehicular access to a car parking area has sufficient queuing space to ensure a vehicle does not queue on a road, cycleway or footpath.	**AO8** Vehicular queuing space to a car parking area: (a) does not provide a turning movement, intersecting aisle or a speed hump in a queuing area; (b) complies with: (i) column 6 of Table 9.4.7.3.2–Vehicle parking and servicing; (ii) Table 9.4.7.3.3–Queuing spaces.	The vehicular access provides sufficient queueing space for two vehicles between the property boundary and the parking aisle in accordance with Table 9.4.7.3.2 and Table 9.4.7.3.3
Driveway crossover		
PO9 A driveway crossover is safe, functional and does not adversely affect infrastructure.	**AO9** A driveway crossover is designed and constructed to comply with section 3.4.5–Design standards for access and driveways of planning scheme policy 5–Infrastructure.	Driveway crossover has been designed and will be constructed such that it is functional and does not adversely affect infrastructure in accordance with the planning scheme policy.
Design and construction of a car parking area		
PO10 A car parking area is designed to: (a) provide easy way finding for pedestrians, cyclists and motorists; (b) provide appropriately sized and line marked spaces in accordance with relevant Australian standards; (c) provide a convenient and safe pedestrian network; (d) provide safe and efficient vehicle circulation; (e) provide a progressive reduction in the speed environment in moving between the road and a parking space; (f) provide a safe sight distance at a potential conflict point; (g) provide for efficient and simple parking space search patterns;	**AO10** A car parking area is designed and constructed in accordance with section 3.4.6–Design standards for car parking of planning scheme policy 5– Infrastructure.	Carparking area is designed and will be constructed in accordance with section 3.4.6–Design standards for car parking of planning scheme policy 5– Infrastructure

Performance outcomes	Acceptable outcomes	Response
(h) provide for uncongested public transport and service vehicle movements through the premises; (i) keeps a heavy vehicle out of a parking aisle; (j) ensure no heavy vehicle reverses across a pathway; (k) prevent parking off a circulation road; (l) prevent an adverse impact on the safety and efficiency of the existing or planned movement network (m) prevent a motorist from reversing on a road; (n) prevent an unnecessary space that encourages illegal parking; (o) address safety of users through appropriate lighting; (p) be appropriately landscaped; (q) be surfaced so as to be useable in all weather conditions; (r) manage stormwater flows.		