PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2020/1121

Date: 16 December 2020

Queensland Government

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SITE-BASED STORMWATER MANAGEMENT PLAN

In Association with the Mixed-Use Development Application

at

Future Way, Maroochydore (Lot 20/SP305311)

for

Habitat Development Group Pty Ltd

Ref: 2014-SBSMP-01_Version 2.0
December 2020

DOCUMENT INFORMATION

Document Title:	Site Based Stormwater Management Plan
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Reviewed & Authorised By:	Tony Shelley (BEng, ADCE, RPEQ, MIEAust)

DOCUMENT CONTROL

Version	Date	Author	Reviewer
1.0	15 May, 2020	Vincent Vicic	Tony Shelley
2.0	7 December, 2020	Vincent Vicic	Tony Shelley

EXECUTIVE SUMMARY

Barlow Shelley Consulting Engineers Pty Ltd has been commissioned by Habitat Development Group Pty Ltd to undertake a Site Based Stormwater Management Plan (SBSMP) for the proposed mixed-use development at Lot 20 on SP305311, at Future Way, Maroochydore, Queensland. An assessment of the stormwater quality and quantity requirements has been carried out for in accordance with Qld SPP (2017). The site is situated in the Maroochydore City Centre Priority Development Area, and the development application is to be assessed by Economic Development Queensland.

The subject site area is 0.4119 ha (4119m^2), and must meet stormwater quality reduction targets specified in the Qld SPP (2017) and the PSP (2014). The total bio-retention filter area of 62m^2 was sized based on the requirements of Table B in Appendix 2 of the Qld SPP (2017). A MUSIC model was created, and confirms the deemed to comply outcome provides an adequate solution for stormwater quality treatment for the development.

Surrounding the site are four existing stormwater pits. Post-developed stormwater flows from the development will flow un-mitigated to the existing stormwater pits provided around the site, as the stormwater network has been designed in accordance with the Maroochydore City Centre PDA guidelines, which specifies the drainage network provides capacity for stormwater discharge from a developed site. The stormwater pits and pipes were built to service the Maroochydore City Centre in its developed state. It is noted that the bio-retention basins proposed for stormwater quality treatment, will provide some nominal stormwater mitigation.

Proposed ground floor level will be at a minimum RL 3.60 m AHD, which will be provided 300mm to local drainage flooding (at year 2100) (RL 3.30 m AHD), and greater than 500mm freeboard above the regional flood (at year 2100) (RL 2.92m AHD), as specified in the Flood Information Search dated 28 April 2020.

Post-developed flows are conveyed to a lawful point of discharge being the existing pits and pipe network surrounding the site. Effective non-worsening is ensured for adjacent and downstream properties as post-developed flows are contained within the existing stormwater network.

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APPENDIX A - Stormwater Management Plan

APPENDIX B - Stormwater Quality Objectives – Construction Phase

APPENDIX C - Flood Information Search

1.0 INTRODUCTION

Barlow Shelley Consulting Engineers Pty Ltd was commissioned by Habitat Development Group Pty Ltd to prepare a Site Based Stormwater Management Plan (SBSMP) for the proposed mixed-use development at Lot 20/SP305311 on Future Way, Maroochydore, Queensland (Refer Figure 1.1).

This report summarises an assessment of stormwater quantity and quality control. It proposes that there will be no worsening or no actionable nuisance of flows and outlines best practice stormwater quality treatment strategies. This report also outlines the freeboard requirement for ground floor areas above local and regional flooding.

Figure 1.1 Locality map of subject site

2.0 SITE DESCRIPTION

The site is described as Lot 20/SP305311 on Future Way, Maroochydore, Queensland. The site is situated in the Maroochydore City Centre Priority Development Area, and the development application is to be assessed by Economic Development Queensland. The total area of the lot is 0.4119 hectares (Ha). Elevation is generally between 3.0m – 4.0m Australian Height Datum (AHD) across the site. Figure 2.1 and Figure 2.2 below show the district locality and subject site.

Figure 2.1 Aerial image of subject site & Maroochydore Township

The site currently has existing stormwater infrastructure at each road frontage (Refer Figure 2.2 below).

Figure 2.2 Existing runoff representation

3.0 PROPOSED DEVELOPMENT

The proposed development will comprise the construction and/or installation of the following components for land use purposes:

- site earthworks and buildings
- access driveways
- stormwater drains
- other ancillary services
- landscaping.

4.0 STORMWATER QUALITY MANAGMENT

This Site Based Stormwater Management Plan includes Stormwater Quality Management guidelines for construction phase of development. The proposed development is greater than 2,500 m^2 and must meet the WSUD load reduction targets in accordance with the Qld SPP (2017). Furthermore, the development will implement stormwater quality management for construction and operational phases as per Qld SPP (2017), and the Water Sensitive Urban Design (WSUD) Technical Manual by Healthy Waterways.

The site will be provided with a 62m^2 bio-retention basin, which is sized based on the requirements specified in Table B, Appendix 2 of the Qld SPP (2017), where the basin area is 1.5% of the contributing catchment. Further to the deemed to comply sizing of the bioretention basin, a MUSIC model was created, which supports the SPP outcomes. Please refer to Appendix A for the location and size of the proposed bio-retention basin.

4.1 CONSTRUCTION PHASE

4.1.1 Pollutants

Typical pollutants generated during the construction phase of a development are listed in Table 4.1 below.

Pollutant	Potential Source	Priority
Litter	Paper, construction packaging, food packaging, cement bags, off cuts	High
Sediment	Unprotected exposed soils and stockpiles during earthworks and building works	High
Hydrocarbons	Fuel and oil spills, leaks from construction equipment and temporary car park areas.	High
Toxic Materials	Cement slurry, asphalt primer, solvents, cleaning agents, wash waters (e.g. From tile works)	Medium
Alkaline substances	Cement slurry and wash waters	High

Table 4.1 Typical Construction Phase Pollutants

4.1.2 Potential Impacts

Construction activities can have a potential impact on water quality. Removal of vegetation, earthworks and changes to drainage patterns can result in erosion and sediment being washed into waterways. This can impact on the physical-chemical parameters of the receiving water, decline in the health of aquatic ecosystems, and overall aesthetics. Potential impacts to the receiving waters surrounding the development site will be minimized during the construction phase with typical measures as outlined below. These

measures should be adequately detailed on erosion and sediment control plans as part of the development's Operational Works application.

4.1.3 Performance Objectives

The amount of runoff traversing and discharging from the site while under construction should be kept to a minimum. This will restrict soil erosion and mobilisation of sediments and pollutants through and off the site.

Stormwater runoff at discharge points during the construction phase shall comply with the objectives detailed in Table A in Appendix 2: Stormwater Management Design Objectives, Part G, SPP (2017).

4.1.4 Control Measures

The following are typical treatment measures that should be implemented before the commencement of any construction works. Detailed erosion and sediment control procedures are to be based on the erosion and sediment control plans lodged at the Operational Works phase.

Maintenance

Maintenance of erosion and control treatment measures (such as sediment fences) will be undertaken if it is observed that they have not been properly installed or the capacity of the measure falls below 75%.

Minimise Disturbed Areas

Only clear land which will be actively under construction in the near term (e.g. within the next 3-6 months).

Stabilise Disturbed Areas

Provide temporary stabilisation of disturbed soils whenever active construction is not occurring on a portion of the site. Provide permanent stabilisation during finish grade and landscape the site.

Protect Slopes and Channels

Safely convey runoff from the top of the slope and stabilise temporary and permanent channel crossings as quickly as possible and ensure that increases in runoff velocity caused by the project do not erode the channel.

Diversions of Upslope Runoff

To prevent the contamination of clean runoff, upslope runoff should be diverted away from areas of exposed soil. This may be achieved by installing tightly abutting sandbags, creating a 'sandbag perimeter bank' to divert flow.

Sediment Fences and Inlet Protection

Delineate site perimeter to prevent disturbing areas outside the project limits. Sediment fences should be installed around the perimeter of works to ensure contaminated runoff is filtered and sediment is trapped before leaving the site. Sandbags or geofabric should also be placed around/over existing stormwater inlets/grates throughout the site to ensure that any contaminated runoff is filtered before it enters the existing piped stormwater network.

Retain Sediment

Retain sediment-laden waters from disturbed, active areas within the site.

Stabilised Vehicle Entry/Exit Point

To minimise the transport of sediment off site, a stabilised entry/exit point should be constructed. All vehicles entering and leaving the site must use this designated entry/exit point.

Stockpiles

Stockpile locations should be identified before the commencement of works. Ideally, they should be located in a flat area at least 15m from any water body or stormwater inlet. Sediment fences should be installed downslope of all erodible stockpiles, and upslope protection measures should be used (i.e. sandbags or sediment fence) to divert runoff in the event of rain. At the end of each working day stockpiles should be covered with geofabric if rain or high winds are forecast.

Street Sweeping

Ensure that local roads are swept as required. This will minimise the potential for sediment tracked onto the road to be washed into the stormwater system. If a large quantity of sediment is being tracked onto the surrounding streets the stabilised entry/exit point may need to be raked or reinforced with rock to provide more effective sediment removal for vehicles.

Erosion Control Matting and Permanent Stabilisation

Exposed areas onsite should be permanently stabilised (i.e. with turf) as the construction works progress. Erosion control matting or mulching should be used as a temporary measure to stabilize exposed areas before permanent stabilisation can be undertaken.

Monitoring

Monitoring and recording of the performance of the drainage control devices including are to be undertaken in accordance with local government requirements. It is further recommended that the proposed construction works are undertaken during periods of dry weather to reduce the potential for sediment to be transported off site during construction.

4.2 OPERATIONAL PHASE

The internal drainage system has been designed to include SQIDs in the water quality treatment train for the proposed development. Refer to the conceptual drainage plans in Appendix A for details.

4.2.1 Bio-retention Basin

Bio-retention basins are densely vegetated filtration devices, where runoff (for small/frequent storm events) enters the basin and is filtered through a filter media layer (e.g. sandy loam) as it percolates downwards. Bio-retention basins often have an extended detention volume above the filter media which increases the volume of runoff treated through the system. The runoff is treated as it passes through the system through fine filtration, absorption, and some biological uptake. Refer to Figure 4.1 below showing a typical cross section of a bio-retention basin.

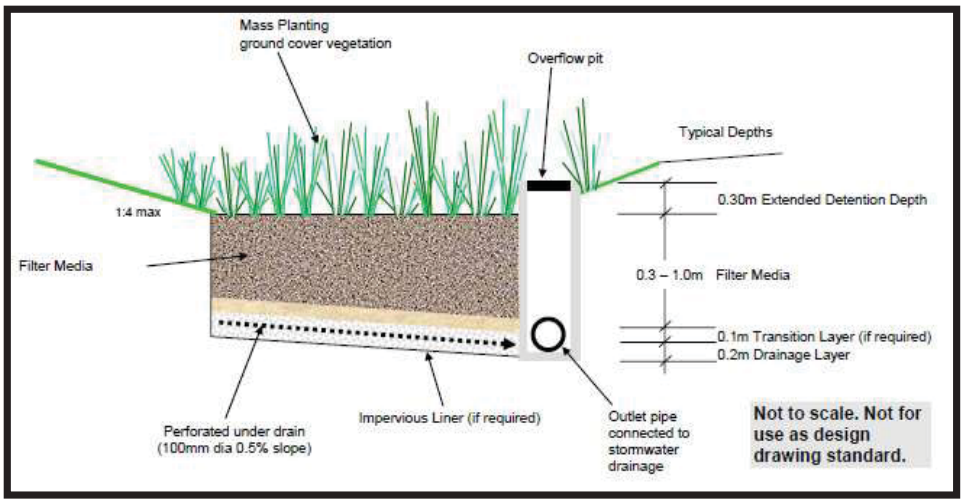


Figure 4.1 Typical cross section of a bio-retention basin

4.3 MUSIC Modelling

MUSIC (Version 6.2, eWater), a pollutant export modelling program has been used to model both the expected pollutant loads generated by the development and the effectiveness of WSUD treatment options selected.

4.3.1 Split Catchment Approach

The MUSIC model is based on a split catchment approach, modeled as various catchments representing the different surface types in accordance with the guidelines and available site information. Split catchment surface information can be found in Table 4.2 below (taken from the guidelines).

Surface Type	% Imperviousness
Roof	100%
Driveway	90%
Roof Terrace	50%*

Table 4.2 Adopted % Imperviousness - *based on relative pervious to impervious fraction

Table 4.3 lists the total areas for each surface type per catchment that were used in the model. The total area is the proposed total extent of the developed area.

Node	Area (ha)
Roofs	0.2010
Driveway	0.1000
Roof Terrace	0.0985
Bypass	0.0124
Total Area	0.4119

Table 4.3 Surface Area of Nodes

4.3.2 MUSIC Meteorological Data

Nambour DPI (Station 40282) meteorological data was selected for the MUSIC analysis. The 10-year climate period was selected in accordance with Table 3.1 of the guidelines. The rainfall and evapo-transpiration data for the period of 01/01/1989 to 31/12/1998, with a 6-minute time step was used in the model.

Input parameters for the rainfall-runoff, source nodes and treatment devices were also obtained from the guidelines. The following parameters were selected based on an urban residential development.

4.3.3 Rainfall-Runoff Parameters

The rainfall-runoff parameters listed in Table 3.7 of MUSIC guidelines were used in the model. The parameters recommended by the guideline are as shown in Table 4.4 below.

PARAMETER	RESIDENTIAL
Rainfall threshold (mm)	1
Soil storage capacity (mm)	500
Initial storage (% capacity)	10
Field capacity (mm)	200
Infiltration capacity Coefficient a	211
Infiltration capacity Exponent b	5.0
Initial depth (mm)	50
Daily recharge rate (%)	28
Daily baseflow rate (%)	27
Daily deep seepage rate (%)	0

Table 4.4 Recommended rainfall-runoff parameters

4.3.4 MUSIC Pollutant Export Parameters for Split Catchment Land Use

Flow Type	Surface Type	TSS log^{10} values		TP log^{10} values		TN log^{10} values	
		Mean	St. dev.	Mean	St. dev.	Mean	St. dev.
Baseflow parameters	Roof	N/A	N/A	N/A	N/A	N/A	N/A
	Roads	1.00	0.34	-0.97	0.31	0.20	0.20
	Ground Level	1.00	0.34	-0.97	0.31	0.20	0.20
Stormflow Parameters	Roof	1.30	0.39	-0.89	0.31	0.26	0.23
	Roads	2.43	0.39	-0.30	0.31	0.26	0.23
	Ground Level	2.18	0.39	-0.47	0.31	0.26	0.23

Table 4.5 MUSIC Export Parameters for Split Catchment Land Use

4.3.5 MUSIC Treatment Node Parameters

Bioretention Basins

Figure 4.2 below show the parameters for the bioretention basin.

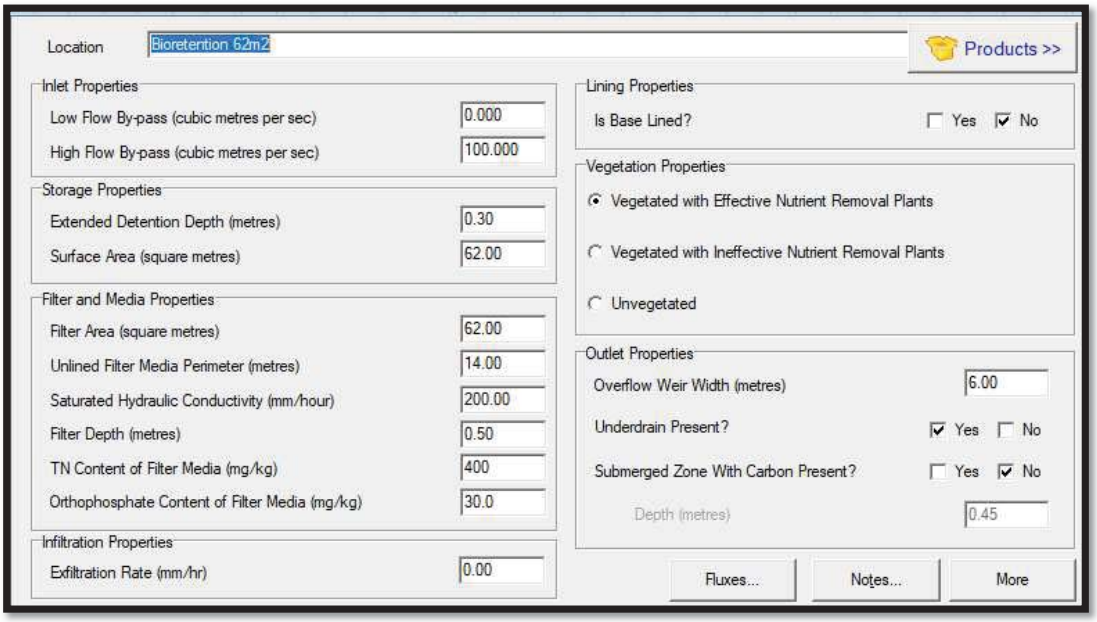
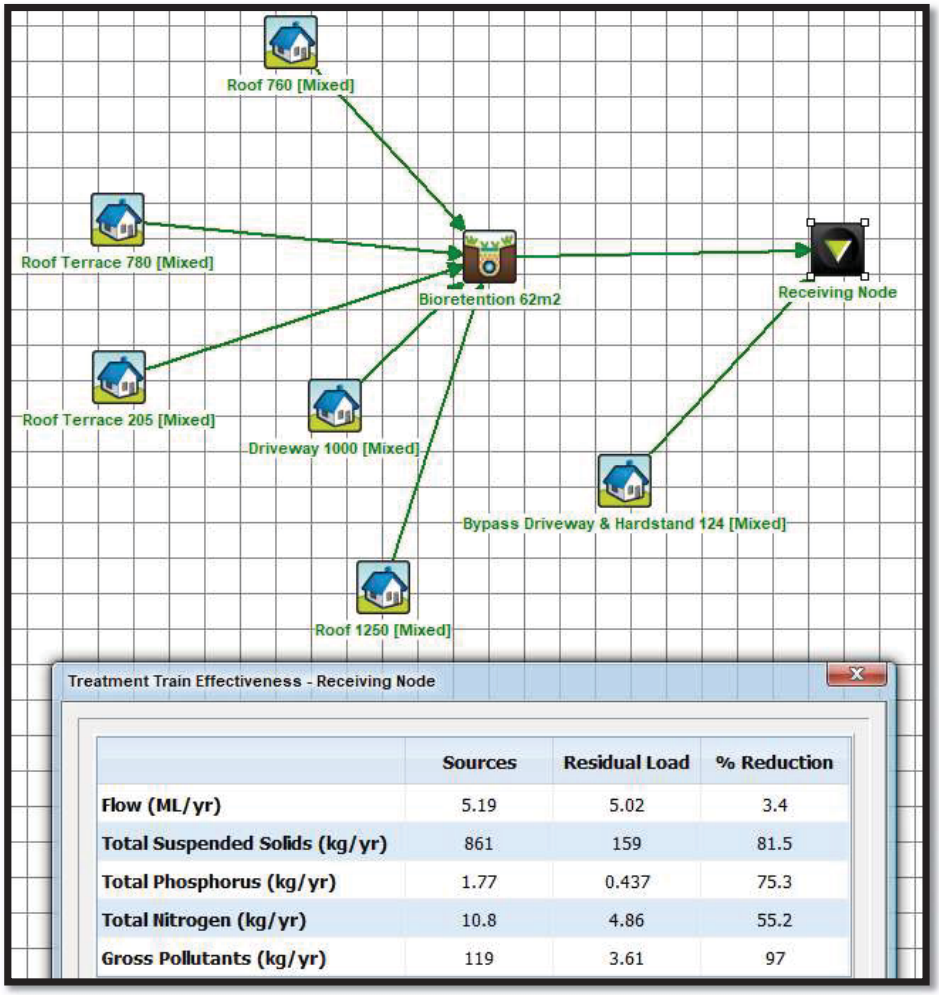


Figure 4.2 Bioretention basin node

4.3.6 MUSIC Model Results

Figure 4.3 shows the MUSIC model treatment train layout and results from the proposed stormwater quality improvement device (SQID). The results as shown below were generated using the stochastic option as per the guidelines.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	5.19	5.02	3.4
Total Suspended Solids (kg/yr)	861	159	81.5
Total Phosphorus (kg/yr)	1.77	0.437	75.3
Total Nitrogen (kg/yr)	10.8	4.86	55.2
Gross Pollutants (kg/yr)	119	3.61	97

Figure 4.3 MUSIC model results

All load-based pollutant reduction efficiencies are met in accordance with the Table A in Appendix 2: Stormwater Management Design Objectives, Part G, SPP (2017) included in Appendix B.

5.0 STORMWATER QUANTITY MANAGEMENT

5.1 SUMMARY

In accordance with Section 3.0 of the Maroochydore City Centre Priority Development Area (Development Scheme) the development is provided with the capacity for stormwater discharge. Minor flows from the development will be conveyed to the existing stormwater network adjacent the site.

The site is provided with four existing stormwater pits surrounding the site. The stormwater pits and pipes were built to service the Maroochydore City Centre in its developed state. Post-developed stormwater flows from the development will flow un-mitigated to the existing stormwater pits provided around the site. The bio-retention basins proposed for stormwater quality treatment, will provide some stormwater mitigation. Please refer Appendix A for the proposed connection to the existing stormwater drainage network.

5.2 LAWFUL POINT OF DISCHARGE

The lawful point of discharge will be the existing stormwater pit and pipe network surrounding the site in compliance with Section 3.4 of QUDM (2017). This lawful point of discharge meets the criteria in accordance with QUDM 2017, as post-developed site discharge ensures effective non-worsening of post-developed flows to adjacent and downstream properties.

6.0 FLOODING

The site is subject to Current and Future Climate Riverine Flooding as defined by the Sunshine Coast Council Development-i Site Report. Figure 6.1 below outlines the extent of the mapped flood extent with respect to the subject site.

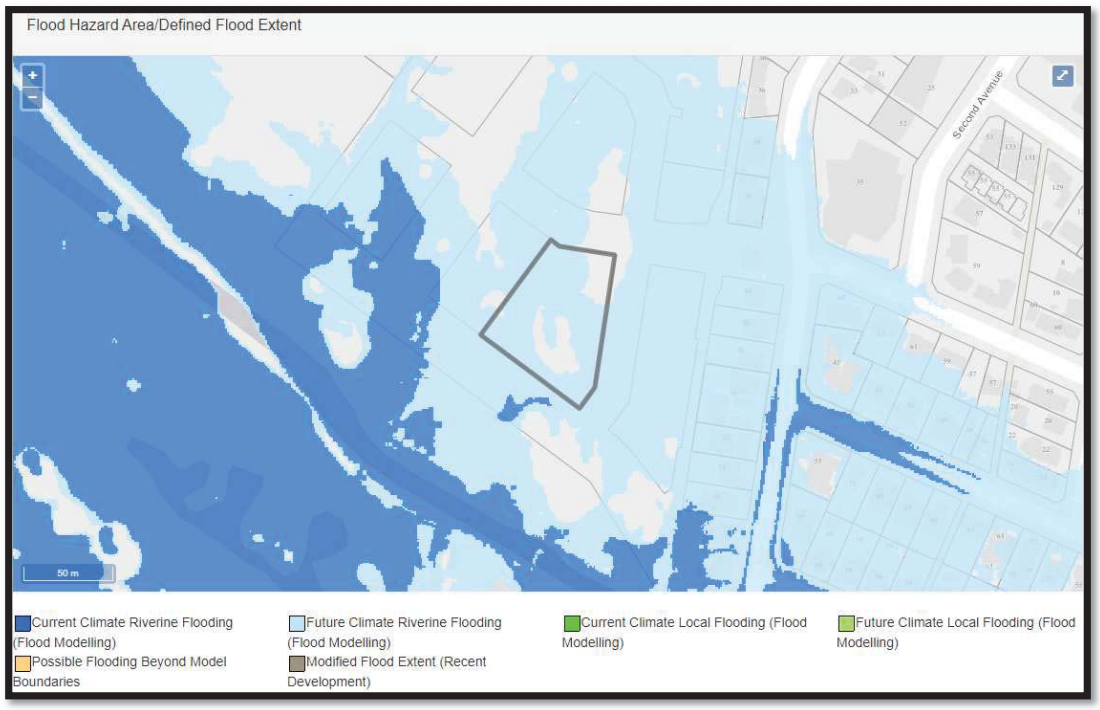


Figure 6.1 Defined Flood Extent (Source: SCC Flood Extent: 6 May 2020)

Peak flood levels during the 1% AEP (at the year 2100) are outlined in the Flood Information Search dated 28 April 2020 included in Appendix C, where the local drainage flood level is 3.30 m AHD, and the regional flood level is 2.92m AHD.

The proposed ground floor levels will be at a minimum RL 3.60m AHD (local drainage + 300mm), which also provides more than 500mm of free-board above the regional flood level. Minimum finished floor level (RL 3.60 m AHD) is also proposed to provide freeboard around ground floor penetrations, opening to levels below the FFL (eg. Envac, lifts). Site survey shows existing surface levels at the site boundary (Refer to drawing 2014-P06) are above the local drainage flood level, thus during local and regional flood events up to the 1% AEP (at year 2100), flood waters do not enter the site.

The proposed development is anticipated to have no adverse impact with regard to flooding and drainage upstream or downstream of the site.

7.0 CONCLUSION

This site-based stormwater management plan has reviewed the proposed development at Future Way, Maroochydore, Queensland.

Based on this assessment the following conclusions have been made:

- The total bio-retention filter area complies with the requirements of and will treat post-developed stormwater flows from the site in accordance with the Qld SPP (2017), and confirmed with MUSIC modelling.
- Post-developed stormwater will flow generally un-mitigated to the existing stormwater network built to service the Maroochydore City Centre in its developed state. The bio-retention basin will provide some nominal detention of minor flows.
- Proposed FFL for the ground floor level will be at RL 3.60m AHD (minimum), which provides 300mm freeboard above the local drainage flood (at year 2100), and greater than 500mm freeboard above the regional flood (at year 2100).

In summary, quality of stormwater leaving the site will satisfy the water quality measures specified in the Qld SPP (2017). Furthermore, the development of the site will result in effective non-worsening of stormwater runoff quantities to adjacent and downstream properties. All stormwater will be discharged to a Lawful Point of Discharge being the existing pit and pipe network surrounding the site.

8.0 LIMITATIONS OF THIS REPORT

This Site Based Stormwater Management Plan (SBSMP) has been tailored to report on issues in the areas of interest, as detailed above. The information in this report is not to be used outside of the subject area.

We consider that this SBSMP accurately considers conditions at the area of interest at the time the SBSMP was developed and based on information supplied to us by second and third parties. This SBSMP is to be reviewed, if site conditions change in the future.

This SBSMP has been undertaken for the specific purposes of Habitat Development Group Pty Ltd, as detailed in our correspondence to them, and is solely for their use.

This SBSMP should only be used in full and may not be used to support objectives other than those set out herein, except where written approval, with comments, are provided by Barlow Shelley Consulting Engineers.

Barlow Shelley Consulting Engineers accept no liability with respect to the accuracy of information supplied by second and third parties.

9.0 REFERENCES

Department of Infrastructure, Local Government and Planning (July 2017), *State Planning Policy*, DILGP, Brisbane.

Institute of Public Works Engineering Australasia, Queensland (2017), Queensland Urban Drainage Manual – Fourth Edition, IPWEAQ, Queensland Division, Brisbane.

10.0 CLOSURE

Should further information or clarification be required please contact:

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For and behalf of;
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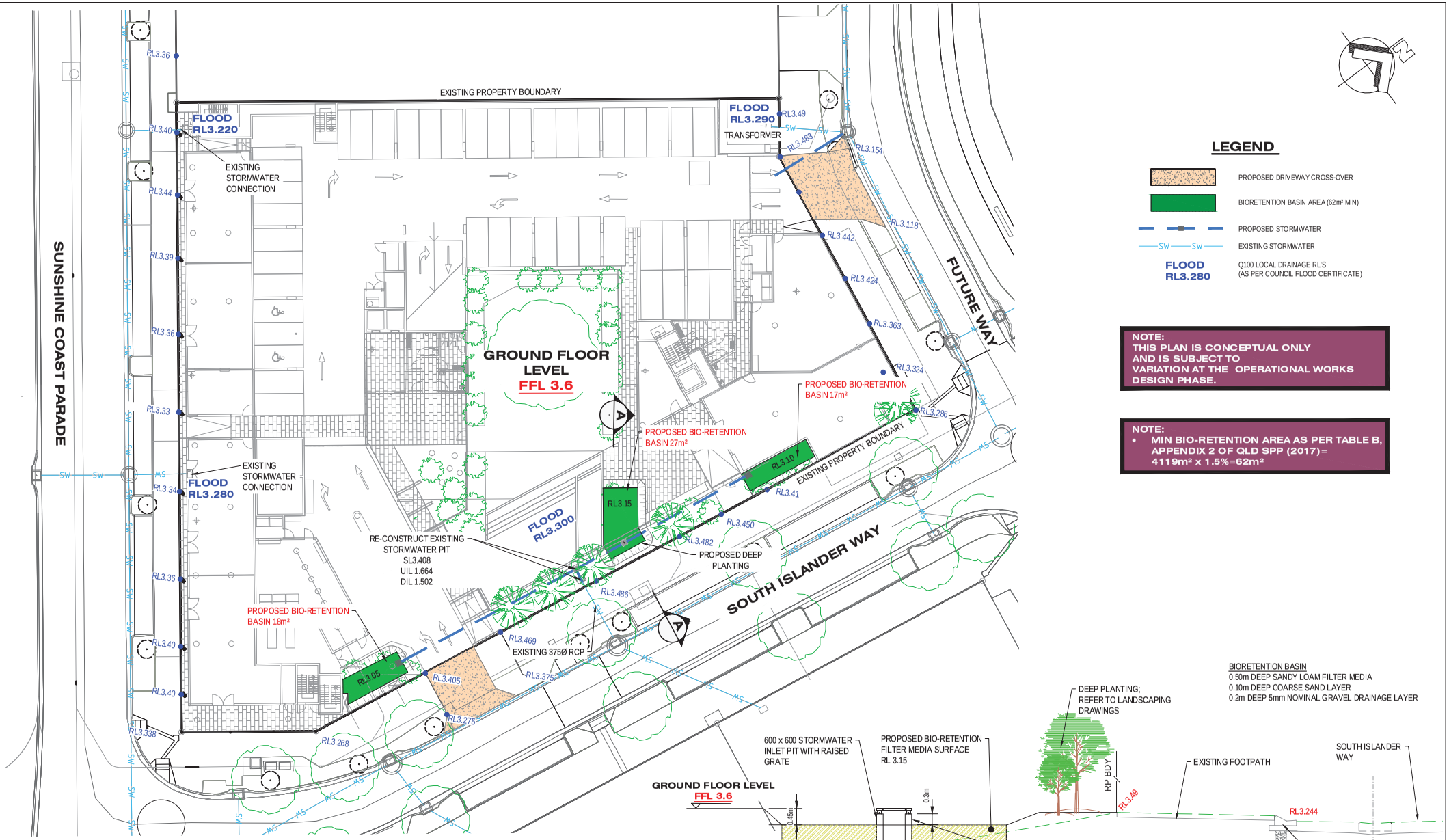
Conceptual Drainage Plans

- Drawings by Barlow Shelley Consulting Engineers



LEGEND

- PROPOSED DRIVEWAY CROSS-OVER
- BIORETENTION BASIN AREA (62m² MIN)
- PROPOSED STORMWATER
- SW — SW EXISTING STORMWATER
- FLOOD RL3.280 Q100 LOCAL DRAINAGE RL'S (AS PER COUNCIL FLOOD CERTIFICATE)

NOTE:
THIS PLAN IS CONCEPTUAL ONLY AND IS SUBJECT TO VARIATION AT THE OPERATIONAL WORKS DESIGN PHASE.

NOTE:
- MIN BIO-RETENTION AREA AS PER TABLE B, APPENDIX 2 OF QLD SPP (2017)= 4119m² x 1.5%=62m²

A SECTION A
1:100 (A3)

BIORETENTION TYPICAL SECTION

REV	DATE	DESCRIPTION	BY	CHKD
A	14.05.20	ISSUE FOR APPROVAL	MB	TS
B	05-11-20	TO SUIT NEW ARCHITECTURAL DRAWINGS	LN	TS
C	01-12-2020	BIO-RETENTION BASINS ADDED IN STAGE 1 & 2	LN	TS

DRAWING DETAILS

DATUM	AHD
DESIGN	MB
DRAWN	MB
DESIGN CHECK	TS
DATE	14.05.20

SCALE
0 4 8 12 16 20m
SCALE 1:400 A3

APPROVED
Director: TONY SHELLEY
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DRAWING STATUS
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PROJECT:
PROPOSED MULTI STOREY DEVELOPMENT (THE CORSO)
FUTURE WAY, MAROOCHYDORE
FOR HABITAT DEVELOPMENT GROUP

JOB NUMBER: 2014
SHEET: 6 OF 7

DRAWING TITLE:
STORMWATER MANAGEMENT PLAN
GROUND FLOOR - SHEET 1 OF 2

DRAWING NUMBER: P06
REV: C

Appendix

B

Stormwater Quality Objectives – Construction Phase

- SPP (2017), Part G, Appendix 2, Table A & B. Department of Infrastructure, Local Government & Planning (DILGP).

- Healthy Waterways Guidelines for Building Sites

Appendix 2 – Stormwater management design objectives

Table A: Construction phase – stormwater management design objectives

Application:

- Applies to all climatic regions.

Part 1 Construction phase – stormwater management design objectives[12]

Issue	Desired outcomes
Drainage control	1. Manage stormwater flows around or through areas of exposed soil to avoid contamination. 2. Manage sheet flows in order to avoid or minimise the generation of rill or gully erosion. 3. Provide stable concentrated flow paths to achieve the construction phase stormwater management design objectives for temporary drainage works (part 2). 4. Provide emergency spillways for sediment basins to achieve the construction phase stormwater management design objectives for emergency spillways on temporary sediment basins (part 3).
Erosion control	1. Stage clearing and construction works to minimise the area of exposed soil at any one time. 2. Effectively cover or stabilise exposed soils prior to predicted rainfall. 3. Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces must be effectively stabilised[13] using methods which will achieve effective short-term stabilisation.
Sediment control	1. Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk. 2. All exposed areas greater than 2500 metres^2 must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).
Litter, hydrocarbons and other contaminants	1. Remove gross pollutants and litter. 2. Avoid the release of oil or visible sheen to released waters. 3. Dispose of waste containing contaminants at authorised facilities.
Waterway stability and flood flow management	1. Where measures are required to meet post-construction waterway stability objectives (specified in table B), these are either installed prior to land disturbance and are integrated with erosion and sediment controls, or equivalent alternative measures are implemented during construction. 2. Earthworks and the implementation of erosion and sediment controls are undertaken in ways which ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction for all events up to and including the 1 in 100 year ARI (1% AEP).

[12] Note: Drainage, erosion and sediment controls should be appropriate to the risk posed by the activity for the relevant climatic region e.g. considering the potential soil loss rate, monthly erosivity or average monthly rainfall.

[13] Note: An effectively stabilised surface is defined as one that does not, or is not likely to result in visible evidence of soil loss caused by sheet, rill or gully erosion or lead to sedimentation water contamination.

Part 2: Construction phase – stormwater management design objectives for temporary drainage works

Temporary drainage works	Anticipated operation design life and minimum design storm event		
	‹ 12 months	12–24 months	› 24 months
Drainage structure	1 in 2 year ARI/39% AEP	1 in 5 year ARI/18% AEP	1 in 10 year ARI/10% AEP
Where located immediately up-slope of an occupied property that would be adversely affected by the failure or overtopping of the structure		1 in 10 year ARI/10% AEP	
Culvert crossing		1 in 1 year ARI/63% AEP	

Part 3: Construction phase – stormwater management design objectives for emergency spillways on temporary sediment basins

Drainage structure	Anticipated operation design life and minimum design storm event		
	‹ 3 months	3–12 months	› 12 months
Emergency spillways on temporary sediment basins	1 in 10 year ARI/10% AEP	1 in 20 year ARI/5% AEP	1 in 50 year ARI/2% AEP

Note: Refer to IECA 2008 Best Practice Erosion and Sediment Control (as amended) for details on the application of the Construction Phase requirements. Advice should be obtained from a suitably qualified person e.g. Certified Practitioner in Erosion and Sediment Control, or Registered Professional Engineer Queensland, with appropriate knowledge and experience in erosion and sediment control design and implementation.

Table B: Post construction phase – stormwater management design objectives

Application:

(1) A material change of use for an urban purpose that involves premises 2500 metres^2 or greater in size and:

(a) will result in six or more dwellings; or

(b) an impervious area greater than 25 per cent of the net developable area.

(2) Reconfiguring a lot for urban purposes that involves premises 2500 metres^2 or greater in size and will result in six or more lots.

Climatic region	Design objectives Reductions in mean annual load from unmitigated development (%)				
	Total suspended solids (TSS)	Total phosphorus (TP)	Total nitrogen (TN)	Gross pollutants >5mm	Waterway stability management
South East Queensland	80	60	45	90	Limit the peak 1-year ARI event discharge within the receiving waterway to the pre-development peak 1-year ARI discharge
Central Queensland (south)	85	60	45	90	
Central Queensland (north)	75	60	40[15]	90	
Cape York[14], wet tropics and dry tropics	80	60[16]	40	90	
Western Queensland[14]	85	60	45	90	

Notes:

- Mapping of climatic regions is available on the State Planning Policy Interactive Mapping System.
- In lieu of modelling, the default bio-retention treatment area to comply with load reduction targets for all Queensland regions in 1.5 per cent of the contributing catchment area.
- Water stability objective applies if development drains to an unlined waterway within or downstream of the site where a risk of increased erosion exists due to changes in hydrology. Local government may also require application of the waterway stability objective where there are planned future rehabilitation works to return a lined channel to a natural channel design.
- The SPP Water quality guidance material provides advice on the measures that demonstrate compliance with table B.

[14] Note: Applies to population centres greater than 25,000 persons.
[15] Note: Mackay Regional Council has adopted a 35 per cent reduction for TN.
[16] Note: Townsville City Council has adopted a 65 per cent reduction for TP.

Controlling stormwater pollution on your building site

HEALTHY WATERWAYS
Because we're all in the same boat

Contents

Erosion and sediment control daily site check list

An erosion and sediment control check list has been developed to assist builders and site supervisors managing the task of control measure maintenance.

For further information on erosion and sediment control, contact your local council.

LEGEND

✓ – Best practice

✗ – Not best practice

Introduction

These guidelines provide a practical guide to best practice techniques to minimise stormwater pollution from building sites. They are designed to help people involved in the building industry comply with their statutory environmental duties and avoid large fines.

The following fact sheets provide practical examples of recommended control measures. Included is an easy-to-follow daily site checklist to guide site supervisors.

- Erosion and sediment control daily site check list
- Erosion and sediment control on residential building sites
- Erosion control
- Sediment control
- Drainage control
- Building operations
- Storage of materials on hard surfaces
- Grouped building lots
- Erosion and Sediment Control Management Plans

BEST PRACTICE

Best practice is the management of an activity to ensure environmental harm is minimised using cost-effective measures. These practices are assessed against national and international standards.

SAVE MONEY TIME AND ENERGY

Some of the benefits to home owners, builders and the building industry include:

- all-weather site access
- improved wet weather working conditions
- sites do not get boggy
- less mud and dust problems
- reduced stockpile losses
- reduced clean-up costs
- a better public image
- more marketable sites
- fewer public complaints
- reduced risk of fines
- better fishing for everyone
- healthier waterways.

National and international experience shows that the cost of effective pollution management on building sites is greatly reduced within the first few years as builders become experienced with the various techniques.

What are the impacts? SEE FACT SHEET 2

Soil, sediment and litter from building sites can be major sources of stormwater pollution, and can cause:

- negative impacts on recreational fishing and the seafood industry
- sediment build-up within waterways which can lead to weed growth
- loss of valuable topsoil
- significant public safety problems when washed onto roads and intersections
- blocked drains and water sensitive urban design features leading to flooding and increased maintenance costs to the community
- significant harm to the environment of freshwater and marine systems through the loss of valuable seagrass habitat for marine creatures
- public health issues from increased algal blooms
- reduced recreational opportunities due to increased turbidity

Mud and dirt on road after rain due to poor on-site erosion and sediment control

Sediment moving out of Moreton Bay into the ocean through Jumpinpin

Erosion and sediment control on residential building sites SEE FACT SHEET 2

Principles of effective stormwater pollution control include:

- sensible site planning
- diversion of up-slope water (where appropriate)
- stabilised site entry/exit point
- minimisation of site disturbance and duration of disturbance
- installation of sediment controls along the lower edge of the site
- appropriate location and protection of stockpiles
- early connection of roofwater downpipes
- trap on-site run-off from tool, paint and concrete washing and brick, tile and concrete cutting
- continual monitoring and maintenance of all control measures
- compaction of backfilled trenches
- revegetation and stabilisation of the site
- development and implementation of Erosion and Sediment Control Management Plans when appropriate.

Control measures in place on a residential building site

SITE PLANNING

When planning the site layout, building location and earthworks, it is possible to minimise the number of control devices needed for the sediment control zone, and their interference with the building process, with a little forward thinking. Suggestions are to:

- minimise the reshaping of the land
- direct stormwater to flow around the building area and any unstable batters
- allow room for a sediment barrier, eg. sediment fence, to be located along the lower side of the disturbance
- design the home to suit the property type, eg. construct pole homes on steep properties
- avoid the permanent use of long, steep and unstable driveways
- avoid the use of exposed aggregate concrete surfaces in areas where the wash-off cannot be contained.

Good site planning

Poor site planning – stockpile over sediment fence, materials and toilet stored outside building site

Sediment Control Zone

The sediment control zone is any area of land disturbance which has potential for the erosion of sediments. This area should be protected by a downslope sediment control measure or device.

Environmental law SEE FACT SHEET 2

The *Environmental Protection Act 1994*, *Environmental Protection (Water) Policy 1997* and the *Integrated Planning Act 1997* are important pieces of legislation that control the way in which soil erosion and sediment are required to be dealt with on building and development sites.

PENALTIES

Breaches of the *Environmental Protection (Water) Policy 1997* may result in:

- on-the-spot fines under the *Environmental Protection (Water) Policy 1997* (ranging from $300 to $600)
- prosecutions under the *Integrated Planning Act 1997* or the *Environmental Protection Act 1994* (fines of thousands of dollars or prison sentences for serious offences)
- the prosecution of individuals and/or companies.

Council officer explaining the Environmental Protection (Water) Policy 1997

Erosion controls

SEE FACT SHEET 3

MINIMISE DISTURBANCE

- Earthworks should be kept to a minimum, and should only be commenced immediately prior to building works.
- Maintain as much soil coverage as possible with the use of grass, leaf litter and mulch, gravel or erosion control blanket (ECB) or matting.
- Vegetation located down-slope of the work site assists in filtering out sediment. Where practicable, maintain kerb vegetation such as grass and turf strips in a healthy state during the building process.

Stockpiles without protection

STOCKPILES

- Stockpiles and building materials should not be stored on the footpath or within the road reserve. Permission must be obtained from your Council to store materials in these areas otherwise fines may be imposed.
- Minimise stockpile losses with the use of covers.
- All stockpiles and building materials should be located within the sediment control zone, for example up-slope of a sediment fence.
- Stockpiles must not be located within an overland flow path.

SERVICE TRENCHES

Backfill service trenches, cap with topsoil, and compact to a level at least 75-100 mm above the adjoining ground level (either manually or with a small machine). This allows for some subsidence of the fill material, and ensures the fill is sufficiently compacted to avoid erosion at a later time. (Note that trenches must be backfilled in accordance with AS3500).

EROSION CONTROL BLANKETS OR MATTING

Erosion control blankets or matting can be used to minimise soil erosion and stormwater pollution from sites by:

- containing high erosion risk soils
- stabilising steep slopes.

Rehabilitate the site promptly to reduce the chances of further erosion

SITE REHABILITATION

All areas disturbed by building activities should be promptly and progressively stabilised, using techniques such as revegetation and landscaping, so they no longer act as sources of sediment.

MULCHING AND GARDEN BEDS

To minimise soil loss, mulch should be applied to open garden beds at a depth of 75-100 mm.

This will assist in plant establishment, minimise water loss and help to control weeds.

Ensure that mulch is stabilised on unstable slopes (e.g. batters and riparian areas) to avoid it washing away and ultimately entering waterways.

Sediment control

SEE FACT SHEET 4

STABILISED ENTRY/EXIT POINT (RUMBLE PAD)

Stabilised gravel entry/exit point (rumble pad)

- Manage entry/exit point (rumble pad) so that sediment is not tracked off the site.
- Restrict site access to one stabilised location.
- Recommended construction method for stabilising access points is a 150-200 mm deep pad of minimum 40 mm crushed rock.
- The pad should be at least 2 metres wide and extend from the kerb to the building slab.
- Where the entry/exit pad slopes towards the road, a 200 mm high bund (hump) should be installed across the pad to deflect stormwater run-off to the side where it can be filtered by a sediment fence.

Note: The location of the permanent driveway may not be an appropriate location for the construction entrance.

SEDIMENT BARRIERS/FENCES

Sediment fence

- Install sediment barriers along the lower side of the soil disturbance.
- The most efficient sediment barrier for building sites is specially-manufactured geotextile sediment fencing.
- Sediment fences on building sites are usually wire-tied to steel or hardwood posts (wire-tied sediment fences have the advantage of being more readily unhooked from their support posts).
- The support posts are spaced no greater than 2 metres apart and the sediment fence buried to a depth of 200 mm.
- For public safety and sediment control efficiency, sediment barriers should not be located outside property boundaries without Council approval.
- Sediment barriers should only be placed on the road as a last resort.
- Sediment barriers placed in front of roadside stormwater inlets are rarely as effective as onsite controls and at best usually result in the sediment being washed down the street and into the nearest open gully inlet.
- Only use proper geotextile sediment fence fabric. Don't use filter cloth or shade cloth.

USE OF SIGNS

Public signs that warn of the need for proper sediment control devices and maintenance are becoming more widely used. Contact your council for further information.

Sediment control information signage

MAINTENANCE OF CONTROL MEASURES

All erosion, sediment and drainage control measures need to be regularly checked and maintained in good working order. Best practice includes anticipation of potential risks and being prepared for abnormal circumstances and emergencies. These measures include:

- Stockpile extra sediment fence fabric and posts on-site to facilitate emergency repairs.
- Reapply crushed rock to the entry/exit pad (rumble pad) when sediment build-up occurs.
- Repair eroded drainage channels with rock, turf or erosion control blankets or matting.
- Ensure built-up sediment is removed at regular intervals from sediment barriers.
- Check and replace/repair sediment barriers daily if they are ripped, damaged or no longer anchored.

All measures require regular inspection

Excessive sediment deposits must be removed from entry/exit point (rumble pad) and additional crushed rock applied

Drainage control

SEE FACT SHEET 5

DIVERSION OF UP-SLOPE WATER

- Where practicable, divert up-slope water around the disturbed area.
- Stormwater can be diverted with the use of small turf or geotextile lined catch drains, or with the use of diversion banks.
- Diverted stormwater should be discharged onto stable ground (for example turfed areas) and should not be diverted into neighbouring properties unless written permission is obtained from the land owner(s).

Temporary roof water connection

EARLY ROOF WATER CONNECTION

- Temporary or permanent downpipes should be installed as soon as practicable after the roof is laid.
- Early connection of roof water to the stormwater system will reduce site wetness and the generation of on-site mud. This has been shown to reduce downtime following storm events and decrease the average building construction time.

Building operations

SEE FACT SHEET 6

Prior to commencing building work

- Obtain all necessary permits, licences and approvals.
- Prepare a site specific Erosion and Sediment Control (ESC) Management Plan and have all necessary ESC materials available.
- Avoid clearing vegetation and excavating until ready to build.
- Where necessary in new estates, temporary revegetation may be required.

Points to consider as part of building operations

- Tool and paint washing, brick, tile or masonry cutting and water-cooled cutting activities should be done within the property boundaries.
- All waste water should be contained on-site where possible.
- Activities should be carried out on a permeable surface or up-slope of an infiltration trench.
- Vehicles should not be parked on the footpath area or verge where they can damage essential vegetation and transport dirt onto the road.
- Contain waste concrete washed from trucks, mixers and barrows on site; do not wash out into stormwater systems as this can clog drains and cause flooding during storm events.

LITTER AND BUILDING WASTE

All hard waste should be stored on-site in a way that prevents material loss caused by wind or water. Smaller materials such as litter should be contained in covered bins or litter traps formed on three sides by a geotextile wind break or similar device.

When travelling to and from the site, secure load to prevent wind blown litter polluting our waterways and roadsides.

One way to properly store building waste

Poor litter and building waste storage

SITE CLEAN-UP

Remove accidental spills of soil or other materials from the road, gutter or any location outside the control of the primary sediment barrier:

- immediately if it is raining or likely to rain during the day
- at least upon completion of the day's work (even if rainfall is unlikely during the night)
- use a broom and shovel instead of hosing to clean hard surfaces.
- clean up food packaging after meal breaks as this litter can enter stormwater systems and waterways.

Following storms, the road reserve and sediment barriers should be inspected and excess sediment residue removed.

Undertake regular site clean-ups

CONCRETE MIXER CLEAN-UP

Fully contain concrete waste washed from trucks and mixer units on-site and store where it cannot be washed from the site, harming the environment.

EXPOSED AGGREGATE CONCRETE SURFACES

- Builders need to demonstrate how they intend to prepare exposed aggregate surfaces without allowing cement residue to flow into stormwater drains or waterways.
- Where practicable, wash cement residue onto pervious surfaces or fully contain it within temporary sediment dams created from tightly stacked sand bags.
- When suitably dry, shovel cement residue into a waste disposal bin.
- At no time should cement residue or wastewater run-off enter the roadside gutter.

This may make it impractical on some sites for exposed aggregate driveways to be constructed. In such cases, an alternative driveway finish must be used.

Storage of materials on hard surfaces

SEE FACT SHEET 7

Whenever possible, materials should be stockpiled within the sediment control zone and, where necessary, covered with waterproof sheeting to minimise the potential for transport of sediments in stormwater.

Materials may be temporarily stored on hard surfaces only where it is necessary to place erodible material on hard surfaces to undertake work and no other reasonable options are available.

Don't store stockpiles on hard surfaces without suitable protection

Grouped building lots

SEE FACT SHEET 8

When one builder controls more than one building lot, combined-lot sediment control structures may be placed down-slope if:

- the combined sediment control measures provide a level of protection at least equal to that provided by individual lot protection
- The builder accepts responsibility for the ongoing monitoring and maintenance of sediment control devices
- suitable drainage and erosion control measures are applied to each building lot
- a suitable sign is placed in a prominent location outside each lot and/or at the entrance of the estate indicating such controls are in place.

Erosion and Sediment Control Management Plans

SEE FACT SHEET 9

Where appropriate, discuss the submission of a management plan with the appropriate building control body. These plans need to communicate to all - builders, subcontractors, private certifiers, home owners and regulators involved in the building – how stormwater pollution will be controlled on the site.

EROSION AND SEDIMENT CONTROL INSTALLATION SEQUENCE

1. Establish a single stabilised entry/exit point (rumble pad).
2. Install sediment fence(s) along the low side of the site.
3. Divert up-slope water around the work site and appropriately stabilise any drainage channels.
4. Clear only the areas necessary (maintaining vegetation on footpath).
5. Stockpile topsoil within the sediment control zone.
6. Stabilise exposed earth banks (for example, with vegetation or erosion control blankets).
7. Install on-site waste receptacles (mini-skips, bins, wind-proof litter receptors).
8. Install roof downpipes as soon as practicable after the roof is laid.
9. Ensure that all control measures are maintained in good working order.
10. Revegetate or otherwise stabilise the site.

- *Stockpile is located behind the sediment fence*
- *Good site planning*
- *Turf strip well maintained*
- *Sediment fence well constructed and in correct location*

- *Stockpile has not been placed behind the sediment fence*
- *Building waste and litter has not been placed in the skip*
- *Poor site planning and management*

Note: Diagrams and selected photos courtesy of Catchments & Creeks Pty Ltd.

SUPPORTED BY

Gold Coast City Council

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Appendix C

Flood Information Search

Sunshine Coast COUNCIL

Request Type

☐ Self Assessable Dwelling

☒ All Other

Flood Information Search

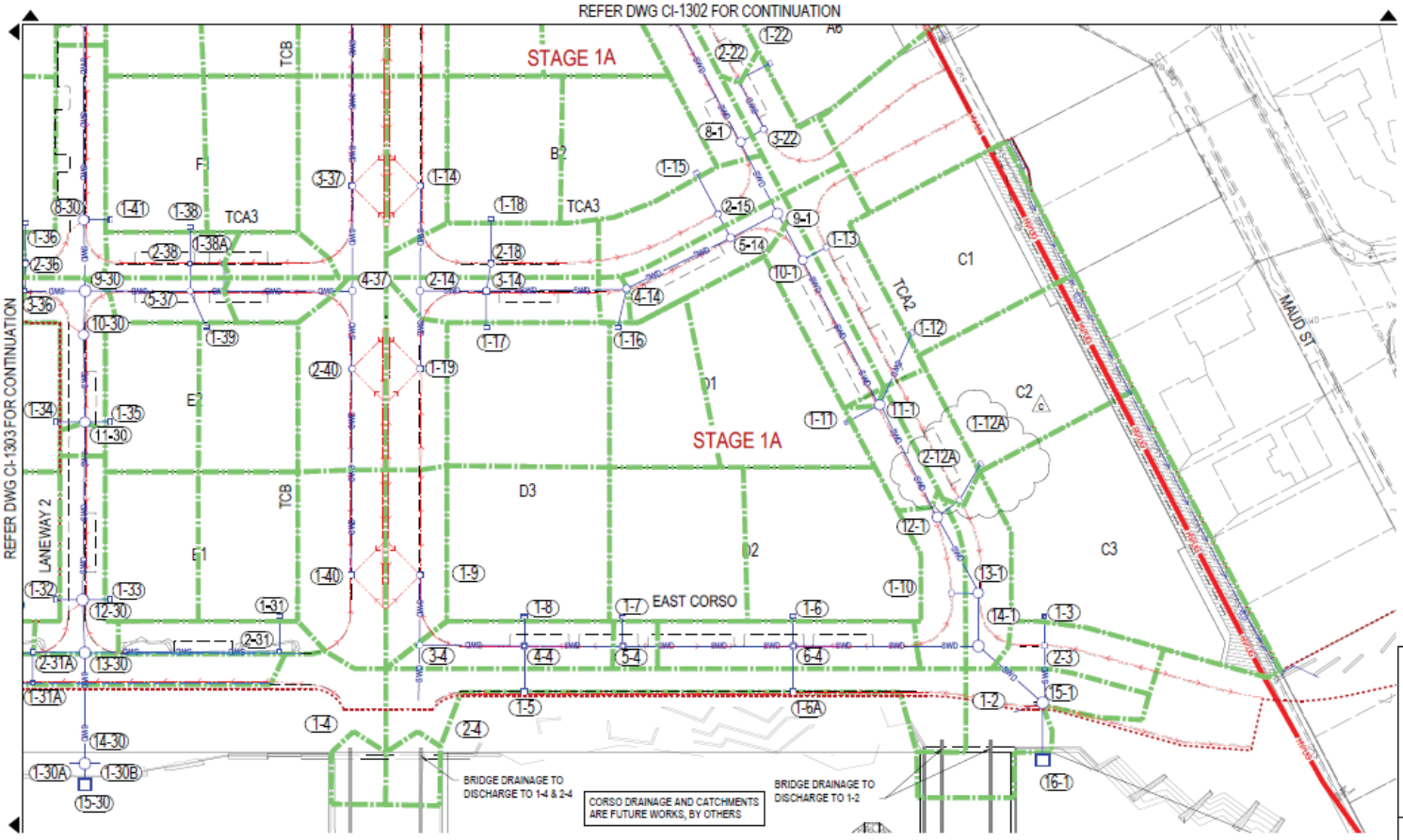
This search is issued in response to an information request for a property which is located within the geographical boundaries of Sunshine Coast Council.

Applicant's Name	Heather Maree Bradbury	**Issue Date**	28 April 2020
Applicant's Address	52 Waterhole Pl BLI BLI QLD 4560	**Land Number**	1523427
		Property Description	Lot 20 SP 305311
		Address	South Sea Islander Way MAROOCHYDORE QLD 4558
		Our Reference	Cer20/04633
Email Address	office@barlowshelley.com.au	**Issuing Officer**	db042
		Your Reference	

ENQUIRY DATE:	21/04/2020
REGISTERED OWNER(S) NAME:	Sunshine Coast Regional Council
SOURCE OF INFORMATION:	Technical Memorandum – Maroochydore City Centre Stage 1 Local Flooding (Cardno, 29 October 2015)
THIS SEARCH IS VALID FOR 6 MONTHS FROM DATE OF ISSUE.	

Lot Identifier	Pit Identifier	1% AEP (at 2100) Peak Flood Level (m AHD)		Minimum Floor Level (mAHD)
		Local Drainage	Regional	
D1	1-11	3.30	2.92	3.60
D1	1-16	3.29	2.92	3.59
D2	1-6	3.28	2.92	3.58
D2	1-7	3.22	2.92	3.52

Figure 1. Property Boundary Relative to Council Flood Mapping



NOTE:
SPEL STORMSACK 200 MICRON LITTER BASKETS (OR APPROVED EQUIVALENT) ARE TO BE PROVIDED ON ALL FIELD & GULLY INLETS.

LEGEND:

- STORMWATER CATCHMENT BOUNDARY
- DRAINAGE SWALE
- STORMWATER PIPE AND MANHOLE/PIT
- (1-1) MANHOLE No. - LINE No.
- SUBSOIL DRAINAGE
- OVERLAND FLOW PATH EASEMENT
- STAGE BOUNDARY
- EXISTING UG HV ELECTRICAL

NOTES:

1. REFER TO DRAWINGS 249402-CI-CI-1311 TO 249402-CI-CI-1320 FOR STORMWATER DRAINAGE LONGITUDINAL SECTIONS.
2. CATCHMENT NAME IS SAME AS PIT NUMBER UNLESS OTHERWISE NOTED.
3. REFER TO DRAWING 249402-CI-CI-1341 TO 249402-CI-CI-1346 FOR STORMWATER DRAINAGE CALCULATIONS TABLE.
4. CONTRACTOR TO SURVEY STORMWATER LINES AT CONNECTION POINTS DURING SITE ESTABLISHMENT AND FORWARD TO ENGINEERS FOR ASSESSMENT PRIOR TO CONSTRUCTION.
5. CONTRACTOR TO SURVEY STORMWATER LINES AT FUTURE CONNECTION POINTS, AS THEY ARE BUILT AND SENT TO ENGINEERS ASAP.

PLAN
SCALE A1 - 1 : 500
A3 - 1 : 1000

5 0 5 10 15 20 25m
Scale 1:500

Rev.	Date	Description	Des.	Verif.	Appd.
C	14/06/2017	LINE 12A RENUMBERED	CK	DH	BK
B	13/06/2017	LOT C2/3 BDY & STORMWATER REVISED	CK	DH	BK
A	24/03/2017	ISSUED FOR CONSTRUCTION	CK	DH	BK

SunCentral Maroochydore

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Drawn	RM LC CK	Date 7/10/2015
Checked	DH	Date 7/10/2015
Designed	CK	Date 7/10/2015
Verified	RB	Date 7/10/2015
Approved		7884 DATE: 1/03/2017

Client: SUNCENTRAL MAROOCHYDORE PTY LTD
Project: MAROOCHYDORE CITY CENTRE
CIVIL WORKS - STAGE 1
Title: STORMWATER DRAINAGE PLAN - SHEET 4

Status: FOR CONSTRUCTION
DATUM: AHD | Orig. Date: 2/17/2016 | Scale: AS SHOWN | Size: A1
Drawing Number: 249402-CI-1304 | Revision: C

NOTES SPECIFIC TO THE FLOOD LEVELS QUOTED ON THIS SEARCH.
Please note that this is a large lot and the governing flood level is varied.

QUEENSLAND DEVELOPMENT CODE MANDATORY PART 3.5 REQUIREMENTS FOR SELF ASSESSABLE NEW CONSTRUCTION OF A DWELLING

MINIMUM DESIGN LEVEL - FLOODING REQUIREMENT FOR THE PURPOSES OF THE QDC MP 3.5 (2012) AND THE BUILDING REGULATIONS s13.1 (2006) THE LEVELS PROVIDED IN THIS TABLE FOR NEW BUILDINGS ARE A DECLARATION OF THE FINISHED FLOOR LEVEL REQUIREMENTS FOR CLASS 1 BUILDINGS BUILT IN ALL OR PART OF THE FLOOD HAZARD AREA	
MINIMUM DESIGN FLOOR LEVEL:	**Refer to table on Page 1 and attached figure for Pit and Lot ID locations**
SOURCE OF INFORMATION:	**Flood level data from Page 1**

MAXIMUM FLOW VELOCITY / INACTIVE OR BACKWATER AREA DECLARATION FOR THE PURPOSES OF THE QDC MP 3.5 (2012) AND THE BUILDING REGULATIONS s13.1 (2006) THE LEVELS PROVIDED IN THIS TABLE FOR NEW BUILDINGS ARE A DECLARATION OF THE FINISHED FLOOR LEVEL REQUIREMENTS FOR CLASS 1 BUILDINGS BUILT IN ALL OR PART OF THE FLOOD HAZARD AREA	
DEFINED FLOOD EVENT VELOCITY:	Not Available
SOURCE OF INFORMATION:	Not Available

☐ If this box is marked, Council advises that the property is in an inactive flow or backwater area.

DRAINAGE DEFICIENT AREAS

☐ If this box is marked, Council advises that the land is in a declared drainage deficient area as shown on Figure 8.27 Drainage Deficient Areas of the Sunshine Coast Planning Scheme (2014) Flood Overlay Code

☐ If this box is marked, Council advises that no record exists of this property previously satisfying drainage deficient area requirements of the Sunshine Coast Planning Scheme (2014) Flood Overlay Code or the relevant prior planning scheme(s). An attachment will be included with this search that provides detail on the filling and survey requirements that Council requires before a minimum floor level can be provided.

CLIMATE ASSUMPTIONS

The advice provided in this search is based upon standards relating to current and year 2100 climatic conditions and historically recorded flood events only. Year 2100 estimates include allowances for future climate conditions which specifically include increased rainfall intensity (20%) and higher mean sea level (0.8m).

Are you flood ready? Be Prepared with Council's award winning Disaster Hub.
http://disasters.sunshinecoast.qld.gov.au/

Review Flood Mapping that shows how flood hazard changes as events get larger.
Prepare your emergency plan and kit.
Keep up to date with emergency warnings and road closure information.

INTERPRETATION NOTES FOR THIS SEARCH

1. Minimum floor levels are provided for residential land uses only in accordance with the criteria for self-assessable development in the Sunshine Coast Planning Scheme, 2014, flood overlay code. For other types of development the flood overlay code of the planning scheme may assign a different event probability to the Defined Flood Event and specify different freeboard requirements. Refer to Table 8.2.7.3.3 of the flood overlay code. In such instances a development application should already be lodged and the Development Services staff assisting with this application will provide guidance on the determination of minimum floor levels.
2. This search has not been prepared with knowledge of the date of construction or approval for development. It is incumbent upon the applicant, or the agent representing the applicant, in a purchasing situation to determine the date of approval for development in order to ascertain which of the minimum floor levels provided on this search are appropriate.
3. The absence of Highest Historical Flood Level information does not imply that the above property is not subject to flooding, simply that Council has no record of this property flooding. Applicants are encouraged to make their own local enquiries.
4. Where a storm tide flood level is greater than the riverine flood level at the probability of the Defined Flood Event, then the Defined Flood Event is the Defined Storm Tide Event as reported on this search.
5. The MINIMUM FLOOR LEVEL as required by the Flood Overlay Code of the Sunshine Coast Council Planning Scheme, 2014, is calculated as whichever is greater of either:
   (a) 500mm freeboard added to the Defined Flood Event Level (Regional Riverine or Storm Tide) for the site; or
   (b) 300mm freeboard added to the Defined Flood Event Level (Drainage) for the site as per the Queensland Urban Drainage Manual; or
   (c) Where a Defined Flood Event is unavailable, 600mm freeboard added to the Highest Recorded Historical Flood Level appropriate to the site.
6. If the property is located within a declared Drainage Deficient Area the MINIMUM FLOOR LEVEL is returned as 'DDA Survey Required'. See Drainage Deficient Area requirements attachment for details.
7. An additional 300mm allowance for wave setup is added to the Defined Flood Event for properties located adjacent to Lake Weyba, in accordance with the Noosa River Flood Study
8. Applicants are advised that other property search services may specify a minimum floor level. In these circumstances applicants should adopt the higher of the minimum floor levels quoted.
9. All buildings shall conform to the relevant Planning Scheme Code in the Sunshine Coast Regional Council, 2014.
10. Please be aware of the natural topography in your area. Water runoff which exceeds the capacity of the underground drainage system (if present) and which concentrates in surface depressions and gullies as it flows down a catchment can cause localised overland flow flooding and may not be identified in this search.
11. Council advises that if there are openings to basements these openings require a minimum level at least equal to the minimum floor level.
12. The levels and velocities provided on this search are derived from information relating to the flood hazard area that is deemed most current and reliable at the time of search provision. This information may supersede flood information contained on the Sunshine Coast Regional Council Planning Scheme flood overlay (2014) which requires planning scheme amendment to maintain currency.

DISCLAIMERS

Flood information provided by Council represents the best information available to Council. It should only be used as a guide to the extent of flooding on the property. This information may be inaccurate or incomplete and it is recommended that purchasers make their own local enquiries with regard to the flooding and drainage history of the site.

The flood level information supplied does not represent the highest possible flood level that could occur on this property. Statistics indicate that a flood of equivalent or greater magnitude than the defined flood event is possible and has a 1% chance of occurring in any given year and similarly a 50% chance of occurring within 70 years.

The absence of flood information does not imply that the property is not subject to flooding, simply that Council has no information for this property flooding.

If the property has a history of flooding or drainage problems, Council recommends you seek professional advice on this matter.

GLOSSARY OF TERMS

Term	Definition
Applicant	The individual(s) requesting a flood search to be completed for a specified property.
Registered Owners	The individual(s) that are registered by Council as owning the property for which a flood search is requested.
AHD	The Australian Height Datum (AHD) is the reference level for defining reduced levels adopted by the National Mapping Council of Australia. The level of 0.0 m AHD is approximately mean sea level.
Defined Flood Event Level	A water level derived through mathematical modelling of the Defined Flood Event.
Defined Flood Event	Terminology consistent with Single State Planning Policy (SPP, 2013) which states "Defined Flood Event is the flood event adopted by a local government for the management of development in a particular area". This may also be the defined storm tide event where the flood level of the storm tide exceeds the flood level of the freshwater flood event (at the AEP of the defined flood event).
Source of Information	Is a reference to the document summarising the results of the anticipated flooding relevant to this location.
Highest Recorded Flood Level	The highest relevant flood water level from all historic events for which Council has records.
Location Description of Highest Recorded Event	A description of the site where the Highest Historical Flood Level was recorded.
Date of Highest Recorded Event	The date on which the Highest Historical Flood Level occurred.
Minimum Floor Level	The minimum floor level calculated in accordance with the planning scheme flood overlay through the addition of the relevant freeboard to the Defined Flood Event Level or the Highest Recorded Historical Flood Level. The minimum floor level on this search relates to a flooding requirement. In some instance town planning notation may also specify a minimum floor level. The applicant should ensure that a town planning notation search is also undertaken. The minimum floor level is the higher of the level provided on this search and a minimum floor level from a town planning notation.
AEP	Annual Exceedance Probability. The 1% AEP has a 1% chance of exceedance in any year.
Rainfall Intensity	The amount of rainfall occurring in a unit of time, usually expressed in millimetres/hour.
Mean Sea Level	A tidal datum; the arithmetic mean of hourly heights of the sea at the tidal station observed over a period of time (preferably 19 years). Source: BOM This is approximately 0.0 m AHD
Storm Tide	The elevation of water generated by a severe weather event such as an east coast low pressure system or tropical cyclone above the normal astronomical tide.
Tropical Cyclone	A tropical cyclone is a low-pressure system which develops in the tropics and is sufficiently intense to produce sustained winds of at least 63 km/h or greater and gusts in excess of 90 km/h near the centre.
Freeboard	A factor of safety usually expressed as a height above the adopted Defined Flood Level. A freeboard tends to compensate for factors such as wave action and historical and modelling uncertainties.
Inactive flow or backwater area	The national flood standards definition defines inactive or backwater areas as areas where the maximum flow velocity is not greater than 1.5m/s.
Flood Hazard Area	An area, whether or not mapped, designated by a local government as a natural hazard area (flood) in the Building Regulation 2006, section 13.
Drainage Flood	This flood type has a flood level derived from a stormwater drainage study with rainfall as the source of flooding. This is normally a local area study that incorporates elements of the stormwater network in the assessment. These studies can provide flood levels associated with overland flow beyond the flood extent shown derived from a Riverine\Creek flood study
Regional/Riverine	This flood type has a flood level derived from a Regional (Riverine or Creek) flood study with rainfall as the source of flooding. As these studies are for larger areas they only consider surface flows and not the sub surface drainage network. Often flows will be input into the flood model at 'source points' and thus overland flows are not represented for the whole catchment area.
Storm Tide Flood	This flood type has a flood level derived from a Storm Tide flood study with the ocean condition as the source of flooding.